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DEPARTMENT OF TRANSPORTATION ★ UNITED STATES OF AMERICA ★

Autumn 1976
Volume 3 Number 2

Covering RRIS accessions between
February 1976 and July 1976

U.S. DEPARTMENT OF TRANSPORTATION
Federal Railroad Administration

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Transportation Research Board

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16. Abstract

This publication contains 1,492 abstracts of journal articles and research reports and descriptions of computer programs and magnetic data tapes. It also has 563 summaries of ongoing research activities in the railroad field. The material, selected from current railroad literature and other contemporary sources, covers the entire range of railroading from technology to operations, management, economics and government involvement. Literature sources are worldwide. The material is arranged according to the RRIS classification scheme in two separate sections, one for the abstracts and descriptions and the other for ongoing project summaries. This publication supplements material in the seven prior Railroad Research Bulletins which should be retained for a complete file of RRIS data.

This publication is available on a regular subscription basis from Railroad Research Information Service, Transportation Research Board, 2101 Constitution Avenue N.W., Washington, D.C. 20418. Batch-mode computerized file searches are available directly from RRIS.

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RAILROAD RESEARCH BULLETIN

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RAILROAD RESEARCH BULLETIN

Autumn 1976
Volume 3 Number 2
Publication 7602

This Bulletin, containing 1492 abstracts of journal articles, research reports, computer programs, and magnetic tape data sets and 563 summaries of ongoing research activities in the railroad field, covers material accessioned by the Railroad Research Information Service between February 1976 and July 1976. Publication and RRIS operation within the Transportation Research Board are made possible by financial support provided by the Federal Railroad Administration of the U.S. Department of Transportation.

Each Bulletin contains new information and is not cumulative. Previous editions should be retained to ensure that the user has a complete record of the RRIS accessions.

RAILROAD RESEARCH INFORMATION SERVICE
TRANSPORTATION RESEARCH BOARD
Commission on Sociotechnical Systems • National Research Council
National Academy of Sciences

Railroad Research Information Service

The Railroad Research Information Service (RRIS) was developed within the National Research Council under contract to the Federal Railroad Administration of the U.S. Department of Transportation.

The RRIS computerized data system incorporates information on the planning, building, managing, operation, and regulation of rail transportation systems. A primary objective is to acquire and select information that will be timely and useful.

The scope of RRIS includes rail rapid transit. All items in the RRIS file are classified according to the basic system, and there is no separate classification for transit material. Items pertaining to rail transit can be identified under the term "Rapid Transit" in the Subject Term Index, where the document record numbers for such items are given.

Three types of data are stored in the RRIS system—abstracts of articles and reports that are within the RRIS scope, descriptions of computer programs and data sets, and summaries of ongoing and recently completed research projects.

Information concerning previous RRIS publications may be found in the RRIS Cumulative Subject Index 1973-1975, which is available from the Railroad Research Information Service along with certain editions of the Bulletin. All RRIS publications are available from the National Technical Information Service at somewhat higher prices. In addition to acquisition and selection, RRIS work includes the classification, indexing, storage, retrieval, and dissemination of abstracts and summaries. Concepts and procedures are similar to those of the other transportation research information services within the National Research Council—the Highway Research Information Service (HRIS) and the Maritime Research Information Service (MRIS).

The Railroad Research Bulletin, published semiannually, contains material added to the RRIS file during the preceding 6 months. Previous editions should be retained. Although RRIS publications are not themselves copyrighted, many of the abstracts in them are and are used with the permission of the copyright holder. In the Railroad Research Bulletin, any abstract followed by "Acknowledgment" should be considered as possibly subject to copyright, and anyone wishing to reproduce abstracts from RRIS publications should secure permission from the holder of the copyright.

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Contents

Using the Railroad Research Bulletin

This volume is divided into 3 major sections: abstracts of documents; summaries of ongoing research; and indexes by subject, author, and source.

If you are interested in reviewing reports of completed research and other published documents, turn to the section, Abstracts of Reports and Journal Articles. The material in this section is arranged by RRIS subject areas. The subject area and the subject area number are listed in the Table of Contents and appear at the top of each page.

If you are interested in ongoing research projects, turn to the section, Ongoing Research Summaries. These summaries are also arranged by subject areas, which with the subject area number appear at the top of each page. An A after the subject area number identifies ongoing research project summaries.

If you can identify your interest by subject, turn to the Subject Term Index. Each term in this index is followed by the document record number, which consists of the 2-digit subject area number and the 6-digit TRIS accession number that identifies the individual document under that subject area. An A after subject area numbers indicates that the item is a summary of ongoing research. The items are arranged in order of ascending accession numbers within each subject area.

If you are looking for abstracts of articles or reports written by a particular author or summaries of projects being conducted by a particular investigator, turn to the Author and Investigator Index and look for the individual's last name in the alphabetized listing. Again the document record number is used to find the item in the abstract or summary section.

If you are interested in abstracts of articles or reports that appeared in a particular publication or were the work of a specific publisher or if you are interested in summaries of research projects being conducted by a specific organization, turn to the Source Index. Again, use the document record number to find the item in the abstract or summary section.

Although the Subject Term Index gives a general idea of the scope of the RRIS classification system, information is available on many other terms that do not appear in this edition.

Abbreviations

AAR*	Association of American Railroads
AIAA*	American Institute of Aeronautics and Astronautics
AREA*	American Railway Engineering Association
ASCE*	American Society of Civil Engineers
ASME*	American Society of Mechanical Engineers
CIGGT*	Canadian Institute of Guided Ground Transport
CNR	Canadian National Railways HQ Library
DOT*	U.S. Department of Transportation
DOTL	U.S. Department of Transportation Library, Washington, D.C.
ECMT*	European Conference of Ministers of Transport
EI	Engineering Index
ESL*	Engineering Societies Library
Fig	Figures
FRA*	Federal Railroad Administration
FY	Fiscal year
GPO*	U.S. Government Printing Office
IEEE*	Institute of Electrical and Electronics Engineers
IPC*	IPC Transport Press Ltd.
IRCA	International Railway Congress Association
IRF	International Road Federation
IRRD	International Road Research Documentation
JC	Journal Collection (DOTL)
NAE*	National Academy of Engineering
NAS*	National Academy of Sciences
NRC*	National Research Council
NTIS*	National Technical Information Service
OECD*	Organization for Economic Cooperation and Development
ORE*	Office for Research and Experiments, UIC
OST*	Office of the Secretary of Transportation
PB	Prefix identifying an NTIS accession number
Phot	Photographs
Ref	References
Repr PC	Paper copy of original document
RP	RRIS Repository (DOTL)
RPI*	Railway Progress Institute
Rpt	Report
RTAC*	Roads and Transportation Association of Canada
SAE*	Society of Automotive Engineers
Shaw	Shaw Publishing Company Ltd.
SNAME*	Society of Naval Architects and Marine Engineers
Tab	Tables
TRB*	Transportation Research Board
TRRL*	Transport and Road Research Laboratory
TSC	Transportation Systems Center
UIC*	International Union of Railways
UITP*	International Union of Public Transport
UMTA*	Urban Mass Transportation Administration
XUM*	Xerox University Microfilms

*See page vii for availability of papers and research reports.

Availability of Research Reports and Journal Articles

An availability statement is included with most abstracts. Addresses for ordering documents are given with the abstracts or with the publisher listing in the Source Index. Copies of reports and articles listed in this publication are not available from the Railroad Research Information Service. When ordering from any source, give full information on the item wanted. When ordering from the National Technical Information Service, be sure to give the NTIS accession number as well as the title and other information. When no availability is specified with an abstract, consult an established transportation library. A loan service for publications and a photocopy service for articles and papers are available at two TRISNET Centers as explained on page ix. Because a large number of documents are available from a few sources, space and printing costs have been reduced by abbreviating sources as follows:

AAR
Association of American Railroads
1920 L Street, N.W.
Washington, D.C. 20036

AIAA
American Institute of Aeronautics and Astronautics
Technical Information Service
750 Third Avenue
New York, New York 10017

AREA
American Railway Engineering Association
59 East Van Buren Street
Chicago, Illinois 60605

ASCE
American Society of Civil Engineers
345 East Forty-seventh Street
New York, New York 10017

ASME
American Society of Mechanical Engineers
345 East Forty-seventh Street
New York, New York 10017

CIGGT
Canadian Institute of Guided Ground Transport
Queen's University
Kingston, Ontario K7L 3N6
Canada

DOT
U.S. Department of Transportation
Nassif Building
400 Seventh Street, S.W.
Washington, D.C. 20590

ECMT
All documents available through OECD (see below)

ESL
Engineering Societies Library
345 East Forty-seventh Street
New York, New York 10017

FRA
Federal Railroad Administration
Transpoint Building
2100 Second Street, S.W.
Washington, D.C. 20590

GPO
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

IEEE
Institute of Electrical and Electronics Engineers
345 East Forty-seventh Street
New York, New York 10017

IPC
IPC (America), Inc.
205 East Forty-second Street
New York, New York 10017

NAE/NAS/NRC
National Academy of Sciences
Publication Sales
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

NTIS
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

OECD
OECD Publications Center
Room 1207
1750 Pennsylvania Avenue, N.W.
Washington, D.C. 20006

ORE
See UIC/ORE below.

OST
Office of the Secretary
U.S. Department of Transportation
400 Seventh Street, S.W.
Washington, D.C. 20590

RPI
Railway Progress Institute
801 North Fairfax Street
Alexandria, Virginia 22314

RTAC
Roads and Transportation Association of Canada
875 Carling Avenue
Ottawa, Ontario K1S 5A4
Canada

SAE
Society of Automotive Engineers
400 Commonwealth Drive
Warrendale, Pennsylvania 15096

SNAME
Society of Naval Architects and Marine Engineers
74 Trinity Place
New York, New York 10006

TRB
Transportation Research Board
Publications Office
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

TRRL
Transport and Road Research Laboratory
Crowthorne, Berkshire RG11 6AU
England

UIC
International Union of Railways, BD
14-16 Rue Jean-Rey
75015 Paris
France

UIC/ORE
For technical reports identified by a report number such as B125/RP3/E (note restrictions below):
International Union of Railways
Office for Research and Experiments
Oudenoord 60
Utrecht, Netherlands

UITP
International Union of Public Transport
Avenue de l'Uruguay 19
B-1050, Brussels
Belgium

UMTA
Urban Mass Transportation Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

XUM
Xerox University Microfilms
300 North Zeeb Road
Ann Arbor, Michigan 48106

Restricted Availability of UIC/ORE Documents

Certain publications of the International Union of Railways (UIC) that are cited in the holdings of the Railroad Research Information Service are subject to restrictions on use. These apply particularly to the reports of the UIC Office for Research and Experiments (ORE).

The president of ORE indicates those reports that can be made available to third parties (industrial firms, individuals, universities, and technical colleges). For each report a price per copy and a separate fee for the right-of-use are established.

Members of ORE—certain railroad administrations that are members of UIC and, in the United States, the Federal Railroad Administration of the U.S. Department of Transportation—receive the ORE reports and possess, by virtue of their membership, the right to use these reports. Possession by virtue of ORE membership or the acquisition of a right-of-use covering a specific report only authorizes the holder of the information in the report to use such data for his or her own needs. This right-of-use is nontransferable. Possession of right-of-use does not authorize the holder to communicate, even in part, the contents of such a report to third parties who have not also acquired a right-of-use. An exception may be made, with special ORE authorization, for use by contractors of those organizations that have the right-of-use. Patent rights and design rights associated with solutions developed by ORE research and disclosed in reports are not acquired automatically when right-of-use is acquired. Such rights must be arranged separately between the report user and the owners of the patent or design.

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Those wishing to acquire the information in ORE reports that are referenced in the RRIS system should contact the Director, International Union of Railways, Office for Research and Experiments, Oudenoord 60, Utrecht, Netherlands. The report should be carefully identified, and the use to which the information is to be put should be completely explained. ORE will then indicate whether the report is available to third parties and specify the charges involved. The collections of ORE reports held in the United States by the Federal Railroad Administration are not available to third parties, except when they serve as contractors to that agency or other U.S. Department of Transportation elements. In such cases, the request for use must be directed to ORE through the Technical Planning Officer, RRD-1, Federal Railroad Administration, Washington, D.C. 20590.

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The Northwestern University Transportation Center Library and the University of California Institute of Transportation Studies Library are functioning as TRISNET Centers in the operation of a prototype decoument delivery system under contract to the U.S. Department of Transportation. The publications in this volume may be requested from either of these Document Delivery Centers.

The objective of the TRISNET Centers is to provide the documents identified through search of the Transportation Research Information Service (TRIS) abstracting and indexing services (RRIS and the Air, Highway, and Maritime Transportation Research Information Services).

In referring your requests for publications to either of these libraries, please cite the following:

Accession number
Author
Article title
Publisher or journal title
Date of publication

The request may be for either loan of the publication for a period of 2 weeks plus estimated mailing time (Northwestern accepts a user's request directly, but University of California requires submission of an interlibrary loan request) or for photocopies of articles or conference papers. If the document is unavailable at the library, referral to the best available source will be made.

Loan services are free when publications are mailed at the book rate. If the user requires priority mailing, the library will charge for mailing costs. Photocopies of articles or individual conference papers are made at the rate of 10 cents per page plus a handling charge of 50 cents per item. In all cases, invoices are mailed with the loan or photocopy.

The TRISNET Center at either library may be contacted as follows:

Transportation Center Library
Northwestern University
Evanston, IL 60201
312-492-5273
TWX 910-231-0872

Institute of Transportation Studies Library
University of California
412 McLaughlin Hall
Berkeley, CA 94720
415-642-3604

RRIS File Searches

The RRIS file is maintained on magnetic computer tape and is available for searches for information related to specific inquiries. The key to searching is RRIS categories and appropriate subject terms. The search is normally done by computer. Output may include abstracts of articles and reports, descriptions of computer programs, and summaries of ongoing research. The output is a computer-printed listing similar in format to listings that appear in this publication.

The fee schedule for RRIS file searches reflects the primary support for the service from the Federal Railroad Administration and the nonprofit nature of all National Research Council information services. The charge for computer retrieval from the RRIS file is $50 per request plus $0.25 per printout page, which is screened by RRIS. A written authorization or purchase order is required before the retrieval is made.

Sample Abstracts

Abstracts are classified according to an 8-digit document record number: The first 2-digits indicate the RRIS subject area number and the last 6 digits indicate the TRIS accession number, which is a unique number assigned to each document. The subject area number and the subject area appear at the tops of the pages in the abstract and summary sections. The document record number appears at the top of each abstract. Abstracts within each subject area are listed in ascending order of the accession numbers, although these usually will not be consecutive. Examples of a report abstract and of a journal article abstract appear below.

ABSTRACT OF A RESEARCH REPORT

Document Record Number
TRIS Accession Number
Subject Area Code

02 128640

Title — **TEST TRAIN PROGRAM SIXTH PROGRESS REPORT**

Research Report Abstract — This report describes the progress of the Rail Research Program involving operation of the FRA test cars and the performance of other rail research efforts during the period 1 July 1973 to 30 June 1974. Highlights of the work reported include operation of the FRA test cars to perform track surveys and other rail research activities; test car upgrading; expansion of the Rail Research Program; and data management and data analysis tasks which have been undertaken to benefit railroad technology. The Rail Research Program primarily involves the operation and instrumentation of the FRA test cars. This research program is designed to provide high-speed measurement of railroad track characteristics, development of comprehensive track measurement techniques, development of special testing instrumentation, and data evaluation through analysis and electronic processing.

Supplementary Notes — Sponsorship was from FRA, DOT.

Authors, Publication Data, Document Data — Peterson, C Kaufman, WM Yang, TL Corbin, JC
ENSCO, Incorporated, (DOT-FR-74-19) Prog Rpt. FRA-ORD&D-75-25, June 1974, 124 pp, 36 Fig.

Activity Data — Contract DOT-FR-20032

Source of Abstract — ACKNOWLEDGMENT: FRA

Availability — PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-247084/AS, DOTL NTIS

NTIS Accession Number

Washington, D.C., availability with RP, JC, or call number

ABSTRACT OF A JOURNAL ARTICLE

Document Record Number
TRIS Accession Number
Subject Area Code

01 131315

Title — **INVESTIGATION INTO CAUSES OF RAIL CORRUGATIONS**

Journal Article Abstract — Heavy traffic density and high-capacity cars increased wear and abrasion or curves which CP Rail countered with lubricators that cut flange abrasion but produced rail corrugation with a wavelength of 8 to 28 inches on the low rail. Plastic flow or rail head metal combined with surface fatigue are predominately responsible for rail corrugation. Recommendations for overcoming the problem includes improved wheel rail contact geometry through elimination of wide gauge, elimination of false flanges on wheels, reduction of railhead curvature and modification of the AAR wheel profile; cutting of lateral frictional force by use of self-steering trucks; changes in rail metallurgy to increase resistance to surface fatigue and plastic flow, reduction of dynamic loadings and improved flange lubrication techniques.

Author, Publication Data, Document Data — Kalousek, J Klein, R *AREA Bulletin* Vol. 77 Bulletin, Jan. 1976, pp 429-48, 15 Fig., 2 Tab., 7 Ref.

Source of Abstract — ACKNOWLEDGMENT: AREA Bulletin

Availability — PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

Washington, D.C., availability with RP, JC, or call number

Sample Summary of Ongoing Research

The summaries of ongoing research describe research activities currently in progress or recently completed. Each summary indicates who is performing the project, who is funding it, and how the research goal is to be attained. A summary is not a document surrogate; that is, there may not be a full report published on the project. The summaries are in the format shown below, although each one may not contain all the elements given in this sample. The document record numbers and the order listing are the same for both summaries and abstracts.

Document Record Number TRIS Accession Number RRIS Subject Area Number	02 058303
Project Title	**FREIGHT CAR TRUCK DESIGN OPTIMIZATION**
Project Summary	The Truck Design Optimization Project (TDOP) is a multiyear project intended to evaluate performance characteristics of existing railroad freight car trucks; determine through cost-benefit analysis the feasibility of improving truck performance by mechanical modification of existing type trucks or through introduction of new truck designs that respect carbody/-suspension system interfaces or are otherwise compatible with existing freight train systems; provide performance and testing specifications for use in the development of freight car suspension systems, and study concepts of integrated carbody support systems and advanced designs in anticipation of future railroad requirements.
Agency Performing the Work	PERFORMING AGENCY: Southern Pacific Transportation Company
Project Investigators	INVESTIGATOR: Byrne, R (Tel 415-362-1212X-22547)
Project Sponsors	SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
Contract Monitor	RESPONSIBLE INDIVIDUAL: Fay, GR (Tel 202-426-0855)
Project Data	*Contract* DOT-FR-40023 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1978 TOTAL FUNDS: $2,000,000
Source of this summary	ACKNOWLEDGMENT: FRA

Abstracts of Reports and Journal Articles

00 052829
DETERMINATION OF DYNAMIC FORCES IN BRIDGES
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Prog. Rpt. D23/CR1/E, Mar. 1955, 36 pp, Figs., 7 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052830
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. REPORT ON THE PRELIMINARY TEST ON THE RHONE BRIDGE OF THE CFF AT RIDDES
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 1/E, June 1957, 23 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052831
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. DIRECTIVES FOR THE CARRYING OUT OF TESTS ON BRIDGES FOR THE DETERMINATION OF DYNAMIC FORCES
The individual arrangements for the tests bridges should be incorporated in the general test programme. Only single span rectangular bridges of classical construction are to be chosen, in front of and behind which, there are not track elevations at a distance as large as possible, but at least equal to 20 m. The track on the bridge and its approaches must be well maintained; there should not be any rail joints on the structure. The arrangement of the rails on the bridge should not give rise to any appreciable interference in the interaction of vehicle and track; rail joints within at least 2 m from the extremities of the bridge should be avoided as well as the laying of sleepers directly onto the masonry abutments, since they present hard points. If these conditions can only be fulfilled at one side of the bridge, then only test runs from this side should be considered for the tests. The Specialists Committee is of the opinion that the influence of rail joints does not require a special investigation. As a matter of fact, these rail joints can often be eliminated on concrete bridges and nearly always on steel bridges. Moreover, it can be assumed that the impacts caused by the rail joints do not exceed those produced by the wheel flats. Railway Administrations, carrying out bridge tests on their lines outside the scope of the ORE-programme, are also recommended to carry out measurements of dynamic strains whenever possible in accordance with the present directives, and to submit the results to the ORE-Bureau.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 2/E, Mar. 1959, 34 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052832
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. TESTS OF THE A1 SERIES. SINGLE TRACK BRIDGES WITH SOLID WEB MAIN GIRDERS AND UPPER TRACK
The dynamic forces were measured on 4 single track metal bridges of the solid web main girder type, span comprised between 5.60 and 29.90 m, under various test trains; each girder was situated directly under a rail. The measuring results were laid down in tables and diagrams established as a function of certain factors of which the influence should be separately studied. The increment of the dynamic forces as a function of the speed was rather obvious. However, certain locomotives showed increment peaks at the intermediate speeds. Contrary to this, the dynamic forces were decreased when the span was increased. It also became apparent that these forces were not proportional to the static stress. The effect produced by wheelflats under the wagons was also examined. The dynamic increment resulting from the passing of a wheelflat was produced at a moderate speed. The report only supplies the rough measuring results, pending the evaluation of the tests carried out on other types of bridges. Subsequently, the possibility of establishing a formula covering the various cases will be examined.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 4/E, Oct. 1961, 16 pp, 17 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052833
DETERMINATION OF DYNAMIC FORCES IN BRIDGES, STEEL LATTICE BRIDGES WITH SINGLE TRACKS THROUGH TYPE, TRACK LAID ON SPRINGER, WITHOUT BALLAST
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 5/E, Mar. 1962, 18 pp, 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052834
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. PRELIMINARY TESTS ON A REDUCED SCALE MODEL
The measurements on existing railway bridges made up to the present by the Specialists Committee have shown that it is difficult to derive laws of general application from these tests. Individual parameters of available bridges cannot be modified without influencing the other properties. It was therefore suggested that similar tests should be made on reduced scale models, on which each parameter can be altered independently to within wide limits. For the solution of static problems tests on reduced scale models have proved their value for years. In order to provide the possibility for dynamic measurements, several questions had still to be solved. For this reason a preliminary test was made, a description of which is supplied in this report. The first part also contains theoretical data, from which the time scale and the speed were determined. It seems that there may be a dynamic similarity when both the reduced scale model and the actual bridge perform the same

number of vibrations during the passing of a vehicle. The tests were made on a bridge model of plexiglas with a span of 1.20 m. A two-axled vehicle which could pass over the model at various speeds by means of two runways served as moving load. The weight of the vehicle could be varied and amounted to 5.0 kg, 8.1 kg and 11.1 kg respectively. Wherever possible, the tests were made in accordance with the directives of the D23 Specialists Committee in charge of railway bridges. The results of the various test series were represented in diagrams according to various points of view. They concerned test runs at identical initial conditions and test runs with different vehicle weights and ballast of the model. On the basis of these preliminary tests it may be concluded that the dynamic effects can be studied from reduced scale models. In order to obtain a confirmation of the conditions of similarity some supplementary tests are required. It is suggested that further tests should be planned, during which comparative measurements on an existing bridge, on a reduced scale model corresponding to a real structure and mathematical investigations of the same bridge are to be made.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 6/E, Mar. 1962, 22 pp, 9 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052835
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. SINGLE TRACK BRIDGES WITH TWIN GIRDERS (A 7 SERIES)

Stress measurements during the passing of test trains running at various speed stages were conducted on three metal single track twin girder bridges, the spans of which ranged between 5 and 15 m. In accordance with the rules defined by the D 23 Specialists Committee and approved by the ORE Control Committee, an attempt was made at determining the relations between the stress increases in connection with the static stresses under the test trains. Generally speaking, the stress increases produced by test trains without wheelflats remain smaller than 100 kg/cm squared, their maximum values do not attain 20 kg/cm squared even at those measuring points considered to be the most unfavorable ones. The sensitivity of short bridges to the effects produced by wheelflats has once more been underlined, as the dynamic increments attain, on a bridge with a span of 5.55 m length, a maximum value of nearly 300 kg/cm squared. The interpretation of the results obtained under a test train without wheelflats does not show any dependence on static stress or span length, while an increase of the speed is generally accompanied by an attendant and rather regular stress increase. This relation is only partly confirmed under the effects produced by wheelflats, which, as stated above, emphasises however the influence of the span.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 7/E, Apr. 1963, 10 pp, 15 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052836
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. PROVISIONAL PROPOSALS FOR THE DETERMINATION OF THE DYNAMIC FORCES IN THE METALLIC BRIDGES

The results of the measurements of stresses produced by the passing of test trains at various speed stages over 17 metal single track bridges and spans ranging between 2.85 and 60.30 m have enabled the D 23 Specialists Committee to propose a formula for dynamic stress calculation. The hyperbolic enveloping curve proposed has it field of application limited to spans exceeding 4.00 m. It should however be remembered that this curve concerns results obtained at speeds below 150 km/h and a range of static stresses limited to values not exceeding 832 kg/cm squared.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D23/RP 8/E, Apr. 1963, 8 pp, 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052837
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. SINGLE TRACK PRESTRESSED CONCRETE BRIDGES

Tests in order to determine the dynamic forces were conducted on 6 reinforced concrete bridges; the spans varied between 7.60 and 37 m; some tracks were laid on ballast, others on rubber plates. The report contains the main results of these tests at speeds under 150 km/h. With the electric and diesel-electric locomotives, the values of the specific dynamic deformations were lower than 16 x 10 to the minus 6th power, whilst for the steam locomotives provoking the most harmful effects, maximum values of 35 x 10 to the minus 6th power were attained.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 9/E, Oct. 1964, 12 pp, 6 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052838
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. SLAB BRIDGES OF REINFORCED CONCRETE AND BUILT-IN BEAMS. TEXT AND APPENDICES

Tests in order to determine the dynamic forces were conducted on 4 reinforced concrete bridges and 3 bridges with built-in beams; the spans varied between 4.07 and 17.20 m; the track was exclusively laid on ballast. The report contains the main results of these tests at speeds under 150 km/h. With the electric and diesel-electric locomotives, the values of the specific dynamic deformations did not exceed 32 x 10 to the minus 6th power on the slab bridge of 4.07 m span. These values decrease with the span. With the steam locomotives, the specific dynamic deformations did not exceed 109 x 10 to the minus 6th power in the case of a bridge of 4.70 m span, whilst values under 20 x 10 to the minus 6th power were obtained in the case of structures with larger spans.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 10/E, Oct. 1964, 13 pp, App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052840
DETERMINATION OF DYNAMIC FORCES IN BRIDGES. RAIL BEARERS AND CROSS-GIRDERS. TEXT AND APPENDICES

During the presentation of the Programme of Work at the 47th meeting of the ORE Control Committee held in Utrecht in October 1963, the D 23 Specialists Committee had envisaged preparing an Interim Report dealing with the study of rail bearers and cross girders. This work is described in this report. A detailed description of the bridges belonging to the a Sub 3 and a Sub 6 series used for the tests and also that of the test trains has been given in Interim Reports Nos. 3 and 5 of the D 23 Specialists Committee. This Interim Report does not give any formula for the dynamic increment as a function of the span, the speed or the stress due to the static live load. The results of the tests described in this report have subsequently been used as a basis for the part "Rail bearers and cross girders" in Interim Report No. 12: "Presentation of the results obtained from steel bridges".

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt D23/RP 11/E, May 1966, 15 pp, Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052842

DETERMINATION OF DYNAMIC FORCES IN BRIDGES. PRESENTATION OF THE RESULTS OBTAINED ON METAL BRIDGES

In Interim Report No. 8 of the D 23 Speialists Committee the test results obtained from metal bridges were represented by a formula expressing the dynamic force as a function of the span only. In this formula, neither the stress due to the static live load, nor the speed are taken into account. New tests have meanwhile been made, expecially on bridges with high values of stress. Other measurements on rail- bearers and cross-girders of a certain number of bridges were made and are given in Interim Report No. 11. The study of all these values has allowed the D 23 Specialists Committee to propose new formulae, taking into account the three variables span, stress and speed. These proposals are the subject of this Interim Report, which is a continuation of Interim Report No. 8. The field of application of the formulae is strictly limited to the field studied during the tests, and these restrictions are indicated together with the formulae in the conclusion of this report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. D23/RP 12/E, June 1966, 18 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052844

DETERMINATION OF DYNAMIC FORCES IN BRIDGES. TESTS ON THE REDUCED SCALE MODEL AND COMPARISON WITH THE RESULTS OBTAINED ON THE OERLIKON BRIDGE. TEXT AND APPENDICES

The report gives the results of studies on a model simulating the existing Oerlikon bridge. This bridge formed the subject of tests described in Report No. 9 "Single track pre-stressed concrete bridges". The first part of the present report contains a detailed description of the model bridge and model vehicles used and defines the programme of tests. After recalling the law of similarity for speed by means of which the tests on the reduced scale model can be compared with the tests on the actual bridge, Specialists Committee D 23 gives the results of the study undertaken, namely: an analysis of the oscillations, an analysis of the influence of the different parameters on the dynamic effects, with representation of the measured results by means of regression curves, and an overall representation of the results of the measurements on the model, obtained by statistical calculations in the form of multiple linear regressions. The report next gives a summary of the results of the tests on the Oerlikon bridge and also a comparison of the results obtained on model 18 with those obtained on the Oerlikon bridge. It seems that the dynamic effects recorded on the model correspond satisfactorily to those observed on the real bridge simulated by the model.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D23/RP 13/E, Nov. 1967, 54 pp, Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052845

DETERMINATION OF DYNAMIC FORCES IN BRIDGES. TESTS FOR THE COMPARISON OF BRIDGES OF DIFFERENT TYPES (STEEL BRIDGES AND COMPOSITE STEEL-CONCRETE BRIDGES

The D 23 Specialist Committee has published a number of Interim Reports which contain the results of tests conducted on different conventional types of bridge. In accordance with the code of practice ('Directives') set out in RP 2, the bridges included in these series were single-span structures of conventional design. This did not, however, give any information on the dynamic effects on skew bridges or bridges of special type, of which large numbers exist in the different countries. The D 23 Specialist Committee's programme of work also provides for series of tests to be conducted on some of these bridges. A detailed report on each bridge tested was made for the bridges of the usual type, although not published by ORE. However, a report was prepared for each series of bridges giving the test results, which was published as an ORE report. Detailed reports were also compiled on the tests made on bridges of special type and on skew bridges, but these were not published by ORE. The objects of this report are to: summarise, chiefly in the form of diagrams, the results of the tests made on bridges of a special type and on skew bridges, and compare the dynamic effects recorded on these bridges with those recorded on similar bridges of the more conventional type.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D23/RP 14/E, June 1967, 20 pp, 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052846

DETERMINATION OF DYNAMIC FORCES IN BRIDGES. STATISTICAL INVESTIGATION OF THE DYNAMIC EFFECTS MEASURED ON BRIDGES

This report gives the results of a statistical investigation of the dynamic effects recorded on bridges during tests carried out by the D 23 Committee, and during several high speed tests on the Administrations. The first part of the report gives a general description of the methods used and describes the successive stages of the study. The statistical investigation relates only to the dynamic effects due to locomotives without hammer-blow (i.e. electric or diesel locomotive). This has resulted in a number of regressions characterising the absolute or relative dynamic effects. The final regressions obtained for the prestressed concrete and the steel bridges are practically identical. They express the relative dynamic effect as a function of the vibratory behaviour of the bridge. The final regression obtained for the rail-bearers and cross-girders is expressed only as a function of the parameter having the greatest influence on the dynamic effect, namely, the running speed.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D23/RP 15/E, Apr. 1970, 45 pp, 10 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052848

DETERMINATION OF DYNAMIC FORCES IN BRIDGES. GENERAL SURVEY OF THE WORK OF THE D 23 COMMITTEE AND PREPARATION OF GENERAL FORMULAE FOR CALCULATING THE DYNAMIC EFFECT

This report gives a general survey of the work carried out by ORE Specialists Committee D 23, charged with the study of the dynamic effects occurring in bridges. The studies included: a series of tests on bridges of different types; a series of measurements on a reduced-scale model of an actual bridge; a statistical analysis of the results of the measurements; a theoretical study of the dynamic effects and detailed calculations covering certain typical cases selected from among those tested. After enumerating the main results obtained, a comparison is made between the experimental and theoretical results. This study has resulted in proposals concerning the formulae to be used for calculating the dynamic effect in bridge-calculations. The dynamic effect, given in the form of a multiplication coefficient of the static stress due to live-loads, is expressed as a function of a factor including the span of the bridge, the vehicle speed and the natural vibration frequency of the loaded bridge. Simplification of the formulae is possible, giving the dynamic effects as a function of the span only. Identical formulae are proposed for concrete bridges and for the main girders of steel bridges. Another formula, expressed as a function of the vehicle speed only, is proposed for the rail-bearers and cross-girders of steel bridges and for light-weight bridges of short span.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. D23/RP 17/E, Apr. 1970, 57 pp, 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

00 052877
BENDING TESTS OF STUCTURES CONSISTING OF TWO BEAMS WELDED AT RIGHT-ANGLES. STATIC TESTS
This report gives the results of static load tests on 2 types of connections between beams meeting at right-angles, one a sharp right-angled connection, Type A, and the other with rounded corners, Type B. The results of the tests are summarised in Table 2, page 10 and commented on in the specimens and the material from which they are made. Appendix 2 is the report of the laboratory, which gives details of the tests and the results obtained.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D86/RP 1/E, Oct. 1968, 12 pp, 23 Fig., 2 Tab., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

00 052878
BENDING TESTS OF STRUCTURES CONSISTING OF TWO BEAMS WELDED AT RIGHT ANGLES
This report summarises conclusions from previous static and fatigue tests on welded connections, and describes further such tests on connections modified in attempts to mitigate the weaknesses of the original two types, both by thickening the material and by stress relieving notches. Photo-elastic tests contributed to the latter study. Appendices give laboratory reports and notes on statistics.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. D86/RP 3/E, Apr. 1971, 15 pp, Figs., 5 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

00 052883
STATISTICAL DISTRIBUTION OF AXLE-LOADS AND STRESSES IN RAILWAY BRIDGES. THE INFLUENCE OF HIGH SPEED TRAINS ON STRESSES IN RAILWAY BRIDGES
This report presents a summary of measurements, made by different Administrations, of the dynamic coefficients of bridge components, over which test trains were run at high speed (v up to 250 km/h). The dynamic coefficients determined from these test results are compared with dynamic coefficients calculated from different mathematical models and the dynamic coefficients suggested by UIC. The conclusions give an evaluation of the different theoretical dynamic coefficient calculation methods.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D128/RP 3/E, Apr. 1975, 26 pp, 38 Fig., 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

00 052884
INVESTIGATION OF BRIDGE DECKS WITH CONCRETE ENCASED GIRDERS. STATIC TESTS ON EXPERIMENTAL BRIDGE DECK NO. 1
Tests are described on a small joist in concrete slab containing encased girders, representing, to reduced size, a type commonly used in bridges, and complying with the UIC recommendations. The test arrangements, applicable to slabs of varying design, are described in detail. The report contains a study of the permissible loads and the safety coefficients, both from the points of view of stiffness and the permissible stresses. It also includes suggestions for improving the loading capacity.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D127/RP 1/E, Apr. 1972, 54 pp, 41 Fig., 5 Tab., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

00 052885
INVESTIGATION OF BRIDGE DECKS WITH CONCRETE ENCASED GIRDERS. STATIC TESTS ON EXPERIMENTAL DECK NO. 6
The sixth experimental model deck differed from its forerunners as it consisted of five beams clamped by transverse pre-stressing. Steel was concentrated in the lowest position as in the fifth model. Frictional bonding and load distribution was studied with varying numbers of pre-stressing rods and various load positions, before testing to failure. Results are given corresponding with deflection limits and permissible steel stress.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D123/RP 4/E, Apr. 1975, 36 pp, 37 Fig., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

00 053103
BRAKING AND ACCELERATION FORCES ON BRIDGES. THEORETICAL STUDIES OF BRAKING AND ACCELERATION FORCES ON BRIDGES
The report contains three theoretical studies, explaining the static and dynamic action of braking and acceleration forces on railway bridges. Differential equations are furnished for bending and longitudinal loading of bridge girders; a simple dynamic model and a quite thorough quasi-static model are solved. Theory is compared with experiment. The effects of the most important parameters on the horizontal forces in rails and bridge bearings provoked by braking and acceleration forces are investigated.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D101/RP 6/E, Oct. 1974, 76 PP, 28 Fig., 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

00 053160
INVESTIGATION OF BRIDGE DECKS WITH CONCRETE ENCASED GIRDERS
This report concerns a model deck composed of three joists in concrete and identical to that described in RP 1. However, these tests included two million cycles of loading prior to static failure loading. Strains increased during the first part of repetitive loading but ultimate strength was not impaired.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D123/RP 6/E, Oct. 1975, 32 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

00 053168
INVESTIGATION OF BRIDGE DECKS WITH CONCRETE ENCASED GIRDERS. TWIN SPAN CONTINUOUS BRIDGE-DECK. TESTS UNDER DYNAMIC LOADS. PART A-TEST. PART B-TABLES AND FIGURES
During the first series of tests, described in this report, both spans were simultaneously subjected to 2,000 cycles of loading, corresponding to that encountered in service by the centre support. Resistance wire and vibrating wire strain-gauges for measuring deflections, cracks and local strains, had shown that the latter stabilized quite rapidly and that the concrete participated to some extent in tension zones.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D123/RP 5/E, Oct. 1975, 69 pp, 68 Fig., 9 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

00 072226
MODERN METHODS OF TUNNEL CONSTRUCTION [Les procedes modernes de construction des tunnels]
Reprint of program and papers of the conference on Tunnel Construction 1) Nice faces its expansion. Needs in transportation infrastructure, especially tunnels. 2) Possibilities and limitations of underground construction in Nice. 3) Conception and characteristics of the Cimiez tunnel in Nice. 4) Construction work on the Cimiez tunnel. 5) Planning the Autoroute A8 in the Department of the Maritime Alps. 6) Construction plan for tunnels on Rte A8. 7) Possible problems at the execution of underground cavities by the new Austrian tunnelling method (not reprinted here). 8) Interesting points in preliminary research. 9) Completion of tunnels on the A8. 10) Experimental sections of the City Center Tunnel (Tunnel Centre Ville) of Marseille. 11) Doubling the tunnel of Saint Cloud/Paris: a new tunnel parallel and close to the old one. 12) The Tunnel under the Channel: Calais-Dover. 13) Recent achievements in rapid transport by the R.A.T.P. (Paris). 14) Tunnels of the French alpine highways. 15) Use of modern methods in the construction of subterranean galleries of the E.D.F. [French]
Research Conference, Nice, October 1974.

Ministry of Construction, France 1974, 224 pp, Figs.

ACKNOWLEDGMENT: TSC
PURCHASE FROM: Ministry of Construction, France Paris, France
DOTL TGB8200.J68

00 084931
INSTRUMENTS TELL INSIDE STORY OF BRIDGE
A trough-shaped prestressed concrete railroad overpass is serving as a test for the California Department of Transportation which is investigating this method of bridge construction as compared with a comparable cellular box girder bridge. The railroad bridge cost 20% less to build than the conventional type and is now instrumented for measurement of static and dynamic effects. The $390,000 study, funded cooperatively by California DOT and FHWA, will compare theoretical design analyses with actual structural reactions. More than 500 gages and meters were incorporated as the bridge was built.

Engineering News-Record Vol. 193 No. 14, Sept. 1974, p 13, 2 Phot.

PURCHASE FROM: ESL Repr. PC, pMicrofilm
DOTL JC

00 092565
RATIONAL DESIGN OF TUNNEL SUPPORTS: TUNNEL SUPPORT LOADING CAUSED BY ROCK FAILURE
Two methods are presented for the analysis of tunnel support loading caused by rock failure. In the first part closed-form solutions are used; in the second, numerical techniques. Emphasis is put upon the statical indeterminacy of the problem and upon the necessity for considering the relative displacements between ground and support. From this follows the need for a realistic calculation of the stiffness of ground and support, as well as the need to consider the sequential development of the interaction between these two elements. It is assumed that the rock mass behavior during failure is softening and dilatant. Interface problems between ground and support that can strongly influence the effective support stiffness are discussed.
Master's Thesis.

Daemen, JJK
Minnesota University, Minneapolis, Army Corps of Engineers Final Rpt. MRD-TR-75, May 1975, 441 pp

Contract DACW45-74-C-0066

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
AD-A-13405/6ST, DOTL NTIS

00 093433
CURVBRG-A COMPUTER PROGRAM FOR ANALYSIS OF CURVED OPEN GIRDER BRIDGES
CURVBRG is a computer program for the structural and stress analysis of open girder (I-section) bridge superstructures. The bridge may be of essentially arbitrary shape in plan, and the girders may be of variable cross section along their length. Diaphragms and crossframes may be taken into account, and changes in form of the structure as its construction progresses may be considered. Deflections, stress resultants and stresses for static loads, support settlement effects and moving live loads are determined. Comparisons are made between computed behavior and that observed in model tests.
Prepared in cooperation with California State Business and Transportation Agency, Sacramento.

Mondkar, DP Powell, GH
California University, Berkeley, Federal Highway Administration, California Business and Transportation Agency, (HPR-1(12)) Final Rpt. UCSESM-74-7, Dec. 1974, 171 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245603/6ST, DOTL NTIS

00 093434
SPLICING OF PRECAST-PRESTRESSED CONCRETE PILES
A broad range of splices for precast-prestressed concrete piles were evaluated, based largely upon information furnished by fabricators, designers, and proponents of the various splices. Basic considerations included size range, field time for splicing, approximate cost, availability, and construction usage. Data on the strength of the splices was obtained from tests during the study, from experience and tests conducted by others, and from theoretical and analytical studies. The cement-dowel splice was tested under hard and soft driving conditions. Study results indicate that the Herkules splice, the Anderson sleeve splice, and the cement-dowel splice would be most effective in fulfilling the needs of practical applications for highway and bridge construction in Louisiana.
Prepared in cooperation with Louisiana Dept. of Highways, Baton Rouge. Research and Development Section, Rept. no. 71-5C.

Tulane University, Federal Highway Administration, Louisiana Department of Highways, (LA-736-01-66) Final Rpt. TR-106, July 1974, 123 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245605/1ST, DOTL NTIS

00 093435
DEVELOPMENT OF A NEW SYSTEM FOR DETECTING FATIGUE CRACKS IN STEEL BRIDGES
The nondestructive detection and characterization of fatigue cracks during field inspection of steel bridge structures are put in perspective in terms of the magnitude of the problem and viable nondestructive methods. The results of nondestructive method assessment, selection, evaluation, and experimental confirmation are presented in detail. Developed as a useful and effective solution to the problem, the inspection system consists of two independent, complementary, lightweight, battery-powered electronic instruments-an acoustic crack detector (ACD), which uses ultrasonic principles, automatic signal analysis, and a simple digital data display for rapid survey, and a magnetic crack definer (MCD), which uses magnetic principles and a simple ON-OFF light data display for defining the precise location and crack length. The features and functioning of the equipment are briefly described, and laboratory and field demonstrations, presentations, and field inspections are reviewed. The technical basis for equipment development, including equipment concepts, is summarized.

Barton, JR Kusenberger, FN Birchak, JR
Southwest Research Institute, Federal Highway Administration, (HPR) Final Rpt. FHWA-RD-73-89, June 1973, 147 pp
RESPONSIBLE INDIVIDUAL: McGogney, CH (HRS-11)

Contract FH-11-7794

ACKNOWLEDGMENT: NTIS, Federal Highway Administration (S0374)
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245606/9ST, DOTL NTIS

00 093559
AUTOMATED DESIGN OF REINFORCED CONCRETE BOX GIRDER BRIDGES
A procedure for automated design by computer of multi-span reinforced concrete bridge girders is described, a user's guide for a computer program developed to apply the procedure is presented, and example designs are reviewed. The program is limited to cast-in-situ girders of constant width and depth, but the span lengths may vary from span to span, and cross section variations are also taken into account. Analyses for dead and live load are carried out automatically, and slab thicknesses and reinforcement areas are then selected on a fully-stressed basis, considering both flexure and shear. The analysis and design cycle is repeated to convergence. In an optional final stage, an optimal reinforcing bar layout may be determined using a dynamic programming procedure. A cost computation for the structure is included in the program. A sample design produced by the program is shown to be close to a design described in the State of California Manual of Bridge Design Practice.

Ghose, A Powell, GH
California University, Berkeley, Federal Highway Administration Final Rpt. USCESM-74-15, FHWA-RD-75-S0388, Sept. 1974, 79 pp

Contract HPR-1(12),D-4-53

ACKNOWLEDGMENT: NTIS, Federal Highway Administration (S0388)
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246853/6ST, DOTL/NTIS

00 093560
MSBOX-A COMPUTER PROGRAM FOR AUTOMATED DESIGN OF PRESTRESSED CONCRETE BOX GIRDER BRIDGES
A procedure for automated design by computer of multi-span prestressed concrete bridge girders is described, a user's guide for a computer program developed to apply the procedure is presented, and example designs are reviewed. The program uses a nonlinear programming procedure (SUMT) to design the depth, slab thicknesses, prestressing cable profile and jacking forces for multi-span box girders. Rational analyses for dead load, prestress loss due to friction, prestress loads and live loads are carried out, and minimum cost designs satisfying constraints on deflection, working load flexural stress, ultimate moment capacity and shear strength are produced. The program is limited to cast-in-situ girders of constant width with continuous prestressing, but is applicable to girders of variable depth, and can take account of stiff piers cast monolithically with the superstructure. Prestressing may be specified to be carried out from one anchorage only if desired.

Ramakrishna, LV Powell, GH
California University, Berkeley, Federal Highway Administration Final Rpt. USCESM-74-18, FHWA-RD-75-S0387, Sept. 1974, 114 pp

Contract HPR-1(12),D-4-53

ACKNOWLEDGMENT: NTIS, Federal Highway Administration (S0387)
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246855/1ST, DOTL/NTIS

00 093595
GIRDER-PC-A COMPUTER PROGRAM FOR DESIGN CHECKING OF PRESTRESSED CONCRETE BOX GIRDER BRIDGES
A computer program for the design analysis of multi-span prestressed concrete bridge structures is described, the analysis and design checking procedures are explained, and a detailed user's guide is presented. The program is primarily applicable to cast in-situ prestressed concrete box girder bridges. The girder must be straight in plan, and it must be possible to idealize any girder cross section as an equivalent I-section, otherwise the program is applicable to structures of a wide variety of geometrical shapes. The girder depth, width and slab thicknesses may vary arbitrarily along its length, vertical or inclined monolithic piers may be specified, and internal hinges and expansion joints may be included. Any number of prestressing cables may be specified, with arbitrary profiles and anchorages at any point. Some spans of the girder may be non-prestressed if desired.

Powell, GH
California University, Berkeley, Federal Highway Administration Final Rpt. UCSESM-74-16, FHWA-RD-75-S0389, Sept. 1974, 125 pp

HP&R HPR-1(12),D-4-53
ACKNOWLEDGMENT: NTIS, Federal Highway Administration (S-0389)
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246854/4ST, DOTL/NTIS

00 093929
REINFORCED EARTH CONSTRUCTION
This project, as part of the FHWA Demonstration Projects Program was intended to demonstrate the practicality, cost effectiveness, and esthetics of reinforced earth structures in highway construction. The reinforced earth concept was developed in France and consists of reinforcing earth with horizontal elements extending from a thin facing (concrete or steel) into a granular backfill to form retaining walls or other types of supporting structures. This report describes the first six retaining structures built on highway projects in the U.S., the first bridge abutment and the first foundation slab supporting an embankment in a sinkhole prone geological area. Construction techniques and equipment are discussed as well as costs for each project. Pictures of completed walls illustrate the esthetics of this concept. This demonstration project has shown that savings in the order of several hundreds of thousands of dollars have been realized on several of the projects described when compared to alternate retaining systems currently available to engineers. The potential for further savings is significant in future highway design. Illustrations of some possible design concepts are presented.

Walkinshaw, JL
Federal Highway Administration Final Rpt. FHWA-DP-18, Apr. 1975, 63 pp

ACKNOWLEDGMENT: NTIS, Federal Highway Administration
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247800/6ST

00 094027
A REVIEW OF ENGINEERING EXPERIENCES WITH EXPANSIVE SOILS IN HIGHWAY SUBGRADES
Volume change resulting from moisture variations in expansive soil subgrades is estimated to cause damage to streets and highways in excess of $1.1 billion annually in the United States. Expansive soils are so extensive that rerouting highways to avoid the material is virtually impossible. This report presents the results of a review of current literature combined with details of experiences of selected state highway agencies on procedures for coping with problems associated with expansive soil subgrades. The report discusses the geologic, mineralogic, physical, and physicochemical properties which influence the volume change characteristics of expansive soils. Currently used techniques for sampling, identifying, and testing expansive materials are reviewed and discussed. Treatment alternatives for the prevention or reduction of detrimental volume change of expansive soil subgrades beneath new and existing pavements are presented and discussed.

Snethen, DR Townsend, FC Johnson, LD Patrick, DM Vedros, PJ
Waterways Experiment Station, Federal Highway Administration Intrm Rpt. FHWA/RD-75-48, June 1975, 139 pp

ACKNOWLEDGMENT: NTIS, Federal Highway Administration (M-0222)
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248658/7ST, DOTL NTIS

00 094036
SHOTCRETE PRACTICE IN UNDERGROUND CONSTRUCTION
This report describes the use and procedures for placement of wet-and dry-mix shotcrete in underground rock excavations. Its purpose is to serve as a guide for designers and contractors in selecting, preparing and applying shotcrete of acceptable quality in the variety of ground conditions encountered in underground work. The contents of this report include design considerations, engineering properties, shotcrete equipment, application techniques and quality control. Specifications for shotcrete are treated as well. The appendices provide supplemental information dealing with the use and engineering properties of fiber and regulated-set cement shotcrete, capabilities and specifications of shotcrete machines and some recommended guidelines for placing shotcrete underground.

Mahar, JW Parker, HW Wuellner, WW
Illinois University, Urbana, Federal Railroad Administration Final Rpt. UILU-ENG-75-2018, FRA/ORD-75/90, Aug. 1975, 501 pp

Contract DOT-FR-30022
ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248765/0ST, DOTL NTIS

00 094254
TUNNEL EXCAVATION WITH ELECTRICALLY GENERATED SHOCK WAVES
The patent relates to an apparatus and method for excavating tunnels with electrically generated shock waves. The tunneling apparatus is comprised of a rotatable barrel for cutting a peripheral ring about a core and a bit which simultaneously bores a hole in the center of the core. The drive for the rock bit also contains electrodes which are pulsed to produce shock waves in the core to peel off a desired thickness of rock layer.
Government-owned invention available for licensing. NTIS Number AD-D001496/9ST, but no availability.

Allgood, JR
Department of the Navy Patent PAT-APPL-346 201, No Date, 5 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: Commissioner of Patents Washington, D.C., 20231 Repr. PC

00 094292
DEMONSTRATION OF ACOUSTICAL SURVEY SYSTEM. WASHINGTON METRO AREA TRANSIT AUTHORITY
This report reviews the techniques and results of the demonstration of the Holosonics Acoustical Survey System in a tunnel of the Washington Metro Area Transit Authority subway system. Acoustical data from a small sampling--a drill hole--was related to the actual conditions of the large volume of rock to detect geological and man-made anomalies. This report also discussed the computer equipment, systems applications and data processing methods involved in the acoustical probe.

Price, TO
Holosonics, Incorporated, National Science Foundation Final Rpt. NSF/RA/T-75/038, June 1975, 65 pp

Grant NSF-GI-41356

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247221/5ST, DOTL NTIS

00 094294
FIELD TEST SECTIONS SAVE COST IN TUNNEL SUPPORT
This study summarizes 50 case histories where instrumented test sections were a key factor in realizing major savings from newer concepts in designing underground works. Savings were most often in the item of tunnel support, using field tests to validate newer approaches. Where the tests formed a coordinated program, savings have been spectacular. One example cited is Britain saving half the construction cost on recent London tunnels. In Sweden, cost of underground works has been reduced to equal or below that of surface alternatives for many facilities such as power plants, sewage and water treatment, oil storage, and parking. Despite growing objections to locating such facilities in the surface environment, high cost has deterred U.S. planners from considering the underground alternative. Major cost improvement could change this, allowing greater use of the underground to alleviate several U.S. problems: urban congestion, pollution and energy waste. The case record charts the road; wider trial of newer and less costly concepts (many developed abroad), using field texts to validate their applicability for U.S. conditions.

Lane, KS
American Society of Civil Engineers, National Science Foundation NSF/RA/T-75-035, Apr. 1975, 67 pp

Grant NSF-GI-41842

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246982/3ST, DOTL NTIS

00 094295
FIELD MEASUREMENTS OF GROUND DISPLACEMENTS ABOUT A TUNNEL IN SOIL
Soil displacements were measured during the construction of two 21-ft OD shield-driven tunnels in principally granular soil for the Washington, D.C. Metro. The program of field observations and measurements was implemented to determine the relationship of construction procedure to ground movements about the tunnels. Inclinometers, extensometers, and surface settlement surveys measured the soil displacements at three instrument cross-sections in the Lafayette Park Test Section. The soil displacements were measured at a sufficient number of points at each cross-section such that the complete pattern of ground movements at different stages of construction could be determined.
Prepared in cooperation with DeLeuw, Cather and Co., Washington, D.C.

Hansmire, WH Cording, EJ
Illinois University, Urbana, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company Final Rpt. UILU-ENG-75-2021, Sept. 1975, 359 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246938/5ST, DOTL NTIS

00 094298
A LABORATORY AND FIELD INVESTIGATION OF TUNNEL BOREABILITY
A theoretical and experimental analysis of tunnel boreability is presented with a literature review. Results of laboratory and field tests were compared to determine the predictability of field boring performance from laboratory tests, and to examine the relationship between cutter forces and cutter edge angle, foliation, cutting velocity, and cutter wear. Recommendations for future study are given.

Ozdemir, L
Colorado School of Mines, National Science Foundation MS Thesis T-1755, NSF/RA/T-75-040, May 1975, 201 pp

Grant NSF-GI-37990

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246804/9ST, DOTL NTIS

00 094314
ROCK HARDNESS INDEX PROPERTIES AND GEOTECHNICAL PARAMETERS FOR PREDICTING TUNNEL BORING MACHINE PERFORMANCE
To bid a tunnel to be excavated by machine, a contractor must have reliable estimates of expected excavation time, cutter costs and overall feasibility. To assist in making such predictions, a series of rock index tests has been proposed, developed and related to boreability. The proposed index properties and other variables were evaluated by empirically relating selected rock properties to TBM penetration rates from recently machined tunnels. Samples were drilled from machine bored tunnel walls, tested parallel to the direction of machine penetration, and the results were compared to rates of penetration at respective sampling locations. Results indicate that the series of rock hardness index properties investigated in this study can be related to TBM penetration rates. With certain limitations and qualifications, acceptable empirical relationships have been developed between in situ Schmidt Hammer Hardness and unconfined compressive strength.

Tarkoy, PJ Hendron, AJ
Illinois University, Urbana, National Science Foundation NSF/RA/T-75/030, Sept. 1975, 347 pp

Grant NSF-GI-36468

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246293/5ST, DOTL NTIS

00 094321
MOBILE ROOF SUPPORTING SHIELD
The patent describes a flexible shield for protecting excavating activities in a tunnel from roof falls which is made mobile by its drivable underlying support structure. Double acting hydraulic jacks, which are retained upright

by pivotal and flexible members in each section of a train of sections comprising the support structure, underpin the flexible shield, and are operable to alternately apply the flexible shield in close proximity to the tunnel roof and maintain it free from engagement with the roof to facilitate its displacement along the tunnel with the support structure. A webbing of interlaced straps which take shape within edge supporting cables form panels corresponding to the sections, and these panels are integrated by nonrigid connections at the jack structures to make a canopy arrangement constituting the flexible shield.

Also includes report no. DOCKET/MIN-1982.

Barrett, AL
Department of the Interior Patent PAT-APPL-357 737, No Date, 11 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: Commissioner of Patents Washington, D.C., 20231 Repr. PC

PB-246065/7ST, DOTL NTIS

00 094327
SELF-CONTAINED INSTRUMENT FOR MEASURING SUBTERRANEAN TUNNEL WALL DEFLECTION
The patent application relates to an instrument whereby the deflection of a subterranean tunnel is measured with a rod-like, self-contained instrument that is adapted to be inserted into a radially extending bore of the tunnel adjacent to an end where the tunnel is being dug. One end of the instrument is anchored at the end of the bore remote from the tunnel wall, while the other end of the instrument is anchored adjacent the end of the wall in proximity to the tunnel wall. The two ends of the instrument are linearly displaceable relative to each other; the displacement is measured by a transducer means mounted on the instrument. Included in the instrument is a data storage means including a paper tape recorder periodically responsive to a parallel binary signal indicative of the measured displacement.

Also includes report no. DOCKET/MIN-1916. Government-owned invention available for licensing. Copy of application available NTIS.

Rasmussen
Department of the Interior Patent PAT-APPL-585 223, DOCKET/-MIN-1915, No Date, 78 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-245369/4ST, DOTL NTIS

00 094330
BRIDGES: CONSTRUCTION AND CONSTRUCTION MATERIALS (A BIBLIOGRAPHY WITH ABSTRACTS)
Bridge design, construction, construction materials, and the structural/mechanical properties are investigated in these Government-sponsored research reports. (This updated bibliography contains 223 abstracts, 119 of which are new entries to the previous edition).

Supersedes NTIS/PS-75/076.

Habercom, GEJ
National Technical Information Service Dec. 1975, 228 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

NTIS/PS-75/888/8ST, DOTL NTIS

00 094405
VENT AND STATION TEST (VST) FACILITY-SPECIAL AND COMPLEX VENT SHAFT TESTING
This report has been prepared under the Transit Development Corporation, Inc. (TDC) project, 'Ventilation and Environmental Control in Subway Rapid Transit System' and is one of many such reports leading to the final product a 'Subway Environmental Design Handbook.' The purpose of this particular report is to present and describe the testing of special and more complex vent shafts. A generalized theory is formulated as an extension of this and previous VST work. Comparison between theory and experiment, according to the authors, is good.

Prepared by Departmental Sciences, Inc., City of Industry, Calif. Aerospace Technology Div. See also PB-212 335.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Departmental Science, Incorporated, (UMTA-DC-06-0010) UMTA-DC-06-0010-73-5, Dec. 1973, 230 pp
Contract DOT-UT-290

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-249048/OST, DOTL NTIS

00 094412
COMPARISONS OF COMPUTER MODEL PREDICTIONS AND FIELD MEASUREMENTS OF SUBWAY ENVIRONMENT IN THE MONTREAL METRO
This technical report has been prepared under the Transit Development Corporation (TDC) project 'Ventilation and Environmental Control in Subway Rapid Transit Systems.' This report describes a series of field tests conducted in the Montreal METRO system for the purpose of validating the Subway Environment Simulation (SES) Computer Program developed pursuant to the TDC project. The report also presents direct comparisons of experiment and theory, demonstrating the applicability of the SES computer program to full scale, multiple-track, bi-directional rapid transit systems.

Prepared in cooperation with De Leuw, Cather and Co., Inc., Washington, D.C., Kaiser Engineers, Los Angeles, Calif., and Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, De Leuw, Cather and Company, Kaiser Engineers, Parsons, Brinckerhoff, Quade and Douglas, Inc, (UMTA-DC-06-0010) UMTA-DC-06-0010-75-3, Aug. 1975, 224 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-249119/9ST, DOTL NTIS

00 094552
SCOUR AROUND BRIDGE PIERS
Available theories and prediction formulas on scour at bridge waterways are reviewed. Formulas that offer potential for prediction of scour around bridge piers are compared by reducing each formula to a non-dimensional form that includes Froude Number, the ratio of scour depth to pier width, and the ratio of stage to pier width. A field study to gather data on scour and related variables is described. The study is aimed at collecting field data in order to furnish a basis on which to compare scour prediction formulas. Four test sites are included in the study. These sites are located on: the Red River in Shreveport, Louisiana, the Brazos River in Richmond, Texas, the Homochitto River near Brookhaven, Mississippi, and the Ohio River in Lawrenceburg, Indiana. An automatic instrumentation system that measures scour depth at three points around a bridge pier as well as river stage is used in this study. The system is based on a depth measuring fathometer.

Hopkins, GR Vance, RW Kasraie, B
West Virginia University, Federal Highway Administration Intrm Rpt. FHWA/RD-75-56, Mar. 1975, 205 pp

Contract DOT-FH-11-7759

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-249670/1ST, DOTL NTIS

00 094755
ATHABASCA TAR SANDS CORRIDOR STUDY. VOLUME 1. PART 1. CORRIDOR CONCEPT
Impending development of the Athabasca tar sands area will generate a demand for a wide variety of transportation facilities; a plan for the linkage of the resource area with its markets and supply centers is presented. A proposal is made for the development of a multipurpose transportation corridor system, incorporating multi-pipelines, electric-power transmission lines, and communication systems in a single right-of-way corridor.

U.S. Sales Only.

Athabasca Tar Sands Corridor Study Group Apr. 1974, 39 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

NP-20371, DOTL NTIS

00 096694
STABILITY OF BRIDGE ABUTMENTS FOUNDED ON PILES SUNK IN A COMPRESSIBLE LAYER [Stabilite des culees de ponts etablies sur des pieux traversant une couche molle]
Study was made of the behavior of 15 bridges in which horizontal movements of the abutments had been observed. The latter rested on piles which were sunk through a compressible layer before or during the construction of the embankments. Taking into account the pile characteristics, the compressibility and geometry of the compressible layer, the authors describe the conditions in which such movements can occur. [French]

Marche, R Lacroix, Y (Ecole Polytechnique, Montreal) *Canadian Geotechnical Journal* Vol. 9 No. 1, Feb. 1972, pp 1-24, 15 Fig., 3 Tab., 22 Ref.

ACKNOWLEDGMENT: Roads and Transportation Association of Canada, Laboratoire Central des Ponts et Chaussees, Transport and Road Research Laboratory (IRRD 100578)
PURCHASE FROM: National Research Council of Canada Montreal Road, Ottawa, Ontario K1A OR6, Canada Transport and Road Research Laboratory Old Wokingham Road, Crowthorne RG11 6AU, Berkshire, England

00 098715
END AREA COMPUTATION
File name is 4A1. This is an electronic calculator program which computes earthwork end areas. Data is input through the keyboard direct from field survey notes. Input data consists of number of points to be entered, elevation and location of each point. Paper tape output includes point number, elevation and distance for each point, and computed end area.

Polka, RA
Missouri Pacific Railroad Nov. 1973

ACKNOWLEDGMENT: AREA (AREA 08-01-004)
PURCHASE FROM: Missouri Pacific Railroad 210 North 13th Street, 1211 Mo Pac Building, Bridge Dept., St Louis, Missouri, 63103

00 098716
SOLUTION OF SECANT FORMULA
File name is SEC. Program solves the secant formula for the load per unit area to give a specified extreme fiber stress in an eccentrically loaded column using an interval halving procedure. Program is on approximately 50 cards. Program was developed primarily for use in teaching structural steel design.

Lewis, ADM
Purdue University Feb. 1970

ACKNOWLEDGMENT: AREA (AREA 08-04-001)
PURCHASE FROM: Purdue University Civil Engineering Building, West Lafayette, Indiana, 47907

00 125518
IMPORTANCE OF GROOVE SPACING IN TUNNEL BORING MACHINE OPERATIONS
The spacing between two neighboring grooves created by the travel of the cutters affects the interaction between the grooves and thus the advance rate and overall efficiency of the tunnel boring machine. Selecting the correct spacing for each specific job requires a thorough understanding of the cutting characteristics of the rock material. Results of cutting experiments with a seven-inch (180-mm) rolling disk cutter in marble, limestone, granite, and quartzite are presented and examined. The values of muck weight per unit length, groove depth, cutting coefficient, and specific energy are taken as indicators of the cutter performance for each test condition. Determination of the optimum and critical groove spacing for field operations can easily be performed with values of any one of the performance indicators based on the interrelation between rock strength indices and cutter performance indicators. /Author/

Rad, PF *ASCE Journal of the Geotechnical Engineering Div* Proceeding Vol. 101 No. GT9, ASCE #11589, Sept. 1975, pp 949-962

PURCHASE FROM: ESL Repr. PC, icrofilm

DOTL JC

00 126097
THE CHANNEL TUNNEL-ITS HISTORY. PRESENT STATE OF THE PROJECT [Le tunnel sous la Manch-Historique-Etat du projet]
A brief outline is given of the tunnel project, and the various trasactions it gave rise to. Details are given of the entry point south west of Clay on the French side, of the exit point north west of Folkestone on the British side, and of the length of the structure (52km, 26km of which would be under the channel). It will be linked to the railway lines going to Dover and London, and Calais and Paris. The main stations will have loading bays for heavy and light vehicles. There will be in fact three tunnels, two parallel ones for each direction of traffic, and between them a gallery, which will be used as an investigation gallery during construction and, later on, will be utilized for services, and ventilation. The main tunnels will have an internal diameter of 6,85m. Three kinds of shuttle trains are planned: single-deck wagons for all private cars including buses and caravans, double-deck wagons for peak-hour use for private cars only, and lorry-carrier trains capable of carrying a 40 tonne road train. The last part of the article deals with the economic efficiency and the economic aspects of the tunnel. /TRRL/ [French]

Callou, R *Industrie Minerale* Vol. 55 No. 6, June 1973, pp 269-280, 4 Fig.

ACKNOWLEDGMENT: Central and Regional Labs of Bridges & Highways,Fr, Transport and Road Research Laboratory (IRRD 101246)
PURCHASE FROM: ESL Repr. PC, Microfilm

00 126194
GROUND WATER AND URBAN PLANNING. REPORT FROM STEGA 1966-73 [Grundvatten och Byggande. Stegas Arbete 1966-73]
Knowledge of groundwater conditions is essential in designing building structures, particularly when foundations are complex and at great depth. Drops in the water table can lead to serious damage to ground and buildings. This project comprised questionnaire surveys, groundwater measurements in reference areas, damage due to settlement near Stockholm, measurements of water table and settlements in new development areas, groundwater problems near tunnels and deep excavations, a computer model for groundwater, a land cost index, effect of groundwater on vegetation, and bacterial decomposition of foundation timber. In a Stockholm suburb, serious settlements occurred in an area built on postglacial clay; piles buckled and there was corrosion. In another Stockholm area, settlement damage is so extensive that repair costs amount to 50% of property value. Several tunnelling projects are in progress in this area. Water table conditions before and after construction were studied in two model areas. Some tunnelling and deep excavation projects were investigated. A drop in water table can affect vegetation; timber piles which had always been below the water table suffer bacterial decomposition. The group compiled building geological maps comprising geological and geotechnical data and also foundation and land costs index maps based on these. /TRRL/ [Swedish]

Lindskoug, NE Nillson, LY
National Swedish Institute for Building Research R&D Rept. R20:1974, 1974, 164 pp, Figs., 18 Tab., Phots.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-213447)
PURCHASE FROM: National Swedish Institute for Building Research Valhallavaegen 191, Stockholm, Sweden Repr. PC

00 128585
THE SINKING OF THE AMSTERDAM METRO
Subway construction was not practical in Amsterdam, the Netherlands, until this new placement technique. Most of the buildings in Amsterdam rest on old, untreated wooden piles that would deteriorate if the high water level were lowered for most conventional subway construction methods. Therefore, the tunnel segments for Amsterdam's new Metro are constructed on the surface and then allowed to settle into their submerged final position with aid of hydraulic excavation by water jets and slurry pumps.

Halperin, D *ASCE Civil Engineering* Vol. 45 No. 9, Sept. 1975, pp 92-95, 2 Fig., 3 Phot.

ACKNOWLEDGMENT: ASCE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 129857
SIMULATION OF TUNNEL EXCAVATION WORKS
To increase the speed of excavation and decrease the total cost of tunnel construction, Japanese National Railways has developed a simulation program for all the activities in such a project, including transportation. This program is designed to be so general that it can be adapted to any tunnel and to any construction method.

Nikaido, T Ishii, H *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 140-141, 5 Fig.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

00 129858
ON THE CHARACTERISTIC PROPERTIES OF COMPRESSIBLE SPRAY-TYPE TWO-PHASE (GAS-LIQUID) FLUID AND ITS MEASURING TECHNIQUE
For developing the jet cutting technology which uses the high speed liquid jet having a velocity of high Mach numbers compared with air, it would seem to be important to consider the results of an investigation on the internal mechanism of a high speed liquid jet. The theoretical treatment of compressibility relating to this spray-type two-phase (gas-liquid) fluid flow which is composed in part of a high speed liquid jet is examined and the results of measurements relating to the simulated liquid jet based on the theoretical treatment is discussed. The high speed liquid jetted from the nozzle forms a spray-type two-type two-phase (gas-liquid) fluid flow mixing with the surrounding air. From the view point of showing the extremely small value of sonic velocity in this fluid flow, the high speed liquid jet which jets out in the air easily becomes the supersonic flow or hypersonic flow. So, in the study of the internal mechanism of a high speed liquid jet, except the non-contact method of measurement, we cannot use the usual method of measurement, but we must therefore develop a new method of measurement applicable to supersonic flow.

Kinoshita, T *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 97-102, 9 Fig., 2 Ref.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

00 129859
BEHAVIORS OF BRACED CUT
The results of field measurement and analysis of an open cut in a weak reclaimed deposit are reported. The field measurement is carried out during the construction of a tunnel by open-cutting and analysis is done by finite element method with many extreme assumptions. The results show good agreement between measurement and analysis in spite of insufficient exploratory boring and soil test and extreme assumptions.

Tarumi, H *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 107-110, 9 Fig.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

00 129861
FUNDAMENTAL STUDY ON A NEW METHOD FOR MEASURING DISPLACEMENT OF PIERS UNDER LIVE LOAD
A method has been developed for measuring the vertical displacement of bridge piers under live load through the long-term vibrograph records utilizing a seismograph. This new method is expected to improve on estimating methods previously used.

Fujiwara, T Iwai, Y *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 135, 2 Fig.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

00 129863
THE TABLE FOR ESTIMATION CUTTING SLOPE AND RESTRICTION ON TRAIN OPERATION UPON A RAINFALL. CASE OF KYUSHU DISTRICT
This paper describes the cut slope failures along lines of the JNR in the Kyushu district and a scoring process on which the safety of such slopes may be estimated. The influence of prevailing rainfall is used in calculating the coefficient of survival. The level of train operations and amount of precipitation are correlated into six groups for the scoring process. A quantification theory was used for calculating the intensity of rainfall.

Imai, T Kiku, Y *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 115-118, 5 Fig.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

00 129864
ESTIMATE OF THE LOOSENED AND PLASTICALLY DEFORMED AREA AROUND THE OPENING
The magnitude of pressure acting on supports around a tunnel opening depends on the loosened area around the opening. To determine the depth of the loosened area, seismic tests were conducted in the tunnel. The depth depends on the geology of the area to be excavated. The geological conditions can be determined by a seismic survey which is seen as useful in tunnel design.

Ikeda, K Sakurai, T Asano, G Higuchi, I *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 111-114, 5 Fig.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

00 129865
SUBSIDENCE OF EMBANKMENT ON WEAK GROUND DUE TO EARTHQUAKE AND ITS COUNTERMEASURE
There can be extraordinary subsidence of embankments on weak ground during earthquakes. An estimate of this subsidence is described from the point of view of liquefaction at the bottom of the embankment and the lateral flow of ground. Effects of various countermeasures against earthquake-caused subsidence are examined in the light of tests of an experimental embankment. The solution is effective for ground with limited strength. Suggested are either side fills or tie rods through the base of the embankment.

Uezawa, H *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 103-106, 8 Fig.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

00 130567
FOUNDATION DESIGN OF EMBANKMENTS CONSTRUCTED ON CONNECTICUT VALLEY VARVED CLAYS
The report encompasses three main subjects. These are: (1) Presentation of a general methodology for the foundation design of embankments, especially regarding construction on soft ground; (2) A summary and synthesis of the engineering properties of Connecticut Valley varved clays, with emphasis on anisotropic strength, deformation and consolidation characteristics; and (3) Specific recommendations for the foundation design of embankments constructed on Connecticut Valley varved clays within Massachusetts. The last topic includes field and laboratory test programs; procedures for executing stability, deformation and consolidation analyses; the use of preloading with sand drains and surcharge fills; selection of soil parameters for design; and supervision of construction and evaluation of performance. Use of theoretical analyses and normalized soil properties are illustrated via an example design problem. Chapter 8 of the report presents a detailed summary of the design recommendations. /FHWA/

Sponsored by the Massachusetts Department of Public Works. Prepared in cooperation with the Department of Transportation, Federal Highway Administration.

Ladd, CC
Massachusetts Institute of Technology, Federal Highway Administration, (R75-7) Final Rpt. FHWA-RD-75 S0395, June 1975, 438 pp

Contract DOT-R23-0

ACKNOWLEDGMENT: Federal Highway Administration (S0395), NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247734/7ST, DOTL NTIS

00 130579
EPOXY RESINS FOR JOINTING SEGMENTALLY CONSTRUCTED PRESTRESSED CONCRETE BRIDGES
This report presents the general requirements for epoxy resins for jointing segmentally constructed prestressed concrete bridges using the cantilever erection method. The report outlines the main function of the epoxy resin material in this type structure, and discusses the development of specific performance requirements for the epoxy resins. Simple test methods and jointing conditions for evaluation of the suitability of epoxy resins for this specific application are suggested. The report summarizes the results of acceptance tests on nine epoxy resin materials submitted by various manufacturers and formulators for consideration for use in a laboratory model and a field structure constructed of precast segments using the cantilever erection procedures. Information on pot life, flexural jointing strength, shear jointing strength, and rate of strength development are included. Experience with the materials submitted for exploratory testing indicates that no fully satisfactory material which met all of the original specifications was found in the program. However, a number of promising materials were identified which could be used with waiver of some parts of the specification. The critical surface condition in evaluation of the jointing capacity was the saturated but surface dry condition. A number of the materials tested would be suitable if used under the completely dry surface condition. Test results indicated the importance of proper surface preparation and particularly the removal of all traces of oil from the surface of the specimens to be jointed. The report includes a recommendation in detailed specification form for epoxy resin material and jointing procedures for this construction application. /FHWA/
Work done in cooperation with the Federal Highway Administration. Sponsored by the Texas Highway Department.

Kashima, S Breen, JE
Texas University, Austin, Federal Highway Administration, Texas State Department of Highways & Public Transp, (Research Rpt. 121-2) FHWA-RD-75-S0403, Aug. 1974, 84 pp

Contract 3-5-69-121-2 (Res. Study)

ACKNOWLEDGMENT: Federal Highway Administration (S-0403), NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247774/3ST, DOTL NTIS

00 130801
BAM: A TRACK FORMATION OF HIGH DURABILITY [BAM-dologovecnoe zemljanoe polotno]
The article examines the geological and civil engineering conditions in the Eastern Siberian and Eastmost region to be crossed by the Baikal-Amour (BAM) main railway line, the special features of the project and the construction of the line's track formation. This line, which is now being built, goes through a whole series of mountain ranges and across large rivers, regions with different geological structures, and various Eastern Siberian and Eastmost climatic zones. The line's route is characterized by complex geological and civil-engineering conditions due to: the presence of terrain hard frozen for many years, a sinuous profile, high seismicity as well as deep tectonic and exogeneous cracks in the mountain masses, and also to the active frost process affecting the ground surface. Added difficulties include: rock falls, ground subsidence and dejecta cones, ice layers and thermokarsts, underground ice layers. The ground surface is constantly strained by distension and subsidence phenomena brough about by the eroding effects of rivers and lakes during the seasonal freezing and thawing processes. [Russian]

Mocenov, GM Larionov, AD *Zeleznodoroznyj Transport* No. 10, Oct. 1975, pp 59-64

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Zeleznodoroznyj Transport Moscow, USSR Repr. PC

00 130815
CALCULATION OF THE CROSSWISE DISTRIBUTION OF AXIAL FORCES IN LARGE RAIL BRIDGES USING THE STIFFNESS COEFFICIENT METHOD [Berechnen der Querverteilung von Achskraeften bei massiven Eisehbahnbruecken nach dem Steifezahlverfahren]
The railways' stipulations regarding the distribution of the pressure of ballast across the track (lateral distribution) vary. The author gives a method of calculating how the horizontal and vertical forces are distributed for various types of sleeper and ballast in the case of central and excentric track positions. The aim is to arrive at uniform stipulations. He uses the stiffness coefficient method and applies it at three levelsì sleeper, ballast and track slabs. [German]

Mildner, K *DET Eisenbahntechnik* Vol. 23 No. 10, Oct. 1975, pp 458-562, 8 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany Repr. PC

00 130840
IMMERSED-TUBES AND THE TEES
The 40 immersed-tube tunnels throughout the world, starting with the 1914 Michigan Central underwater connection between Detroit and Canada are discussed. Seven of the tunnels are for railroads or rapid transit lines. The immersed-tube tunnel is one where the structure is precast in large units of concrete or concrete and steel which are floated into position and generally laid in a trench dredged in the bed of the waterway. The waterway should have a stable, easily dredged bed; be adequately deep; be generally calm and have only moderate currents. The longest such tunnel is that of Bay Area Rapid Transit across San Francisco Bay.

Culverwell, DR (Freeman Fox and Partners) *Tunnels and Tunnelling* Vol. 8 No. 1, Jan. 1976, pp 27-33, 7 Fig.

PURCHASE FROM: ESL
DOTL JC

00 131009
ACQUISITION AND USE OF GEOTECHNICAL INFORMATION
This report presents the results of a comprehensive review and assessment of the current practices of state highway and transportation agencies in the acquisition and use of geotechnical information in route selection, design, and construction of transportation facilities. Information is presented on such matters as planning, conducting, and presenting information from geotechnical investigations, the equipment, procedures, and selection of sampling locations for geotechnical investigations, and the structuring and positioning within the agency framework of the organization that must acquire and use geotechnical information.

Transportation Research Board NCHRP Synthesis Final Rpt. No. 33, 1976, 40 pp, 12 Fig., Refs., 6 App.

NCHRP HR20-5

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

00 131030
DESIGN OF TRANSIT STRUCTURES FOR URBAN AREAS
Design of transit structures for urban area requires consideration of many factors in addition to the purely technical strength and size designs. The task is to design the most effective and economical structures that will meet the overall transit and surrounding community needs. Development of such designs should achieve a coordinated balance among factors related to operation of the transit system and impact on the community, long range and during construction. Ths involves detailed consideration of many things, chiefly among which are: (1) The operating philosophy and plan of the transit system; (2) existing community development along the system planned; (3) constraints--physical, financial, visual public reaction; (4) geological conditions and probable construction methods; (5) nonstructural items, e.g., vehicles and train-control; (6) detailed design and contract packaging; and (7) scheduling construction--equipment and testing.

Hammond, DG Desai, DB (Daniel, Mann, Johnson and Mendenhall) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE1, Proc. Paper

11918, Feb. 1976, pp 1-16, 11 Fig., 5 Ref.
ACKNOWLEDGMENT: ASCE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

00 131138
FROST, MOISTURE, AND EROSION
The effects of climate and water on roadway design, construction, and performance have always been of the highest importance. Without temperature changes, structural portions of a roadway would be rather easy to design for anticipated loads as they would be if moisture changes were also not present. Therefore, the information in this record will be of interest to soils and design engineers who are concerned with the performance of the roadway structure under variations of climate, temperature, and moisture.

Presented are 9 reports prepared for the 54th Annual Meeting of the Transportation Research Board.

Transportation Research Record No. 532, 1975, 105 pp, Figs., Tabs., Refs.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL JC

00 131141
SOIL AND ROCK MECHANICS, CULVERTS AND COMPACTION
Although the trend is toward computer aided solutions, there are many times when graphical or chart solutions can aid engineers in checking the reasonableness of a computer answer or in a simplistic check of a proposed embankment design. Huang provides two charts, and Fang, Snitbhan, and Chen have supplied another that will aid materially in these quick check solutions.

Presented are 9 reports prepared for the 54th Annual Meeting of the Transportation Research Board.

Transportation Research Record No. 548, 1975, 105 pp, Figs., Tabs., Refs.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL JC

00 131240
TEMPORARY BRIDGES FOR TRACK [Die Hilfsbruecke im Gleis]
The first part of the article provides project engineers with information enabling them to choose supporting elements for bridges according to the type of bridge in question and the distance between supports. The author discusses the essential planning documents required, the stages involved and the preparatory work necessary. He also describes details of the construction of the "Karlsruhe" type support. In the second part, the author discusses preparatory work on site and the installation of temporary bridges including the materials needed and the time required for construction. He concludes with a number of details concerning maintenance of temporary bridges and dismantling. [German]

Rower, HD *Eisenbahningenieur* Vol. 26 No. 11, Nov. 1975, pp 286-394

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

00 131242
A RAILWAY EMBANKMENT ON A PILE FOUNDATION [Pfahlgruendung eines Eisenbahndammes]
During work on the elimination of a level crossing, a new railway embankment had to be constructed on a weak sub-soil foundation. The author describes the various methods possible for improving the sub-soil. The most economical method was found to be deep foundations on sunken wooden piles. [German]

Watzlaw, W *Eisenbahntechnische Rundschau* Vol. 24 No. 11, Nov. 1975, pp 409-416, 4 Fig., 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC
DOTL JC

00 131248
THE NON-POLLUTING JUMBO HYDRAULIC EQUIPMENT USED AT FURKA [Les jumbos hydrauliques complets et non-pollutants utilises a la Furka]
A description of hydraulic boring machines. The new Furka railway tunnel (narrow gauge line) is one of the first tunnels in the world where all boring is by hydraulic equipment. [French & German]

Druckluft-Air Comprime No. 4, 1975, pp 4-9, 2 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Druckluft-Air Comprime Bienne, Switzerland Repr. PC

00 131284
SEISMIC METHOD OF PROBING RAILWAY EMBANKMENTS [Primenenie sejsmiceskogo metoda dlja zondirovanija zelznodoroznyh nasypej]
The seismic method is based on the study into elastic-wave fields propagated in the teack bed due to the impact of an explosion. Using a seismic receiver, it is possible to record, at the surface of a stratified soil, different types of wave: longitudinal, transversal, reflected or refracted by various interfaces, as well as surface waves. [Russian]

Konsin, GG Kruglyj, AG *Vestnik Vniizt* Vol. 34 No. 8, 1975, pp 37-41, 2 Tab., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

00 131297
NEW IDEAS ON TUNNEL STATICS [Nuovi concetti sulla statica delle gallerie]
The article examines the problem of tunnel statics in its most general form, specifying the basic characteristics, the simplifying hypotheses and basic elements to be used for a correct solution. After a brief review of the classical solutions available, the problem is analysed by considering the characteristic lines, the conditions of the attack surface, the influence of the weather and cases of stability. The article consequently defines the main characteristics of the problem of tunnels, and concludes that the two basic issues, as regards tunnel statics, are the three-dimensional states of stress at surface level and the viscous behavior of the rock, which influence one another. Finally, the new rheological principles are explained, on the basis of the definition of the corresponding laws and the resulting models. [Italian]

Lombardi, G *Ingegneria Ferroviaria* Vol. 30 No. 2, Feb. 1975, pp 3-16, 18 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

00 131299
REMARKS ON THE STUDY AND CALCULATION OF THE STABILITY OF LOOSE ROCK EMBANKMENTS [Bemerkungen zur Untersuchung und Berechnung der Standfestigkeit von Lockergesteinboeschungen]
After reviewing conventional methods of calculating the stability of embankments, the authors envisage dealing with the problem, not by a deterministic method, but as a problem of reliability. For this purpose, they draw up a table of 10 factors affecting this reliability: the foundation soil, shape of embankment, hydrology, composition, vegetation, damage by animals or boring insects, etc., how they influence stability, and their combined action. They show how the results of numerous tests could be combined, so as to deduce laws of probability, and refer to the problem of optimising embankments in relation to construction and maintenance costs. They conclude that statistical material for such calculations does not exist at the moment, but that it would be useful to collect this material. [German]

Klengel, KJ Schmidt, M *Hochschule f Verkehrs F List Wissenschaft Zeitschr* Vol. 21 No. 4, 1974, pp 789-796, 2 Tab., 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hochschule f Verkehrs F List Wissenschaft Zeitschr Friedrich List Platz 1, Dresden, East Germany

00 131312
ROCK SLOPE STABILITY ON RAILWAY PROJECTS
Increase in weight, length and frequency of trains is increasing the stress on trackside slopes, even though it might be thought that cuts up to a century old would be thoroughly stabilized. Knowledge of rock mechanics and rock slope stability has increased greatly in the past decade and potential areas of rock instability can be identified and improved stabilization programmed. Factors which influence rock slope stability are identified and methods of stabilization are detailed. Suggestions for new construction are also made.

Brawner, CO Wyllie, D *AREA Bulletin* Vol. 77 Bulletin 656, Jan. 1976, pp 449-74, 16 Fig., 6 Ref.

ACKNOWLEDGMENT: AREA Bulletin
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

00 131321
VEGETATION CONTROL ON BRANCH LINES. THE SPECIAL PROBLEMS AND HOW THEY ARE HANDLED
A survey of representative railroads shows the need for control of weeds and brush on the less important lines is widely recognized. Spraying and cutting programs have to be tailored to fit the importance of the lines and the availability of funds. The choice between mechanical cutting and chemical treatment can be a matter of economics.

Railway Track and Structures Vol. 72 No. 2, Feb. 1976, pp 14-17

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

00 131390
DRILLING AND PREPARATION OF REUSABLEî LONG RANGEî HORIZONTAL BORE HOLES IN ROCK AND IN GOUGE. VOLUME II: ESTIMATING MANUAL FOR TIME AND COST REQUIREMENTS
The objective of this study is to assess horizontal drilling as an alternative to pilot tunneling in geological investigation prior to the design and construction of highway tunnels and to identify means to increase the penetration capability and accuracy and decrease the cost of horizontal drilling. This volume presents a model for estimating the time and cost of drilling long horizontal holes. Sample problems are worked in detail to illustrate the application of the model to four (4) different drilling techniques. Procedures to apply the model to any combination of geological conditions are illustrated with an example problem. The logic and format of the model are adaptable to future improvements in the state-of-the-art of horizontal drilling. This is the second of three volumes. Volume I is published as FHWA-RD-75-95, subtitle: A State-of-the-Art Assessment. Volume III is published as FHWA-RD-75-97, Subtitle: A Development Plan to Extend Penetration Capability, Increase Accuracy and Reduce Costs. /FHWA/
Sponsored by the Department of Transportation, Federal Highway Administration.

Mack, WM, Jr Tracy, N Wickham, GE
Foster-Miller Associates, Incorporated, Federal Highway Administration, (HWA-7443.2) FCP35B2-042, 106 pp
RESPONSIBLE INDIVIDUAL: Majtenyi

Contract DOT-FH-11-8486

ACKNOWLEDGMENT: Federal Highway Administration, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-251613/AS, DOTL NTIS

00 131783
CRITERION FOR THE ANALYSIS OF THE STABILITY OF THE EXCAVATION FACE OF A TUNNEL [Criterio para el analisis de la estabilidad del frente de la excavacion de un tunel]
A brief description is given of the method developed by Broms, Bermermark, Deere et al. and Peck for forecasting the possible instability of the excavation face of a tunnel; it is critically examined in the light of the experience gained after its application to the tunnels of the Seville underground railway, in Spain. According to this method, the stability of the tunnel face is governed by a stability factor, of = (pz-pa)/su, when pz = total vertical pressure at the height of the tunnel axis, Pa = air pressure within the tunnel, and su = undrained shear strength. It is concluded that the least favourable conditions exist when pz is high and the cohesion is low. The measures usually taken to ensure stability at the face can be of two types: 1) improvement in the of factor by increasing Pa or su (grouting of sandy soils); 2) creating conditions inhibiting the development of failure: series of grouting operations or horizontal inspection of the roof level of the tunnel above and ahead the face. See also IRRD abstracts nos. 216638, 216640 to 216645. /TRRL/ [Spanish]

Bernal, A
Ministry of Public Works, Spain Conf Paper May 1975, pp 82-86, 5 Fig., 1 Tab., 3 Ref.

ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain (LTMS61002E), Transport and Road Research Laboratory (IRRD-216639)
PURCHASE FROM: Ministry of Public Works, Spain Calle Alfonso XII 3, Madrid, Spain

00 131784
EFFECT OF GROUND PLASTIFICATION AROUND A TUNNEL ON SURFACE SETTLEMENTS [Influencia de la plastificacion del terreno alrededor de un tunel en los asientos superficiales]
Studies have been made of the problem of subsidence caused by the excavation of circular tunnels close to ground level. The finite element non-dimensional, theoretical analysis assumes that the ground will behave according to an elastic pattern. However, the plastification and dilatancy of the ground must also be taken into consideration since these factors alter the stress-strain behaviour of the ground surrounding the excavation. This paper puts forward some results obtained in some special cases and considers the introduction of the possible ground plastification in the calculations by means of analytical and numerical procedures. Among these, the solutions of Kisiel, Reyes and Deers are discussed. The finite element method was used and the rheological behaviour of the soil was considered to correspond to that of an elastoplastic medium, which need not conform to the law of normal behaviour. Several figures show the effect of soil cohesion on the plastified area, ground level settlements and settlements on tunnel roof. /TRRL/ [Spanish]

Sagaseta, C Oteo, C
Ministry of Public Works, Spain Conf Paper May 1975, pp 76-79, 6 Fig., 4 Ref.

ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain (IRRD-216643), Transport and Road Research Laboratory
PURCHASE FROM: Ministry of Public Works, Spain Calle Alfonso XII 3, Madrid 7, Spain

00 131785
CALCULATION OF VARIATIONS AND SLOPE STABILITY [El calculo de Variaciones y la estabilidad de taludes]
The safety coefficient of a slope and the worst slip line are determined by applying variation calculations, avoiding the traditional method of trial and error by successive approximations. When the safety factor is expressed in terms of a function, the Euler equation enables a direct determination to be made of the worst of all slip curves which pass through two given points of the profile of the slope. The cross-sectional conditions facilitate determination of the two points mentioned so as to obtain the worst slip line among all the possible lines which fulfil certain conditions of regularity. In order to demonstrate the potential of the method, it is applied to janbu's method for the case of a wholly cohesive ground and of a slope of exponential profile. The results, obtained in non-dimensional form, are compared with Taylor charts for a slope of straight profile. /TRRL/ [Spanish]

Castillo, E Revilla, J
Ministry of Public Works, Spain No. 108, Mar. 1975, pp 31-37, 6 Fig., 4 Ref.

ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain (IRRD-216648), Transport and Road Research Laboratory
PURCHASE FROM: Ministry of Public Works, Spain Calle Alfonson XII 3, Madrid 7, Spain

00 131786
CONICAL SLOPES OF EMBANKMENTS [Kegelvormige taluds]
In designing earthworks embankments are often assumed to be straight and infinite, the slopes being plane. In practice, however, there are many

cone-shaped parts of embankment surfaces, e.g. in abutments, curved embankments, hills, pits, etc. In this paper a calculation method of the angle of repose of cohesionless soil in conical slopes is presented. It is pointed out that the difference between the angles of repose in plane and in conical slopes is only of practical importance if the granular material of the embankment is coarse, e.g. crushed rock. In sandfills the difference is only small. /TRRL/ [Dutch]

Metz, HE *Polytechnisch Tijdschrift: Bouwk Weg Waterb* Vol. 30 No. 14, July 1975, pp 457-61, 7 Fig., 3 Phot., 1 Ref.

ACKNOWLEDGMENT:
PURCHASE FROM: Stam Tijdschriften P.O. Box 375, Carnegie Plein 5, The Hague, Netherlands

00 131787
CONSTRUCTIONAL AND ECONOMIC ASPECTS OF TUNNEL CONSTRUCTION [Aspectos constructivos y economicos de la construccion de tuneles]
The constructional problems of a tunnel can be divided into three main groups: a) the project stage; b) procedures or construction methods; and c) formulae for contracting. With regard to the first group, a study is made of the effect of an analysis and mapping of the ground on the tunnel project, and it is concluded that the more detailed the survey, investigation and mapping of the ground, the more satisfactory the results will be. Concerning the second aspect, the influence of the excavation process, soil support and loading, and removal of rubble is examined. When contracting underground works, the following points must be taken into consideration: 1) projects should be carried out rationally with regard to economic and construction aspects; 2) budgets should be flexible; 3) the greatest possible number of unit prices should be available for the different types of support; 4) the excavation price and the lining costs should be considered as variable. The contracting process should be as follows: a) updating of the estimated cost, b) direct control of the actual cost, and c) certification on a monthly basis and at origin. See also IRRD abstract No. 216643. /TRRL/ [Spanish]

Duelo, C
Ministry of Public Works, Spain Conf Paper May 1975, pp 91-103, 9 Phot.

ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain (LTMS61005E), Transport and Road Research Laboratory (IRRD-216642)
PURCHASE FROM: Ministry of Public Works, Spain Calle Alfonso XII 3, Madrid 7, Spain

00 131873
LAND CUT AND FILL
Computer program modifies IBM's standard time sharing Cut and Fill package in order to make the calculations necessary for railway operations.
Direct requests to G.E. Warfel, Chief Engineer, St. Louis- San Francisco Railway.

St Louis - San Francisco Railway Company No Date

ACKNOWLEDGMENT: St Louis - San Francisco Railway Company
PURCHASE FROM: St Louis - San Francisco Railway Company 3253 East Trafficway, Springfield, Missouri, 65802

00 132882
AN INTRODUCTION TO SOIL MECHANICS AND FOUNDATIONS. SECOND EDITION
The second edition of the book is the result of a full revision of the text of the first edition, and takes account of recent research. One chapter has been re-written to give a better assessment of the relation between mathematical models and the behaviour of real soils, and a new chapter has been added which gives an introduction to geotechnical processes. Chapters are as follows: the analysis and classification of soils; the clay minerals; pore pressure, effective stress and suction; permeability and seepage; consolidation; the shear strength of soil; site investigation and in situ tests; failure conditions in a soil mass; lateral earth pressure, stability of slopes; bearing capacity of foundations; piled foundations; geotechnical processes; and the finite element method. /TRRL/ /TRRL/

Scott, CR
Applied Science Publishers Limited 361 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213388)
PURCHASE FROM: Applied Science Publishers Limited Ripple Road Barking, Essex, England

00 132883
GROUTING OF TUNNELS TO PREVENT SMALL-SCALE INFILTRATION [Tunneltaetning mot Smaa Laeckage]
In large urbanised areas tunnels are often made use of for different purposes; examples are underground railways, sewage tunnels and air raid shelters. Since most of the ground surface in such areas is covered and drained to sewers, such tunnels can exert a considerable drainage effect and lower the subsoil water table, with consequent damage to houses and installations. The laboratory tests on the penetration of grouts into sand and narrow gaps, which are described in national Swedish building research report r45:1970, have been supplemented using new grouts and performing tests at lower temperatures. Limited field tests were performed in a rock tunnel of approximately six square metres cross section in order to find what degree of impermeability can be achieved using chemical grouts of low viscosity and high penetration capacity /TRRL/ [Swedish]

Bergman, S Lindman, K Lundstroem, L Soederman, P Ullerud, S
Statens Raad foer Byggnadsforskning R&D Rpt. 1975, 82 pp, 28 Fig., 8 Tab., 7 Phot., 11 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 214980)
PURCHASE FROM: Statens Raad foer Byggnadsforskning Fack, Stockholm 6, Sweden

00 132884
PROBING AHEAD FOR TUNNELS: A REVIEW OF PRESENT METHODS AND RECOMMENDATIONS FOR RESEARCH
Tunnel construction is an uncertain and sometimes hazardous undertaking because information on ground conditions along the alignment is never complete, no matter how good the site investigation. There is a strong need, therefore, for the development of reliable methods of determining ground conditions ahead of the advancing tunnel face, whilst recognizing that such methods should not interfere too much with the tunnelling operations. The working party on probing ahead for tunnels was set up to review the present state of knowledge and to make recommendations for research and development on promising methods. This report presents the findings. The methods available are long horizontal boreholes drilled between shafts, direct drilling from the tunnel face, geophysical measurements made at the tunnel face or on the surface or from a borehole drilled from the tunnel face and, in certain circumstances, the driving of A pilot tunnel. The principal recommendations are that encouragement should be given in the short term to collecting information and publishing details of existing practice in probing ahead, and in the medium term to the development of horizontal drilling methods for use either from shafts or at the tunnel face and to research into the feasibility of geophysical methods used either at the tunnel face or in a horizontal borehole. In the long term, encouragement should be given to a systems approach in which a horizontal drill would be fully incorporated into the tunnelling machine and a geophysical method could be operated in the probe hole. (A) /TRRL/

Transport and Road Research Laboratory R&D Rpt. No. SR171UC, 1975, 49 pp, 17 Fig., 4 Tab., 28 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215246)
PURCHASE FROM: Transport and Road Research Laboratory Department of the Environment, Crowthorne, Berkshire RG11 6AU, England

00 132888
STRUCTURAL AND CUT-OFF DIAPHRAGM WALLS
Following a brief account of early developments in the field of slurry trench excavations, the author describes the methods of forming cut-off walls and discusses slurry materials and properties generally. Chapters include descriptions of slurry testing methods and equipment, excavation equipment currently available and guidance on the mixing and re-use of slurry. A chapter on structural diaphragm walls includes case histories and descriptions of precasting units, and also post-tensioning and load-bearing systems. /TRRL/

Boyes, RGH (Andrews and Boyes Limited)
Applied Science Publishers Limited 1975, 181 pp, 58 Fig., 12 Tab., 21 Phot., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216386)
PURCHASE FROM: Applied Science Publishers Limited Ripple Road, Barking, Essex, England

00 132889
ANALYSIS OF THE PORE PRESSURE CHANGES FOLLOWING THE EXCAVATION OF A SLOPE
In a numerical analysis the pore pressure changes due to excavation of a slope and the subsequent dissipation of excess pore pressures were calculated. The analytical results of the pore pressure changes due to unloading of a slope agree reasonably well with pore pressure measurements in comparable embankments. This suggests that pore pressures immediately after slope excavation can be predicted analytically in homogeneous materials. The results of an analysis dealing with the dissipation of excess pore pressures due to unloading can also be substantiated by field evidence: however, only few comparable field data are available. For many slopes it can be noted that the time for full dissipation is of the same order of magnitude as the time between excavation and failure. This suggests that many failures might be caused by the delayed equalization of pore pressures. (A) /TRRL/

Eigenbrod, KD (Hardy (RM) and Associates) *Canadian Geotechnical Journal* Vol. 12 No. 3, Aug. 1975, pp 429-440, 9 Fig., 22 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215418)
PURCHASE FROM: ESL
DOTL JC

00 132926
DESIGN AND CONSTRUCTION OF SOME HIGH RAILWAY BANKS BETWEEN ERMELO AND PIET RETIEF
The construction of new railway line in the area required some major earthworks and revealed problems typical of the two geological and geomorphological regions traversed. On the Ecca Shales of the highveld, where high banks were to be constructed, adequate stability was achieved by removing 4 to 5 m of residual clay before placing permeable blankets. For the deep residual silts of the Archaean Complex in the lowveld, rate and amount of settlement were important, but sand-piles were not required and field monitoring of settlement aided design decisions.
Presented at the Reg. Conf. for Afr. on Soil Mech. & Found. Eng., 6th, Durban, S. Afr., Sept. 1975.

Williams, AAB Andrew, MR Glenday, BS
Balkema (AA) Proc Paper Vol. 1 1975, pp 263-269, 10 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Balkema (AA) Cape Town, South Africa

00 132928
STABILITY OF A RAILWAY CUTTING IN MICACEOUS SILTSTONES
Instability of a partially completed cutting was arrested by temporary drainage and careful monitoring. Analysis indicated that the final cutting would be unstable due to the low shear strength of thin layers of silty clay. Permanent anchors were adopted to provide a stable slope.
Presented at the Reg. Conf. for Afr. on Soil Mech. & Found. Eng, 6th, Durban, S. Afr. Sept. 1975.

Wagener, F Neely, WJ
Balkema (AA) Proc Paper Vol. 1 1975, pp 213-218

ACKNOWLEDGMENT: EI
PURCHASE FROM: Balkema (AA) Cape Town, South Africa

00 132974
EFFECT OF HEAVY AXLE LOADS ON BRIDGES
It is estimated there are 3500 miles of bridges on American railroads; replacement cost is estimated at $10 billion. The problem is not the spectacular, long-span steel bridges, but the many structures built many years ago for much lighter loading. As reconstruction is deferred, more speed and weight restrictions will have to be imposed; modern equipment may have to be prohibited from many lines. With scarce capital it will be many years before the frail steel spans of 1880-1900 are replaced. The Cooper E-60 rating permitted by the AAR Mechanical Division does not produce cars capable of unrestricted operation over the rail network. Timber trestles are particularly vulnerable to closely spaced axles.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Noyszewski, M (Illinois Central Gulf Railroad)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 133-138, 9 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

00 132976
HEAVY AXLE LOADS IN NATIONAL RAILWAYS OF MEXICO AND NEED FOR STRENGTHENING OF BRIDGES
National Railways of Mexico has been confronted with many low-capacity bridges on lines where heavy cars are being, or will be handled. While the new bridge standard is Cooper E72 rating, those built prior to 1970 range downward from E60 to E35 on some former narrow-gauge routes. NdeM has raised the ratings on some bridges since diesel locomotives have replaced steam with resultant reduced impact loadings. Slow orders are imposed on certain structures to handle concentrated program of strengthening bridges where it is reduce impact on bridges and use of neoprene pads under the rail base for the same reason have been widely applied. A concentrated program of strengthening bridges where it is economical has been undertaken. Bridges of low capacity or in bad condition are replaced.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Diaz, GR (National Railways of Mexico)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 148-154, 29 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

00 132981
DECAY IN TIMBER TRESTLES: WHAT IS ITS RATE OF GROWTH?
The destruction of wood, especially timber piles, by decay is examined. After defining the nature of decay, it is concluded that its progression is exponential rather than linear. Decay is seen expanding in all directions on the same mathematical basis as a sphere grows when its diameter increases. From this concept, a mathematical approach is developed which makes it possible to predict the percentage of reject piles that might be expected to develop in a trestle, or in all the trestles on a line at any future time. Because much of the piling in the 2,300 track miles of timber railroad trestles in the U.S. and Canada was driven between 1910 and 1930, the demand for heavy annual maintenance or renewal is predicted.

Williams, JR Norton, KJ *Railway Track and Structures* Vol. 72 No. 4, Apr. 1976, pp 26-29, 3 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

00 133414
USER'S MANUAL FOR THE STATIC ANALYSIS OF CURVED BRIDGE GIRDERS
This report presents the listing and operation of two computer programs designated CURSGL-single and multispan prismatic and nonprismatic curved girder, and CURSYS-system of curved girders with interconnected top deck and diaphragms. These programs have been written in FORTRAN 4, and were used on the UNIVAC 1108. The mathematical technique used herein is the solution of Ulasov equations and finite differences. Example application of the programs and sample input/output is given.
Prepared in cooperation with Federal Highway Administration, Washing-

ton, D.C., and Maryland State Highway Administration, Brooklandville. Bureau of Research.

Yoo, C Heins, CPJ
Maryland University, College Park, Federal Highway Administration, Maryland Department of Transportation Intrm Rpt. C.E.-55, AW-75-133-046, Sept. 1974, 105 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-251746/4ST, DOTL NTIS

00 133578
ON THE IMPROVEMENT OF HOMOGENEITY AND JOINTING METHODS OF PREPACKED CONCRETE
Prepacked concrete, economical because of mass production, is used for structural construction and repair, both under water and on land. As demand grows, quality must be assured with high volume production. Homogenization can be a problem, as can also the weakening of joints. In large structures, such as under-sea foundations, attachment to bed rock, prevention of leaks in the forms, methods for handling large volumes and assurance of homogenous construction have all been studied.

Harada, Y Iwai, Y *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 160-164, 8 Fig.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

00 133581
CONSOLIDATION OF PEAT BY MEANS OF ATMOSPHERIC PRESSURE MEASURE
Geotechnical investigations had indicated that a portion of the new Yokohama freight line would traverse a drowned river valley consisting of very soft peat layers. Stability of the embankment and cost of suitable fill made necessary some sort of soil stabilization. Atmospheric pressure loading, a consolidation procedure developed in Sweden, was tested. For soft and weak soil deposite, it was found that this method had great effect, particularly in the upper fibrous peat which was extremely soft. It is concluded atmospheric pressure loading is widely adaptable and is not confined to any single soil type.

Muromachi, T Misawa, T *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 150-153, 9 Fig., 1 Ref.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

00 133583
TAMING THE SIBERIAN TAIGA
Construction of the 4500-km Baikal-Amur Magistral (BAM) route, the new Transiberian railway north of the existing route, is proceeding across the taiga, or virgin territory, which has had less contact with man's activity than any other region of the world. It will provide a basis for industrial development in eastern Siberia. Permafrost and seismicity are the two most difficult geological features. However the climate, crossings of large rivers which have dramatic variations in flow rate, and the delicate, unstable nature of the ecosphere also complicate construction. An important question will be whether standard technology can be used in the harsh conditions of the region, or whether radically new construction techniques will have to be developed.

Adzhiev, ME *New Scientist* Vol. 69 No. 988, Feb. 1976, pp 382-384, 2 Phot.

PURCHASE FROM: IPC Magazines Limited 66-69 Great Queen Street, London WC2E 5DD, England
DOTL JC

00 133630
COMPUTER PROGRAMS [PROGRAMMES DE CALCUL SUR ORDINATEUR]
This book contains the computer programs established by the Soil an Foundation Division at the LCPC, except the Rosalie Program established by the Geotechnics Division. They deal mainly with structural design (slope stability, retaining structures, foundations), the interpretation of some test results (triaxial apparatus) or in-situ measurements (inclinometer). These programs, which are all operational, are written in FORTRAN 4. They can be used on the C 11 iris 80 computer. /TRRL/ [French]

Central Laboratory of Bridges & Highways, France Feb. 1974, 29 pp, Figs., Tabs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 102441)
PURCHASE FROM: Central Laboratory of Bridges & Highways, France 58 Boulevard Lefebvre, 75732 Paris, France

00 133631
THE OTHER SIDE OF THE TRACKS
The co-operation of two piling specialists on the site of connecting viaducts on the Stormy Down to Groes section (stage 1) of the M4 is described. This labour intensive method has had to be used following a British Rail stipulation made because the piling work is sited alongside the main South Wales railway line. Two kinds of construction have been used on each side of the track. On the south side high slump concrete using sea dredged aggregate has been used for the 544 bored piles. On the northern side 900 shell piles have been driven to depths of 6M. /TRRL/

Atkinson, I *Contract Journal* Vol. 268 No. 5021, Nov. 1975, p 23, 1 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216716)
PURCHASE FROM: IPC Building and Contract Journals, Limited 32 Southwark Bridge, London SE1, England

00 133634
IN SITU CONCRETING IN TUNNELS
This article outlines the various problems, and the methods of answering them which arise during the concreting stage of tunnel construction, using the experience of the Liverpool loop line as a typical example. This line is a new underground railway system which incorporates 3.2km of 5M dia. tunnel. Access for the contractors was limited to five vertical shafts down to the tunnel which ranges in depth from 20 to 35M below ground level. The question of inaccessibility, no concrete lorry could gain access to the tunnel, raised major problems involving delivery of concrete to the tunnel, rapid transit from the access point to the working point and the handling of the concrete at the working point. The use of steel-lined boreholes incorporating pneumatic doors at the base of the downpipes to deliver concrete to the tunnel is described, together with the use of pneumatic-tyred and rail-way-tracked vehicles in addition to pumping to rapidly transmit the material to the workpoint, and the placing methods employed at the workpoint. In all these operations timing was considered to be of utmost importance, and a high degree of effective supervision necessary /TRRL/

Owen, GP *Concrete* Vol. 9 No. 10, Oct. 1975, pp 14-17, 8 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216708)
PURCHASE FROM: Cement and Concrete Association 52 Grosvenor Gardens, London SW1W 0AQ, England

00 134061
THE ITALIAN JOB: 100 KILOMETRES OF VIADUCT AND TUNNEL
The article gives some details of the civil engineering on A 260km twin track railway being built between Rome and Florence. The horseshoe-shaped twin tunnels of 4.72M internal radius were constructed by conventional methods using arch ribs and sprayed concrete as a temporary support before forming the 600-800mm thick concrete lining. Large steel plates, which could be thrust forward to protect the face, were hinged to the part of the shield for the difficult clay and bedded sand of the Cartiglione tunnel. Viaduct construction has been standardised as far as possible to simply supported prestressed concrete twin-box girders. From Settebagni northwards each span was constructed using three steel girders which could straddle the supporting piers carrying all formwork for a span enclosed in a weather protecting shed. Between Orte and Citta della Piere the 25 and 29M spans were precast in two line is designed for speeds of 250km/h and has a minimum horizontal radius of 3000M. /TRRL/

Ferguson, H *New Civil Engineer* No. 173, Dec. 1975, pp 30-31, 1 Fig., 3 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217082)
PURCHASE FROM: Institution of Civil Engineers 26-34 Old Street, London EC1V 9AD, England

00 134063
TRANSPORT TUNNELS IN URBAN AREAS
After a short consideration of the vital role of transport in urban areas the various types of transport tunnel are described and the merits and problems of using tunnels to carry transport facilities are outlined. Data are given on the cost of constructing road and underground railway tunnels. Ground settlement due to tunnelling and the ventilation of road tunnels are considered. Examples of recent developments in European cities incorporating substantial underground works providing mass-transit, road and car parking facilities are described and an attempt is made to assess the future prospects of transport tunnels. /TRRL/

O'Reilly, MP (Transport and Road Research Laboratory) *Highway Engineer* Vol. 23 No. 1, Jan. 1976, pp 12-21, 11 Fig., 5 Tab., 24 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217526)
PURCHASE FROM: ESL

00 134308
CONSTRUCTION OF SHIN-KANMON TUNNEL-EXCAVATION OF GREAT FAULTY ZONE UNDERSEA
A detailed description of the construction of this railway tunnel is given. The article includes sections covering the following topics: cross-section of the tunnel; type of support; the route; summary of works; works of undersea section (construction method for undersea section, excavation of inclined shaft, long horizontal boring and pilot tunnel, geology of undersea zone, works in fractured rock layers in pilot tunnel, design and execution of works of main tunnel); execution of works of land zone with inferior rock (weak rock containing spring-water, zone having thin earth covering beneath urban area); and shotcrete methods and rock bolting methods. /TRRL/

Saita, T (Japanese National Railways) *Civil Engineering in Japan* Vol. 13 pp 43-65, 14 Fig., 8 Tab., 4 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217779)
PURCHASE FROM: Japan Society of Civil Engineers 1-chome, Yotsuya, Shinjuku-ku, Tokyo 160, Japan
7507041

00 134549
CHANGE IN THE STRENGTH OF CLAYEY SOILS IN TRACK INFRASTRUCTURE UNDER THE INFLUENCE OF VIBRODYNAMIC VEHICLE EFFECTS [Veraenderung der Tragfaehigkeit toniger Boeden im Eisenbahnunterbau beim vibrodynamischen Einwirken der Fahrzeuge]
The author describes test results in the laboratory and on site. Laboratory tests under triaxial stress conditions show changes according to water content, density and the intensity of vibration. Test results on an embankment show a drop in the strength of these soils as a result of vehicle vibrodynamic effects. [German]

Zinkin, GN *DET Eisenbahntechnik* Vol. 24 No. 1, Jan. 1976, pp 15-18, 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany

00 134570
THE UIC 71 LOAD DIAGRAM, THE NEW BASIS FOR RAILWAY BRIDGE DESIGN [Das Belastungsbild UIC 71, die neue Bemessungsgrundlage fuer den Eisenbahnbrueckenbau]
The construction of a modern international railway network, such as proposed by the European Infrastructure Master Plan, makes it necessary both to standardise and simplify the permissible load conditions for the design of railway bridges on the European continent. The recently-developed UIC 71 load diagram takes this requirement into account, and is adaptable for a wide range of the most varied traffic conditions. The author describes its principle and effects, with special reference to the effects of dynamic forces, and the ORE's work in Utrecht to determine the total increase in the dynamic loads. [German]

Prommersberger, G Siebke, H *Eisenbahntechnische Rundschau* Vol. 25 No. 1-2, Jan. 1976, pp 33-40, 2 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany
DOTL JC

00 134580
LARGE SCALE TESTING
The article describes techniques used by B.R. in measuring deflections and stresses in bridges. No specific bridge test is mentioned. New developments in equipment and techniques are reviewed.

Aitken, WR Whitbread, JE *Railway Engineer* Vol. 1 No. 1, Jan. 1976, pp 38-40, 4 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mechanical Engineering Publications Penthouse 1, 15 West 55th Street, New York, New York, 10019
DOTL JC

00 135179
FRACTURE OF STEEL BRIDGES CAUSED BY TENSILE STRESS
The report summarizes the study on the examples of fracture due to tensile stress and explains the situation, causes, and characteristics of outbreak of the fracture. It is concluded that plastic stress intensity factor is effective to analyze the brittle fracture.

Nishimura, T Miki, C *Japan Society of Civil Engineers, Journal of* Vol. 60 No. 11, Nov. 1975, pp 55-64, 45 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

00 135188
BEHAVIOR OF BOLTED JOINTS OF LARGE-STEEL-SEGMENTAL TUNNEL
This paper deals with the bolted joints of a large steel segmental tunnel built in a zigzag fashion and subjected to bending moment in the ring plane. The stiffness of the segmental joint subjected to axial compression on its contact surfaces was about one thirteenth that of main beams of the segment. The method of the structural analysis suggested was in fairly good agreement with the experimental results.

Shitate, S (Sumikin Piping and Construction Company, Limited); Inoue, H Yamakawa, S *Sumitomo Search* No. 11, May 1974, pp 52-62, 8 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

00 135208
SUPPORT FOR LONG TUNNELS YESTERDAY AND TODAY [Soutenement des tunnels profonds autrefois et aujourd'hui]
The authors use the studies on the stability of rail tunnels built at various times as a basis for examining the pattern of stress-deformation graphs to define the behaviour of various types of support and they reach the following conclusions: for schists, the resistance limit is attained at little depth, mechanised methods of fixing supports rapidly help during the period leading up to stability, the "new Austrian Method" can take various forms.

Duffaut, P Piraud, J *Industrie Minerale-Mine* No. 1, Feb. 1976, pp 15-31, 10 Fig., 1 Tab., 23 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

00 135210
PLASTIC FILTERS-A NEW CONSTRUCTION MATERIAL. TESTS ON DRAINAGE OF THE TRACK FORMATION [Kunstoffilter-ein neuer Baustoff, Versuche zur Sanierung des Untergrundes von Eisenbahngleisen]
Synthetic cloth and woven plastic are obtainable from industry firms, to be used for filtering and all problems to do with separating the upper layer of

soil and drainage. Under certain conditions these materials can be used to retain the soil and allow water to drain away. The article describes tests at present in progress on track bed drainage using these plastic filters. [German]

Martinek, K *Eisenbahningenieur* Vol. 27 No. 2, Feb. 1976, pp 51-54, 1 Fig., 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

00 136273
USE OF ASPHALT MATERIALS IN RAILWAY LINE INFRASTRUCTURE [Impiego dei materiali bituminosi nella sovrastruttura delle linee ferroviarie]
For the first time in Italy, it has been decided to use a sealed asphalt mixture (partically impermeable) as base layer (under the ballast) to reinforce and protect the infrastructure of the new FS Rome-Florence Direttissima line because trains will travel at high speeds (250 km/h) and traffic will be dense (200 trains per day in both directions). It is important to distribute evenly the load transferred from the ballast to the embankment and to ensure perfect line layout. The article describes in detail the characteristics of the elements making up the asphalt mixture used and construction work on the new track formation. [Italian]

Castaenetta, V *Ingegneria Ferroviaria* No. 12, Dec. 1975, pp 3-26, 25 Fig., 7 Tab., 8 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 136390
STRESS CYCLES FOR FATIGUE DESIGN OF RAILROAD BRIDGES
Fatigue design criteria for railroad bridges are evaluated in the light of latest research concerning fatigue. Railroad bridge loadings and stress histories of the primary and the secondary members are examined.

Wolchuk, R Mayrbaurl, RM *ASCE Journal of the Structural Division* Vol. 102 No. ST1, Jan. 1976, pp 203-213, Refs.

ACKNOWLEDGMENT: ASCE Journal of the Structural Division
PURCHASE FROM: ASCE

DOTL JC

00 136808
REPAIR OF CONCRETE WITH POLYMERS
The use of polymers was investigated for repairing cracked or damaged concrete. Several monomer systems, using methyl methacrylate as the primary monomer, were studied. The variables investigated included relative moisture content, crack width, monomer viscosity, concrete temperature, and the use of sand fillers. In many cases the original flexural strength of the plain concrete could be restored by the repair. The repair of reinforced beams that had been loaded to failure was investigated. Failure modes were flexural and diagonal tension. Sand filler was used with a monomer solution that cured at ambient temperatures. The freeze-thaw durability of repaired non-reinforced slabs was studied to determine the effect of crack width, monomer systems, and surface impregnation and the use of sand fillers. Several bridge abutments have been repaired using the techniques developed. A summary of the repairs is given.

Sponsored in part by Texas Highway Dept., Austin. Planning and Research Div. Prepared in cooperation with Federal Highway Administration, Washington, D.C. Report on Polymer-Impregnated Concrete for Highway Application.

Jaber, MM Fowler, DW Paul, DR
Texas University, Austin, Federal Highway Administration, Texas State Department of Highways & Public Transp Res. Rept. CFHR-3-9-71-114-3, Feb. 1975, 84 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-252490/8ST, DOTL NTIS

00 137699
THE TRIVAL FINITE ELEMENT CALCULATION PROGRAM [Le programme de calcul par elements finis trival]
The trival program is designed for computers of average capacity (44000 words maximum in the central memory). It comprises systematic methods of data in-put and out-put processing, but can only solve problems of homogenous, isotropic or conductivity linear elasticity, thermal or hydraulic linear elasticity under load, or homogeneous and orthotropic linear elasticity. This program was designed for the rapid, systematic, low-cost but accurate evaluation of displacements, stresses or temperatures and hydraulic loads in soil and rock masses, and in short plane or axisymmetrical structural elements. The use of this program and interpretation of the results require only a general knowledge of the finite element method and continuous medium mechanics. /TRRL/ [French]

Guellec, P Dubouchet, A *Bulletin de Liaison des Lab des Ponts et Chaussees* No. 66, July 1973, pp 39-43, Figs., 2 Ref.

PURCHASE FROM: Central Laboratory of Bridges & Highways, France Ministry of Equipment and Housing, 58 Boulevard Lefebvre, 75732 Paris, France

00 137701
MODERN TIMBER BRIDGES. SOME STANDARDS AND DETAILS
This summary of suggested bridge standards and details has been prepared with a view to coordinating bridge design criteria and timber design criteria, and to provide A background of suitable structural designs. It provides design information through which various spans, widths and types of bridges may be selected and combined to fit the site conditions. The range of suggested standards, so combined, will fill the needs of most of the possible bridge designs where the ground profile calls for a girder or stringer deck-type bridge. /TRRL/

Canadian Institute of Timber Construction 1970, 48 pp, Figs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 219589)
PURCHASE FROM: Transport and Road Research Laboratory 100 Bronson Avenue, Ottawa, Ontario, Canada

7604043

00 138082
CONCRETE TRACK TRIALS IN HOLLAND
Concrete deck sections carried directly on piling supports have been installed on an industrial branch line extending across low load bearing terrain by Netherlands Railways. The design of non-settling track for districts with poor subsoils has been under way for 8 years. Details of the installation costs and advantages and problems are detailed. Track is layed about 1.5 m above the surrounding ground and comparison with normal earth embankments is made.

de Steur, IW *Railway Engineer* Vol. 1 No. 3, pp 25-30, 3 Fig., 3 Tab.

PURCHASE FROM: Mechanical Engineering Publications Penthouse 1, 15 West 55th Street, New York, New York, 10019

DOTL JC

00 138304
MONEY-SAVING TUNNEL JACKING LEAVES RAILROAD UNDISTURBED
The paper reports how with excavation advancing immediately ahead of them, tunneling crews jacked a 6-lane highway tunnel forward into position beneath a four-track rail line without disrupting rail traffic.

Pedersen, AA *Construction Equipment and Materials* Vol. 58 No. 4, Apr. 1976, pp 61-63

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

DOTL JC

00 138306
DRILLING THROUGH THE ALPS
Between Oberwald, just south of the Grimsel Pass and Gletsch, and Realp, about 10 km southwest of Andermatt, work has been in progress since the summer of 1973 for the excavation of a 15.4 km railway tunnel with a cross section of about 25 sq m. 3500 m from the entrance at Oberwald the tunnel

will be excavated for double tracks over a stretch of 500 m, area 50 sq m. A similar enlargement will be made 4000 m from Realp. About 12 km west of Airolo in the Tessin, at Ronco in the Bedretto Valley, an about 9 sq m large and 5221 m long transport tunnel is being driven up to the railway tunnel at a point 6863 m from Oberwald. The project is being constructed by a consortium of Swiss, French and Italian contractors. The three tunnels, known as the Furka project, are to be completed by October 1978.

Australian Mining Vol. 67 No. 12, Dec. 1975, pp 27-29

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

00 138321
"PUSHBUTTON" SURVEYING

A three-electronics package combination developed by Hewlett Packard brings new simplicity to railroad surveying. An instrument which measures by pushbutton indication joins a special calculator and printer which provides hard copy results of the data collected.

Progressive Railroading Vol. 19 No. 4, Apr. 1976, p 27, 2 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606

DOTL JC

01 052731
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. REPEATED LOADING OF CLAY AND TRACK FOUNDATION DESIGN
This report on repeated loading of clay and track foundation design covers a three-phase investigation: Laboratory study of deformation of a cohesive soil subjected to triaxial loading; development of a design method for predicting depth of ballast required under track to prevent the failure of the subgrade; field investigations to check the validity of the design method. Among the conclusions: (1) Under repetitive loading some cohesive soils will fail at lower stresses than those causing failure under a single application; (2) For these soils a level of stress exists, above which repeated application causes rapid permanent deformation and plastic yielding, and below which repeated application causes terminating deformation; (3) Other cohesive soils with high silt or sand fraction do not exhibit a distinct threshold stress; (4) Threshold stress is not a unique parameter; (5) Standardized tests develop values useful in track design.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D71/RP 12/E, Oct. 1970, 44 pp, 34 Fig., 3 Tab., 5 Ref., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052732
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. SUMMARY OF THE RESULTS GIVEN IN REPORTS NOS. 1-2
This final report of investigation of the related effects of traffic loads and various track structural components is a summary of the 12 preceding interim reports. Studied were stresses in rails, in rail fasteners, in cross ties and in ballast and subgrade. Field tests, supplemented by theoretical investigations, have extended the knowledge about the stresses in the various components of conventional track. The results of the tests and investigations represent useful documentation for practical applications. In addition to summaries of the findings of all the investigations, there are some proposals for future work.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D71/RP 13/E, Oct. 1970, 31 pp, 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052733
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. STRESSES IN RAILS
This report describes measurements taken by the DB and SNCF with a view to studying the dynamic stresses in rails. Measurements were taken on a number of tracks with varying subgrade conditions and track structures. Forces of vehicles, including locomotives, operating at up to 200 km/h were measured. The report is in four parts. Part 1 defines the purpose of the measurements, the places they were taken, the quantities which were measured, and summarizes the principal results obtained. Part 2 describes the measuring and calibration methods. Part 3 reports the measurements taken by SNCF. Part 4 reports the measurements taken by DB. Data yields stress in rail under the effects of vertical and horizontal forces. Observations are made on importance of voids under ties, rapid increase in dynamic forces from lateral track misalignment, flexibility of vehicle suspensions, curve radius, track design and train speeds.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D71/RP 1/E, Apr. 1965, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052734
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. STRESSES IN CONCRETE SLEEPERS
The results of study of the mechanical characteristics of concrete cross ties are analyzed. Some experiments werein the laboratory and other were carried out in track. The prestressed concrete cross ties of SNCF, BR and DB, as well as conventional cross ties are appraised. Laboratory tests determined the modulus of elasticity of concrete and studied tie deformations under specific loads. Track tests indicated the extent to which the real stresses were dispersed. Experiments permit definition of statistical ranges convenient for evolving an empirical solution to defining cross tie dimensions and to determining acceptance conditions for ties examined at a manufacturer's works.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D71/RP 9/E, Oct. 1969, 77 pp, 108 Fig., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

01 052736
OPTIMUM ADAPTATION OF THE CONVENTIONAL TRACK TO FUTURE TRAFFIC. STUDY OF THE CHANGE IN TRACK GEOMETRY AS A FUNCTION OF TRAFFIC. ADDITIONAL RESULTS
The report deals with changes in the longitudinal level, cross level, alignment and gauge of conventional track under traffic loading. The tests were made in the field on different track constructions so as to enable the influence of different equipment parameters to be ascertained. Generally, it appears that track deterioration is proportional to the logarithm of the tonnage carried. The results of the measurements obtained are often scattered, which indicates that many parameters are near their optimum value. It could, therefore, be thought that the conventional track is now already largely optimised from experience and that only little improvement can be expected from equipment parameter modification.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D117/RP 7/E, Oct. 1975, 85 pp, 44 Fig., 7 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052740
UNCONVENTIONAL TRACKS. LAYING OF PRE-STRESSED CONCRETE SLAB TRACK AT NEUILLY-SUR-MARNE
A concrete slab track 300 m long has been constructed on the SNCF Outer Ring line around Paris used almost exclusively by freight trains. Speed is limited to 90 km/h, a high proportion of 20-ton axle loads are handled and traffic level is 100,000 tons per day. Subgrade is mediocre clay embankment. The behavior of the prestressed slab laid directly on this subgrade should permit rapid appraisal of this construction. After being subjected to 40 million tons of traffic, the indications are that maintenance should be low. It was determined that this method of construction would be costly, even if highly mechanized. The concrete seems subjected to small stresses and that the prestressing is only necessary to prevent cracks initiated by thermal effects.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D87/RP 14/E, Oct. 1975, 17 pp, 3 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052742
STUDY OF THE LOCAL HARDENING OF SOFT WOOD SLEEPERS BY BRUSH APPLICATION OR IMPREGNATION
No Abstract.

Restrictions on the use of this document are contained in the explanatory

material.
International Union of Railways Prog. Rpt. E35/CR 1/E, May 1956, 20 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052826
DETERMINATION OF PRINCIPLES TO BE APPLIED FOR THE FISHPLATES OF UIC-RAILS
The report first of all contains an analytical section summarizing the motives which led to the adoption of fishplates; motives which always remain valid, for, in spite of the desire of Engineers to promote to the utmost the use of long-welded rails, certain fields remain outside the scope of the latter. These motives obviously make it necessary to define the functions of fishplates in general, although these functions may well be contradictory. The following chapter specifically deals with the mechanical behaviour of the fish-joint, for which purpose the following items are examined: its behaviour under the passing of a wheel; the defects which become apparent during its ageing; the causes of these defects and the mistakes to be avoided; the importance of an isostatic joint and the possibility of applying this joint without committing the mistakes made in the initial tests; the importance of the diameter of fishbolt holes and of their position in relation to the end of the rail. The Rapporteurs next pay particular attention to showing that the opinions thus expressed are not simple unfounded views, but, for the greater part, are confirmed by experience and, in this respect, they quote fish-joint specimens more or less answering to these principles. Finally, they have especially drawn attention to the failures and drawbacks which might arise from the application of fish-plates anwereing to these new principles if the permanent way gangs are not instructed at the same time, lest these gangs should apply to the joint thus conceived the maintenance methods previously used for remedying the defects occurring in the older type of joint. In concluding, the Rapporteurs suggest the principles to be adopted for the fishplating of UIC rails, viz: long fish-plates; support on the upper and lower fishing surfaces of the rail, to be restricted to the working parts; horizontal cambering of each fish-plate so as to increase the degree of play take-up; application, as far as possible, of 3 bolts on either side of the joint; symmetrical profile; and vertical moment as high as possible, with small transverse moment.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. D32/RP 1/E, Oct. 1959, 43 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052827
QUALITY OF RAILS AND MEANS OF GUARANTEEING IT. DEFINITION TESTS AND SPECIAL TESTS ON THOMAS STEEL RAILS HAVING PROVED SATISFACTORY IN THE TRACK, AND THOSE HAVING SHOWN A POOR PERFORMANCE (THIRD SERIES OF TESTS) TEXT, APPENDICES, TABLES AND FIGURES
The investigation of the quality of rail steels and the means of guaranteeing it has been entrusted to the D 45 Specialists Committee at the request of the 7th UIC Commission. Two series of tests were made within the scope of this work. The first series concerned the testing of newly-rolled rails and the second the relationship between the performance of rails during tests and that in the track. An account of these tests is given in Interim Report Nos. 1, 2 and 5. The results published in these Interim Reports were very interesting and it therefore appeared advisable to the D 45 Committee to extend these tests by investigations of rails having proved satisfactory in the track and those having shown a poor performance. Performance was defined by taking into account suitable criteria. Approval of the Control Committee to make these tests was obtained, and the results are given in this Interim Report No. 9, for the rails manufactured by the Thomas process.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. D45/RP 9/E, Oct. 1966, 23 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052828
QUALITY OF RAILS AND MEANS OF GUARANTEEING IT--DEFINITION TESTS AND SPECIAL TESTS ON RAILS OF NORMAL QUALITY MADE OF SIEMENS-MARTIN STEEL AND ALSO ON RAILS OF WEAR-RESISTING QUALITY MADE OF SIEMENS-MARTIN STEEL, ELECTRIC FURNACE STEEL AND LD STEEL
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D45/RP 12/E, Apr. 1971, 61 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052867
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. STRESS DISTRIBUTION IN THE RAILS
The stress distribution in a rail results from the following; Stresses due to the vertical wheel loads; Stresses produced by the lateral guiding force; Stresses resulting from the central or eccentric longitudinal forces which act at the contact point between wheel and rail as a consequence of the adhesive friction; and Stresses caused by changes in the rail temperature.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. D71/RP 2/E, June 1966, 65 pp, 50 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052868
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. STRESSES IN FASTENING SYSTEMS. STATIC AND FATIGUE TESTS MADE IN THE LABORATORY ON VARIOUS TYPES OF FASTENING SYSTEMS (GERMAN, ENGLISH AND FRENCH SYSTEMS)
The object of Section II of the Programme of Work of the D 71 Specialists Committee is to complete the studies of rail fastening devices, which were already started by the D 11 Specialists Committee. It concerns in particular: 1) The study of the resistance offered by rail fastening devices to lateral forces. 2) The study in the track of the dynamic stresses in these devices during the passage of trains and the study of the reduction of the tightening forces. This Report contains a description of the tests made in the laboratory on several types of fastening systems, mainly concerning their resistance to lateral farces and the drop in tightening force following repeated loads exerted by a pulsating load device. Six types of fastenings on wooden sleepers have been tested: German fastenings, Type K, with baseplates held by 2 coach screws and spring washers; German fastenings, Type K, with baseplates held by 4 coach screws and spring washers; English fastenings, Mills Type MRC 2/3; French fastenings, rigid type, on baseplates with 3 coach screws; French fastenings, elastic type, on baseplates with 3 coach screws; French fastenings, elastic type, without baseplates with 2 coach screws; While allowing for the conditions under which these various types of fastenings are used, these tests have shown that these fastenings afford an important safety margin relative to the lateral forces currently encountered in the track. They have also shown a gauge widening for all the types of fastening systems by at least 2 mm after 2 million stress cycles and that this gauge widening had nearly reached its total magnitude after only 200,000 stress cycles. Finally they have shown that in elastic fastening systems the dynamic stresses and the loss of the tightening forces in the coach screws are favourably reduced.
Restrictions on the use of this document contained in the explanatory material.

International Union of Railways Intrm Rpt. D71/RP 3/E, June 1966, 21 pp, 16 Fig., 6 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052869
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. STRESSES IN THE FORMATION (RESULTS OF THE FIRST PHASE: DEVELOPMENT OF TECHNIQUES, STATIC TESTS)
The background and aims of the investigation are explained and the objects of this first phase are listed. A discussion of the results obtained is preceded by a brief description of the test site, the installed measuring equipment and the experimental procedure. A concluding survey relates the original objects to the actual achievements and gives proposals for the second and third phases of the experimental programme.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D 71/RP 4/E, June 1966, 15 pp, 36 Fig., 4 Tab., 6 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052870
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. STRESS INCREMENTS IN RAILS DURING STARTING AND BRAKING
Item 1 (b) of the D 71 Work Programme covers the measurement of bending stresses at the rail foot, of the shear stress at the outer rail head surface, and of the longitudinal stress in the rail-web induced during accelerating and braking. The report discusses the measuring methods employed, including the determination of wheel loads at the rails. Separate measurements were made with two electric locomotives, one diesel locomotive, and one steam locomotive all with axle loads between 20 t and 21 t), and each of the runs was repeated with a goods train weighing 480 t. These measurements disclosed increases in the axle load of up to 17% during starting (accelerating), the maximum values being in good agreement with theoretical maximum values and of up to 11% during braking. These increases are most pronounced in the case of the four-wheeled bogie locomotives. The highest shear stresses measured during these investigations approached the values measured during high-speed tests.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D 71/RP 5/E, June 1967, 17 pp, 16 Fig., 2 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052872
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. CLASSIFICATION OF BALLAST PRESCRIPTIONS
The ballast used for the permanent way (nature of ballast materials, granular structure, shape of the grains) is of decisive importance for the quality of the permanent way, and, consequently, for the riding quality. An elastic, stable and weather-resistant ballast bed is the first condition for a well-laid track and low maintenance expenditure. Investigations concerning the static and dynamic elasticity of the ballast have therefore been added to the programme of work for Question D 71. Within the scope of studies preceding those in the laboratory on behalf of Question D 71 in the Stevin laboratory of the Delft Technical University, the research group (Railways) of the Highway and Hydraulic Engineering Department has compiled a list of specifications concerning ballast materials used by fourteen European Administrations. Also the relevant prescriptions and conditions in the various countries pertaining to the individual properties of the ballast materials such as quality, grain shapes and sizes, etc. have been represented.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. D71/RP 7/E, June 1967, 62 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052873
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. STRESSES IN THE FORMATION (RESULTS OF THE SECOND PHASE: INFLUENCE OF SLEEPER PARAMETERS AND THICKNESS OF CONSTRUCTION
The Objectives of Phase II of the program were to examine the influence of the following parameters on the longitudinal and lateral stress distribution between the subgrade and track structure under quasi static loading: 1) Ballast and Subgrade thickness; b) Crosstie flexural rigidity; c) Crosstie spacing; d) Crosstie packing conditions. Another objective was to check the validity of elastic theory for calculating the stress distribution in the track substructure.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D 71/RP 8/E, Apr. 1968, 20 pp, 10 Fig., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052874
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. DEFORMATION PROPERTIES OF BALLAST (LABORATORY AND TRACK TESTS) VOLUME 1-TEXT AND APPENDICES. VOLUME 2-TABLES AND FIGURES
This report describes laboratory and field studies aimed at ascertaining the fundamental laws describing the response of the ballast layer in the track foundation to the action of repetitive loads. Measurements of the elastic and plastic deformation of ballast were made in triaxial and radially restrained (compressometer) samples. The vertical settlement of the ballast layer after maintenance was measured in the track. The appendices cover tests on the deformation of a ballast bed when compacted with a vibrator and measurements made in the laboratory on the deformation of and the load distribution through the ballast from two circular loading plates. The main conclusions are, that repetitive loading produces a more stable ballast structure i.e. a higher resistance to permanent deformation, the settlement of the ballast is extremely dependent upon the degree of initial ballast compaction and that the behaviour of the ballast can be predicted for constant stress conditions.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D 71/RP 10/E, Apr. 1970, 39 pp, Figs., Tabs., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052876
STRESSES IN THE RAILS, THE BALLAST AND IN THE FORMATION RESULTING FROM TRAFFIC LOADS. STRESSES IN THE BALLAST AND IN THE FORMATION (RESULTS OF THE THIRD PHASE: MEASUREMENTS UNDER DYNAMIC CONDITIONS
This report describes the measurement of stresses in a railway track foundation for various speeds and axle loads. It is shown that the stresses acting at: a) the sleeper soffit to ballast interface; b) the ballast to blanket interface; c) the blanket to formation interface are principally dependent upon: 1) the rail to sleeper reaction; 2) the sleeper support (packing) condition; 3) for b) and c) the depth below the sleeper soffit of the two interfaces. Over the speed range studied (o-96 km/h) there were no speed effects other than those influencing the rail to sleeper reaction.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D 71/RP 11/E, Oct. 1970, 34 pp, 13 Fig., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052879
TRACKS WITHOUT BALLAST FOR UNDERGROUND LINES IN URBAN CENTRES. ENQUIRY REPORT
Question D 87 "Tracks without ballast for underground lines in urban centres" was added to the Programme of Work of ORE in October 1963, during the 47th meeting of the Control Committee. A Specialists Committee was set up in October 1964 and the Programme of Work was approved in October 1965 by the Control Committee. On 8th June 1965, a questionnaire was sent to 18 Member-Administrations of ORE. The present Enquiry Report is based on the replies received from these Administrations; also it contains information received by the ORE from the "Teito Rapid Transit Authority". Six Administrations have already constructed tracks without ballast. In particular some have been occupied with: studies concerning the elasticity of the track, measurements of vibrations of tunnel invert and vault and in surrounding ground, noise measurements in tunnel and vehicles, tests to reduce the noise level by sound-absorbing lateral screens. Despite the importance of these studies, the data thus obtained in rather incomplete and lacking in uniformity (methods applied and conditions under which the measurements were made, results obtained). Therefore, in the present report, the Specialists Committee D 87 proposes to the Members of the Control Committee that the study of tracks without ballast should be pursued as follows: 1) unification of methods, measuring conditions and also the methods of interpretation, and 2) comparative tests in the laboratory and in the track on 5 types of direct track fixing systems.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. D87/RP 1/E, Oct. 1966, 30 pp, 29 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052881
TRACKS WITHOUT BALLAST FOR UNDERGROUND LINES IN URBAN CENTRES. LABORATORY REPEATED-LOADING TESTS OF SELECTED TYPES OF DIRECT FIXING FOR UNDERGROUND LINES
This report is limited to an account of laboratory tests to define mechanical properties under static and repeated loading of five chosen types of direct fastening.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D87/RP 3/E, Oct. 1968, 17 pp, 79 Fig., 4 Tab., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052882
UNCONVENTIONAL TRACKS. EFFECT OF CRACKS IN PAVED CONCRETE TRACK. THEORETICAL APPROACH
Calculation method is presented to represent the effects of cracking in a concrete slab. Cracks should be regarded as probable in any estimate of necessary reinforcing steel. Design of the Duffield (BR) slab provides numerical example.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D87/RP 11/E, Apr. 1975, 17 pp, 10 Fig., 10 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 052903
DEVELOPMENT OF HEAVY RAIL-PROFILES. GUIDING PRINCIPLES FOR THE DEVELOPMENT OF HEAVY RAIL-PROFILES
Report D 120/RP 1 summarises the existing information, based on bibliographical studies, and gives an outline of the guiding principles to be adopted for the study. This study will take into account the results of recent investigations carried out by the other ORE Specialists Committees or by Administrations on problems concerning wheel-rail contact and increasing running speeds.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D120/RP 1/E, Apr. 1971, 21 pp, 4 Fig., 17 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 053157
UNCONVENTIONAL TRACKS. CONSTRUCTION OF THE BALLAST-FREE TRACK AT RHEDA (WESTPHALIA)
This report is one of a series describing experience with slab track in main lines. The DB high speed track through Rheda uses sleepers already fitted with rail fastenings, and positioned prior to casting a concrete slab. To the observations from the DB are added comments of the Specialists Committee.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D87/RP 12/E, Oct. 1975, 19 pp, 4 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 053159
OPTIMUM ADAPTATION OF THE CONVENTIONAL TRACK TO FUTURE TRAFFIC. RHEOLOGICAL PROPERTIES OF THE TRACK (CONTINUED)
Measurements of ballast stiffness and damping have been made for ORE D 117 Committee. Two aspects of the work are reported here. A special purpose vehicle was built to measure static and dynamic stiffness and energy losses for a range of ballast depths and formations, on existing BR tracks. Results of these tests are reported here. Appendix 1 contains an account on the validity of the theory of foundation vibration and concludes that a relatively simple model can be used to predict ballast behavior.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D117/RP 6/E, Apr. 1975, 29 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 053169
UNCONVENTIONAL TRACKS. REPORT ON THE DESIGN AND CONSTRUCTION OF THE TRACK WITHOUT BALLAST IN THE HEITERSBERG TUNNEL OF SWISS FEDERAL RAILWAYS
From its inception the Heitersberg Tunnel has been equipped with slab track as previously tried in the Bozberg Tunnel. Switches and crossings within the tunnel are on concrete slab. Design details are given.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D87/RP 15/E, Oct. 1975, 32 pp, 22 Fig., Refs., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

01 093374
NORTHEAST CORRIDOR HIGH-SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 3. TRACK AND STRUCTURES STANDARDS DEVELOPMENT
Track and structure characteristics and problem areas to be encountered in upgrading the Corridor are discussed. Standards considerations and applicability are outlined along with the maintenance history of the Corridor. Track system options for application to 150 MPH High Speed Rail (HSR) service are discussed and performance records examined. Concrete ties, fastener systems and ballastless track (concrete slab) are considered with wood tie track in a structural and cost effective investigation. Factors of type and frequency level of HSR train service and potential joint usage with freight movements are projected for these analyses. With this information, design parameters such as lateral and vertical track stability are investigated and established. On basis of structural integrity, selected track system candidates are costed over a 50 year life cycle of construction and maintenance. All projected maintenance items are described in detail with cycle rationale delineated.
See also PB-243 419.

Howell, RP Kendall, RA Magee, GM Holowaty, MC Holness, KJ
De Leuw, Cather/STV, Federal Railroad Administration Final Rpt. FRA/ONECD-75/3, Sept. 1975, 355 pp

Contract DOT-FR-40026

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-245774/5ST, DOTL NTIS

01 093600
TEST TRAIN PROGRAM SIXTH PROGRESS REPORT
The report describes the progress of the Rail Research Program involving operation of the FRA test cars and the performance of other rail research efforts during the period 1 July 1973 to 30 June 1974. High-lights of the work reported include operation of the FRA test cars to perform track surveys and other rail research activities; test car upgrading; expansion of the Rail Research Program; and data management and data analysis tasks which have been undertaken to benefit railroad technology. The Rail Research Program primarily involves the operation and instrumentation of the FRA test cars. This research program is designed to provide high-speed measurement of railroad track characteristics, development of comprehensive track measurement techniques, development of special testing instrumentation, and data evaluation through analysis and electronic processing.
See also PB-241 419.

Peterson, C Kaufman, W Yang, TL Corbin, J
ENSCO, Incorporated, Federal Railroad Administration FRA/ORD/D-75-25, June 1974, 128 pp

Contract DOT-FR-20032

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247084/7ST, DOTL NTIS

01 093930
SPECIAL RESEARCH REPORT COMPUTER DESIGN OF GLUED LAMINATED TIMBER BRIDGE SYSTEMS
This report presents investigations of the use of glued laminated structural timber for system building of short span bridges. With the recent developments and performance appraisal of glued laminated components, the all-timber bridge becomes attractive. Longitudinal stringers with transverse decking properly designed and preservatively treated, produces a system which is easy to erect, enduring and has little maintenance requirements. Investigations also include using steel and prestressed girders with vertically glued laminated decking. Computer programs are developed to design two types of systems: glulam girders with glulam deck and prestressed spread box girders with glulam deck. Design information provided in this report is adequate to enable comparisons of the systems and to build prototypes to study the systems under real conditions.
Prepared by West Virginia Univ., Morgantown. Dept. of Civil Engineering Sponsored by West Virginia Dept. of Highways and Federal Highway Administration

Wolford, CW GangaRao, HVS
West Virginia Department of Highways, West Virginia University, (HPR-73041) Res. Rpt. WVDOH-50-1, May 1975, 162 pp

ACKNOWLEDGMENT: NTIS (S0405)
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-274802/2ST, DOTL NTIS

01 125806
RAILROAD TRACKS FOR HIGH-SPEED TRAINS
[Eisenbahnoberbau fuer Schnellverkehrsstrecken]
Design criteria for railroad beds and structures to support heavy loads and high-speed trains are discussed. Specially designed fish plates with bolts that employ springs for holding rails are described. [German]

Eisenmann, J (Technical University of Munich, West Germany) *Verein Deutscher Ingenieure Zeitschrift* Vol. 17 No. 17, Apr. 1975, pp 335-341, 20 Ref.

PURCHASE FROM: ESL

01 129180
TRACK GEOMETRY CAR. MANAGEMENT USAGE
At Canadian Pacific tables and graphs are drawn up from track geometry car recordings and these supply information easily interpreted by the various different levels of staff in the Track Maintenance Department on: immediate action, long or medium term planning. This article describes such working methods.

Holt, RW *AREA Bulletin* Vol. 76 No. 653, June 1975, pp 561-572, 4 Fig., 3 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

01 129181
EVOLUTION OF RAIL STEEL AND RAIL SECTIONS AND WHAT IS BEING DONE RELATIVE TO THIS MATERIAL TODAY
Account of the shapes and manufacturing processes for making steel rails over the years in the USA and brief details of the AAR's research into tests, specifications, chemical composition, treatment and rail microstructures as well as into fault detection.

Schoeneberg, KW *AREA Bulletin* Vol. 76 No. 653, June 1975, pp 653-664, 3 Fig., 3 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: ESL
DOTL JC

01 129786
A TEST SECTION FOR DETERMINING THE RUNNING BEHAVIOR OF WAGONS OVER MARSHALLING YARD HUMPS
[Ob izmeritelnom ucastke dlja opredelenija hodovyh svojstv vagonor na Sortirovocyh gorkah]
The article examines the problems connected with selecting the most rational length of track for tests to determine wagon running characteristics over marshalling yard humps. The highest speed for splitting up a train is reached at the shortest possible distance between the crest of the hump and the points at the head of the group of sidings, i.e. about 60 m. away. Wagons coming off the hump must be spaced out. The test section can be designed for two 4-axle wagons since the distance required between the crest of the hump and the points at the head of the set of sidings is in the vicinity of the optimal distance. [Russian]

Strakovskij, II Tiskov, LB *Vestnik Vniizt* Vol. 34 No. 5, 1975, pp 54-59, 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

01 129796
RESIDUAL STRESSES IN SERIES P65 HARDENED RAILS
[Ostotocnye naprjazenija v Zakalennyh relsah P65]
This article gives the results of a study on residual stresses in core hardened rail produced by the Nijni Taghil (Central Urals) steel combine. The authors

discuss new rail, as well as rail over which trains of various tonnages have been hauled. A comparison of diagrams showing residual stresses in new rail and those in rail over which 152 and 235 million gross tonnes have been hauled show that, for the most part, there is no difference between the location of these stresses in the web and the rail flange of new rails, and those in rails which show wear. However, the study showed that the type and extent of residual stress on the contact area of the rail head is modified when trains run on these rails. Traction stresses of 8.1 kgf/mm2 were recorded on the rail head of new rails, whilst stresses of 4.5 and 3.1 kgf/mm2 were recorded on rail heads over which 152 and 235 million gross tonnes had been hauled. [Russian]

Sahunjanc, GM Nikonov, AM *Trudy CNII MPS: Ostat naprja i proc zelez relsov* Vol. 491 1973, pp 27-29

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Trudy CNII MPS: Ostat naprja i proc zelez relsov Moscow, USSR Repr. PC

01 129802
WHAT REALLY HAPPENED ON THE BLACK MESA AND LAKE POWELL?
In the face of conflicting reports concerning the track problems of the Black Mesa & Lake Powell, this article reports the results of an on-site investigation. Management view is that the track bed is sound, rail was properly laid and has perfact alignment, but there have been problems with rail fastenings. This has led to problems with the concrete cross ties, which developed spalling under the rails. BM&LP is replacing about 75,000 of its original 196,000 concrete ties with 100,000 wood ties, leaving 121,000 concrete ties in service. All concrete ties on curves greater than 30 minutes are being replaced. The spalled areas of all remaining ties are being repaired with a sand/epoxy mix. Clip bolts on all remaining concrete ties are being replaced with high-tensile steel and the rubber pads under the rails are being replaced with hard polyethylene pads, retaining original clips.

Dick, MH *Railway Age* Vol. 177 No. 1, Jan. 1976, pp 26-29, 4 Phot.

PURCHASE FROM: XUM Repr. PC
DOTL JC

01 129813
LIGHT RAIL PERMANENT-WAY REQUIREMENTS AND SOURCES
This paper sets forth the technical requirements for the permanent way needed in construction of light rail transit facilities and then develops sources for assembling rights-of-way. Described first are the physical capabilities of light rail transit for grade, curves, and clearances. Requirements for the guideway are established with the development of standards for track work suited to light rail transit. The latest techniques in track component design are evaluated. Pitfalls to be avoided in light rail facility design are pointed out. General requirements for stations are set forth with particular emphasis on space needs. Types of platforms, shelters, and security enclosures are described. Station needs for light rail transit are contrasted with the needs of full-scale rapid transit. Sources that can be considered for light rail rights-of-way are treated in a way intended to stimulate the imagination of the engineer and planner in locating potential routes. Dealt with are surplus railroad tracks, boulevard and freeway center strips, canal beds, stream channelization, electric transmission lines, parkways, street running, reservation of streets, and the selective application of elevated lines, bridges, and subways to light rail transit. Advantages and limitations of each type of right-of-way are explained.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Landgraf, RJ (Ohio Department of Transportation) *Transportation Research Board Special Reports* No. 161, 1975, pp 77-85, 9 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

01 129852
DOT TEST TRAIN PROGRAM SYSTEM INSTRUMENTATION MANUAL-SIXTH EDITION
This manual describes track measuring instrumentation which has been developed during the report period and covers all instrumentation currently installed aboard the FRA test cars. The major emphasis of this report deals with the operation and calibration of the track geometry measurement system installed aboard test car T-3. Ancillary systems as well as equipment aboard test cars T-1, T-2, and T-4 are also summarized. New track measurement subsystems such as the alignometer, compensated accelerometer, grade, and magnetic gage systems are described briefly in this report. These systems are scheduled for prototype testing on the FRA test cars during the coming year, and will be fully documented in subsequent reports.
Sponsorship was from Federal Railroad Administration, U.S. DOT.

ENSCO, Incorporated, (DOT-FR-74-23) Ann. Rpt. FRA-ORD&D-75-26, Dec. 1974, 126 pp, 70 Fig.

Contract DOT-FR-20032

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-250776/AS, DOTL NTIS

01 129860
STUDY OF TRACK IRREGULARITY INSPECTION SYSTEM WITH ACCELEROMETER
Measurements of rail profile and alignment are done by the mid-chord offset system; this is suitable for ride quality determinations of conventional vehicles. Japanese National Railways has been experimenting with a track profile measuring instrument for use on the Shinkansen which consists of an accelerometer mounted on the journalbox of one wheelset with the signal double integrated to give an absolute profile.

Takeshita, K Kishimoto, S *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, p 136, 2 Fig.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

01 130672
LI TRIES FOR MORE TIE LIFE BY REDUCING TIE-PLATE WEAR
To reduce the cutting of wooden cross ties by tie plates, the Long Island Rail Road has initiated tests of Pandrol rail fastenings with special plates having shoulders that accommodate the legs of the spring clips. The goal was to increase the 28-year tie life experienced on heavy-density routes. A 13-mile stretch of new continuous welded rail has been secured with the Pandrol fastenings; tie plates are secured with three Lock Spikes. Tie life is enhanced by eliminating movement of the plates on the ties and a stiffer track structure is thought to have been produced. In addition to the longer service from ties, the Pandrol assembly simplifies the changing of defective rails and avoids problems of spike killing of ties and the loss of plate gauge every time a rail is changed.

Railway Track and Structures Vol. 72 No. 1, Jan. 1976, pp 26-27, 5 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

01 130800
IMPROVEMENT OF THE RESISTANCE OF HARDENED STEEL RAILS WITH FLAWS OF THERMOMECHANICAL ORIGIN
[Povysenie procnost, zakalennyh relòsov s termomehaniceskimi povrezdenijami]
The article describes the results of studies into the effect of flaws of thermomechanical origin in hardened rails on the resistance characteristics of these rails. It is seen that the reduction in static and wear resistance, plasticity, tensile strength of rails, as results from wheel slipping and skidding, can be lessened by heat hardening of the rails. [Russian]

Sur, EA Porosin, VL *Vestnik Vniizt* Vol. 34 No. 7, 1975, pp 48-51, 1 Tab., 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

01 130813
ON THERMIT WELDING OF NATURALLY HARD RAILS OF SPECIAL STEEL CHROMIUM-MANGANESE [Zum aluminothermischen Schweissen von Naturharten Schienen aus Sonderguete Chrom-Manganstahl]
An intermediate casting is used for rail welding. The temperature levels must be adapted to the qualities of the alloys. Welding done respecting the manufacturers' advice have generally given good results on lines with very heavy traffic flows. [German]

Heller, W Schweitzer, R *Eisenbahntechnische Rundschau* Vol. 24 No. 10, Oct. 1975, pp 357-364, 9 Fig., 2 Tab., 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC
DOTL JC

01 130817
DETERMINATION OF THE HEAT STRESSES IN THE RAILS OF A TRACK WITH LONG WELDED SECTIONS BY MEANS OF A PERMEABILITY CHANGE MEASURING DEVICE [Bestimmung der thermischen Kraftgroessen in den Schienen eines lueckenlosen Gleises mit Hilfe eines Permeabilitaetsaenderungs-Messkopfes]
To clarify various points over practical use of the effect of permeability to determine thermal stresses in tracks with long welded rails, the author shows a common characteristic of the causes behind mistakes in the results from the measuring device. He also defines the areas in which the method is applicable to obtain statistically accurate measurements and establish the temperature for laying long welded rails. [German]

Mazur, S *Eisenbahntechnische Rundschau* Vol. 24 No. 10, Oct. 1975, pp 378-381, 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany
DOTL JC

01 130820
SUITABLE POINTS ARRANGEMENTS AND LENGTH OF SCISSOR CROSSINGS IN STATIONS [Zweckmaessige Weichenanordnung und Laenge der Bahnofsweichenstrassen]
The author establishes the optimum number of points and crossings and the optimum length of points systems in stations. He also shows the interaction between the number of points and crossings and scissor crossings by explaining formulae and calculation methods. [German]

Tassev, J *Hochschule f Verkehrs F List Wissenschaft Zeitschr* Vol. 22 No. 1, 1975, pp 221-227

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hochschule fuer Verkehrswesen Friedrich List Friedrich List Platz 1, Dresden 801, East Germany

01 130821
USE OF COMPUTER IN THE LAYING OF TRACKS FOR THE NEW SANYO LINE
In the Okayama-Hakata section of the Sanyo line, slab tracks (on straight or curved sections) are scheduled to be laid a distance of 272 kms. The track layout is verified by means of column ribs placed at standard interval: 5 m, on which a datum instrument is installed. The intervals depend on the construction of the track and the method for calculating the versine is very complicated. Accordingly, a computer is used for calculations; the article gives a detailed description of the procedure used with examples.

Sakai, T Tanaka, I *Permanent Way* Vol. 16 No. 1, Series No. 58, July 1975, pp 1-14, 14 Fig., 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

01 130823
DISTRIBUTION OBLIQUITY [Die Schiefe einer Verteilung]
With the help of several sets of figures for rail operations, the author illustrates the calculation of statistical measurement of skew. Then by means of the obliquity, he evaluates the operating process models (e.g. beta, binominal, Poisson, Erland, Weibull), using them to represent observations on these processes. [German]

Potthoff, G *DET Eisenbahntechnik* Vol. 23 No. 10, Oct. 1975, pp 464-467, 6 Tab., 11 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany Repr. PC

01 130824
TURNOUT SNOWMELTER OF ELECTRIC HOT AIR BLOWER TYPE
The advantages of this equipment are discussed and compared to other systems. It has one drawback: it uses an air supply duct, heated by electricity which is expensive. This drawback is offset by the use of rational automatic control of the electric power supply, according to weather conditions. The article describes its structure, its regulation and the tests carried out.

Suzuki, S *Permanent Way* Vol. 16 No. 1, Series No. 58, July 1975, pp 15-24, 12 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

01 130826
SYMPOSIUM ON RAILROAD TRACK MECHANICS PRINCETON UNIVERSITY, 1975
This report contains a description of the Symposium on Railroad Track Mechanics which took place at Princeton University on April 21, 22 and 23, 1975. It contains the program as well as extensive summaries of each technical paper. The papers: Development of Analytical Models for Railroad Track Dynamics; The Mechanics of Rail Fasteners for Concrete-Slab Tracks; Experimental Determination of the Axial and Lateral Track Ballast Resistance; Railroad Track Structure for High Speed Lines; Lateral Buckling of Tracks Due to Constrained Thermal Expansion; A Contribution to Ballast Mechanics; Review of Rail-Wheel Contact Stress Problems; Excitations and Behavior of Railroad Track During Train Passage at Very High Speeds; Selection and Performance of Railroad Ballast; Deformation of Railway Ballast Under Repeated Loading Conditions; Requirements for the Reliability Assessemnt of Railroad Rail in Service; The Current Status of Measurement and Evaluation Technique for Structure-Borne Sound Measurement of Track; Development of the Prestressed Concrete Tie in the USA.

Sponsorship was from the Federal Railroad Administration, DOT. See RRIS Nos. 01 130827 through 01 130839 and 10 130838, Publication 7602.

Kerr, AD
Princeton University Final Rpt. 76-TR-1, Oct. 1975, 41 pp

Contract DOT-FR-54175

PURCHASE FROM: NTIS Repr. PC, Microfiche
DOTL NTIS

01 130827
THE DEVELOPMENT OF ANALYTICAL MODELS FOR RAILROAD TRACK DYNAMICS
A renewed interest during the past decade in high-speed rail transportation has underlined a need for better understanding of the dynamic interaction between vehicle and track. Speeds in excess of 160 km/h tax the presently used rail-tie-ballast track structure in terms of long-term stability and required track accuracy. Hence, the investigation of improved structures with better dynamic response characteristics and greater stability has followed in the wake of improved high-speed railcar design. This paper presented some recent developments in analytical modeling of railroad track structures for the study of vehicle-track dynamic interaction by computer simulation. Field measurements taken on main-line track of several North American railroads were used to evaluate the accuracy and define the necessary modifications of the computer model. Predictions of better overall system response and long-term stability from this computer model have aided in the preliminary design of several new track structures which are currently undergoing field evaluation.

This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Ahlbeck, DR Meacham, HC Prause, RH (Battelle Columbus Laboratories)
Princeton University 76-TR-1, Oct. 1975, pp 21-22

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130828
THE MECHANICS OF RAIL FASTENERS FOR CONCRETE-SLAB TRACKS
In the growing use and potential development of the concrete rail base in place of ballast, rail fasteners serve a vital function. To a large extent they substitute for the elasticity that is traditionally provided by ballast. In addition, they may aid in the possible suppression of noise. Since the first use of concrete slabs for railroad use, fastener problems have been persistent. In this paper, Bramall summarized basic design principles and practical applications that are being developed for rail fasteners for such installations. An analysis and comparison of experiments with various fasteners and analysis of their characteristics may serve as a design guide and a basis for further investigation.
This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Bramall, B (International Union of Railways)
Princeton University 76-TR-1, Oct. 1975, pp 34-35

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130829
EXPERIMENTAL DETERMINATION OF THE AXIAL AND LATERAL TRACK BALLAST RESISTANCE
This paper presented a state-of-the-art survey of the various techniques for determining axial and lateral track-ballast resistance and described the experimental methods used in these investigations. The survey included a comparison of the results produced by several investigators. The discussion included data on the effect of compaction of ballast and the effect of an increase in ballast. Various methods of static and dynamic measurements of lateral and axial resistance by rails, ties, and ballast were presented.
This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Dogneton, P (International Union of Railways)
Princeton University 76-TR-1, Oct. 1975, pp 14-16

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130830
RAILROAD TRACK STRUCTURE FOR HIGH SPEED LINES
Speeds in the 250-300 km/h range demand a track with precise alignment with elastically mounted rails, and low maintenance cost. Along with an improved ballasted track, a track structure mounted on a rigid pavement, distinguished by a precise mounting of the rails and the promise of low maintenance cost, was discussed. Prof. Eisenmann described a track structure using a concrete paving slab. The results presented were based on research carried out at the Institute for Construction of Land Transport Routes of the Technical University of Munich. On the basis of research work of the last two decades and current practical experience, it has been determined that a reinforced ballasted track may be used for speeds up to 250 km/h. For higher speeds an elastic rail mounting on a rigid pavement has been investigated. Experiments performed on the high-speed section of the Deutsche Bundesbahn between Bielefeld and Hamm using concrete ties demonstrated a noticable improvement with the insertion of a soft rubber pad in the area of the rail fastening. Experience in highway construction indicates the pavement should have a multi-layered structure, and the supporting system must be frostproof. With a correct calculation of dimensions and structural design, ideal conditions are created for trouble-free wheel motion with an almost complete elimination of maintenance work.
This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Eisenmann, J (Munich Technical University)
Princeton University 76-TR-1, Oct. 1975, pp 6-7

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130831
THE LATERAL BUCKLING OF RAILROAD TRACKS DUE TO CONSTRAINED THERMAL EXPANSIONS
Thermal buckling of jointed tracks has been a problem for quite some time. Its occurrence has greatly increased since the introduction of CWR. In spite of intensive research conducted in several countries over the past several decades, to date there are no reliable analyses to predict the buckling temperature of a railroad track. The purpose of this paper was to review the relevant test results and various analytical attempts to solve this problem. The discussion sought to review their deficiencies and thus pave the way towards a solution of the track- buckling problem.
This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Kerr, AD
Princeton University 76-TR-1, Oct. 1975, pp 12-13

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130832
A CONTRIBUTION TO BALLAST MECHANICS
Most railroaders are apparently convinced that conventional track, will not meet the performance requirements of future traffic. It is clear that immediate progress will stem from current research experiments. In this paper the author described tests he conducted in conjunction with the Austrian Federal Railways to improve conventional railroad track. First, the effect of grain size, grain shape, and quality of ballast upon stability of the road bed were considered. This was followed by a discussion of the plastic and elastic settlement of the ties and a comparison between the behavior of the ballast bed and that of a spring model. Prof. Klugar introduced a new type tie called the "wing tie" devised to increase lateral stability. The author then discussed the lateral displacement of the track in connection with buckling tests in sharp curves.
This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Klugar, K (Graz Technical University)
Princeton University 76-TR-1, Oct. 1975, pp 38-39

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130833
A REVIEW OF RAIL-WHEEL CONTACT STRESS PROBLEMS
Nearly 200,000 defective rails were located on U.S. railroads in 1972. Rail failures are one of the largest single causes of derailments, ranking somewhat ahead of the next most substantial contributor: wheels and axles (bearings). Furthermore, a high degree of correlation was observed between the rail-related accidents and the ton-miles carried, suggesting that a higher utilization of the rail system may lead to yet higher accident rates. The defective rails and rail-failure-related accidents occur in spite of a massive

inspection effort and the installation of over 700,000 tons of new rail annually. Not all defects are equally likely to cause derailments. Rail-end failures (bolt-hole cracks and head/web separations) occur most frequently, but are not proportionately the largest cause of accidents. Transverse defects, which are less frequent, can account for a disproportionately high number of accidents.

This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Paul, B
Princeton University 76-TR-1, Oct. 1975, pp 25-26

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130834
STRESSES AND BEHAVIOR OF RAIL TRACKS DURING THE PASSAGE OF TRAINS TRAVELLING AT VERY HIGH SPEEDS; STANDARDS ADOPTED BY THE SNCF FOR ITS FUTURE VERY HIGH SPEEDS LINES (250/300 KM/H)

On the Paris-Madrid line in Southwest France, between Bordeaux and Dax, there is a section on which there are two straight stretches of 20 to 45 km, separated by a curve with a radius of 2850 meters. This SNCF line allows tests to be carried out at speeds of over 250 km/h. Since August 1972, two prototype trains, the TGV 001 turbotrain, and the Z 7001 electric motor train, have been traveling four times a day at speeds between 250 and 320 km/h. This paper summarized the knowledge acquired in France as the result of systematic tests carried out at those speeds in anticipation of the new Paris-Sud-Est line on which trains will travel at speeds of over 250 km/h. Although the problems are not yet completely solved, they are at least now defined very clearly, and none of them is of a fundamental type. The doubts raised a few years ago now appear to be baseless, at least for speeds of up to 300 km/h.

This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Prud'Homme, A (French National Railways)
Princeton University 76-TR-1, Oct. 1975, pp 29-31

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130835
SELECTION AND PERFORMANCE OF RAILROAD BALLAST

This paper reported an investigation of ballast selection, using standard and modified standard classification tests. The results enable ballasts to be selected with better reliability. A large number of standard laboratory tests were performed on ten ballasts to determine correlation with field performance. The field performance in terms of stability and in terms of breakdown of the ten ballasts was obtained from a CNR field test. In addition, the behavior of a layer of ballast was investigated under ideal loading conditions. Vibration tests investigated how ballast compacts under vibration. Repeated loading tests investigated the fundamental stress-strain characteristics of the ballast. These were supplemented by a model full-scale test. The results of this additional work will improve the specifications for the initial compaction of a layer of ballast and tie configuration to give the best subsequent performance under load. In the future it should lead to the development of a theoretically valid design method for the complete roadbed.

This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Raymond, GP Gaskin, PN (Queen's University, Canada)
Princeton University 76-TR-1, Oct. 1975, 41 pp

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130836
DEFORMATION OF RAILWAY BALLAST UNDER REPEATED LOADING CONDITIONS

The work described in this paper was concerned with the action of repetitively applied stresses on the deformation of track ballast and was confined to the tri-axial testing of dry ballast where the stresses can be accurately controlled. A major departure between this work and the more normal testing in the field of soil mechanics is that it is more usual to concentrate on the determination of the ultimate strength of the material, while here the main purpose is to determine deformations in the material at stresses often well below those which cause failure. At the present moment the work is in mid-program and both interpretation of the existing test results and also the complete test series have not yet been concluded. Therefore, this paper is by way of an interim report suggesting some ideas which may immediately have direct relevance to today's railways and also to act as a spur for work to be done to bring the knowledge of the material properties of ballast up to that of other engineering materials.

This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Shenton, MJ (British Railways Technical Centre)
Princeton University 76-TR-1, Oct. 1975, pp 40-41

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130837
REQUIREMENTS FOR THE RELIABILITY ASSESSMENT OF RAILROAD RAIL IN SERVICE

The increasing occurrence of defective railroad rail and the associated increase in train accidents has emphasized the need, both from safety and operation viewpoints, to consider the statistical character of rail failure. Even though wheel-rail contact stresses play a central role in many significant railroad problems (wear, traction, guidance, braking, headway, etc.), an adequate understanding of these stresses still eludes us. The complexity of the problem was illustrated, and the current status of knowledge was reviewed in such areas as: conformal contact (worn or "profiled" wheels), rolling contact, adhesion, creep, plastic flow, residual stresses, and surface roughness effects. Sources of information on these and related areas were identified, and physical and geometrical plausibility arguments were used to describe a number of major results which have been achieved by complex mathematical procedures.

This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Steele, RK (Transportation Systems Center)
Princeton University 76-TR-1, Oct. 1975, pp 23-24

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130838
THE CURRENT STATUS OF MEASUREMENT AND EVALUATION TECHNIQUE FOR STRUCTURE-BORNE SOUND MEASURED AT THE TRACK

This paper described the investigation which has led to the suppression of noise pollution produced by rail transport systems. A common noise problem for subway systems lies in the production of structure-borne sound in structures erected in the vicinity of the tunnel. Suppression of noise transmission begins at the point of origin of structure- borne sound, i.e., at the railroad track. The problem for the track engineer is thus one of developing track types with maximum sound-insulation properties. Dr. Steinbeisser described a solution proposed, and the methods and instrumentation utilized, in a tunnel of the S-Bahn (rapid transit system) in Frankfurt. Insulating effects were based upon the insertion of a buffer mass between the floor of the tunnel and the vehicle. It was indicated that great influence can be exerted on the suppression of structure-borne sound by structural measures. The paper discussed the tools of measurement technology which provide a comparison of various track structures with regard to their sound insulating properties.

This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Steinbeisser, L (Technical University of Munich, West Germany)
Princeton University 76-TR-1, Oct. 1975, pp 19-20

Contract DOT-FR-54175

ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 130839
DEVELOPMENT OF THE PRESTRESSED CONCRETE TIE IN THE U.S.
Weber traced the history of concrete crossties in the United States, starting in 1893 when 200 were installed by the Reading in Germantown, Pa., through 1972, when several major railroads had installed concrete ties in main-line service for, in the most part, short test sections of one mile or less. Such installations were located on the Western Pacific, the Southern and the Santa Fe. Despite persistent problems (except for the period 1930-1957 when there was virtually no concrete-tie activity in this country because of adequate timber supply and preservation methods) development has continued with emphasis on the requirement for further research. By 1957 several European countries had already developed satisfactory concrete ties designed specifically for the loads and conditions prevailing in those coutries. Until new information becomes available, the new American Railway Engineering Association "Specifications for Concrete Ties (and Fastenings)" will set the standards for concrete-tie performance.

This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is $3.75, Microfiche $2.25.

Weber, JW (Rowland and Company)
Princeton University 76-TR-1, Oct. 1975, pp 32-33

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ACKNOWLEDGMENT: Princeton University
PURCHASE FROM: NTIS

DOTL RP

01 131021
THE ROLE OF PULSE-ECHO ULTRASONIC TESTING IN THE MODERN RAILWAY CIVIL ENGINEERING ORGANISATION
Since the Hither Green disaster of 1967 there has occurred on the Chief Civil Engineers Department a drastic re-organization of the methods by which defects in rail are detected. Prior to 1967 the method of flaw detection used was the 'AUDIGAGE', which although a form of ultrasonic testing was without doubt a very inefficient method measured in modern terms. The methods used since 1967 are those which employ the 'PULSE-ECHO' method of ultrasonic testing and which are highly suited to the problem of rail defect detection in a modern railway system. The article was written with a view to bringing to the notice of the Permanent Way Sections of the Chief Civil Engineer's Department the impact that the introduction of 'Pulse-Echo' ultrasonic testing has had to date. The content was deliberately kept non-technical in order that the people concerned would not get 'Bogged down' with technical jargon, but to be informed as to what is going on and why.

Farley, PG *Permanent Way Institution, Journal & Rpt of Proc* Vol. 93 No. t2, 1975, pp 102-113

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Derry and Sons, Limited Canal Street, Nottingham, England Repr. PC

01 131028
STATE-OF-THE-ART OF BALLASTLESS TRACK AT-GRADE
Ballastless track support structures are regarded as possible solutions to the problems of track maintenance and the research and development of these structures is reviewed. The new types of structures include ties embedded in concrete slabs and also beams. These structures are cast-in-place, precast, and slip formed. Several design problems are examined with consideration to the advantages of ballastless track over conventional track. Maintenance and cost advantages are considered. Current research and development is considered for seven countries; United States, United Kingdom, Germany, France, Soviet Union, Switzerland, Japan. This paper reviews the types of structures actually built and put in experimental or revenue service. The development of new types of rail fasteners is also considered with each type of new track structure.

Wheeler, WL (Parsons Brinckerhoff-Tudor-Bechtel) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE1, Proc. Paper 11929, Feb. 1976, pp 131-145, 20 Ref.

ACKNOWLEDGMENT: ASCE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 131234
STUDY INTO DYNAMIC FORCES IN RAILWAY TRACK AND LAYOUT OF A TESTING DEVICE [Estudio sobre esfueros dinamicos en las vias ferreas y diseno de un aparato de pruebas, basaco en mediciones directas]
The Secretariat for Civil Engineering in Conjunction with Mexico University's Institute of Engineering, has proposed a series of studies into the stresses caused by dynamic forces acting on the track superstructure, and the determination of pressure distribution under the sleeper and ballast, aimed at designing and developing equipment adapted for laboratory tests. This paper, which won first prize in Section A of the Caracas Congress, contains a description of the initial steps of this plan, and comprises three parts: 1) Theoretical bases, hypotheses, and calculation methods for orienting the on-site experiments. 2) Actual on-site recordings. 3) Layout of testing equipment, particularly for concrete sleepers and rail fastenings, aimed at reproducing the necessary load and speed characteristics. [Spanish]

Gardulo, AM
Pan-American Railway Congress Proc Paper Section A, Nov. 1975, 89 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France Repr. PC

01 131235
A STUDY OF THE MAGNETISATION OF RAILS
It has been noted that rail magnetisation could have a serious effect on arc welding rails. The article describes the study of this phenomenon in order to find a solution. It has been seen that the main cause was the position of the rails in relation to the earth's magnetic field. It would not seem that types of traction, the volume of traffic, rail age, track circuit current, nearness of high voltage cables have any noticeable effect.

Venugopalan, P *Indian Railway Technical Bulletin* Aug. 1974, pp 80-90, 1 Tab., 2 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Research Design and Standards Organization Alambagh, Lucknow 5, India Repr. PC

01 131241
DETERMINATION OF THE DENSITY OF THE BALLAST BED BY MEANS OF RADIOACTIVE ISOTOPES [Bestimmung der Bettungsdichte mittels radioaktiver Isotope]
The measuring principle is based on the absorption of the gamma rays by the ballast, situated between a radioactive preparation and ray detector. The author describes this measuring method, used by the DB Test Centres at Minden and Munich.

Schmidt, W *Eisenbahntechnische Rundschau* Vol. 24 No. 11, Nov. 1975, pp 426-427, 1 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

01 131243
ON THE DESIGN OF JUNCTION CURVES ON LINES FOR VERY HIGH SPEEDS [Zur Gestaltung der Uebergangsboegen auf Strecken fuer sehr hohe Geschwindigkeiten]
On lines designed for very high speeds, but which are only used to begin with for lower speeds, it seems necessary to reduce not only the cant, but also the length of the junction curves and of the superelevation ramp, so as to simplify maintenance work. The author describes the solutions used by the DB. [German]

Weigend, M *Archiv fuer Eisenbahntechnik* Vol. 30 Dec. 1975, pp 65-67, 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

01 131244
RECORDING AND ANALYSING TRACK IRREGULARITIES [Die Registrierung und Analyse von Gleisunregelmaessigkeiten]
The author discusses the possible procedures for recording track irregularities, and methods of analysing this data. He then explains the relationship between the duration of the analysis and the evaluation errors to be expected, indicating the respective analytical reports both for analogical and digital evaluation. He also gives the results from the testing vehicle running on the lines of the DB and other railways. Finally, the article explains a procedure based on power spectral density, using multivariable regression analysis. [German]

Krettek, O *Glasers Annalen ZEV* Vol. 98 No. 11, Nov. 1975, pp 326-334, 1 Tab., 14 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

01 131245
APPLYING INFORMATION ON RAIL REPLACEMENTS TO THE STUDY OF RAIL SERVICE LIFE [Wykorzystanie danych o pojedynczych wymianach szyn do badania ich niezawodnosci eksploatacyjnej]
The author explains how an analysis of rail Service life was made in the PKP using statistics concerning damaged rails and replacements. He uses Weibull's law to quantify the stresses exerted on rails and thereby determines their service life.

Fijalek, M *Przeglad Kolejowy Drogowy* Vol. 22 No. 9, Sept. 1975, pp 23-29, 3 Tab., 9 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Wydawnictwa Komunikacji i Lacznosci Ul Kazimierzowska 52, Warsaw 12, Poland Repr. PC

01 131253
REAL-TIME AUTOMATIC ANALYSIS OF MEASUREMENTS OF THE GEOMETRICAL STATE OF RAIL TRACKS. POSSIBLE APPLICATIONS WITHIN AN INTEGRATED TRACK-MAINTENANCE MANAGEMENT SYSTEM [Analyse automatique et en temps reel des mesures de l'etat geometrique des voies ferrees. Applications potentielles dans un systeme de gestion integre de la maintenance de la boie]
No Abstract. [French]

Rivier, RE
Lausanne Federal Polytechnics School Thesis No. 221, 1975, 147 pp, 43 Fig., 11 Tab., 54 Ref., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France Repr. PC

01 131268
STATISTICAL ANALYSIS OF THE MOST EFFECTIVE WAY TO CARRY OUT TRACK RENEWAL WORK [Analiza statystyczna efektywnosci roznych metod napraw glownych nawierzchni]
Track renewal operations in the Gdansk area were taken as the basis for a statistical analysis of the effectiveness of various track renewal methods. The authors examine four techniques applied in this area between 1971 and 1974. The most effective method proved to be the system which is not based on the use of track panels. [Polish]

Bielawska, G Sredzinska, O *Przeglad Kolejowy Drogowy* Vol. 22 No. 6, June 1975, pp 15-20, 5 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Wydawnictwa Komunikacji i Lacznosci Ul Kazimierzowska 52, Warsaw 12, Poland Repr. PC

01 131280
THE EFFECT OF LATERAL RESISTANCE ON TRACK BUCKLING ANALYSIS
A model which exhibits the essential features of track buckling mechanisms is used. It is represented by four bars constrained at the interconnecting joints by spiral springs. The bars deform axially according to Hooke's law and the law of linear thermal expansion, but are "rigid" in bending. The author analyses the mathematical model according to three different assumptions. He compares the results obtained and draws conclusions as to the critical temperature at which buckling can occur and the assumption which is most representative of track buckling.

Kerr, AD *Rail International* Vol. 7 No. 1, Jan. 1976, pp 30-38, 1 Fig., 16 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

01 131282
THE TRACK SUPERSTRUCTURE ON SOVIET UNION RAILWAYS [Der Oberbau bei den Eisenbahnen der USSR]
The SZD carry over half of the world's total volume of freight traffic. The average density of traffic on electrified lines is 76 million gross tonnes per year; locomotive axle loads reach 27 tonnes, and the length of freight trains may be up to 2000 m. The lines are classified as "very heavy traffic" (50 million tonnes of freight a year)", "heavy traffic" (over 25 million tonnes), and "normal" (up to 25 million tonnes). For these categories, standard rails (R.50, 65, 75) are shown in tables and figures, together with wear allowances, shaping, temperature, compensation, length and transport. 70% of the tracks are laid on wooden sleepers, but laying on concrete sleepers is on the increase. The measurements of concrete sleepers are given, also those for superstructure on concrete slabs, test results, construction and maintenance costs. The organisation and direction of superstructure work are described, and an organisation chart for an automated district is shown. [German]

Haferkorn, FG *Holzschwelle* Vol. 70 No. 81, Dec. 1975, pp 32-56, 1 Fig., 2 Tab., 35 Ref.

ACKNOWLEDGMENT: Messerschmitt-Boelkow-Blohm GmbH
PURCHASE FROM: Studiengesellschaft fuer Holzschwellenoberbau E.V. Waldstrasse 11, Bonn-Ippendorf, West Germany Repr. PC

01 131283
OVERALL EVALUATION OF TRACK CONDITIONS FOR THE PURPOSE OF PLANNING SYSTEMATIC MAINTENANCE [Syntetyczna ocena nawierzchni dla planowania napraw biezacych ciagtych]
It is necessary to know what the actual condition of track is to draw up overall track maintenance plans. The author describes a "synthesis" method for evaluating track conditions using an Amsler dynamometer car with Matisa measuring equipment. An index which is a synthesis of track characteristics and condition (Ws) is established on the basis of a statistical analysis of 5 parameters (levelling, gauge, track distortion, superelevation, and alignment). The analysis contains variations of Ws in relation to acceptable train speeds and lineload. The author concludes with a recommendation concerning the use of the Ws index for planning track maintenance operations. [Polish]

Semrau, A *Przeglad Kolejowy Drogowy* Vol. 22 No. 7/8, July 1975, pp 1-11, 7 Tab., 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Wydawnictwa Komunikafji i Lacznosci Ul Kazimierzowska 52, Warsaw 12, Poland Repr. PC

01 131290
IMPROVING TRACK INFRASTRUCTURE FOR HIGH SPEEDS [Tendenzen bei der Weiterentwicklung des Eisenbahnoberbaues fuer hohe Geschwindigkeiten]
It is essential to improve ballast track for operating at speeds of up to 200-250 km/h. But for speeds of up to 300 km/h ballastless track where rails are placed on concrete slabs is necessary. Some experience has already been acquired in this area but further tests are needed. [German]

Eisenmann, J *Eisenbahntechnische Rundschau* Vol. 24 No. 12, Dec. 1975, pp 456-458, 3 Fig., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC
DOTL JC

01 131298
ELASTICITY OF RAIL STRETCHES IN RELATION TO THE PARAMETERS OF THE FASTENINGS [Uprugost' rel'sovyh nitej v zavisimosti ot parametrov promezutocnyh skreplenij]
The article examines the theoretical correlation between, on the one hand, the rigidity parameters of rail fastenings during the intermittent actions of loads on the bearings and, on the other, the elasticity of the track during wheel stresses on the rail stretch. Results are given concerning the experimental research into these problems. On the basis of tests with the security devices both in laboratory and under operating conditions, the theoretical research explained in the article provides an overall insight of wheel action, which is vital when defining the optimum parameters of fastenings. [Russian]

Kupcov, VV *Vestnik Vniizt* Vol. 34 No. 3, 1975, pp 28-34, 5 Fig., 2 Tab., 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

01 131310
CALCULATION OF THE DIMENSIONS OF A PRESTRESSED REINFORCED CONCRETE SLEEPER ON THE BASIS OF A RIGID BEAM [A fesizitett betonalj meretezese merev tarto alapjan]
The author presents a very simple method of calculation, based on the uniform, or uniformly varied, distribution of the pressure of the rail base. This procedure is suitable for the preliminary project, for the comparison of sleepers, and it provides rapid results, although it does not take into account the elastic characteristics of the sleeper and the ballast. [Hungarian]

Kutasy, L *Kozlekedestudomanyi Szemle* Vol. 25 No. 1, Jan. 1975, pp 25-29, 3 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Lapkiado Vallat Lenin Korut 9-11, Budapest 7, Hungary Repr. PC

01 131315
INVESTIGATION INTO CAUSES OF RAIL CORRUGATIONS
Heavy traffic density and high-capacity cars increased wear and abrasion or curves which CP Rail countered with lubricators that cut flange abrasion but produced rail corrugation with a wavelength of 8 to 28 inches on the low rail. Plastic flow or rail head metal combined with surface fatigue are predominately responsible for rail corrugation. Recommendations for overcoming the problem includes improved wheel rail contact geometry through elimination of wide gauge, elimination of false flanges on wheels, reduction of railhead curvature and modification of the AAR wheel profile; cutting of lateral frictional force by use of self-steering trucks; changes in rail metallurgy to increase resistance to surface fatigue and plastic flow, reduction of dynamic loadings and improved flange lubrication techniques.

Kalousek, J Klein, R *AREA Bulletin* Vol. 77 Bulletin, Jan. 1976, pp 429-48, 15 Fig., 2 Tab., 7 Ref.

ACKNOWLEDGMENT: AREA Bulletin
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

01 131322
POLYETHYLENE TIE PLATES PASS LAB, SERVICE TESTS, REGULAR USE BEGINS
Specimens have survived rolling-load machine tests, extremes of heat and cold, exposure to water and sand, chemical agents and ultraviolet rays, and severe load conditions in actual service. The high-density polyethylene tie plate is injection molded from a formulation of Super-Dyland and weigh 1 1/2 lb each, as compared with 18 lb for the 13-inch steel tie plate. Field testing includes a range from industrial tracks to heavy-traffic main lines. Now Koppers, the manufacturer, reports increasing interest in the tie plate for use in surface tracks of rapid transit lines.

Railway Track and Structures Vol. 72 No. 2, Feb. 1976, pp 28-29

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

01 131327
STRUCTURAL AND GEOMETRIC CHARACTERISTICS OF HIGHWAY- RAILROAD GRADE CROSSINGS
This report is the first in a series dealing with structural and geometric characteristics of highway-railroad grade crossings. The report details a study of crossing distribution and geometric characteristics, crossing appraisals, drainage, dynamic loadings, stabilization fabrics, and structural details for improved life and rideability.
Sponsored by the Texas State Department of Highways and Public Transportation, Transportation Planning Division.

Newton, TM Lytton, RL Olson, RM
Texas Transportation Institute, (No. 164-1) Intrm Rpt. TTI-2-18-74-164-1, Aug. 1975, 113 pp, Figs., Tabs., 30 Ref.

Contract 2-28-74-164

ACKNOWLEDGMENT: Texas Transportation Institute
PURCHASE FROM: NTIS Repr. PC, Microfiche
DOTL NTIS, DOTL RP

01 131530
TEST TRAIN PROGRAM. SEVENTH PROGRESS REPORT
This report describes the progress of the Rail Engineering and Test Support Program during the period July 1, 1974 to June 30, 1975. Primary emphasis of the program was placed on the establishment of a viable operational track measurement capability. This emphasis resulted from efforts to meet the requirements of the National Track Inspection Program under implementation by the FRA's Office of Safety. Also covered in this report are special tests performed by the FRA test cars; operational improvements to the test car track measurement instrumentation; improvements in data-processing techniques that permit an analysis of track conditions in a more timely and more efficient manner; and highlights of other efforts performed under the Rail Engineering and Test Support Program.

Gunn, W
ENSCO, Incorporated, Federal Railroad Administration, (DOT-FR-75-13) Prog. Rpt. FRA-ORD&D-76-140, June 1975, 140 pp, 28 Fig., Tab., 2 App.

Contract DOT-FR-54174

ACKNOWLEDGMENT: FRA, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-261186/AS, DOTL NTIS

01 131622
NEW DEVELOPMENTS IN TRACK INSPECTION INSTRUMENTS
Instrumentation for a new automatic track inspection car is currently being built for the Federal Railroad Administration (FRA) by ENSCO, Inc. An existing rail safety research track measurement system, in operational service for several years, has successfully demonstrated that high-speed track geometry measurements can provide useful and timely inputs to FRA regional track inspectors. The new system will include the most advanced features of the instruments previously developed, expanded computer system hardware, and automatic rail flaw detection equipment. The new inspection system is being installed in an 85-foot rail car completely refurbished to accommodate the equipment and operating crew.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Demuth, HP Marine, RW (ENSCO, Incorporated); Mould, JC (Federal Railroad Administration)
Institute of Electrical and Electronics Engineers C76 457-7 IA, Jan. 1976, 8 pp, 14 Fig.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

01 131634
HI-RAIL TRACK GEOMETRY CAR
The purpose of this paper is to describe the track geometry vehicle presently operating on the Louisville & Nashville Railroad. The reasoning behind this unique approach to the measurement of track geometry was based on the experience of operating gage measuring equipment on dissimilar types of vehicles and on fulfilling specified objectives set forth at the outset of our track geometry program.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Borntraeger, JE Hopkins, GE
Institute of Electrical and Electronics Engineers C76 456-9 IA, Jan. 1976, 4 pp, 1 Fig.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

01 131872
BRIDGE GIRDERS
Computer program analyzes the bridge girder requirements for a present or proposed bridge.
Direct requests to G.E. Warfel, Chief Engineer, St. Louis- San Francisco Railway.

St Louis - San Francisco Railway Company No Date

ACKNOWLEDGMENT: St Louis - San Francisco Railway Company
PURCHASE FROM: St Louis - San Francisco Railway Company 3253 East Trafficway, Springfield, Missouri, 65802

01 131875
TRACK ALIGNMENT-INDUSTRIES
Computer program determines the proper track alignment when coming off the main line and to a proposed industry.
Direct requests to G.E. Warfel, Chief Engineer, St. Louis- San Francisco Railway.

St Louis - San Francisco Railway Company No Date

ACKNOWLEDGMENT: St Louis - San Francisco Railway Company
PURCHASE FROM: St Louis - San Francisco Railway Company 3253 East Trafficway, Springfield, Missouri, 65802

01 132202
KANSAS TEST TRACK: WHAT WENT WRONG?
The FRA-sponsored Kansas Test Track, an 8000-ft field laboratory composed of eight segments utilizing concrete ties and continuous longitudinal concrete beams and slabs and ballast stabilized by an elastomeric polymer, has been retired. Early in 1977 FRA will present a final report telling how the stretch adjacent to Santa Fe's mainline at Eldorado, Ks., performed and failed to perform. The goal had been to understand the improvement in track stability, performance and maintenance requirements resulting from incremental increases in stiffness. When AT&SF revenue freight trains first traversed the track at low speed, track fasteners on the beams failed. After months of repairs, trouble developed again after the line was reopened. Beams again developed problems but mud pumping around them and under the stabilized ballast indicated that the entire subgrade was failing. Some of the track components will be reused at Pueblo, Colo.

Railway Age Vol. 177 No. 7, Apr. 1976, pp 34-40, 4 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 132206
WIDE-GAUGE RESEARCH LEADS TO A NEW STANDARD ON UP
Following research on the causes of wide gauge, Union Pacific has adopted as standard a 16-inch tie plate with a 1:30 cant. Gauge widening is a problem common on high-speed,heavy-duty mainline track and this phenomenon was investigated on UP as part of the industry's Track Train Dynamics Research Program. Tie-plate cant varied from standard 1:40 down to 1:14. The 1:30 design finally chosen is to reduce the incidence of rail rollover and to reduce overloading on the gauge side so that the wear pattern was down the center of the rail.

Railway Track and Structures Vol. 72 No. 3, Mar. 1976, 5 pp

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 132207
IN TIE-GANG PRODUCTION, WHAT ARE THE CRITICAL FACTORS?
Interest sparked by reports of renewal of as high as 2,000 ties per day on Missouri Pacific led chief engineers of other railroads to see for themselves. MP has six such maintenance groups and the details of the organization are described. Competition is encouraged between the groups. It is agreed that the foreman is the key factor in successful production.

Railway Track and Structures Vol. 72 No. 3, Mar. 1976, 5 pp

PURCHASE FROM: XUM

DOTL JC

01 132955
EVOLUTION OF RAIL STEEL AND RAIL SECTIONS AND WHAT IS BEING DONE RELATIVE TO THIS MATERIAL TODAY
Account of the shapes and manufacturing processes for making steel rails over the years in the USA and brief details of the AAR's research into tests, specifications, chemical composition, treatment and rail microstructures as well as into fault detection.

Schoeneberg, KW *AREA Bulletin* Vol. 76 No. 653, June 1975, pp 653-664, 3 Fig., 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: AREA

DOTL JC

01 132960
TESTING CONCRETE TIES
After commenting on the resons for increased interest in concrete ties in the U.S., the author describes the feasibility study undertaken by Chessie System to investigate the technical and economic aspects of such substitution. Experience elsewhere and the economics of such substitution were first examined. Laboratory tests were then made of selected ties. Finally three field tests were made. There was evidence of higher lateral resistance for the concrete-tie track. The reduced resistance to buckling after tamping is discussed, and the advantage of ballast compactors must be studied.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Reiner, IA (Chessie System)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 17-26, 23 Fig., 8 Ref.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS

DOTL NTIS, DOTL RP

01 132961
TRACK STRUCTURES FOR HEAVY WHEEL LOADS
The load bearing capability of track depends on the combined characteristics of foundation, superstructure and loads to be carried. Evidence is that loads imposed by 100-ton cars exceed the load-bearing capacity of much of the track over which they operate. Track deterioration under heavy loads appears in the form of loss of surface and line; in conversion of subgrade and

ballast sections into plastic masses that pump mud and water, in wide gauge, plate cutting, tie splitting and spike-killed ties; in rapid wear, battered rail ends and in formation of corrugated and shelly rail. After discussing facets of track design and track deflection, the problems of ballast and subgrade are examined and the effects of wheel loads are detailed. Ten recommendations for combatting effects of high wheel loads and two other lines of action for limiting or accounting in advance for track deterioration are suggested.

Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Hay, WW (Illinois University, Urbana)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 27-36, 10 Fig., 13 Ref.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS

DOTL NTIS, DOTL RP

01 132963
EFFECT OF HEAVY AXLE LOADS ON RAIL AND TIES
The Quebec North Shore and Labrador Railway was built in 1953 to handle iron ore from mines 350 miles north of the St. Lawrence River. Trains of up to 280 cars with five locomotive units are operated. This presentation reports the maintenance experience on track which carries up to 50 million net tons annually, and has handled almost 700 million gross tons since opening. Among the findings: line, surface and gauge must be maintained even on tangent track; corrugated rail develops quickly on grades and curves and must be countered promptly; joint bars must be kept tight and rail ends restored; oilers are all-important on curves.

Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Monaghan, BM (Iron Ore Company of Canada)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 45-48, 9 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS

DOTL NTIS, DOTL RP

01 132964
WELDING CONTINUOUS RAIL IN-TRACK
Continuous welded rail has usually been fabricated using the electric flash butt welding process to join 39-foot rails into 1440-foot lengths. These are then transported for installation in the field. This entails a major materials handling problem which could be reduced by making field welds. Such welds have not met the criteria of quality or cost. A solution developed in the USSR is a highly portable electric flash butt welder. It adds a new option for rail welding and is suitable not only for field work but also for in-plant welding.

Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Hunziker, RA (Holland Company)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 49-53, 7 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS

DOTL NTIS, DOTL RP

01 132982
POST-MORTEM SET FOR THE KANSAS TEST TRACK
Problems developed almost immediately after this 8000-ft experimental section was placed in service in 1973. The early problems centered in the anchorages for the fastenings in test sections built with concrete slabs and longitudinal beams. The track was taken out of service until redesigned anchorages could be installed. With the track back under traffic, other problems were encountered, attributed mainly to unstable roadbed. The final straw came when two kinks occurred which were attributed to fouled ballast. The track has now been dismantled.

Railway Track and Structures Vol. 72 No. 4, Apr. 1976, pp 16-18
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 133413
EXPERIMENTAL RESEARCH ON FLEXURE DISTORTION AND STRESS IN RAILROAD SUPERSTRUCTURE
Experimental research on flexure, distortion and stress in railroad track structures is described herein. Report undertaken with object of comparing the effect on track of several types of high-speed locomotives for passenger trains. The improved photographic method used to record movements of selected points in different parts of the superstructure makes it possible to measure both flexure distortion and stress at these points with great precision, while avoiding certain shortcomings found in other familiar methods. The data presented in this report was developed prior to 1936 and is offered in a historical context only. Portions of this document are not fully legible.

Trans. of mono. Annals of the Academy of Technical Sciences, Warsaw, v4 1937.

Wasiutynski, A
Federal Railroad Administration FRA/ORD-76-10, 1937, 221 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-251686-T/ST, DOTL NTIS

01 133580
PRACTICAL PERFORMANCE OF THE TRACK SYSTEM WITH ASPHALT TREATING METHOD
Maintenance required on conventional track/ballast structures has caused Japanese National Railways to investigate ways to preserve track geometry and minimize ballast degradation. The Track System with Asphalt Treating Method was developed to be applied with a minimum of out-of-service time for the track and to prevent track subsidence while also stabilizing ballast. Asphalt is forced into the ballast beneath the ties and the ballast shoulders are paved. A slab tie must be used--these-called Large Prestressed Concrete (LPC) Slab Ties. Tests indicate stability does not decrease in the long term.

Inui, S Umeda, S Iwasaki, I *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 154-155, 2 Fig., 1 Tab.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan

DOTL JC

01 134057
SPANISH BOOST FOR PACT TRACK SYSTEM
An account is given of the design and installation of the British Rail paved concrete track system (pact) in Spain for Spanish National Railways (renfe). The design for the slab track was based on a standard British rail slab of 2.400 M width modified to suit the renfe rail gauge. The slab was continuously reinforced with 20 16 mm-dia high-tensile longitudinal bars and 16 mm-dia transverse bars. Prior to constructing the paved slab some earthworks stabilisation was carried out. The reinforcing steel was fabricated into A mat as paving proceeded. Special techniques had to be employed during the concreting period so that work could proceed in high temperatures (39 C). /TRRL/

New Civil Engineer No. 177, Jan. 1976, p 27, 1 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217534)
PURCHASE FROM: Institution of Civil Engineers 26-34 Old Street, London EC1V 9AD, England

01 134058
A NEW ORBIT FOR GLASGOW'S VETERAN UNDERGROUND
The article describes the projected modernisation of the Glasgow underground system where ,18M is to be spent on work to be completed by July 1978. This work includes rebuilding five stations with flank platforms, and installing ramps to the surface at the Broomload depot. Bored piling will be installed to provide permanent ground support around the new or enlarged chambers. Eleven of the fifteen stations are to become interchanges with bus or British rail transport. The old permanent way is to be removed and replaced with continuously welded track laid on precast concrete slab sleepers later infilled with in-situ precast concrete. Modern cabling and

signalling will also be installed. Work will start on the outer of the twin tunnels and should be completed by autumn 1977 when traffic will be switched and the track relaid in the inner tunnel. The present rolling stock, which has been used since the opening in 1896, will be replaced by thirty-three new power cars ordered from Metro-Cammell, Birmingham. Each car is designed for automatic operation responding to track signals accomodating 36 seated and 54 standing passengers. /TRRL/

Wade, S *New Civil Engineer* No. 173, Dec. 1975, pp 26-27, 2 Fig., 3 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217081)
PURCHASE FROM: Institution of Civil Engineers 26-34 Old Street, London EC1V 9AD, England

01 134535
NEW SNCF CONCRETE SLEEPERS [Les nouvelles traverses en beton de la SNCF]
After outlining the history of the use of concrete sleepers and describing their technical characteristics, the study on stresses in the track, caused by dynamic overloading, is based on the work of an ORE Specialists Committee (Question D 71) and the experience acquired by the SNCF in the calculation of the maximum stresses to be taken into consideration. So as to be able to compare the performance of the different sleepers and check the results obtained by experiment against behaviour in service, the SNCF decided to have the following types manufactured: composite reinforced concrete sleepers (VAX V30 and SL V 30); monobloc prestressed concrete sleepers; composite "PRETUBE" sleepers in which an extrusion tube serves as a tie-bar and a means of obtaining prestressing. [French]

Prud'homme, A Erieau, J *Revue Generale des Chemins de Fer* Vol. 95 Feb. 1976, pp 102-117, 13 Fig., 2 Tab., 1 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL
DOTL JC

01 134538
STUDY OF THE BEHAVIOR OF TRACK SUBJECTED TO TRANSVERSAL STRESSES [Estudio del comportamiento de la via frente a esfuerzos transversales]
The purpose of this study is to further knowledge on the horizontal stability of the track. The author considers the effect of transversal movement on the reliability of the different elements forming the track. He calculates the coefficient of safety against bending of the track on the basis of ballast slip resistance and sleeper rigidity. [Spanish]

Martinez-Solares, U
Asociacion de Investigacion del Transporte-AIT No. 7, Dec. 1975, pp 43-69

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Asociacion de Investigacion del Transporte-AIT Madrid, Spain

01 134567
THE METALLURGY OF RAIL STEEL WELDING [Die Metallurgie des Schweissens von Schienenstaehlen]
No Abstract. [German]

Guntermann, H *Braunkohle* Vol. 27 No. 7, July 1975, pp 221-226, 10 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Verlag Braunkohle Postfach 1122, 4 Duesseldorf, West Germany

01 134576
THEORETICAL STUDY OF NATURAL FREQUENCIES AND OSCILLATION AMPLITUDES IN BALLASTLESS AND BALLASTED PERMANENT WAY [Theoretische Untersuchung der Eigenfrequenzen und Schwingungsamplituden bei schotterlosen Oberbau Konstruktionen und klassischem Schotteroberbau]
The study provides the basis for calculating the dimensions of the ballast layer and the intermediate elastic slabs. These elastic slabs replace the ballast bed for load distribution and absorbing shocks, while costing less for maintenance. The slabs can reduce the forces imposed on the track by oscillation, and thus have a favorable effect on noise, track bed stability, rail wear, and smooth running. [German]

Keim, D *Eisenbahntechnische Rundschau* Vol. 25 No. 1-2, Jan. 1976, pp 94-105, 3 Fig., 1 Tab., 1 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany
DOTL JC

01 134579
TRIAL LENGTHS ON DB OF BALLASTLESS TRACK
First test lengths laid in 1967 embodied prefabricated slabs but these are technically inferior to site-cast continuous techniques as applied to the two trials reported here, implemented in 1972 at Rheda and Oelde.

Eisenmann, J *Railway Engineer* Vol. 1 No. 1, Jan. 1976, pp 18-20, 7 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mechanical Engineering Publications Penthouse 1, 15 West 55th Street, New York, New York, 10019
DOTL JC

01 136266
SPECIAL PROPERTIES OF STEEL RAIL [Ueber die besondere Eigenart des Schienenstahls]
Behaviour of rails in service depends on the structure and chemical make-up of the steel used for the rails. The author shows how it is possible to vary the elements making up the alloy as well as production, cooling and heating techniques and thereby modify the structure, the physical properties and the characteristics of use of these rails. Costs are also influenced as a result. [German]

Schulteiss, H *Eisenbahningenieur* Vol. 27 No. 3, Mar. 1976, pp 91-96, 2 Fig., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

01 136275
THE SIGNIFICANCE OF THE RAIL LIFT UNDULATING MOVEMENT [Die Bedeutung der Abhebewelle der Schiene]
Lateral track displacement which occurs at high temperatures can be traced to the area where the rail lift undulating movement occurs, i.e. in front of and behind the axle of a vehicle. The lift movement is significantly influenced by the type of vehicle involved and the track ballast coefficient. The author makes a theoretical analysis and shows that this undulating movement which can seriously affect the track bed and stress on the ballast can be reduced by increasing the weight of track panels. [German]

Eisenmann, J *Eisenbahningenieur* Vol. 27 No. 3, Mar. 1976, pp 85-89, 2 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

01 136276
REFLECTIONS ON THE THEORY OF ERROR WHEN MARKING OUT TRACK CURVES [Fehlertheoretische Ueberlegungen Zur Gleisbogenabsteckung]
With reference to two methods of measurement used in practice when pegging out track curves, the author describes the interdependence between the inevitable inaccuracies in measuring and staking, and explains the allowable error for the appreciation of the exactitude of the track bed position. He then notes that lower limit of the allowable error is considerably exceeded in the case of application of the method of coordinates. To be able to comply with the limit of error allowed, when marking out by the Nalenz method, the measurement of the height of the deflection must offer a certain degree of exactitude and systematic errors of method must be eliminated from the angle-diagram layout. [German]

Freimann, E *Eisenbahningenieur* Vol. 27 No. 3, Mar. 1976, pp 107-113, 4 Tab., 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

01 136277
THE SM 125 RAIL EXAMINATION CAR [Die Schienenoberflaechenmessdraisine SM 125]
The SM 235 track motor car is equipped with a system for measuring the extent of rail corrugation; it operates on a permanent basis and is automatic. The author describes this system in detail and provides information on the practical aspects of the system and the results obtained. [German]

Harmening, E *Eisenbahningenieur* Vol. 27 No. 3, Mar. 1976, pp 97-101, 2 Fig., 2 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

01 136278
NEW MANUAL DEVICE FOR LOCKING POINTS [Neue Handverschlusseinrichtung fuer Weichen]
A new system for looking points by means of a manual device was developed because of the heavier profile of the UIC 60 rail and because of the need to replace point locks and switch tongue locks by a single manual locking device with open and closed points. The author explains the method of installing and operating and the new manual system for all types of switches. [German]

Signal und Draht Vol. 68 No. 1-2, Jan. 1976, pp 1-3, 2 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

01 136391
CONTRIBUTION TO SELECTION OF RAILROAD BALLAST
Ballast field rating; standard laboratory classification tests; field breakdown rating correlation findings resulting from study.

Gaskin, PN Raymond, GP *ASCE Journal of Transportation Engineering* Vol. 102 No. TE2, May 1976, pp 377-394, Refs.

ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering
PURCHASE FROM: ASCE
DOTL JC

01 136419
THE DB'S MUNICH TRACK RENEWAL SECTION WORKING ALTERNATELY ON TWO LINES IN 1975 USING A ROSTER SYSTEM AND TWO WORK CREWS (UP2) [Baustellenserie 1975 der DB Muechen im Zweischichten Springsystem (UP2)]
Munich's regional headquarters renewed 56.4 km of track on 13 sections of two different lines in less than 9 months in 1975. The schedule for this work was fixed so that the UP2 track renewal train was used alternatively on the two lines. The authors describes the results obtained and the experience acquired during this work. [German]

Kraft, W Kaiser, D *Eisenbahningenieur* Vol. 27 No. 3, Mar. 1976, pp 103-106, 2 Tab., 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

01 136798
DEVELOPMENTAL TESTS OF CONCRETE TIE AND TIE FASTENING SYSTEMS
This report covers a series of laboratory investigations into improved techniques for fastening rails to concrete railroad cross ties. Past experience with several fastening designs in North America had pointed out certain areas of deficiency. Several concepts were developed which were intended to improve this performance. The laboratory experiments were a first step in testing these concepts. Some of the designs and concepts tested were found to be ready for field testing while others demanded further development efforts. The tests included measurements of vertical, longitudinal and lateral rail restraint, electrical characteristics and stress determinations. The results are given in tabular and graphical form.
Prepared in cooperation with Baltimore and Ohio Railroad Co., Baltimore, Md.

Way, GHJ
Chessie System, Federal Railroad Administration, Baltimore and Ohio Railroad Final Rpt. RS-73-106-Phase 1, FRA-ORD/D-76-13, May 1973, 145 pp

Contract DOT-FR-20015

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-252181/3ST, DOTL NTIS

01 136799
RAILROAD TRACK TECHNOLOGY IN THE USSR: THE STATE OF THE ART
Report contains limited assessment of the present state of the art of railroad track research, construction and maintenance technology in the U.S.S.R. It synthesizes the observations and opinions of a six-man team of U.S. railroaders which visited the Soviet Union during a 12-day period in the summer of 1974, for the purpose of evaluating Soviet railroad track technology. The major evaluation priority was to isolate aspects of Soviet technology that would be of value to the U.S. scheme and as identified, the steps necessary to introduce the concepts or procedures to the U.S. maintenance of way community.

Guins, SG
Federal Railroad Administration Final Rpt. FRA/ORD-76/12, Oct. 1974, 136 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-252199/5ST, DOTL NTIS

01 138300
INVESTIGATION OF THE EFFECT OF THE STRENGTH OF RAILROAD RAILS ON THE FORMATION OF CONTACT-FAGIGUE DEFECTS DURING USE [Issledovanie vliyaniya prochnosti zheleznorozhdenykh rel'sov na obrazovanie kontaktno-ustalostnykh povrezhdenii v ekspluatatsii]
It is shown that one of the main causes of the formation of contact-fatigue defects in rails is strong cold-working of the peripheral metal layers and development of considerable stresses at the boundaries between the cold-worked and non-cold-worked layers. It is found that an increase of the static strength of steel by any means (heat treatment, alloying or modification of steel) sharply reduces its cold-workability and thereby cuts down its tendency to the formation and development of contact-fatigue damage. [Russian]

Lempitskii, VV Kazarnovskii, DS Shnaperman, LY *Strength of Materials* Vol. 7 No. 9, Sept. 1975, pp 13-17

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

01 138309
BIRTH OF A RAILROAD
The first in a series of articles on the problems and prospects of ConRail considers its most crucial problem area, that of track and roadway rehabilitation. ConRail has inherited the deteriorating trackage of the 7 bankrupt railroads of the Northeast; to become competitive not only with other railroads, but more importantly with highway trucking, it is imperative that ConRail improve the condition of its track. Following the USRA's Final System Plan, top priority will be given to upgrading key yards and then to signal modernization. The future of U.S. railroads is seen as dependent upon the success which ConRail enjoys.

Shedd, T *Modern Railroads/Rail Transport* Vol. 31 No. 3, Mar. 1976, pp 52-55, 2 Fig., 2 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Cahners Publishing Company, Incorporated Watson Publications, 5 South Wabash Avenue, Chicago, Illinois, 60603
DOTL JC

01 138313
SANTA FE INSTALLS RECONSTITUTED TIES
Santa Fe Railroad is installing fabricated creosoted ties made of old tie chips compressed with resin. The 9-ft. ties weigh 265 lbs. 940 ties are being tested under various road service conditions.

Progressive Railroading Vol. 19 No. 2, Feb. 1976, p 39, 3 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606
DOTL JC

01 138320
QUALITY IN TRACK MAINTENANCE
Author explains the philosophy that has enabled Union Pacific to maintain the highest standards of track and roadbed quality in the U.S. Maintenance budgets have not been manipulated to control profitability, precision is insisted upon in the expensive area of new track laying, tie preparation is considered essential and tie replacement is carefully screened.

Brown, RM (Union Pacific Railroad) *Progressive Railroading* Vol. 19 No. 3, Mar. 1976, pp 37-46, 7 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606
DOTL JC

01 138324
ICG STEPS UP TRACK REHABILITATION
The Illinois Central Gulf is continuing 1975 activity of ballast undercutting and cleaning with an expanded program in 1976 using a combination of machines for open track, switches and grade crossings. The importance of ballast condition is emphasized by C.R. Fulghum, system engineer-planning of the ICG.

Progressive Railroading Vol. 19 No. 5, May 1976, pp 49-52, 7 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606
DOTL JC

01 138334
WOOD CROSSTIE TECHNOLOGY: RESEARCH AND TESTS POINT THE WAY
The evolution of timber-based substitutes for the conventional wood crosstie is described. Experimental installations of dowel-laminated ties are described, including their performance. Progress of the development of a cycled tie is reviewed. Other investigations looking to improvement of the wood tie are mentioned.

Burdell, CA *Railway Track and Structures* Vol. 72 No. 6, June 1976, pp 22-25, Phots.

PURCHASE FROM: XUM
DOTL JC

01 138335
RESEARCH PRODUCES INNOVATIONS IN FROG AND SWITCH DESIGN
Changes in design have produced for Canadian Pacific a main- line turnout with significantly longer service life and reduced maintenance costs. Explosive hardening of manganese castings, use of chrome steel in manufacture of special trackwork and adoption of special stop nuts have all been adopted since the investigation began in 1968.

Railway Track and Structures Vol. 72 No. 6, June 1976, pp 26-29

PURCHASE FROM: XUM
DOTL JC

02 052683

CONSTRUCTIONAL ARRANGEMENTS FOR IMPROVING THE RIDING STABILITY AND THE GUIDING QUALITY OF ELECTRIC AND DIESEL LOCOMOTIVES AND VEHICLES. MEASUREMENTS OF THE FORCES EXERTED ON THE RAILS BY VARIOUS TYPES OF MOTIVE POWER UINTS (MEASURED IN A CURVE OF 300M RADIUS AT GIORNICO)

In 1955 the CFF decided to intitiate investigations in order to determine by means of experiments the extent of the wear to which the track would be subjected in a curve of 300 m radius by the then newly developed locomtive types of the series Ac 4/4 (BoBo) and Ae 6/6 (CoCo). The measuring rail working according to the Schlumpf system was used as measuring apparatus. The results of these measurements have shown that the modern bogie locomotives subject the track to less wear at the same speed (BoBo) or to hardly any heavier wear (CoCo) than the rigid frame locomotives of not so recent date. Following the tests which had been made at the suggestion of the Working Group "Measurements on the track" of the B 10 Specialists Committee, for the comparison between three different measuring methods (see B 10 RP 4), arose the possibility of repeating the tests made in 1955. The measuring rail was again used as measuring apparatus, as it had been done for the tests made in 1957, but the tests included a larger number of locomotive types and a considerable versine error was intentionally arranged in the test track. The tests made in 1957 have confirmed the fundamental results of 1955, moreover they have shown that 1) a transverse coupling between the bogies and 2) the lateral movement of the rubber cushioned leading axles of the CoCo locomotives considerably reduce the forces exerted on the track.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B10/RP 5/E, Nov. 1960, 18 pp, Figs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052792

EFFECT OF THE REDUCTION IN THE PLAY OF THE AXLES IN THE TRACK ON THE RIDING STABILITY OF VEHICLES. REPORT OF RESEARCH TO DATE AND PROVISIONAL CONCLUSIONS

A questionnaire was sent to the different Administrations and the answers and conclusions derived from them are set forth in this report. Question C15 in its present form is abandoned and will be incorporated into the more general investigations of the problems of interaction betweeen vehicle and track considered under Question C9.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. C15/RP 1/E, Feb. 1955, 7 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052793

MUTUALLY PERMISSIBLE WEAR PROFILES OF WHEEL TYRES AND OF POINTS AND CROSSINGS

The danger of derailment caused by a "sharp flange" while running through the typical switch-points of the various Administrations has been dealt with in the present report. The parameters which are involved are mentioned, although their relative importance, in a quantitative sense, has still not been completely worked out. The replies received in answer to a questionnaire make it possible to state that, as a rule, there does not exist any very accurate definition of a sharp flange. The degree of danger of derailment represented by such a flange also does not seem to be defined. Although several Administrations possess check-gauges developed on the basis of the principles set forth in this report, the scope of the present study would be exceeded if we were to seek already a synthesis. However, due to the free circulation of railway stock across the frontiers, it seems necessary to establish a common criterion in order to avoid, in the future, difficulties and misunderstanding at these frontier points. These misunderstandings are troublesome from the technical aspect and are also harmful to a flexible railway operation. A possible way has been sought by modifying the shape of the tongue and thus to arrive at a solution eliminating the danger of derailment. It is impossible however to formulate final solutions at this time because such a solution will, in all probability, be linked with the actual design of the tongues and stock-rails of the points. Moreover, it seems necessary to study in greater detail the dynamic equilibrium of the forces and of the instantaneous values of the friction coefficients. Before being able to propose a modification of the points, numerous factors have to be considered. A study of all these other problems would exceed the scope of a report of enquiry.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways C70/RE /E, June 1964, 40 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052794

TESTS CONCERNING THE PROBLEMS INVOLVED WITH THE KINEMATIC GAUGE. THEORETICAL INVESTIGATIONS CONCERNING THE POSITION OF VEHICLES IN THE TRACK

With regard to the position of bogies in the track, it was found that in curves, while braking, while stationary and upon starting, the leading axles of bogie vehicles were pressed against the guiding surface of the outer rail. The rear axles of the bogie vehicles were displaced towards the inside of the curve and the clearance between outer rail and the wheel varied between 0 and 30 mm. The motor bogies of electric tractive units were an exception. During acceleration, the wheelsets of these sometimes slid, within short distances (10 to 60 m), to press against the inner rail. The question still remained as to whether, for calculating the inner and outer limits, these tests were sufficiently representative to allow the problem of track negotiation as set forth in Technical Unity to be dispensed with and whether some new positions should be indicated more suitable to the permissible widths of vehicles, especially passenger coaches. The influence of the automatic coupler and of the pronounced longitudinal forces which might occur during the braking of a long train (due to dynamic phenomena) would also have to be taken into account.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways C102/RP 1/E, Apr. 1968, 20 pp, 14 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052795

INCREASE OF THE PERMISSIBLE LOAD OF S AND SS WAGONS. INFLUENCE OF THE NATURE OF WAGONSî THE SPEED AND THE SUB RATED WHEEL LOAD ON THE FATIGUE OF THE TRACK

The object of these tests, which were carried out by the SNCF in 1969 on a track in an average condition of maintenance, was to examine the possibility of increasing the maximum axle-load of modern wagons in S and SS service, which is at present 18 t and 16 t respectively. A large number of strain gauge measurements were taken on the track to determine the statistical distribution of the dynamic forces exerted on the track by vehicles (on old-type wagon and modern non-bogie wagons) in different load conditions and at different speeds. It seems in fact that the transverse forces are very weak (less than 10 to 4th power N), and so only the vertical forces were considered. Two vehicle-effect indices were considered, based on the standard deviation of the statistical distribution of the forces and characterising (a) the damage caused to the track per gross-tonne and per kilometre, and (b) the maximum dynamic wheel-load. It was established that the maximum permissible loads should be 19.5 t for modern non-bogie wagons used in SS service and 20 t in other cases (S service and modern bogie wagons in SS service) in order to ensure that their effect on the track is not greater than that of the old-type wagons.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways C113/RP 1/E, Apr. 1970, 15 pp, 13 Fig., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052796
INCREASE OF THE PERMISSIBLE LOAD OF S AND SS WAGONS. MEASUREMENTS TAKEN ON VEHICLES
The present report contains the results of the measurements taken on the vehicles in straight and curved track in order to determine the forces exerted on the track as a result of cant deficiency or excess and the random forces due to the movements of the suspended and non-suspended masses; regarding the non-bogie wagons also the forces exerted in the spring elements and in the wheel centers were measured. The first part contains a description of the evaluation procedures used in order to determine the various factors and, while taking into consideration two criteria defining the detrimental effects of vehicles on the track, it was found that the modern bogie or non-bogie wagons running with an axle load of 20 t and at a speed of 120 km/h are no more harmful to the track than the old type, non-bogie wagons running at a speed of 80 km/h with an axle load of 20 t. In the second part the results of the measurements on the constituent components of the wagons are discussed and it has appeared, regarding the non-bogie wagons studied, that a limitation of the axle load to 18t would be necessary at 120 km/h owing to the excessive stresses in the leaf springs of the suspension system.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. C113/RP 2/E, Oct. 1970, 75 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052797
PERMISSIBLE MASSES PER AXLE FOR TRAILER VEHICLES AS A FUNCTION OF THE WHEEL DIAMETER AND SPEED. PERMISSIBLE MASSES PER AXLE FOR SPECIAL PURPOSE WAGONS WITH VERY SMALL WHEELS (DIAMETER IS LESS THAN 630 MM)
The present report contains data relating to track measurements (on straight track and in a 700 m radius track curve) with special small wheel wagons, the SGP-wagon (350 mm dia wheels) and the "Rolling road" wagon (500 mm dia wheels), and with an ordinary bogie wagon (920 mm dia wheels). The test runs were made at speeds up to 130 km/h. The test results support the conclusion that these wagons may be permitted to run at speeds up to 120 km/h with an axle-load of 5 t for the SGP-wagon and an axle-load of 10 t for the "Rolling road" wagon.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways C113/RP 4/E, Apr. 1975, 31 pp, 62 Fig., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052798
INTERACTION BETWEEN VEHICLES AND TRACK. POWER SPECTRAL DENSITY OF TRACK IRREGULARIES. PART 1-DEFINITIONS CONVENTIONS AND AVAILABLE DATA
The excitation of the track can be introduced into mathematical models in the form of "power spectral density of track irregularities" showing the relative importance of the various frequencies comprising the whole of the irregularities for a given section of track. A first stage for obtaining these spectra consists of recording the track irregularities by means of measuring vehicles, and a second stage consists of establishing these spectra by means of mathematical procedures (analogue and digital). The rules for the presentation of these spectra are laid-down and the spectra envelopes obtained by different Administrations are given. Numerous problems remain to be solved e.g. those relating to the stationarity of the records, to the influence of certain parameters (axle-load, measuring speed, wheel and rail profiles). For high speeds, it is also necessary to possess spectra in the low frequency field.
Restrictions on the use of this document are contained in the explanatory material.
International Union of Railways C116/RP 1/E, Oct. 1971, 22 pp, 7 Fig., 1 Tab., 11 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052802
MAXIMUM SPEEDS ATTAINABLE ON WHEEL/RAIL SYSTEMS
The question was raised what maximum speed, considered merely from the technical angle, is attainable on the classical wheel/rail system, using adhesion for the transmission of the propulsive force. For the various elements values of the estimated maximum speeds are given, adapted from the available documents on the subject. Many theses and reports have already been published on this subject. Therefore, this report on preliminary studies does not claim to be exhaustive.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Prelim Rpt S1004/RP 1/E, Apr. 1972, 58 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 052864
ORE COLLOQUIA. PROCEEDINGS OF THE ORE COLLOQUIUM ON "HIGH SPEEDS" HELD AT VIENNA ARSENAL ON 23 APRIL 1971. VOLUME 1- ABSTRACTS OF PAPERS, APPENDICES 1 TO 6: TEXTS OF PAPERS BY DIRECTORS. VOLUME 2-APPENDICES 7 TO 13: TEXTS OF TECHNICAL PAPERS
Paper presented at the ORE Colloquium: STELTER: High speed problems on the DB; MARTIN C.: SNCF progress and prospects in the field of high speeds; BOLIGNIN Carlo: FS high speed experience as regards rolling stock; MAGLIETTA: FS high speed experience as regards fixed installations; SPRING and CALDER: British Railways high speed experience and development; PRUD'HOMME Andre: Stresses and stability of the track at high speeds; HERBST W: Demands of the track on the riding of vehicles taking track irregularities into consideration; BALUCH Henryk: Optimal designing of the longitudinal profile of crossings for high running speeds; TERRASSE Rene: Stability of vehicles at high speeds; NEFZGER A.: Vehicle and track, wheel and rail; LAPLAICHE M.: Braking of trains at high speed; HOCHHUTH Curt: Dynamic braking and friction braking.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 40/RP 3/E, May 1971, Figs., 13 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053110
CONSTRUCTIONAL ARRANGEMENTS FOR IMPROVING THE RIDING STABILITY AND THE GUIDING QUALITY OF ELECTRIC AND DIESEL ENGINED LOCOMOTIVES AND VEHICLES. REPORT ON TESTS MADE ON THE LOCOMOTIVE 1141.04 OF THE AUSTRIAN FEDERAL RAILWAYS (OBB)
At the time that the Specialists Committee B 10 started its work and drew up its Work Programe, the Austrial Federal Railways were preparing tests on their locomotive Testing Department of the DB. At the request of ORE the test programme was expanded in such a manner that two parameters, appearing on the test-programme of the committee, could be examined, namely the lateral flexibility of the bogie and the application of a transverse coupling between the bogies. Similar tests were carried out by the Societe Nationale des Chemins de fer francais on the same type of locomotive (SNCF BB 9002), but within a different speed range. Measurements were made of the transverse forces between axles and axle bearing and the relative movements of the constructional parts of the locomotive. It appeared from the tests, that none of the variations of parameters tested was superior with regard to the lateral forces between axle and axle bearing. This result is so surprising that no general conclusions should be drawn without further tests.

Tests on a third locomotive of the same type are being planned. In order to examine the influence of the transverse coupling on the wear of wheel flanges, tests are being carried out on six locomotives, three of which are equipped with a transverse coupling, the other three being without one. The results of these measurements will be published as soon as they come to hand.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B10/RP 1/E, Nov. 1957, 24 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053111
CONSTRUCTIONAL ARRANGEMENTS FOR IMPROVING THE RIDING STABILITY AND THE GUIDING QUALITY OF ELECTRIC AND DIESEL LOCOMOTIVES AND VEHICLES. RESULTS OF THE MEASUREMENTS MADE WITH THE LOCOMOTIVES 949 DE 12 OF THE SNCF AND NO. 0621 OF THE WESTPHALIAN PROVINCIAL RAILWAY

The B 13 Specialists Committee met in the course of its studies with the problem as to whether a locomotive without bogies, but equipped with the Beugniot lever system, might be admitted as a standard locomotive suitable for running at speeds up to 80 km p.h. In order that the various aspects of this problem might be clearly understood the Locomotive Testing Department of the DB was requested to compare, by means of tests to be carried out within the sphere of the work being done by the B 10 Specialists Committee and in cooperation with the SER of the SNCF, locomotive No. 0621 of the Westfalische Landeseisenbahn (Westphalian Provincial Railway) and the 040 DE-12 bogie locomotive of the SNCF. Several measurements were made after blocking two axles of the locomotive equipped with the Beugniot lever system, thus producing a running gear arrangement which possessed the same characteristics as that of a rigid-frame locomotive. This type could therefore be included in the comparison. These comparative measurements have proved, beyond any doubt, the superiority of the Beugniot lever system over the rigid frame arrangement. As to the comparison of the "Beugniot" and "bogie" running gear arrangements, both types may be considered to possess approximately equivalent riding qualities. Consequently, the B 13 Committee was informed, by letter ORE/B 10.22.392 of 1st July 1957, that locomotives equipped with the Beugniot lever system might, without any restriction, be admitted for running at speeds not exceeding 80 km p.h. The H-forces (transverse forces on the axleboxes) were applied as a criterion in order to determine, quantitatively, the running properties of the locomotives under test.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B10/RP 3/E, Oct. 1979, 58 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053112
CONSTRUCTIONAL ARRANGEMENTS FOR IMPROVING THE RIDING STABILITY AND THE GUIDING QUALITY OF ELECTRIC AND DIESEL LOCOMOTIVES AND VEHICLES COMPARISON OF TWO MEASURING METHODS (MEASURING RAIL OF THE CFF AND MEASURING WHEEL-SET OF THE SJ) FOR DETERMINING THE FORCES EXERTED BY THE WHEELS OF A VEHICLE ON THE RAILS

The accomplishment of the task entrusted to the B 10 Specialists Committee requires a knowledge of the forces exerted tranverse to the direction of travel on the track- so called Y-forces-by various types of locomotives. The Administrations employ for their own investigations different measuring methods in order to determine these Y- forces but it has been found that they record different values. For the purpose of arriving at a uniform assessment of the running qualities of various types of locomotives it is necessary to known the reason for the differences resulting from the employment of the different measuring methods for the measurement of the Y-forces. This report contains the description of the comparative tests made for the purpose of measuring the Y-forces according to the Schlumpf method with a measuring rail, as used by the CFF, and according to the Olson method with strain gauges on a wheel, as used by the SJ. These comparative tests have shown that good agreement exists between these two measuring methods, when the forces are higher than about 4 tons; but when the forces are smaller the agreement is not so good for reasons which will be explained later in the report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B10/RP 6/E, Nov. 1960, 12 pp, 15 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053113
CONSTRUCTIONAL ARRANGEMENTS FOR IMPROVING THE RIDING STABILITY AND THE GUIDING QUALITY OF ELECTRIC AND DIESEL LOCOMOTIVES AND VEHICLES. SUMMARY OF THE WORK CARRIED OUT BY SPECIALISTS COMMITTEE B 10 SO FAR

Having, since it was set up, published nine reports (RP 1 to 9) and prepared another one (RP 11) for publication, Specialists Committee B 10 considers the time to be appropriate for striking an interim balance. The present report (RP 10) serves this purpose by reviewing the work carried out so far and thus allowing the necessary conclusions to be inferred for its continuation.

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International Union of Railways Intrm Rpt. B10/RP 10/E, Oct. 1964, 76 pp, 33 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053115
CONSTRUCTIONAL ARRANGEMENTS FOR IMPROVING THE RIDING STABILITY AND THE GUIDING QUALITY OF ELECTRIC AND DIESEL LOCOMOTIVE AND VEHICLES. RIDING STABILITY-TEST AND EVALUATION TECHNIQUES, PART 1: REPORT, PART 2: APPENDICES AND FIGURES

Quantities which are typical of the riding of a vehicle regarding its performance and safety aspects are discussed, methods of measuring them are described and procedures enabling a reliable and comprehensive evaluation of the results measured are indicated. The random character of the processes permits representative characteristic values to be obtained only by means of a statistical analysis of values measured on a test track of adequate length. These values enable vehicles of different design and construction and also various designs of parts of the same vehicle to be compared. Methods which permit a statistical analysis based on different points of view are referred to, and in this connexion the method of range mean counting is considered to offer an efficient procedure for analysing the problems of the riding stability. An analogue representation of the quantities measured should not, however, be dispensed with since a statistical analysis does not generally provide any information on the sequence of the values measured with respect to time. In addition, terms of importance to questions of the riding stability are simplified and systematically arranged, and reference systems of co- ordinates which are of general validity established.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B10/RP 12/E, Apr. 1969, 79 pp, 30 Fig., 9 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053131
PREVENTION OF DERAILMENT OF GOODS WAGONS ON DISTORTED TRACKS. CONDITIONS FOR NEGOTATING TRACK TWIST. CALCULATION AND MEASUREMENT OF IMPORTANT VEHICLE PARAMETERS

The report outlines conditions for safe negotiation of track twist to be observed in the design of 2-axled and bogie wagons and describes the relevant calculation method required as well as the experimental determination of the vehicle parameters, in particular torsion properties from twist tests. The main object of this twist test is to determine the actual wheel-load reduction of the leading wheel and to compare this with the permissible wheel-load reduction. This last parameter is determined from certain specific criteria: track twist limit for the vehicle, derailment safety criterion and the guiding force to be considered. Values can be determined direct from twist diagram or indirect from the wheel-load deviation and variation with linear and non-linear suspensions. The limiting values may be calculated or obtained from the appendices for different vehicle parameters. The report is completed by a set of diagrams for determining torsional stiffness of the body of 2-axled wagons with double-link suspension and the torsional stiffness of several types of wagons measured by different administrations. These conditions enable the wagon builder to design new vehicles accordingly and to check existing ones.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B55/RP 6/E, Apr. 1975, 48 pp, 14 Fig., 10 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053137

TRANSMISSION OF VIBRATIONS BY SUSPENSION ELEMENTS AND CONNECTION COMPONENTS WITH THE VEHICLE BODY. ENQUIRY REPORT

The object of the study of the problem caused by the transmission of oscillations to coach bodies by suspension and linkage elements, is to determine constructional means through which oscillations, adversely affecting the running quality of the vehicle, and consequently, the comfort, are prevented as far as possible, from reaching the coach body. This study originally formed part of the Programme of Work of ORE Specialist Committee B 7 (Strength of bodies of passenger coaches). At its 51st Meeting, the Control Committee entrusted the study of this question to Specialist Committee B85. At its 53rd Meeting, the Control Committee decided to set up Specialist Committee B96, and charged it with launching an enquiry.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B96/RP 1/E, Mar. 1967, 48 pp, 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053138

TRANSMISSION OF VIBRATIONS BY SUSPENSION ELEMENTS AND CONNECTION COMPONENTS WITH THE VEHICLE BODY. ANALYSIS OF THE TESTS MADE ON BEHALF OF THE B79 COMMITTEE ON THE MINDEN TEST RIG AND ON THE TRACK

Tests were carried out in 1965 and 1966 on the Minden (Westphalie) test-rig and on the track (DB) on behalf of the ORE B 79 Committee so as to enable the permissible out-of-roundness and out-of-balance values for passenger coaches to be determined for speeds between 0 to 150 km/h. In re-analysing the recording made during the tests, the B 96 Committee has been able to obtain qualitative information and, in particular, has been able to show the influence of the design and of the characteristics of the connecting and supporting elements between vehicle body and bogie frame. The analysis has shown the need for carrying out tests with combined excitation of out-of-roundness and out-of-balance, and for tests on the track. Moreover, it has made it possible to predict the nature and accuracy of the measurements to be made during future tests (Vitry-sur-Seine test-rig for vehicle suspensions).

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B96/RP 2/E, Oct. 1969, 33 pp, Figs., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053142

PROBLEMS OF INTERACTION OF VEHICLES AND TRACK. PERFORMANCE OF SMALL DIAMETER WHEELS WHEN TRAVERSING A 1 AND 9 CROSSING ON A CURVE OF R = 450 M

In Report No. 7 the C9 Specialists Committee has given a concise account of the results obtained from the studies of the geometry of the contact and the safety against derailment when traversing a 1 in 9 obtuse crossing on a test bench. These studies were requested by the Working Group "Small diameter wheel" of the UIC. In order to obtain a comprehensive picture of the problems involved, the C9 Specialists Committee felt that the performance of small wheels currently used in service should be tested in a crossing on a running line. The principal aim of these tests were to confirm that the values measured on the test bench were not exceeded by wagons in current service. For this purpose, the maximum values of the angle of attack of the wheelsets and the transverse forces on the axleboxes which were due to the effects of the vehicle on the wheelset and to those of the train formation on the individual vehicle, were measured. The tests were conducted in particularly adverse conditions which, however, corresponded to those encountered in service.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways C 9/RP 8/E, June 1967, 28 pp, 19 Fig., 3 Tab., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053143

TESTS CONCERNING THE PROBLEMS INVOLVED WITH THE KINEMATIC GAUGE. TESTS AND FINAL REPORT

In connection with the kinematic gauge (UIC question), ORE has conducted a study concerning the position of the bogies and wheelsets in the track. The aim of the studies was to investigate the possibility of abandoning the position of the vehicles in the track, as prescribed in the Technical Unity, and to indicate new and more favourable positions relative to the permissible width of the vehicles. Report No. 1 contains a theoretical study. During this study, graphs were plotted for a curve with R = 150 m, indicating the longitudinal force as a function of the coefficient of adhesion between wheel and rail, in order that the most unfavourable position might be produced. In the present report, graphs were plotted for other curvature radii. The great unknown factor in this problem is the minimum value to be taken into consideration for the coefficient of adhesion. For this purpose, tests were conducted whose description and results are given in an Appendix. Apart from given exceptional cases, the tests have shown that the most unfavourable positions do not occur in reality.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways C102/RP 2/E, Oct. 1969, 11 pp, Figs., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053158

BRAKING AND ACCELERATION FORCES ON BRIDGES AND INTERACTION BETWEEN TRACK AND STRUCTURE, BRAKING AND ACCELERATION FORCES ON BRIDGES, ACCUMULATED RESULTS

The report gives a proposal for a UIC leaflet concerning braking and starting forces on bridges. Theoretical models are used to extend the earlier bridge test results to a range of span of 0 to 100 m. The results apply basically to single span ballasted steel bridges. Coefficients are suggested for calculating braking and starting forces.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D101/RP 9/E, Oct. 1975, 45 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

02 053161
PROBABILITY CONSIDERATION WITH A VIEW TO THE ASSESSMENT OF MEASURES INTENDED TO INCREASE THE SAFETY AGAINST DERAILMENT
Different measures are possible for ensuring that safety against derailment is still provided after the introduction of the automatic coupler. To be able to judge the effectiveness of such measures it will be necessary to know the probability of derailment in the event of their application. This report indicates one method for determining the safety against derailment. It is based on the use of statistical data concerning the characteristics of the track profile, the wagon park, the longitudinal forces occurring in trains, the transverse stability of the track, the coefficient of friction, etc. In the case of a horizontal stabilizing articulation, allowance is also made for a deformed coupler arm. Only the effect of the horizontal components of the longitudinal force are considered. Consequently, one of the advantages of the existing side buffers is obviously disregarded. It has been found that the available statistical data is inadequate. To check the possibility of applying the method, estimates are made to complete the missing data. Provided that the estimates are correct the result will be as follows: For existing two-axled wagons, a pin joint or articulation having vertical but no horizontal stabilization will mean an unacceptably high probability of derailment. The likelihood of derailment is reduced, but not sufficiently, if the electropneumatic brake is used. This also applies if a suspension system with limited transverse play is adopted.

Restrictions on the use of this document are contained in the explanatory material.

Saliger, W
International Union of Railways DT 34/E, Apr. 1974, 29 pp, Figs., Tabs., 11 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

02 094278
TRACK/TRAIN DYNAMICS TEST REPORT MODAL SURVEY
The modal survey vibration test conducted on an 80 ton open hopper freight car is described. The test data, the post-test update of the modal survey test requirements and procedure, and an index to the test data are presented. Photographs of actual measurement locations and the test historical log are included. (Author)

Vigil, RA
Martin Marietta Corporation NASA-CR-144000, Jan. 1975, 314 pp

Contract NAS8-29882

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
N76-10476/9ST, DOTL NTIS

02 094554
TRACK GEOMETRY DATA COLLECTED ON TEST SECTIONS OF THE SOUTHERN PACIFIC TRANSPORTATION COMPANY RAILROAD
The Track Geometry data was collected on the Southern Pacific Transportation Company Railroad in connection with the Truck Design Optimization Project. The data were collected on three test dates on three test sections; (1) Oakland-Ogden, (2) Schellville Branch, and (3) Niles Line. The track Geometry Data was collected onboard the FRA Track Measurement Car (T-3). The Track Geometry parameters listed on the tape are Gage, Left and Right Profile (14.5 chord), Crosslevel, and Curvature. All parameters are measured with noncontact sensors. The data on the tape also includes milepost numbers, original ENSCO tape number, automatic location detection level and speed of the measurement at the time of data collection.

Source tape is in EBCDIC character set. Tape(s) can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

Bang, AJ Gerber, RR Luttrell, N
Federal Railroad Administration Data file FRA/ORD/MT-75/66, FRA/DF-76/001, July 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249794/9ST, DOTL NTIS

02 094561
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0001
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car 70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010104TEM001* Track-HiSpd. CWR.* Speed-30 to 60 in 10 mph Stops* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-010104TEH001* Track-HiSpd. CWR* Speed-70 & 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch 47 off 0 ***FILE 3: Name-010104TSR001* Track-Med.Spd.Jtd.* Speed-10 to 18 in 2 mph stops* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 161. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/14, FRA/DF-75/014, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250160/9ST

02 094562
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0002
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car 70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010104TSM001* Track-Med.Spd.Jtd.* Speed 15 to 45 in 5 mph Stops* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-010104TWA001* Track-HiSpd.Jtd.* Speed-30 to 79 in 10 mph stops* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 162. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/15, FRA/DF-75/015, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250161/7ST

02 094563
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0003
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck.

Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car 70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-051* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None*NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010104CNE001* Track-Curved* Speed-28 mph* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. Clear* Additional Experimental Conditions-None* Errors noted-ch 29 & 39 inoperative; ch 9 off 0 ***FILE 2: Name-010104CN0001* Track-Curved* Speed-35 mph* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch 39 Inoperative.

See also PB-250 163. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/16, FRA/DF-75/016, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250162/5ST

02 094564
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0010

The 4 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010103TEM001* Track-Hi.Speed CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-010103TEH002* Track-Hi.Speed CWR* Speed-70 & 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-polarity on Inner pin Ch. 24 reversed. ***FILE 3: Name-010103TEH003* Track-Hi.Speed CWR* Speed-70 & 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 4: Name-010103TWA003* Track-Hi.Spd. Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 164. Supersedes PB-244 292. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-75/64, FRA/DF-76/013, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250163/3ST

02 094565
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0011

The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8 3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None*NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010103TSM004* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5mph stops Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None*Errors noted-Neg Noise Ch 1, Ch 20 off 0***File 2: Name-010103TSR002* Track-Med.Spd.Jtd.* Speed-10 to 18 in 2 mph steps*Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None*Errors noted-Neg Noise Ch 1, Ch. 7 & 22 off 0.

See also PB-250 165. Supersedes PB-244 293. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-75/65, FRA/DF-76/014, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250164/1ST

02 094566
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0012

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric description of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010101TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph Steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg.Noise on Ch 1 ***FILE 2: Name-010101TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph Steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg.-Noise on Ch 1, polarity reversed inboard pin ch 24 ***FILE 3: Name-010101TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg.Noise Ch 1.

See also PB-250 166. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/17, FRA/DF-75/017, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250165/8ST

02 094567
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0013

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010101TEH001* Track-Hi.Spd.CWR.* Speed-70 & 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-

010101TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-010101TSR001* Track-Med.Spd.Jtd.* Speed-10 to 18 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Ch 1 has neg. noise.

See also PB-250 167. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/18, FRA/DF-75/018, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250166/6ST

02 094568
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0014
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Rain* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010101TSM002* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg Noise on Ch 2, Ch 32 off 0 ***FILE 2: Name-010101TWA003* Track-Hi.Spd.Jointed* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg Noise Ch 1, Ch 32 off 0, polarity reversed Ch 24 ***FILE 3: Name-010101TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg Noise ch 2.

See also PB-250 168. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/19, FRA/DF-75/019, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250167/4ST

02 094569
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0015
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010102TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-Noise on ch 1 ***FILE 2: Name-010102TSR001* Track-Med.Spd.Jtd.* Speed-10 to 18 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 169. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/20, FRA/DF-75/020, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250168/2ST

02 094570
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0016
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car=70 Ton M Reefer* Truck-ASF ride control* Truck center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditons-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010102TWA001* Track-Hi. Spd. Jtd* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In. clear.* Additional Experimental Conditions-None* Errors noted-Noise on ch 1, ch 28 off 0***FILE 2: Name-010102TEM001* Track-Hi. Spd. CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In. clear.* Additional Experimental Conditions-None* Errors noted-Noise on ch 1***FILE 3: Name-010102TEN001* Track-Hi. Spd. CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In. clear.* Additional Experimental Conditions-None* Errors noted-Incomplete-Test aborted.

See also PB-250 170. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/21, FRA/DF-75/021, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250169/0ST

02 094571
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0017
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010102TEH002* Track-Hi. Spd. CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-Noise on ch 1 ***FILE 2: Name-010105TSM001* Track-Med. Spd. Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-Noise on ch 1, ch. 7 and 22 off 0 ***FILE 3: Name-010105TSR001* Track-Med. Spd. Jtd.* Speed-10 to 18 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-Noise on ch 1.

See also PB-250 171. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/22, FRA/DF-75/022, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250170/8ST

02 094572
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TDOP 0018
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Ceer Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010105TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear* Additional Experimental Conditions-None* Errors noted-Noise on ch 1, ch 33 off 0 ***FILE 2: Name-010105TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditons-None* Errors noted-Neg. Side ch 13 inoperative, ch 7 off 0 ***FILE 3: Name-010105TEH001* Track-Hi.Spd.CWR* Speed-70 & 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear* Additional Experimental Conditions-None* Errors noted-Neg. side ch 13 inoperative.

See also PB-250 172. Supersedes PB-246 324. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/27, FRA/DF-76/002, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250171/6ST

02 094573
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0019
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditons. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010106TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg. side ch 13 inoperative ***FILE 2: Name-010106TEH001* Track-Hi.Spd.CWR* Speed-70 & 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg. side ch 13 inoperative ***FILE 3: Name-010106TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Noise on ch 1, ch 34 off 0.

See also PB-250 173. Supersedes PB-246 325. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/28, FRA/DF-76/003, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250172/4ST

02 094574
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0020
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010106TSR001* Track-Med. Spd. Jtd.* Speed-10 to 18 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch 47 off 0 ***FILE 2: Name-010106TSM001* Track-Med. Spd. Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/4 In. clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 174. Supersedes PB-246 326. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/29, FRA/DF-76/004, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250173/2ST

02 094575
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0021
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 2 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010106CNE001* Track-Curved* Speed-28 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 39 Inoperative, ch 26 and 27 had polarity reversed ***FILE 2: Name-010106CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 39 Inoperative; ch 29 Inoperative ***FILE 3: Name-010105CNE001* Track-Curved* Speed-28 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 39 Inoperative, ch 35 has noise spikes.

See also PB-250 175. Supersedes PB-246 327. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/30, FRA/DF-76/005, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250174/0ST

02 094576
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0022
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O: 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010105CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 39 Inoperative, ch 35 is noise ***FILE 2: Name-010102CNE001* Track-Curved* Speed-28 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 39 Inoperative ***FILE 3: Name-010102CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 39 Inoperative.

See also PB-250 176. Supersedes PB-246 328. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/31, FRA/DF-76/006, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250175/7ST

02 094577
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0023
The 4 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010101CNE001* Track-Curved* Speed-28 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 1 inoperative, Noise on ch 39, ch 13 questionable ***FILE 2: Name-010101CNO001* Track-curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 1 inoperative, ch 13 questionable ***FILE 3: Name-010103CNE003* Track-Curved* Speed-28 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 1 inoperative ***FILE 4: Name-010103CNO002* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 1 inoperative.

See also PB-250 177. Supersedes PB-246 329. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/32, FRA/DF-76/007, Feb. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250176/5ST

02 094578
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0024
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Half Load* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None except vertical adaptor calibration should be on basis of 17.8 K* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010302TEM001* Track-Hi. Spd. CWR* Speed-30-60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Erors noted-ch 39 Inoperative, ch 28 off 0 ***FILE 2: Name-010302TEH001* Track-Hi. Spd. CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-010302TWA001* Track-High. Spd. Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-ch 28 off 0.

See also PB-250 178. Supersedes PB-246 330. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/33, FRA/DF-76/008, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250177/3ST

02 094579
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0025
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Half Load* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None except vertical adaptor calibration should be on basis of 17.8K* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010302TSM001* Track-Med Spd Jtd* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-Ch 13 has pos. Noise, ch 28 off 0 ***FILE 2: Name-010302TSR001* Track-Med Spd Jtd.* Speed-20 to 28 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 179. Supersedes PB-246 331. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/34, FRA/DF-76/009, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250178/1ST

02 094580
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0026
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck.

Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Half Load* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None Except Adaptor calibration should be on basis of 17.8K* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010301TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-010301TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-010301TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 180. Supersedes PB-246 332. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/35, FRA/DF-76/010, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250179/9ST

02 094581
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0027
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Half Load* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None Except vertical adaptor calibration should be on basis of 17.8 K* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010301TSR001* Track-Med. Spd. Jtd.* Speed-20 to 24 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-010301TWA001* Track-Hi. Spd. Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch 41 and 43 are 0.5 v., ch 44 and 46 are-0.5 v off 0.

See also PB-250 181. Supersedes PB-246 333. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/37, FRA/DF-76/011, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250180/7ST

02 094582
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0028
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Empty* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010202CNE001* Track-Curve* Speed-25 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-Ch 28 was 1.0 volt off 0 ***FILE 2: Name-010202CNO001* Track-Curve* Speed-35 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-010201CNE001* Track-Curve* Speed-25 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 182. Supersedes PB-246 334. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/37, FRA/DF-76/012, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250181/5ST

02 094583
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0029
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Empty* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010204CNE001* Track-Curve* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-010204CN0001* Track-Curve* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-010206CNG001* Track-Curve* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. clear.* Additional Experimental Conditions-None* Errors noted-21, 22, 28, 29, 31 all off 0.

See also PB-250 183. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/38, FRA/DF-75/024, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250182/3ST

02 094586
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0033
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Empty* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010202TWA001* Track-Hi. Spd. Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/8 In. Clear.* Addi-

tional Experimental Conditions-None* Errors noted-ch 41, 43, 44, and 46 all questionable ***FILE 2: Name-010205TWA001* Track-Hi. Spd. Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch 46 off 0, ch 23 questionable ***FILE 3: Name-010204TWA001* Track-Hi. Spd. Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In. Clear* Additional Experimental Conditions-None* Errors noted-ch 46 off 0, ch 48 and ch 23 questionable.

See also PB-250 187. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/42, FRA/DF-75/028, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250186/4ST

02 094587
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0034
The 4 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Empty* Wheel Profile-New 1 in 20* Spring Group 7-05O; 6-05I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010204TEM001* Track-Hi. Spd. CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-ch 23 no neg., ch 36, 39, and 46 questionable ***FILE 2: Name-010204TEH001* Track-Hi. Spd. CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-ch 46 questionable calibration, ch 23 neg inoperative ***FILE 3: Name-010204TSR001* Track-Med. Spd. Jtd.* Speed-24 to 32 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-Ch 23 no neg., ch 28-1.0V off 0, ch 29 .6V off 0 ***FILE 4: Name-010204TSM001* Track-Med. Spd. Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-ch 23 no neg.

See also PB-250 188. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/43, FRA/DF-75/029, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250187/2ST

02 094593
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0040
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Empty* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010205TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 23 no neg. ***FILE 2: Name-010205TSR001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 23 no neg.

See also PB-250 194. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/48, FRA/DF-75/034, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250193/2ST

02 094594
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0047
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-Worn* Spring Group 7-D3O; 2-D3I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020206TEM001* Track-Hi. Spd. CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39, 48 Bad; Ch 10-questionable***FILE 2: Name-020206TEM001* Track-Hi. Spd. CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39, 48 Bad; Ch. 10 questionable***FILE 3: Name-020206TWA001* Track-Hi. Spd. Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39, 48 Bad; Ch. 10 questionable.

See also PB-250 201. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/55, FRA/DF-75/041, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250200/2ST

02 094595
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0048
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-Worn* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020206TSM001* Track-Med. Spd. Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Spring Group-7-D3O; 2-D3I* Additional Experimental Conditions-None* Errors noted-Ch. 39, 41, 48, 36 Bad***FILE 2: Name-020206TSR001* Track-Med. Spd. Jtd* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Spring Group-7-D3O; 2-D3I.* Additional Experimental Conditions-None* Errors noted-Ch. 36,

39, 41, 48 Bad***FILE 3: Name-020203TEM001* Track-Hi. Spd. CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Spring Group-7-D3O; 2-D3I.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 41, 48 Bad.

See also PB-250 202. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/56, FRA/DF-75/042, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250201/1ST

02 094596
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0049
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-Worn* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020203TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch.17,36,48 Bad ***FILE 2: Name-020203TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch.36,48 Bad ***FILE 3: Name-020204TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8In.* Side Bearings-3/8In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch.36,48 Bad.

See also PB-250 203. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/57, FRA/DF-75/043, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250202/9ST

02 094597
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0073
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 3-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020407TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 33 is 0.6v off 0; ch. 37 is-1.0u off 0 ***FILE 2: Name-020407TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 37 is 1.0v off 0; Test ended at M.P. 47; ch. 33 is 0.6v off 0 ***FILE 3: Name-020407TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 37 is-0.6v off 0; Ch 39 is 1.0u off 0.

See also PB-250 227. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/87, FRA/DF-75/067, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250226/8ST

02 094598
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0075
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 3-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020408TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 35 0.5 u off 0 ***FILE 2: Name-020408TSR001* Track-Med.Spd.Jtd.* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch 43 bad.

See also PB-250 229. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/89, FRA/DF-75/069, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250228/4ST

02 094599
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0076
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 3-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020408TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-020408TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ****FILE 3: Name-020408TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 230. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/90, FRA/DF-75/070, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250229/2ST

02 094623
A REVIEW OF MEASUREMENT TECHNIQUES, REQUIREMENTS, AND AVAILABLE DATA ON THE DYNAMIC COMPLIANCE OF RAILROAD TRACK
The need for increasing train speeds and operating safety while reducing track maintenance is responsible for much of the current research on track structures, vehicle dynamics, and vehicle/track interaction. This report covers Phase I of a 3-phase program to design and fabricate equipment for measuring track dynamic characteristics. It is generally recognized that the available data and measurement techniques for obtaining this type of data for U. S. track are inadequate. This Phase I report includes a review of previous measurement techniques, a compilation of available data on track dynamic characteristics, an evaluation of data requirements, and the development of concepts for measuring track dynamic compliance.

Kaiser, WD Nessler, GL Meacham, HC Prause, RH
Battelle Columbus Laboratories, Federal Railroad Administration Intrm Rpt. FRA-ORD/D-76-70, May 1975, 66 pp

Contract DOT-FR-30051

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250547/7ST

02 129179
HEAVY CARS. WHAT ARE THE ISSUES?
The author refers to the trend towards using increasingly heavy cars (up to 125 tons for 4 axles), the efforts made to adapt track for use of such stock, the disappointments because of fast rail degradation due to scaling, corrugation and cracking.

Way, GH *AREA Bulletin* Vol. 76 No. 653, June 1975, pp 616-621

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: ESL

DOTL JC

02 129792
ANALYSIS OF THE LATERAL HUNTING MOTION OF A TWO-AXLE RAILWAY WAGON BY DIGITAL SIMULATION
The article describes the results of studies which have been under way since 1961 and during which increasingly complex conditions similar to real situations were introduced progressively. It describes the mathematical model which was chosen for use on a digital computer. The results of this simulation tally with experimental results obtained, and the simulation is sufficiently precise to show what happens when a derailment occurs.

Fujii, S *Japan Society of Mechnical Engineers, Bulletin* Vol. 18 No. 122, Aug. 1975, pp 813-818, 4 Fig., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL

02 129836
THE PROGRAMME FOR "RESEARCH INTO THE LIMITS OF THE RAIL/WHEEL SYSTEM" [Das Forschungsprogramm "Erforschung der Grenzen des Rad/Schiene-Systems"]
Representatives from industry, scientific institutions and the German Federal Railway are collaborating in this programme which is promoted by the German Federal Republic's Ministry for Research and Technology. Current studies are in the field of track and vehicle dynamics and interaction, driving techniques, and environmental problems. Middle-term task and research planning covers a four-year period. Test installations for the study of transport techniques are also needed in conjunction with this programme.

Spoeher, W *Eisenbahntechnische Rundschau* Vol. 24 No. 9, Sept. 1975, pp 339-342, 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

02 129849
INFLUENCE OF THE CONCRETE CONDITIONS OF CONTACT BETWEEN WHEEL AND RAIL ON THE RUNNING OF VEHICLES OVER RAILWAY LINES [Einfluss konkreter Rad-Schiene Beruhrungsverhaltnisse auf das Laufverhalten von Schienenfahrzeugen]
The authors speak of the effects of a number of different wheel, and rail profiles on the stability of rolling stock, and also of the influence on such stability of the wheel/rail friction coefficient. From the studies carried out, it transpires that a wheel profile close to the shapes created by natural wear between wheel and rail is more advantageous than conical profiles as regards maintenance and running stability. [German]

Hanneforth, W Fischer, W *DET Eisenbahntechnik* Vol. 23 No. 9, Sept. 1975, pp 409-412, 1 Tab., 11 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany

02 129850
LATERAL DYNAMICS OPTIMIZATION OF A CONVENTIONAL RAILCAR
The attempt to develop a railway vehicle that can operate in the 150 to 300-mph (240 to 480-km/h) speed regime is seriously hampered by the problems of ride comfort, curve negotiation, and "hunting." This latter phenomena involves sustained lateral oscillations that occur above certain critical forward velocities and cause large dynamic loads between the wheels and track as well as contributing to passenger discomfort. This paper presents results of an initial effort to solve these problems by utilizing optimization procedures to design a high speed railway vehicle. This study indicates that the problem is more easily treated as a constrained optimization problem than as an unconstrained problem with several terms in the objective function. In the constrained optimization problem, the critical "hunting" speed was maximized subject to constraints on (1) the acceleration of the car body, (2) the suspension stroke length, and (3) the maximum suspension stroke while negotiating a curve. A simple, three degree- of-freedom model of the rail vehicle was used for this study. Solutions of this constrained problem show that beyond a minimum yaw stiffness between truck and car body the operating speed remains nearly constant. Thus, above this value, the designer may trade off yaw stiffness, wheel tread conicity and stability margin.

Cooperrider, NK Cox, JJ (Arizona State University); Hedrick, JK (Massachusetts Institute of Technology) *ASME Journal of Dynamic Systems, Meas and Control* Vol. 97 No. 3, Sept. 1975, pp 293-299

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ESL

DOTL JC

02 130809
ROAD AND RAIL VEHICLE OSCILLATION [Schwingungen von Schienen und Strassenfahrzeugen]
The authors calculate the amplifying function of the acceleration of vehicle bodies and fluctuations in axle-loads on comfort, safety and the stresses on the running surface for road and rail vehicles. By comparison it is possible to establish similarities and differences, analyse these and propose improvements for rail vehicles. [German]

Mitschke, M Helms, H *Eisenbahntechnische Rundschau* Vol. 24 No. 10, Oct. 1975, pp 371-377, 3 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

02 130812
LONGITUDINAL FORCES IN A TRAIN WHEN TAKING A CONVEX CURVE CONNECTING WITH A LONGITUDINAL SECTION [Prodolnye sily v poezde na soprjazenii ogranicivajuscih uklonov vypuklyh ucastkov profilja puti]
The article studies the profiles to be given to these connecting curves, and their effects when they are taken by heavy trains under traction conditions. Recommendations are made for reducing the dynamic longitudinal forces of quasi-static nature appearing in the couplings of such trains. [Russian]

Versinskij, SV Sakovic, LA *Vestnik Vniizt* Vol. 34 No. 7, 1975, pp 34-38, 3 Tab., 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

02 130814
PROBLEMS OF THE ADHESION COEFFICIENT OF ELECTRIC LOCOMOTIVES [Problemy Koefficienta sceplenija elektrovozov]
The article examines:-the various adhesion coefficient concepts to be applied to these locomotives,-a method for determining the adhesion coefficient,-the tasks involved in making an objective evaluation of this coefficient, taking into account the running conditions of an electric locomotive when adhesion is at a maximum. In addition, details of the extent and methods for preparing a new method of determining the adhesion coefficient are given. A statistical study of wheel slipping must be made in order to establish a technically and economically optimal theoretical adhesion coefficient for electric locomotives in operation at present and for those which will be improved upon later, especially using electrical means for obtaining greater adhesion. This study is necessary because it takes into account all of the various aspects of adhesion. The study of wheel slip and the operation of the motor equipment of electric locomotives must be the basis for the creation of a method of controlling these locomotives by means of a constant command of adhesion. [Russian]

Golovatyj, AT Nekrasov, OA *Vestnik Vniizt* Vol. 34 No. 7, 1975, pp 1-5, 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

02 130907
DEFLECTION RESULTS FROM MOVING LOADS ON A BEAM THAT RESTS UPON AN ELASTIC FOUNDATION REACTING IN COMPRESSION
The two experimental curves shown strongly verify the theoretical appropriateness of using an elastic foundation that reacts in compression only to represent railroad track support. In comparing the improvement in accuracy gained versus the complexity of calculation though, it is suggested that only with high speed trains is any marked advantage achieved with this more accurate model. At all speeds downward deflections (maximum deflections and stresses) were nearly identical in the two models, an argument against using a newer foundation model.

Torby, BJ (California State University) *ASME Journal of Applied Mechanics* Vol. 42 No. 3, Ser E, Sept. 1975, pp 738-739, 12 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

DOTL JC

02 130908
ANALYSIS, DESIGN, AND OPTIMIZATION OF HIGH SPEED VEHICLE SUSPENSIONS USING STATE VARIABLE TECHNIQUES
The article applies state variable techniques to high speed vehicle suspension design. When a reasonably complex suspension model is treated, the greater adaptability of state variable techniques to digital computer application makes it more attractive than the commonly used integral transform method. A vehicle suspension model is developed, state variable techniques are applied, numerical methods are presented, and an optimization algorithm is chosen to select suspension parameters.
15th Jt Autom Control Conf, University of Texas, June 18-21, 1974.

Hedrick, JK (Arizona State University); Billington, GF Dreesbach, DA
American Institute of Chemical Engineers Proc Paper 1974, pp 116-127

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Institute of Chemical Engineers 345 East 47th Street, New York, New York, 10017

02 130910
TECHNICAL STABILITY OF THE LATERAL VIBRATION OF A SINGLE WHEEL SET MOVING ALONG A TRACK WITH A NONLINEAR TRANSVERSE ELASTICITY [Statecznosc techniczna drgan bocznych pojedynczego zestawu kolowego poruszajacego sie wzdluz toru z nieliniowa sprezystoscia poprzeczna]
The technical stability of a mechanical system with a single degree of freedom, a nonlinear elasticity characteristic, free play, and damping by dry fricition, is considered. This system performs forced lateral vibrations produced by a harmonic force. The system is acted on by constantly acting perturbations of the elasticity and damping characteristics. The regions of the stability were considered from the practical point of view. The problem is analyzed by means of the second method of Lyapunov. The relations obtained for the stability conditions contain the elasticity coefficient, the damping, and the rate of lateral motion of the body. [Polish]

Pieniazek, A Pieniazek, W *Mechanika Teoretyczna i Stosowana* Vol. 13 No. 1, 1975, pp 107-115

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

02 131032
FREQUENCY DOMAIN COMPUTER PROGRAMS FOR PREDICTION AND ANALYSIS OF RAIL VEHICLE DYNAMICS. VOLUME 1-TECHNICAL REPORT
Frequency domain computer programs developed or acquired by TSC for the analysis of rail vehicle dynamics are described in two volumes. Volume I defines the general analytical capabilities required for computer programs applicable to single rail vehicles and presents a detailed description of frequency domain programs developed at TSC in terms of analytical capabilities, model description, equations of motion, solution procedure, input/output parameters, and program control logic. Descriptions of programs FULL, FLEX, LATERAL, and HALF are presented. TSC programs for assessing lateral dynamic stability of single rail vehicles are also described. Volume II contains program listing including subroutines and card-by-card descriptions for inputing data for the four TSC frequency domain programs described in Volume I.

Perlman, AB DiMasi, FP
Transportation Systems Center, (DOT-TSC-FRA-75-16.I) Final Rpt. FRA-OR&D 76-135.I, Dec. 1975, 116 pp, Figs., Tabs., 5 Ref.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS

DOTL NTIS

02 131033
FREQUENCY DOMAIN COMPUTER PROGRAMS FOR PREDICTION AND ANALYSIS OF RAIL VEHICLE DYNAMICS. VOLUME II-APPENDIXES
Frequency domain computer program developed or acquired by TSC for the analysis of rail vehicle dynamics are described in two volumes. Volume I defines the general analytical capabilities required for computer programs applicable to single rail vehicles and presents a detailed description of frequency domain programs developed at TSC in terms of analytical capabilities, model description, equations of motion, solution procedure, input/output parameters, and program control logic. Descriptions of programs FULL, FLEX, LATERAL, and HALF are presented. TSC programs for assessing lateral dynamic stability of single rail vehicles are also described. Volume II contains program listings including subroutines for the four TSC frequency domain programs described in Volume I.
See also Volume II, RRIS 02 131032, Publication 7602.

Perlman, AB DiMasi, FP
Transportation Systems Center, (DOT-TSC-FRA-75-16.II) Final Rpt. FRA-OR&D-76-135.II, Dec. 1975, 102 pp

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS

DOTL NTIS

02 131247
THEORETICAL STUDY ON THE DETERMINATION OF SECONDARY DEFLECTION IN RAILS [Theoretische Studie ueber die Ermittlung der Sekundaerdurchbiegung der Schiene]
The calculation of the deflection of a rail is based on the assumption of a continuous elastic support. It is in fact a support at separate spaced points, which causes an additional (secondary) deflection. The author calculates this secondary deflection, and concludes that it does not not have any significant effect on superstructure stress. [German]

Eisenmann, J Reinfelder, R *Glasers Annalen ZEV* Vol. 99 No. 11, Nov. 1975, pp 301-303, 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL
DOTL JC

02 131252
FURTHER DEVELOPMENT OF THE WHEEL/RAIL TECHNIQUE. PROGRAMME OF OBJECTIVES OF THE GERMAN FEDERAL TRANSPORT MINISTER FOR THE GERMAN FEDERAL RAILWAY [Die Weiterentwicklung des Rad/Schiene-Technik-Eine Zielvorgabe des Bundesverkehrministers fuer die Deutsche Bundesbahn]
On 12 June 1975, the German Railway Engineers Association (VDEI) organised a congress in Munich, on the theme of further development of the wheel/rail technique. In a discussion led by the Chairman of the DB Central Office in Munich, in which seven representatives from industry, science and the DB took part, the relationship between vehicle, track and computer science was examined, and also the limits of the wheel/rail technique. The conclusion reached was that research and improvement with regard to the three above-mentioned factors was necessary in the future. The article gives the text of the discussions. [German]

Holzschwelle Vol. 70 No. 81, Dec. 1975, pp 5-31

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Studiengesellschaft fuer Holzschwellenoberbau E.V. Waldstrasse 11, Bonn-Ippendorf, West Germany

02 131256
AN ANALYSIS OF THE LATERAL HUNTING MOTION OF A TWO-AXLE RAILWAY WAGON BY DIGITAL SIMULATION
This is a sequel to the article published by the same authors in this magazine in August 1975. The authors use the mathematical model proposed in this article to study in greater detail the influence of track distortions and of wagon constructional parameters on track displacement. They also propose a new model making greater allowance for the actual profile of wheel treads.

Fujii, S *Japan Society of Mechanical Engineers, Bulletin* Vol. 18 No. 125, Nov. 1975, pp 1246-51, 2 Fig., 2 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

02 131263
WEAR ON EXTERNAL SURFACES OF WHEELS AND RAIL DUE TO FRICTION [Verschleissvorgang im Grenzschichtbereich der Reibpaarung Rad/Schiene]
The stresses borne by rail and wheel elements are analysed on the basis of several fundamental definitions of wear by Fleischer. A number of studies were carried out on plastic deformation, running surfaces and wear characteristics. Partial oxidation can occur when the external surfaces of wheels or rails are deformed because the materials come into contact with the surrounding atmosphere. Oxidised metallic particles are then worn away. Wear is often affected by the characteristics of the process itself or by layers of martensite which are produced by shoe brakes. [German]

Pigors, O *DET Eisenbahntechnik* Vol. 23 No. 11, Nov. 1975, pp 495-498, 5 Fig., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany Repr. PC

02 131292
STABILISING BACK-UP SYSTEM FOR INCREASING THE SPEED LIMIT OF RAIL VEHICLES [Stabilisierendes Hilfssystem zur Erhoehung der Grenzgeschwindigkeit von Schienenfahrzeugen]
To increase the speed limit of rail/wheel system vehicles, wheelsets are tracked in fixed position, shock-absorbers are introduced between the wheelsets and the bogie, the wheel section is modified, etc. The article is a theoretical examination of a passive, stabilizing back-up system with which the speed limit of a wheelset can be increased by over 100%. This back-up system consists of a ring-shaped device sliding freely on the wheelset but connected to it by springs and shock-absorbers. The authors propose three alternative types of stabiliser involving a ring-shaped weight guided by a platespring or a roller oscillator or a spring oscillator where stiffness is controlled by electromagnets. If the frequencies of the oscillator and of the wheelset crosswise movement are harmonised, the wheelset movment is stabilized up to very high-speeds. [German]

Gasch, R *Leichtbau der Verkehrsfahrzeuge* Vol. 19 No. 1-2, Jan. 1975, pp 21-27, 10 Fig., 1 Tab., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Leichtbau der Verkehrsfarzeuge Augsburg, West Germany Repr. PC

02 131294
THE STABILITY AND TRANSFER FUNCTIONS OF RAIL VEHICLES
The objective of this work was to elaborate the general mathematical model of a rail vehicle, which fully expresses conditions in the course of running, and to study the effect of the vehicle's parameters on its stability, transfer function and the number of running quality.

Rus, L *Vehicle System Dynamics* No. 2-3, 1975, pp 159-165

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

02 131295
EVALUATION OF RAILWAY CONTACT THEORY BY EXPERIMENTS
The paper concerns an evaluation of a widely used mathematical model for the description of the wheel-rail forces in the equations of motion of a railway vehicle. By using the measured responses of a bogie on a normal track, actual values for the creep coefficients and the geometrical contact parameters will be determined. Interesting results have been obtained for the influence of the gravitational stiffness.

Broersen, PMJ *Vehicle System Dynamics* No. 2-3, 1975, pp 173-176

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

02 131302
STUDY INTO THE STABILITY OF EMPTY CARS RUNNING AT HIGH SPEEDS OVER LINE SECTIONS WITH ARTIFICIALLY-CREATED IRREGULARITIES [Issledovanie ustojcivosti prooznih gruzovyh vagonov pri povysennyh skorostjah na ucastkah puti s iskusstvennymi nerovnostjami]
The article gives the results of dynamic tests with empty cars worked at up to 300 km/h; then tests took place in a test yard, over line sections with artificially- created irregularities. Proof is given of the possibility for freight cars equipped with MT-50 trucks to run at speeds of up to 100 km/h. The creation of irregularities on the track is an efficient and promising method for studying the dynamic properties of rolling stock. [Russian]

Versinskij, SV Kondrasov, VM *Vestnik Vniizt* Vol. 34 No. 3, 1975, pp 3-8, 1 Tab., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

02 131303
THE RUNNING AND OSCILLATION TECHNIQUE DIVISION OF THE GERMAN FEDERAL RAILWAY'S TESTING INSTALLATION AT MINDEN, WESTPHALIA [Die Abteilung fuer Lauf-und Schwingungstechnik in der Bundesbahn-Versuchsanstalt Minden (Westf.)]
After some general remarks on the problems of running technique and the study of oscillation in railway vehicles, the author briefly describes the stage at present reached in research on these problems. The DB is currently engaged in work ranging over a very wide field. The central point of this work is the solution of problems resulting from the planned increase in train speeds. The organization of this division is described, and the authors stress the particular professional features and qualities of character required from its workers. Strain gauges have been used for many years for research on the resistance of rail vehicles. Faster and more accurate results are obtained by using automatically compensated multi-figure measuring equipment and a high-speed electronic printer. Torsion measurements are used to determine safety against derailment. The article briefly describes the calculation process and measuring technique. The application is demonstrated by means of an example. [German]

Zottmann, W Lang, M *Glasers Annalen ZEV* Vol. 98 No. 3, 1974, 3 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

02 131307
CRITERIA FOR EVALUATING RAIL VEHICLE DYNAMICS BY COMPUTER MODELING TECHNIQUES
The problem is tackled by means of a 14-degree-of-freedom computer model excited by two track geometry errors: a deterministic input based on bolted-rail track, and random geometry power spectra based on continuous welded rail. The model is not described, and the paper is devoted to the study of possible criteria and the results obtained from application of these criteria to various types of rolling stock. The authors review the classical ride-comfort criteria of JNR, ISO, BR and devise complex criteria combining vertical and cross vibration, and characterising: the maximum permissible weight of the vehicles; the stability of the track/vehicle system; comfort in curves; the ride quality.

Ahlbeck, DR
High Speed Ground Transportation, Intl Conf Jan. 1975, pp 1-17, 3 Tab., 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France Repr. PC

02 131627
A COMPARISON OF LOCOMOTIVE HAULED TRAINS AND ELECTRIC MU CARS. TECHNICAL CONSIDERATIONS
Since 1969 the Penn Central Railroad has been operating a Metroliner fleet of sixty-one self powered electric cars (MU) between New York City and Washington, D.C. The fleet is operated on an hourly schedule in both directions and is presently providing a service of 198 trains per week. The Metroliners were designed for maximum speed of 160 miles per hour and have a short term power rating of 2500 horsepower per car at the wheels.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Marchetti, JW
Institute of Electrical and Electronics Engineers C76 461-9 IA, Mar. 1976, 6 pp, Figs.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

02 131629
A COMPUTER METHOD FOR CALCULATING DYNAMIC RESPONSES OF NONLINEAR FLEXIBLE RAIL VEHICLES
This paper discusses a digital computer program which is capable of simulating rolling, heaving, pitching, swaying, and yawing motions of rail vehicles in response to track irregularities. Effects of several types of nonlinearities, such as coulomb damping, wheel-rail separation, and nonlinear spring force-deflection characteristics, are taken into account. The method of superposition of normal modes is used to analyze the effects of car body flexibility. The program has been validated by comparison with experimental data. Several examples of the correlation with test data for the rock and roll problem are presented.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Healy, MJ (Wyle Laboratories)
American Society of Mechanical Engineers 76-RT-5, Jan. 1976, 9 pp, 10 Fig., 7 Ref.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

02 131637
SOME RELATIONSHIPS BETWEEN DYNAMIC PERFORMANCE OF FREIGHT CAR TRUCKS AND WORN WHEEL TREAD
Stability of flanged wheels on steel rails involves wheel tread and rail head contours. But after 150 years of railroading, the merits of various tread profiles are still being debated. To fix the importance of wheel profile on lateral stability of the freight car truck and riding qualities of the car, extensive tests were conducted by Southern Pacific on 89-foot flat cars used in container service. It was found that wheel contours have overriding influence on truck stability. While asymetrical wear patterns may develop from external influences, not all such uneven wear produces unstable operation. Hollow treads seem to stabilize a wheel set. Further investigations, assisted by computer analysis, are needed to understand the dynamic performance of car trucks as influenced by worn wheels. Brake shoe wear has an influence on wheel wear which can affect wheelset stability but this is not understood fully.
Direct enquiries to P.V. Garin. Prepared for the Joint ASME/IEEE Meeting, Chicago, Illinois, April 6-8, 1976.

Garin, PV Cappel, KL (Wyle Laboratories)
Southern Pacific Transportation Company Apr. 1976, 31 pp, 27 Fig., 1 Tab., 7 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

02 131638
SYMPOSIUM ON RAILROAD EQUIPMENT DYNAMICS
Railroad equipment dynamics is undergoing comprehensive study by the railroad industry, its supporting suppliers and the Federal Government. An understanding is emerging of the forcing influences involved in the dynamic environment. Theoretical analyses, including mathematical models, are being created to extend an understanding of the dynamic systems involved and to serve as tools for improving on the design of railroad equipment and structures involved in this environment. This Symposium Volume contains papers involving dynamic analysis, testing of the dynamic environment, results of freight car performance operating in the dynamic environment and a power system design related to improving the operational performance of a railroad passenger car.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, sponsored by the Rail Transportation Division, ASME and the Land Transportation Committee, IEEE, Chicago, Illinois, April 6-8, 1976. Individual papers are RRIS Abstract Nos. 02 131639, 02 131640, 02 131641, 02 131642, 02 131643, 02 131644, 03 131645 and 04 131646, Publication 7602.

American Society of Mechanical Engineers 1976, 176 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

02 131639
WHEELSET SUSPENSIONS DESIGNED TO ELIMINATE THE DETRIMENTAL EFFECTS OF WHEEL WEAR ON THE HUNTING STABILITY OF RAILROAD VEHICLES
Traditionally, railroads use wheels having conical wheeltreads, the conicity being 1/20 normally. In practice it has been found that wheeltreads tend to

wear hollow. There is also considerable wear to wheel flanges. Such wheel wear changes the effective conicity of the wheeltread and railroad practice has shown that worn wheels frequently excite the vehicle, often to violent oscillations in the lateral plane at certain critical speeds. These undesirable oscillations are generally referred to as hunting. The hunting phenomenon can be explained adequately by the creep theory. A consequent application of this theory leads to the design of wheelset suspensions which result in wheel wear being minimized and distributed evently over the tread surface, thus reducing the tendency for the wheeltread conicity to change with wheel wear. Such suspensions require wheels having profiled wheeltreads of a relatively high effective conicity. In addition, the elastic yaw constraint between wheelset and truck frame must not exceed certain values.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRIS No. 02 131638, Publication 7602.

Scheffel, H (South African Railways)
American Society of Mechanical Engineers 1976, pp 1-23, 17 Fig., 4 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

02 131640
LATERAL DYNAMICS OF A RAILWAY VEHICLE

A 17-degrees-of-freedom model is used for investigating the lateral stability of a four-axle railway vehicle. Influence of various design parameters on primary and secondary hunting is studied. The study provides useful information to the practicing engineers engaged in the suspension design of railway vehicles.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRIS No. 02 131638, Publication 7602.

Garg, VK (General Motors Corporation); Chu, KH (Illinois Institute of Technology); Mels, KD (General Motors Corporation)
American Society of Mechanical Engineers 1976, pp 25-40, 6 Fig., 1 Tab., 8 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

02 131641
ANALYTICAL AND EXPERIMENTAL DETERMINATION OF NONLINEAR WHEEL/RAIL GEOMETRIC CONSTRAINTS

The wheel/rail geometric constraint relationship for actual wheel and rail profiles are generally nonlinear functions of wheelset lateral displacement. Two of these relationships which strongly influence the lateral dynamics of railway vehicles are the effective conicity and gravitational stiffness. An algorithm for the digital computer is presented that calculates these nonlinear relationships for arbitrary wheel and rail head profiles. An experimental apparatus was developed to determine the location of the wheel/rail contact points as a function of wheelset lateral displacement for arbitrary profiles. Experimental data obtained with this apparatus are presented for various cases which validate the results of the analytical procedure.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRIS No. 02 131638, Publication 7602. Also available from NTIS, PB-252290/AS.

Cooperrider, NK (Arizona State University); Law, EH (Clemson University); Hull, R (Arizona State University); Kadala, PS Tuten, JM (Clemson University)
American Society of Mechanical Engineers 1976, pp 41-69, 11 Fig., 9 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

02 131642
ROAD AND LABORATORY INVESTIGATION OF TRUCK BOLSTERS FOR UNIT TRAIN CARS

Problems of "excessive" wear and failure have arisen in new cars in unit train service, some due to over-the-road running, others to handling of light cars. Similar problems can arise in trains of non-uniform, but regularly assigned, car types in continuous high-mileage, high speed, rapid turnaround service. Railroad cars permanently assigned to unit train service travel many more miles yearly than cars in conventional freight service. At terminals their loading and unloading is expedited to reduce turnaround time. Consequently, the load spectrum that a conventional-service car would encounter over years, is compressed, for the unit train car, into a much shorter time interval. This paper describes the experiences with truck bolsters from a coal-hauling fleet of unit train cars.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRIS No. 02 131638, Publication 7602.

Weber, HB (Midland-Ross Corporation); Driver, JB (Association of American Railroads)
American Society of Mechanical Engineers 1976, pp 87-114, 15 Fig., 2 Tab., 4 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

02 131643
DYNAMIC BODY CRACKING OF UNIT COAL TRAIN CARS

Problems of "excessive" wear and failure have arisen in new cars in unit train service; some due to over-the-road running, others to rough handling of light cars. The load spectrum encountered by a conventional-service car is compressed, for the unit train car, into a much shorter time interval. One problem these conditions produced in a new fleet of coal-hauling unit cars was corrosion-fatigue.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRIS No. 02-131638, Publication 7602.

Rhine, PE Williams, AD (Union Pacific Railroad); Driver, JB (Association of American Railroads)
American Society of Mechanical Engineers 1976, pp 115-122, 4 Fig., 2 Tab.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

02 131644
EFFECT OF VERTICAL TRACK IRREGULARITIES ON CAR BODY VERTICAL ACCELERATIONS

Using Power Spectral Density and Voltage Density techniques, this paper studies the influence of Track Irregularities, Speed and Spring Design on Vertical Ride Characteristics of Freight Cars.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRIS No. 02 131638, Publication 7602.

Guins, SG
American Society of Mechanical Engineers 1976, pp 71-85, 15 Fig., 1 Tab., 5 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

02 131771
TRAIN PERFORMANCE SIMULATOR

The TPS computer program may be used to estimate motive power requirement and train running times, to analyze the effect on train performance of curves, grades, speed restrictions and station stops, and to compare alternative plans for line changes or new rail lines. The program includes several new features: (1) look-ahead braking detects stops and speed restrictions in advance and brakes the train accordingly; (2) route information necessary for a simulation is input on only one or two cards; (3) the locomotive and train consist information for each run can be input on one card; (4) changes in locomotives, train consists, station stop time, speed limits, elevation (gradient) and curvature may be made during a simulation run; (5) tonnage ratings can be developed for a route by specifying an option which makes iterative runs over the ruling grade. The simulation program, written in FORTRANú takes into account grades, curves, speed restrictions, station stops, wind speed and direction, train resistance and locomotive tractive effort, braking and fuel consumption characteristics. A train is considered a line rather than a point and is divided into sections with the center of gravity and the resistance being computed separately for each section. This technique provides more accurate results, especially on lines with rolling profiles where different sections of the train may be on varying gradients. Track data for all MoPac System main lines and many branches have been coded and stored permanently on a resident disc pack available to the TPS program. Track data not available on disc may be read in on cards.

Direct requests to M.T. Manninger, Industrial Engineering Division, MoPac Railroad. A user manual is available upon request.

Missouri Pacific Railroad No Date

ACKNOWLEDGMENT: Missouri Pacific Railroad
PURCHASE FROM: Missouri Pacific Railroad Missouri Pacific Building, 210 North 13th Street, St Louis, Missouri, 63103

02 131774
OVER-THE-ROAD SIMULATION MODEL
The OTR model, a computer program, may be used to determine the effect on track capacity and on train operations resulting from changes in track configuration, speed restrictions, train schedules, or horsepower-per- trailing-ton characteristics. Some of the features included in the program are: (1) ability to simulate train operations in multiple track territory; (2) ability to originate or terminate trains at intermediate locations in the network being simulated; (3) ability to change train characteristics (length, priority, horsepower-per-trailing- ton, etc.) at intermediate work locations; (4) ability to operate 'turns'; and (5) ability to specify connections between trains and to have these connections considered in the resolution of conflicts. The simulation program schedules trains using horsepower-per-trailing-ton data from a train performance simulation program. The work a train must do and the connections which the train is to make are also considered in developing the initial schedule. Conflicts between trains are determined and the program selects the best of several possible resolutions based on delay time incurred, train priority, possible future conflicts, and the effect on scheduled train connections.

See also RRIS 17 131887. Direct requests to M.T. Manninger, Industrial Engineering Division, MoPac Railroad. A general description of program characteristics, required data preparation and reports generated is available upon request.

Missouri Pacific Railroad No Date

ACKNOWLEDGMENT: Missouri Pacific Railroad
PURCHASE FROM: Missouri Pacific Railroad Missouri Pacific Building, 210 North 13th Street, St Louis, Missouri, 63103

02 131776
TRAIN PERFORMANCE CALCULATOR
This computer program is a simulation of a single train across a segment of the railroad that takes into account grade, curvature, speed limits, train consist, and type of locomotives. Gives the minimum running time, i.e., does not take into account interaction with other trains, however, speed limit changes and intermediate stops may be specified. Also fuel consumption is calculated. May be used to test the effect on running time and fuel consumption of a variety of changes, such as speed limits, tonnage, locomotives, or line changes. Also the model can be used in establishing tonnage ratings. The program uses several disk files for storing track data and route information.

Direct requests to W.C. Doughty, Computer Services Department, N&W Railways.

Norfolk and Western Railway No Date

ACKNOWLEDGMENT: Norfolk and Western Railway
PURCHASE FROM: Norfolk and Western Railway 8 North Jefferson Street, Roanoke, Virginia, 24011

02 131880
TRAIN PERFORMACE CALCULATOR
This version of the TPC computer program can operate in either of two modes: first, to derive the minimum running time and fuel consumption of a specifically defined train over a track segment; second, to determine tonnage ratings for various types of locomotives over specified territories. Track profile and speed restrictions for the entire System, as well as locomotive characteristics, are maintained on tape and are automatically extracted for input to a TPC run. Dynamic braking is included within the model logic.

Direct requests to R.L. Sauder, Director, Operations Research, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

02 132931
STANDARD TEST RAILROAD CAR OF THE WEST GERMAN RAILROAD SYSTEM FOR TESTING AT HIGH SPEEDS-1,2 [Der Einheitsmesswagen der Deutschen Bundesbahn fuer Versuche mit Hohen Geschwindigkeiten-1,2]
A vehicle is described which can be used for performing a wide variety of tests. Constructional details and a description of the electric and power supply equipment are presented. For application when the basic equipment is insufficient, some cars are provided with supplementary equipment. However the universality of the vehicle is not restricted thereby. [German]

Hofmeister, K Knau, U Hugo, K *Elektrische Bahnen* Vol. 46 No. 9, Sept. 1975, pp 219-226

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

02 132937
TRACK-TRAIN DYNAMICS
The purpose of this paper is to outline one of the serious dynamic problems involving railroad cars and to propose an orderly approach to the definition of a dynamic model through analysis and testing that can be used to investigate various fixes. The problem in question is the hunting phenomenon involving lateral instability of the car suspension (trucks). This phenomenon has been recognized as a major contributing factor in a significant number of derailments causing millions of dollars in losses. This paper expounds on the mechanics and characteristics of hunting. The planned solution is outlined as a building block approach directed at formulating a test verified dynamic model of an open hopper freight car-truck assembly. Results obtained to date are presented together with conclusions related to the program.

Presented at a meeting Nov. 17-20, 1975.

Abbott, PW (Martin Marietta Corporation); Morosow, G Macpherson, J
Society of Automotive Engineers Preprint N751058, 1975, 13 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

02 132938
DYNAMIC ANALYSIS OF RAIL-VEHICLE SYSTEMS USING DYNALIST II
The purpose of this paper is to introduce the DYNALIST (Dynamics of Articulated Linear Systems) computer program and demonstrate its application to rail-vehicle systems. The program is available through the U.S. Department of Transportation, Transportation Systems Center, and offers general modeling and computational tools for Linear analysis in the frequency domain based on modal superposition. The paper describes the lateral dynamic analysis of a passenger type vehicle including calculations for sinusoidal, periodic and stationary random rail irregularities. A transient response capability is also demonstrated. Approximate results based on modal truncation are compared to exact solutions.

Presented at a meeting Nov. 17-20, 1975.

Hasselman, TK (Wiggins (JH) Company); Bronowicki, AJ
Society of Automotive Engineers Preprint N751059, 1975, 10 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

02 132948
LOWERING THE ORDER OF SYSTEMS OF NONLINEAR DIFFERENTIAL EQUATIONS OF MOTION BY ELIMINATING FAST-DECAYING SOLUTIONS [Ponizhenie poryadka sistem nelineinykh differentsial'nykh uravnenii dvizheniya putem isklyucheniya bystrozatukhayushchikh reshenii]
Some methods of decomposition of systems of nonlinear differential equations into lower-order blocks are considered. This is particularly effective is cases when the system contains fast-decaying motions that can usefully be excluded. Two methods of such decomposition are presented. Applicability of these methods is demonstrated by examples regarding railroad rolling stock motions. [Russian]

Lazaryan, VA (Academy of Sciences, Ukraine); Dulgach, LA Zil'berman, IA Korotenko, ML *Soviet Applied Mechanics* Vol. 11 No. 8, Aug. 1975, pp 81-88

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

02 132958
EFFECT OF HEAVY AXLE LOADS ON TRACK
Sessions included track developments, suspension developments and track/-train interaction. Eighteen papers were presented by authors from the United States, Canada, Mexico and Europe.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23 and 24, 1975. Individual papers are RRIS Numbers 02 132959, 01 132960, 01 132961, 02 132962, 01 132963, 01 132964, 03 132965, 03 132966, 03 132967, 03 132968, 03 132969, 24 132970, 02 132971, 02 132972, 18 132973, 00 132974, 02 132975, and 00 132976.

Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, 174 pp, Figs., Refs.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-252968/AS, DOTL NTIS, DOTL RP

02 132959
DETERMINATION OF LOADS ON TRACK
In the past decade, advances in the technology of instrumentation and of computers have made possible the determination of wheel/rail loads so that proper design and maintenance procedures may be developed for vehicles and track so that the industry can live with today's axle loadings. Methods of determining such loads by measurements on the vehicle and the track are discussed. Mathematical modeling procedures may also be utilized to calculate such loads. Computer simulation which includes both vehicle and track in a dynamic interacting system permits specification of outputs in the form of vertical and lateral forces between wheel and rail. Some of the research programs in load determination are then described.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Meacham, HC
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 8-16, 28 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

02 132962
OBSERVATIONS ON THE EFFECT OF HEAVY WHEEL LOADS ON RAIL LIFE
The Bessemer and Lake Erie Railroad has operated 90-ton open-top cars since 1931 and has some statistics on rail wear and rail life under the stresses imposed by such equipment. Rail life on tangent track has been around 440 million gross tons for jointed rail and beyond 650 million gross tons for continuous welded rail. Statistics are also available for Curvemaster and controlled cooled rail on curves. On newer ore carrying railways, rail life appears to be appreciably shorter. Among possible reasons are the bidirectional operation of loaded trains on B&LE, the mixing of various capacities of cars, and the predominance of traffic on solid, rather than roller-type, journal bearings.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Rougas, M (Bessemer and Lake Erie Railroad)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 41-44, 5 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

02 132971
RAIL DYNAMICS SIMULATOR
The car testing facility at the Rail Dynamics Laboratory at the Transportation Test Center is described. The facility was designed and constructed to assist government and industry in evaluating and characterizing the dynamic behavior of cars equipped with two-axle trucks. The configuration of the Vertical Shaker System are described, along with its capabilities. Mathematical modeling of a piggyback car is discussed.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

De Benedet, D (Wyle Laboratories)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 118-122, 12 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

02 132972
COMPARATIVE STUDY OF LOCOMOTIVE LATERAL STABILITY MODELS
In this paper a comparative study is made between present investigation of the 39 degree-of-freedom mathematical model and other simplified models. The results of the study of a typical six-axle locomotive obtained from the 39 DOF model are presented. The lateral stability is appraised, and the model includes the coupling between vertical and lateral motions. The merits and demerits of various models are discussed. A bibliography is included.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Garg, VK Mels, KD (General Motors Corporation)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 123-129, 5 Fig., 13 Ref.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

02 132975
RAIL WEAR AND CORRUGATION PROBLEMS RELATED TO UNIT TRAIN OPERATIONS: CAUSES AND REMEDIAL ACTION
This paper is a case study of rail wear problems on Canadian National's main line through the Rocky Mountains as a result of unit train operation. The problems are gauge-face wear on the high rail on curves, rail head flow on the low rail and corrugations having a wavelength varying from 8 to 30 inches on the low rail. Prior to introduction of unit trains there were almost no such problems. A study of the lateral forces is described. Remedial action requires a concentrated effort by Engineering, Equipment and Transportation groups with no quick "fix" available. Absence of any action will only cause track deterioration and if it is desired to more bulk commodities in unit trains, the problem must be attacked in an organized manner.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

King, FE (Canadian National Railways)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 139-147, 11 Fig.

Acknowledgment: FRA
Purchase From: NTIS

DOTL NTIS, DOTL RP

02 133032
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0041
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-1/2 Worn* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020102TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 12 No Pos.; Ch. 38, 47 Noisy ***FILE 2: Name-020102TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 12 No Pos.; Ch. 28 off 0 ***FILE 3: Name-020102TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 12 No Pos.

See also PB-250 195. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/49, FRA/DF-75/035, Apr. 1975

Acknowledgment: NTIS
Purchase From: NTIS

PB-250194/8ST

02 133033
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0042
The 4 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-1/2 Worn* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020102TSR001* Track-Med.Spd.Jtd.* Speed-24 to 32 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 12 No Pos. ***FILE 2: Name-020102TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 12 No Pos. ***FILE 3: Name-020101TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 12 No Pos. ***FILE 4: Name-020101TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 12 No Pos.; ch 46, 48 questionable.

See also PB-250 196. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/50, FRA/DF-75/036, Apr. 1975

Acknowledgment: NTIS
Purchase From: NTIS

PB-250195/5ST

02 133034
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0043
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-1/2 Worn* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020101TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 41, 46, 48 Inoperative; ch. 12 No Pos. ***FILE 2: Name-020101TSR001* Track-Med.Spd.Jtd.* Speed-24 to 32 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 6, 41, 46, 48 Inoperative; ch. 12 No Pos.

See also PB-250 197. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/51, FRA/DF-75/037, Apr. 1975

Acknowledgment: NTIS
Purchase From: NTIS

PB-250196/3ST

02 133035
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0044
The 1 data file on this magnetic tape includes acceleration, force, and displacement measurements at critical points on a freight car and truck. The file includes detailed alphanumeric descriptions of test conditions. The following are for the single test on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-1/2 Worn* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the test are as follows: FILE 1: Name-020101TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Errors noted-ch.12 No Pos.

See also PB-250 198. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/52, FRA/DF-75/038, Apr. 1975

Acknowledgment: NTIS
Purchase From: NTIS

PB-250197/1ST

02 133036
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0045
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-Worn* Spring Group 7-D7O; 6-D7I* Snubbing-8-3091* Snubber

Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020205TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 19, 40, 48 Inop.; ch. 12 No Neg.; ch. 10 1.0v off 0; ch. 29 0.4v off 0; ch. 26, 36, 39 questionable ***FILE 2: Name-020205TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 19, 48 Inop.; ch. 12 No Neg.; ch. 26, 36, 39 questionable ***FILE 3: Name-020205TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 19, 48 Inop.; ch. 12 No Neg.; ch. 26, 36, 39 questionable.

See also PB-250 199. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/53, FRA/DF-75/039, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250198/9ST

02 133037
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0046

The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-Worn* Spring Group 7-D7O; 6-D7I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020205TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 48 Inop.; ch. 10-0.4v off 0; ch. 36, 39 questionable ***FILE 2: Name-020205TSR001* Track-Med.Spd.jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch.48 Inop.; ch. 10, 36, 39 questionable.

See also PB-250 200. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration FRA/ORD/MT-76/54, FRA/DF-75/040, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250199/7ST

02 133038
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0050

The 4 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-Worn* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020204TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36, 40, 48 Bad; 13 No Neg. ***FILE 2: Name-020204TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36, 48 Bad; 13 No Neg. ***FILE 3: Name-020204TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch.36, 48 Bad; ch. 13 No Neg. ***FILE 4: Name-020204TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36, 48 Bad; ch. 13 No Neg.

See also PB-250 204. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/58, FRA/DF-75/044, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250203/7ST

02 133039
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0051

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-Worn* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020203TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36, 48 Bad; ch. 13 No Neg.; ch. 47 off 0 ***FILE 2: Name-020203TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36, 48 Bad; ch. 13 No Neg. ***FILE 3: Name-020203CNE001* Track-curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 48 Bad; ch. 24 No Neg.

See also PB-250 205. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/59, FRA/DF-75/045, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250204/5ST

02 133040
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0052

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Wheel Profile-Worn* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1:

Name-020203CNO001* Track-Curved* Speed-35 mph* Load-None* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 48 Bad; ch. 24 No Neg.; ch. 41 questionable ***FILE 2: Name-020303CNE001* Track-Curved* Speed-25 mph* Load-Full* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.-Clear.* Additional Experimental Conditions-None* Errors noted-ch. 14 Bad; ch. 47 was 0.5v off 0 ***FILE 3: Name-020303CNO001* Track-Curved* Speed-35 mph* Load-Full* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 41 questionable.

See also PB-250 206. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/60, FRA/DF-75/046, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250205/2AT

02 133041
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0053
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-Worn* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020303CNR001* Track-Curved* Speed-16 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-020303TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 12 No Pos. ***FILE 3: Name-020303TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 207. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/61, FRA/DF-75/047, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250206/0ST

02 133042
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0054
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-Worn* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020303TSR001* Track-Med.Spd.Jtd.* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 40 off 0 ***FILE 2: Name-020303TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-020303TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 208. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/62, FRA/DF-75/048, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250207/8ST

02 133043
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0055
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-Worn* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020306TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 41, 43 Noisy ***FILE 2: Name-020306TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.clear.* Additional Experimental Conditions-None* Errors noted-ch. 41, 43 Noisy.

See also PB-250 209. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/63, FRA/DF-75/049, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250208/6ST

02 133044
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0056
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-Worn* Spring Group 7-05 O; 6-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020306TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 41 had Pos. spikes ***FILE 2: Name-020306TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 41 had Pos. spikes ***FILE 3: Name-020306TSR001* Track-Med.Spd.Jtd.* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 41 noisy.

See also PB-250 210. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer

Products, if you have questions.
Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/64, FRA/DF-75/050, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250209/4ST

02 133045
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0057
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-Worn* Spring Group 7-D7O; 6-D7I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020304TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 43 noisy ***FILE 2: Name-020304TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 43 noisy ***FILE 3: Name-020304TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 43 noisy.

See also PB-250 211. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/65, FRA/DF-75/051, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250210/2ST

02 133046
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0058
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-Worn* Spring Group 7-D7O; 6-D7I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020304TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. clear.* Additional Experimental Conditions-None* Errors noted-ch 39 Bad***FILE 2: Name-020304TSR001* Track-Med.Spd.Jtd* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 212. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/66, FRA/DF-75/052, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250211/0ST

02 133047
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0059
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-Worn* Spring Group 7-D3O; 2-D3I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020305TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 33-1.0v off 0; ch. 13 Neg. Noise ***FILE 2: Name-020305TSR001* Track-Med.Spd.Jtd.* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.clear.* Additional Experimental Conditions-None* Errors noted-ch. 33-1.0v off 0; ch. 13 Neg. Noise.

See also PB-250 213. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/67, FRA/DF-75/053, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250212/8ST

02 133048
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0060
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-Worn* Spring Group 7-D3O; 2-D3I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020305TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 13, 43 noisy; ch. 33-1.0v off 0; ch. 36 questionable ***FILE 2: Name-020305TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 13, 43 noisy; ch. 33-1.0v off 0; ch. 36 questionable ***FILE 3: Name-020305TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 13, 43 noisy; ch. 33 -1.0v. off 0; ch. 36 questionable.

See also PB-250 214. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/68, FRA/DF-75/054, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250213/6ST

02 133049
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0061
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck.

Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-2/3 Normal*Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020401TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 10, 29 0.5v off 0; ch. 38-0.5v off 0; ch. 13 neg. noise ***FILE 2: Name-020401TSR001* Track-Med.Spd.Jtd.* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear* Additional Experimental Conditions-None* Errors noted-ch. 25 off 0 ***FILE 3: Name-020401TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 13 neg. noise.

See also PB-250 215. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/75, FRA/DF-75/055, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250214/4ST

02 133050
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0062

The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-2/3 Normal* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020401TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.clear.* Additional Experimental Conditions-None* Errors noted-Ch. 13 neg. noise ***FILE 2: Name-020401TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 13 neg. noise; ch. 39 bad.

See also PB-250 216. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/76, FRA/DF-75/056, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250215/1ST

02 133051
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0063

The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-2/3 Normal* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020402TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.clear.* Additional Experimental Conditions-None* Errors noted-Ch. 13 Neg. Noise ***FILE 2: Name-020402TSR001* Track-Med.Spd.Jtd.* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 13 No Neg.

See also PB-250 217. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/77, FRA/DF-75/057, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250216/9ST

02 133052
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0064

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-2/3 Normal* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020402TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 13 no neg. ***FILE 2: Name-020402TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-020402TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 218. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/78, FRA/DF-75/058, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250217/7ST

02 133053
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0065

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-2/3 Normal* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020403TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-020403TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 42 questionable ***FILE 3: Name-020403TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch 14, 38, 42, 48 questionable.

See also PB-250 219. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/79, FRA/DF-75/059, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250218/5ST

02 133054
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0066
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-2/3 Normal* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020403TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36,39, 48 questionable ***FILE 2: Name-020403TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 220. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/80, FRA/DF-75/060, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250219/3ST

02 133055
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0067
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-2/3 Normal* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020404TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 14-0.7v off 0, ch. 36, 39 questionable ***FILE 2: Name-020404TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36, 39 questionable ***FILE 3: Name-020404TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36, 39 questionable.

See also PB-250 221. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/81, FRA/DF-75/061, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250220/1ST

02 133056
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0068
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 6-05 I* Snubbing-2/3 Normal* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020404TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39, 48 questionable ***FILE 2: Name-020404TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39, 48 questionable.

See also PB-250 222. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/82, FRA/DF-75/062, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250221/9ST

02 133057
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0069
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 3-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020405TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39, 48 questionable ***FILE 2: Name-020405TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39 questionable ***FILE 3: Name-020405TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 17 Bad.

See also PB-250 223. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/83, FRA/DF-75/063, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250222/7ST

02 133058
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0070
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 3-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020405TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch 36, 39, 48 questionable ***FILE 2: Name-020405TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36, 39, 48 questionable.
See also PB-250 224. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/84, FRA/DF-75/064, Apr. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250223/5ST

02 133059
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0071
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 3-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020406TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch 36, 39, 48 questionable ***FILE 2: Name-020406TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39, 48 questionable ***FILE 3: Name-020406TSM001* Track-Med.Spd.Jtd.* Speed 15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 46 Bad; Ch. 36, 39, 48 questionable.
See also PB-250 225. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/85, FRA/DF-75/065, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250224/3ST

02 133060
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0072
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 3-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020406TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-020406TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear* Additional Experimental Conditions-None* Errors noted-Ch. 36, 39, 41 questionable.
See also PB-250 226. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/86, FRA/DF-75/066, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250225/0ST

02 133061
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 2, TAPE TDOP 0074
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 3-05 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-020407TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-020407TSR001* Track-Med.Spd.Jtd.* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-1/4 In.* Side Bearings-1/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None.
See also PB-250 228. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/88, FRA/DF-75/068, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250227/6ST

02 133062
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0077
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-Barber S2C* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental De-

vices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030102TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear* Additional Experimental Conditions-Use MP 41.6 to MP 41.1 for 79 mph* Errors noted-ch. 6 was-2.74v off 0 ***FILE 2: Name-030102TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 14-0.7v off 0; ch. 21 to .3v. off 0.

See also PB-250 231. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/91, FRA/DF-75/071, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250230/0ST

02 133063
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0078
The 1 data file on this magnetic tape includes acceleration, force, and displacement measurements at critical points on a freight car and truck. The file includes detailed alphanumeric descriptions of test conditions. The following are for the test on this tape: Car-70 Ton M.Reefer* Truck-Barber S2C* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20 * Spring Group 7-D5O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* FILE 1: Name-030102TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 14 0.9v off 0* NOTE: Vertical adapter forces are subject to question.

See also PB-250 232. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/92, FRA/DF-75/072, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250231/8ST

02 133064
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0079
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-Barber S2C* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 4-05 I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030102TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 23 Bad ***FILE 2: Name-030102TSR001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 23 reversed.

See also PB-250 233. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/93, FRA/DF-75/073, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250232/6ST

02 133066
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0081
The 1 data file on this magnetic tape includes acceleration, force, and displacement measurements at critical points on a freight car and truck. The file includes detailed alphanumeric descriptions of test conditions. The following are for the test on this tape: Car-60 Ft., 100 Ton Box* Truck-Barber S2C* Truck Center-46 Ft. 3 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 7-05 I* Snubbing-8-B432; 8-B433* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* FILE 1: Name-030202TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 23 neg. questionable* NOTE: Vertical adapter forces are questionable.

See also PB-250 235. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/95, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250234/2ST

02 133067
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0082
The 1 data file on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. The file includes detailed alphanumeric descriptions of test conditions. The following are for the test on this tape: Car-60 Ft., 100 Ton Box* Truck-Barber S2C* Truck Center-46 Ft. 3 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 7-05 I* Snubbing-8-B432; 8-B433* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* FILE 1: Name-030202TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-None* NOTE: Vertical adapter forces are questionable.

See also PB-250 236. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/96, FRA/DF-75/076, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250235/9ST

02 133068
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0083
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-60 ft., 100 Ton Box* Truck-Barber S2C* Truck Center-45 Ft. 3 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-05 O; 7-05 I* Snubbing-8-8432; 8-B433* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030202CNE001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Addi-

tional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030202CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 237. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/97, FRA/DF-75/077, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250236/7ST

02 133069
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0084
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-Barter S2C* Truck Center-45 Ft. 9 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030102CNE001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 23-1v. off 0; ch. 12 neg. reversed ***FILE 2: Name-030102CNR001* Track-Curved* Speed-16 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 12 neg. reversed; ch. 7 questionable ***FILE 3: Name-030102CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 14-0.5v. off 0.

See also PB-250 238. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/98, FRA/DF-75/078, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250237/5ST

02 133070
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0085
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-Barber S2C* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030101CNE001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-ch. 14-0.5v. off 0 ***FILE 2: Name-030101CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 239. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/100, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250238/3ST

02 133072
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0087
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-60 ft., 100 Ton Box* Truck-Barber S2C* Truck Center-46 Ft. 3 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-05O; 7-D5I* Snubbing-8-B432;8-8433* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030201TSM001* Track-Med Spd Jtd* Speed-15 to 45 in 5 mph steps: Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 47 neg. noise***FILE 2: Name-030201TSR001* Track-Med Spd Jtd* Speed-14 to 22 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 241. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/101, FRA/DF-75/081, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250240/9ST

02 133073
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0088
The 1 data file on this magnetic tape includes acceleration, force, and displacement measurements at critical points on a freight car and truck. The file includes detailed alphanumeric descriptions of test conditions. The following are for the test on this tape: Car-60 ft., 100 Ton Box* Truck-Barber S2C* Truck Center-46 Ft. 3 In.* Load-Full*Wheel Profile-New 1 in 20* Spring Group 7-D5O; 7-D5I* Snubbing-8-B432;8-B433* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* FILE 1: Name-030201TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None* NOTE: Vertical adapter forces are subject to question.

See also PB-250 242. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/102, FRA/DF-75/082, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250241/7ST

02 133074
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0089
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-60 ft.; 100 Ton Box* Truck-Barber S2C* Truck Center-46 Ft. 3 In.* Load-Full* Wheel Pro-

file-New 1 in 20* Spring Group 7-D5O; 7-D5I* Snubbing-8-B432;8-B433* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030201TWA001* Track-Hi. Spd. Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030201TEH001* Track-Hi. Spd. CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 243. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/103, FRA/DF-75/083, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250242/5ST

02 133075
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0097

The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-50 ft. 70 ton Box* Truck-Barber S2C* Truck Center-40 Ft. 10 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 4-D5 I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030302CNE001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. clear.* Additional Experimental Conditions-None* Errors noted-ch.44-1.0v. off 0 ***FILE 2: Name-030302CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. clear* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 251. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/111, FRA/DF-75/091, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250250/8ST

02 133076
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0098

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-50 ft., 70 Ton Box* Truck-Barber S2C* Truck Center-40 Ft. 10 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030301CNE001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Ch.5 Bad; Ch.36 pos. spikes ***FILE 2: Name-030301CNO001* Track-curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.clear.* Additional Experimental Conditions-None* Errors noted-Ch. 36 pos. spikes; No speed signal(Ch. 2)* NOTE: This test rerun on TDOP Tape no. 0104 ***FILE 3: Name-030301CNR001* Track-curved* Speed-16 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.clear.* Additional Experimental Conditions-None* Errors noted-No Speed signal(Ch.2)* NOTE: This test rerun on TDOP Tape no. 0104.

See also PB-250 252. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/112, FRA/DF-75/092, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250251/6ST

02 133146
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 1, TAPE TDOP 0030

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer, Truck-ASF Ride Control* Truck Center-45 ft 9 In.* Load-Empty* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-010204CNE001* Track-Curve* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-010204CNO001* Track-Curve* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-3/8 In.Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-00206CNG001* Track-Curve* Speed 25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear.* Additional Experimental Conditions-None* Errors noted-21, 22, 28, 29, 31, all off 0.

See also PB-250 184. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data File FRA/ORD/MT-76/39, FRA/DF-75/025, Mar. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250183/1ST

02 133147
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0090

The 3 data files on this magnetic tape include acceleration, force, and displacement measurement at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 ton M. Reefer* Truck-Barber S2C* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030101TSR001* Track-Med.Spd.Jtd* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg.noise Ch. 42 and 45. ***FILE 2: Name-030101TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-Slight air brakes applied at 15 and 20 mph* Errors noted-Neg. noise Ch. 42 and 45 ***FILE 3: Name-030101TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 14-1.3V. off 0.

See also PB-250 244. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data File FRA/ORD/MT-76/104, FRA/DF-75/084, May 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250243/3ST

02 133149
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0092
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-50 Ft., 70 Ton Box* Truck-Barber S2C* Truck Center-40 Ft. 10 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030302TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030302TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-Ch. 3 and 7. Bad ***FILE 3: Name-030202TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In.Clear* Additional Experimental Conditions-None* Errors noted-None.
See also PB-250 246. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data File FRA/ORD/MT-76-106, FRA/DF-75/086, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250245/8ST

02 133150
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0093
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-50 Ft., 70 Ton Box* Truck-Barber S2C* Truck Center-40 Ft. 10 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030302TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg. Noise on Ch. 42 and 45 ***FILE 2: Name-030302TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Neg noise on Ch 42 and 45.
See also PB-250 247. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/107, FRA/DF-75/087, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250246/6ST

02 133151
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0094
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-89 ft. flat car* Truck-ASF Low level* Truck Center-64 ft. 0 in.* Load-None* Wheel Profile-New 1 in 20* Spring Group 5-D4 O; 5-D3 I* Snubbing-8-3221; 8-3222* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030501TSM001* Track-Med.Spd.Jtd* Speed-15 to 45 in 5mph steps* Outer Gib Clearance-5/8 in.* Side Bearings-1/4 In. clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030501TSR001* Track-Med.Spd.Jtd.* Speed-30 to 38 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-030501TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.
See also PB-250 248. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/108, FRA/DF-75/088, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250247/4ST

02 133152
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0095
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-87 ft. flat car* Truck-ASF low level* Truck Center-64 Ft. 0 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 5-D4 O; 5-D3 I* Snubbing-8-3221; 8-3222* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030501TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030501TEH001* Track-Hi.Spd.CWr* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.
See also PB-250 249. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/109, FRA/DF-75/089, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250248/2ST

02 133153
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0096
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck.

Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-89 ft. Flat Car* Truck-ASF Low Level* Truck Center-64 Ft. 0 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 5-D4 O; 5-D3 I* Snubbing-8-3221; 8-3222* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030501CNE0001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030501CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 250. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-75/090, FRA/DF-75/090, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250249/0ST

02 133154
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0102

The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-50 ft., 70 Ton Box* Truck-Barber S2C* Truck Center-40 Ft. 10 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 4-D5 I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030301TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Pos. Noise ch. 32 ***FILE 2: Name-030301TSR001* Track-Med.Spd.Jtd.* Speed-12 to 20 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 253. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/113, FRA/DF-76/015, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250252/4ST

02 133155
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP-0103

The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-50 ft., 70 Ton Box* Truck-Barber S2C* Truck Center-40 Ft. 10 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 4-D5 I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030301TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030301TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 7 Bad ***FILE 3: Name-030301TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 254. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/114, FRA/DF-76/016, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250253/2ST

02 133156
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0104

The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-50 ft., 70 Ton Box* Truck-Barber S2C* Truck Center-40 Ft. 10 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 4-D5I* Snubbing-8-B432* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030301CNR001* Track-Curved* Speed-16 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 4 Bad ***FILE 2: Name-030301CNO002* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 4 Bad.

See also PB-250 255. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/115, FRA/DF-76/017, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250254/0ST

02 133157
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0105

The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-89 ft. Flat Car* Truck-ASF Low Level* Truck Center-64 Ft. 0 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 5-D4 O; 5-D3 I* Snubbing-8-3221; 8-3222* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030502CNE002* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030502CNO002* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 256. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/116, FRA/DF-76/018, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250255/7ST

02 133158
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0106
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-89 ft. Flat Car* Truck-ASF Low Level* Truck Center-64 Ft. 0 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 5-D4O; 5-D3I* Snubbing-8-3221; 8-3222* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030502TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030502TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-030502TSM002* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 257. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/117, FRA/DF-76/019, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250256/5ST

02 133159
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0107
The data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-89 Ft. Flat Car* Truck-ASF Low Level* Truck Center-64 Ft. 0 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 5-D4 O; 5-D3 I* Snubbing-8-3221; 8-3222* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030502TSR002* Track-Med.Spd.Jtd.* Speed-26 to 34 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030502TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 21-0.9 V off 0.

See also PB-250 258. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/118, FRA/DF-76/020, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250257/3ST

02 133160
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0108
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-89 ft. Flat Car* Truck-ASF Low Level* Truck Center-64 Ft. 0 In.* Load-None* Wheel Profile-Fully Worn* Spring Group 5-D4 O; 5-D3 I* Snubbing-8-3221; 8-3222* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None except no instruments on adapters* FILE 1: Name-030503TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 14 0.4v off 0 ***FILE 2: Name-030503TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 259. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/119, FRA/DF-76/021, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250258/1ST

02 133161
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0109
The 1 data file on this magnetic tape includes acceleration, force, and displacement measurements at critical points on a freight car and truck. The file includes detailed alphanumeric descriptions of test conditions. The following are for the test on this tape: Car-89 ft. Flat Car* Truck-ASF Low Level* Truck Center-64 Ft. 0 In.* Load-None* Wheel Profile-Fully Worn* Spring Group 5-D4O; 5-D3I* Snubbing-8-3221; 8-3222* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None except no instruments on adaptors* FILE 1: Name-030503TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Errors noted-None.

See also PB-250 260. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/120, FRA/DF-76/022, June 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250259/9ST

02 133162
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0110
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-100 Ton C. Hopper* Truck-ASF Ride Control* Truck Center-41 Ft. 3 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 8-D5O; 8-D5I* Snubbing-8-3091; 8-3092* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030401CNE001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030401CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors

noted-None ***FILE 3: Name-030401CHR001* Track-Curved* Speed-18 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 261. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/121, FRA/DF-76/023, July 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250260/7ST

02 133163
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0111
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-100 Ton C. Hopper* Truck-ASF Ride Control* Truck Center-41 Ft. 3 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 8-D5O; 8-D5I* Snubbing-8-3091; 8-3092* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030401TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030401TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 262. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/122, FRA/DF-76/024, July 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250261/5ST

02 133255
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0112
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-100 Ton C. Hopper* Truck-ASF Ride Control* Truck Center-41 Ft. 3 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 8-D5O; 8-D5I* Snubbing-8-3091; 8-3092* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030401TSR001* Track-Med.Spd.Jtd.* Speed-14 to 22 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030401TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In. Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 263. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/123, FRA/DF-76/025, July 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250262/3ST

02 133256
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0113
The 1 data file on this magnetic tape includes acceleration, force, and displacement measurements at critical points on a freight car and truck. The file includes detailed alphanumeric descriptions of test conditions. The following are for the test on this tape: Car-100 Ton C. Hopper* Truck-ASF Ride Control* Truck Center-41 Ft. 3 In.* Load-Full* Wheel Profile-New 1 in 20* Spring Group 8-D5O; 8-D5I* Snubbing-8-3091; 8-3092* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* FILE 1: Name-030401TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None* NOTE: Vertical adapter forces are subject to question.

See also PB-250 264. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/124, FRA/DF-76/026, July 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250263/1ST

02 133257
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0114
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-100 Ton C. Hopper* Truck-ASF Ride Control* Truck Center-41 Ft. 3 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 8-D5O; 8-D5I* Snubbing-8-3091; 8-3092* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030402CNE001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-5/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 44 1.4v. off 0 ***FILE 2: Name-030402CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-5/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 265. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/125, FRA/DF-76/027, July 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250264/9ST

02 133258
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0115
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-100 Ton C. Hopper* Truck-ASF Ride Control* Truck Center-41 Ft. 3 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 8-D5O; 8-D5I* Snubbing-8-3091; 8-3092* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are

least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030402TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-5/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030402TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-5/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 266. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/126, FRA/DF-76/028, July 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250265/6ST

02 133259
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 3, TAPE TDOP 0116
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-100 Ton C. Hopper* Truck-ASF Ride Control* Truck Center-41 Ft. 3 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 8-D5O; 8-D5I* Snubbing-8-3091; 8-3092* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-030402TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-5/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-030402TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-5/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-030402TSR001* Track-Med.Spd.Jtd.* Speed-24 to 32 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-5/8 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 267. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/145, FRA/DF-76/029, July 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250266/4ST

02 133260
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0124
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040101TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040101TEH002* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040101TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 29-0.9v. off 0.

See also PB-250 268. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/146, FRA/DF-76/030, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250267/2ST

02 133261
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0125
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Adapter clearance is 0; longitudinal controls under axles* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040102TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040102TEH002* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040102TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None.

See also PB-250 269. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/147, FRA/DF-76/031, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250270/0ST

02 133262
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0126
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Composition-Steel* Additional Experimental Devices or Conditions-Adapter clearance is 0; Longitudinal controls under axles* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040103TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch.29-0.4v. off 0 ***FILE 2: Name-040103TEH002* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040103TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None.

See also PB-250 270. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only.

Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/148, FRA/DF-76/032, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250269/8ST

02 133263
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0127
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Composition-Steel* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040104TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040104TEH002* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040104TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 271. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/149, FRA/DF-76/033, Sept. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250270/6ST

02 133264
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0128
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Friction-Steel-Steel* Additional Experimental Devices or Conditions-Adapter Clearance is 0; Longitudinal pedestal controls under Axels* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040106TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-Ch. 35 Bad; Ch. 18-2.7v off 0; Speed has neg spikes ***FILE 2: Name-040106TEH002* Track-Ho.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040106TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 272. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/150, FRA/DF-76/034, Sept. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250271/4ST

02 133265
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0129
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Steel* Additional Experimental Devices or Conditions-None* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040105TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040105TEH002* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040105TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-Ch. 33 went bad during test.

See also PB-250 273. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/151, FRA/DF-76/035, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250272/2ST

02 133266
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0132
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame intertie; longitudinal axle controls* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040201TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 48-2.35v. off 0 ***FILE 2: Name-040201TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 23 has noise at start ***FILE 3: Name-040201TWA002* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-Ch. 23 has pos. noise.

See also PB-250 274. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/152, FRA/DF-76/036, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250273/0ST

02 133267
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0133
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame intertie; Longitudinal axle controls* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040201TEM002* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040201TEH001* Track-Hi.Spd.CWR* Speed-70 to 79 mph* Outer Gib Clearance-5/8 In.* Side Bearing-1/4 In. Clear.* Additional Experimental Conditions-None.

See also PB-250 275. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/153, FRA/DF-76/037, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250274/8ST

02 133268
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0134
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame intertie* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040202TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Tape number in parameter list is incorrect ***FILE 2: Name-040202TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-calibrated only at end of run; Type 5 Record at beginning of file is erroneous ***FILE 3: Name-040202TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 39 Bad.

See also PB-250 276. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/154, FRA/DF-76/038, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250275/5ST

02 133269
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0135
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame Intertie* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040202TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 45 to 0.6 off 0; ch. 13 Neg. Noise ***FILE 2: Name-040202TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 277. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/155, FRA/DF-76/039, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250276/3ST

02 133270
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0136
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame intertie; Rubber adaptors; Long axle controls.* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040204TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 6-0.6v. off 0; ch. 9-0.3v. off 0 ***FILE 2: Name-040204TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040204TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 278. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/156, FRA/DF-76/040, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250277/1ST

02 133271
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0137
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The

following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame Intertie; Rubber adaptors; Long axle controls.* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040204TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040204TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Test name is incorrectly ISM in header records.

See also PB-250 279. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/157, FRA/DF-76/041, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250278/9ST

02 133272
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0138
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame intertie; Rubber adaptors.* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040203TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 36 through 39 reversed polarity ***FILE 2: Name-040203TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 280. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/158, FRA/DF-76/042, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250279/7ST

02 133273
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0139
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5O; 6-D5I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame Intertie; Rubber Adaptors* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040203TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040203TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Pos. Noise ch. 43 ***FILE 3: Name-040203TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear* Additional Experimental Conditions-None* Errors noted-ch 58 inoperative until mp 43.5.

See also PB-250 281. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/159, FRA/DF-76/043, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250280/5ST

02 133274
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0140
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side Frame Intertie; Hydraulic Dampers* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040302TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-Ch. 13 pos. noise. ***FILE 2: Name-040302TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 282. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/160, FRA/DF-76/044, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250281/3ST

02 133275
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0143
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Side frame intertie; Hydraulic damper; Long. adapter clearance is 0; Long axle controls* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040301TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040301TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 285. Source tape is in ASCII and BINARY character set.

Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/163, FRA/DF-76/047, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250284/7ST

02 133277
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0145
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Hydraulic dampers, Long. adapter clearance 0, Long axle controls* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040304TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040304TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 48-0.5v. off 0, ch. 43 has slight noise.

See also PB-250 287. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/165, FRA/DF-76/049, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250286/2ST

02 133278
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0146
The 2 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Hydraulic dampers* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040303TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-ch. 43 slight noise ***FILE 2: Name-040303TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 288. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/166, FRA/DF-76/050, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250287/0ST

02 133279
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0147
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-3091* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Hydraulic dampers* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040303TEM001* Track-Hi.Spd.CWR* Speed-30 to 60 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040303TEH001* Track-Hi.Spd.CWR* Speed-70 and 79 mph* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040303TWA001* Track-Hi.Spd.Jtd.* Speed-30 to 79 in 10 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-1/4 In. Clear.* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 289. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/167, FRA/DF-76/051, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250288/8ST

02 133281
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0149
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test condions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-9031* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Constant contact side bearings* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040402CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-5000 lb. Preload* Additional Experimental Conditions-None* Errors noted-None ***FILE 2: Name-040403CNE001* Track-Curved* Speed-25 mph* Outer Gib Clearance-5/8 In.* Side Bearings-7500 lb. Preload* Additional Experimental Conditions-None* Errors noted-None ***FILE 3: Name-040403CNO001* Track-Curved* Speed-35 mph* Outer Gib Clearance-5/8 In.* Side Bearings-7500 lb. Preload* Additional Experimental Conditions-None* Errors noted-None.

See also PB-250 291. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/169, FRA/DF-76/053, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250290/4ST

02 133282
TRUCK DESIGN OPTIMIZATION PROJECT FIELD TEST DATA, SERIES 4, TAPE TDOP 0150
The 3 data files on this magnetic tape include acceleration, force, and displacement measurements at critical points on a freight car and truck. Each file includes detailed alphanumeric descriptions of test conditions. The following are for all tests on this tape: Car-70 Ton M. Reefer* Truck-ASF Ride Control* Truck Center-45 Ft. 9 In.* Load-None* Wheel Profile-New 1 in 20* Spring Group 7-D5 O; 6-D5 I* Snubbing-8-9031* Snubber Augmentation-None* Centerplate Friction-Steel-Moly* Additional Experimental Devices or Conditions-Constant contact side bearings* NOTE: Vertical adapter forces are subject to question. Those on sharper curves or empty cars at high speed are least accurate. Individual variations of the different tests are as follows: FILE 1: Name-040401TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-2500 lb. Preload* Additional Experimental Conditions-None* Errors noted-Ch. 18 Bad; Noise on Ch. 39; Ch. 10 .7; Ch. 11-0.5; Ch. 21 0.5v. off 0 ***FILE 2: Name-040401TSR001* Track-Med.Spd.Jtd.* Speed-22 to 30 in 2 mph steps* Outer Gib Clearance-5/8 In.* Side Bearings-2500 lb. Preload* Additional Experimental Conditions-None* Errors noted-Ch. 6-0.5V. off 0 ***FILE 3: Name-040402TSM001* Track-Med.Spd.Jtd.* Speed-15 to 45 in 5 mh steps* Outer Gib Clearance-5/8 In.* Side Bearings-5000 lb. Preload* Additional Experimental Conditions-None* Errors noted-None.
See also PB-250 292. Source tape is in ASCII and BINARY character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions.

Bang, AJ
Federal Railroad Administration Data file FRA/ORD/MT-76/170, FRA/DF-76/054, Sept. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-150291/2ST

02 133574
FUNDAMENTAL STUDY ON IMPROVEMENT OF ADHESION
An increase or stabilization of adhesion under car or locomotive wheels by means of plasma or ionized gas jets has been studied. With any condition of the rail surface, the coefficient of adhesion does increase, but then decreases with the passage of time after the treatment. The increase of the adhesion coefficient is attributed to the cleaning action and to conversion of rust into ferric oxide particles which increases the adhesion just as sanding would. The metallurgy of the rail itself is unaffected.

Iwamoto, M Tomisawa, M Deguchi, S *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 177-180, 8 Fig.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

02 134540
FURTHER DEVELOPMENT OF THE WHEEL/RAIL TECHNIQUE [Weiterentwicklung der Rad/Schiene Technik]
The writer outlines the German Federal Republic's development policy, which is aimed at further development of the wheel/rail system. The study of models, simulation programmes and experiments on a test platform provide the necessary data for the design and construction of highly efficient vehicle and track components. A stationary rig has been built in Munich for testing running techniques. [German]

Kurz, H *Glasers Annalen ZEV* Vol. 100 No. 1, Jan. 1976, pp 12-15, 1 Fig., 1 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

02 134584
INTEGRATION LIMITS WHEN CALCULATING DYNAMIC TRAIN LOADS FOR TRACK SUPERSTRUCTURE EQUIPMENT [O predelah integrirovanija pri rascetah ekvivalen]
The effects on the track of dynamic loads are determined by integral formulae. The article explains the composition and integration limits of the latter. [Russian]

Lysjuk, VS *Vestnik Vniizt* No. 1, 1976, pp 45-48, 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

02 134587
STUDY OF VEHICLE SUSPENSION [Studie von den wagensuspensic]
This series comprises 7 chapters, dealing in turn with the following subjects: resonance and energy spectrum curve. Definition of the line profile on which the vehicle travels; criteria for evaluating the suspension of a vehicle; theoretical resolution of a linear system; simulation of a simplified, single-wheel vehicle on an analogical computer, and assessment of the influence of the suspension components; discussion of the characterics of a shock-absorber, and influence of a non-linear characteristic; simulation on a hydraulic pulsator. The problem of the stiffness of a tire, and load simulation. The problem of the simulation of the line profile on which the vehicle travels. [Dutch]

Verschoore, R *Revue T.T. Tijdschrift* Nos. 2, 3, 4, Nos. 1, 2, 3, 1974, 26 pp, Phots.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Association des Ingenieurs de l'Univ Libre 87 avenue A. Buyl, B-1050 Brussels, Belgium

02 134591
GUIDING OF TRACKED VEHICLES. 2444 BIBLIOGRAPHICAL REFERENCES FROM 1826-1974. WITH A HISTORICAL INTRODUCTION [Spurfuehrung, 2444 Zitate aus den Jahren 1826-1974. Mit geschichtlicher Einfuehrung]
This bibliography is the result of 50 years' activity by Professors H. Heumann and W. Basler, and the engineers R. Vogel, J. Troitzsch and V. Schwank, concerning the guiding of vehicles on narrow-gauge track and in curves. [German]
Document at the DOT Library RRIS Repository is available in microfiche form only.

Liechty, R 1975, 636 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Swiss Federal Railways Documentation Bureau 6 rue de l'Universite, CH 3000 Berne, Switzerland
DOTL RP

02 135163
ALTERNATIVE TO THE ROLL AXIS FOR USE IN COMMERCIAL VEHICLE SIMULATION
Vehicle dynamicists have frequently assumed that the roll motions of the spring mass take place without a roll axis. Equations of motion based on the assumption must be expected to exhibit dynamic coupling, a significant complication in the case of digital computer simulations of multi-unit vehicles. Digital simulations have been developed which, while preserving the physical character of the roll axis formulation, use further approximations to avoid the dynamic coupling. Validation exercises have been performed which demonstrate the accuracy of this methodology.

Bernard, JE (Michigan University, Ann Arbor) *Vehicle System Dynamics* Vol. 4 No. 4, Dec. 1975, pp 211-222, 7 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

02 135164
STABILITY ANALYSIS OF CONSTANT SPEED TRANSIT VEHICLES ON STRAIGHT, HORIZONTAL, FIXED GUIDEWAYS
Methods of motion stability analysis are examined and compared in the context of the problem posed by a simple idealization of a transit vehicle

moving at constant speed on a straight, horizontal, fixed guideway, supported by idealized rubber tires, air cushion pads, or semiconical steel wheels on steel rails. Stability analysis methods examined include Lyapunov analysis with the Hamiltonian and with a modified Hamiltonian proposed by Walker, and analysis of characteristic equations using theorems due to Routh, Hurwiz, Cronin, and Lienard and Chipart. It is concluded that for rubber-tired and aircushioned vehicles a Lyapumov analysis employing the Hamiltonian is most efficient, and for the tracked vehicle the criteria of Lienard and Chipart are most useful.

Olusola, OB (California University, Los Angeles); Likins, PW *Vehicle System Dynamics* Vol. 4 No. 4, Dec. 1975, pp 223-248, 14 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

02 135166
WHEEL/RAIL ADHESION-THE OVERRIDING INFLUENCE OF WATER
Laboratory experiments are described which show how water reduces friction between rail and tire steel surfaces. Depending on the amount of oily containation, the friction coefficient is reduced to a value between 0.3 (no oil present) and the friction which is characteristic of an excess of the oil. Lower friction on oil-free surfaces is observed using laboratory machines which involve continuous rolling; water mixes with wear debris or surface rust to form a lubricating past, and friction coefficients as low as 0.05 result. The lowest friction occurs when the ratio of water to debris is small,and a viscous (non-Newtonian) paste is formed which is observed on the laboratory rigs for a few seconds wherever wetted surfaces are on the point of drying completely. Trains similarly encounter low adhesion in slightly wet conditions, most noticeably on little used lines where a substantial coverage of debris particles is present on the wear band.

Beagley, TM (British Railways Board); Pritchard, C *Wear* Vol. 35 No. 2, Dec. 1975, pp 299-313

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

02 135169
ADHESION AND DYNAMIC PHENOMENA DURING SLIPPAGE OF ELECTRICAL ROLLING STOCK-3. SELF-EXCITED VIBRATION DURING SLIPPAGE OF ELECTRIC LOCOMOTIVE TRUCKS
When the driving axles of an electric locomotive slip, self-excited vibration will occasionally occur in its trucks. To suppress such self-excited vibration, detailed theoretical calculations of the vibrations during slippage of typical trucks were made and stability criteria were sought by simplifying the system. Theoretical expressions were derived for the vibrations during slippage of typical trucks, that is, individual quill spring drive type trucks, and individual axle-hung motor type trucks, and numerical calculations regarding actual examples were made. The calculated and observed results generally agree with each other, revealing that the behavior of trucks can be predicted through theoretical calculations. Stability criteria were sought for several problematical modes of vibration, that is, the torsional vibration of both individual and monomotor driving systems and the pitching of an axle-hung motor about the axle. The validity of the stability criteria was proved by comparing them with actual examples, and some instances of success in suppressing self-excited vibration were disclosed.

Hirotsu, T (Hitachi Research Laboratory); Ishida, S *JSME Bulletin* Vol. 18 No. 125, Nov. 1975, pp 1236-45, 3 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Mircofilm

02 135209
THE RESEARCH PROGRAMME ON "LONG-DISTANCE GUIDED TRANSPORT WITH THE WHEEL/RAIL TECHNIQUE"
[Das Forschungsprogramm :Spurgefuehrter Fernverkehr in Rad/Schiene Technik"]
The author describes the programme of research on the wheel/rail technique, with some photos of the test bench and scale models of the vehicle. He also gives an organisation chart of the "Programme of research on the limits of the wheel/rail system". [German]

Spoeher, W *Die Bundesbahn* Vol. 52 No. 3, Mar. 1976, pp 175-180, 4 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany

02 136262
UNEVEN WHEELSET MOTION [Zur Frage der Instabilitaet beim Radsatzlauf]
Rolling, resonance and instability are terms used to describe the riding qualities of a rail vehicle. The article explains how these factors are recorded during tests and how instrumentation engineers interprete them. [German]

Zottmann, W *Glasers Annalen ZEV* Vol. 100 No. 2/3, Feb. 1976, pp 46-51, 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

02 136268
FORECASTING PROBABILITY IN THE REALISATION OF WEIGHTS OF FREIGHT TRAINS BY DIGITAL COMPUTERS
According to the author, the adhesion force of the locomotive and resistance to train movement are independent random values dispersed according to normal laws. On this basis, he provides formulae forecasting the probability of hauling train weights without wheel slipping, with loads below or above the standard train weights, according to average values and scatter values of adhesion and resistance forces. He then discusses: the influence of the value of these statistical parameters on forecasting probability for realising train weights, and the difficulty in forecasting because of the necessity to take into account the parameters of "under service conditions".

Isayev, IP *Rail International* Vol. 7 No. 4, Apr. 1976, pp 208-218, 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

02 136270
ON GROUND VIBRATION SET UP BY ROAD AND RAIL TRAFFIC [Ueber die Erschuetterungsimmissionen durch Strassen und Schienenverkehr]
Road and rail vehicles set up vibrations in the road or track as they run. These vibrations spread through the ground and can be transmitted to neighbouring buildings. The author gives the results of measurements taken in a number of actual cases, and draws attention to their significance. [German]

Splittberger, H *Internationales Verkehrswesen* Vol. 27 No. 5, Sept. 1975, pp 245-248, 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff Verlag Niddastrasse 64, Frankfurt am Main, West Germany

02 136639
DYNAMIC RAILROAD FREIGHT CAR MONITORING SYSTEM
The patent relates to a monitoring system that provides an engineer of a freight train with a real time picture of the coupling extensions of selected cars distributed throughout the entire length of his train. Located between each selected pair of cars is a sensor that detects whether a Buff (compressed) or a Draft (stretched) condition exists at the coupling. Individual encoders associated with each of the sensors respond thereto by providing one of two uniquely coded outputs representing, respectively, either a Draft or Buff condition as detected by the sensor. The outputs of the encoders are relayed by individual transmitters to a receiver located at a control station. Coupled to the receiver is a decoder that decodes the incoming signals and energizes a display that furnishes the engineer with a dynamic indication of the coupling condition existing at each of the selected points along the train.
Supersedes PB-234 769.

Vrabel, JD Gosselin, DW Sussman, ED Ofsevit, DS
Department of Transportation Patent PAT-APPL-494 098, PATENT-3 905 012, No Date, 7 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: United States Patent Office Washington, D.C., 20231
PB-249706/3ST, DOTL NTIS

02 137694

PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE ON VEHICLE DYNAMICS. PART 1: DYNAMICS AND STABILITY

Some of the papers presented in part 1 are as follows: Dynamics of a vehicle supported by repulsive magnetic forces, Harding,JT and Gross,A (this paper is presented in abstract form); Stability analysis of constant span transit vehicles on straight, horizontal, fixed guideways, Olusola,OB and Likins,PW (this paper is presented in abstract form); Evaluation techniques for determining the influence of proposed weight reductions on automobile handling, ride, performance and impact, Sachs,HK (this paper is presented in abstract form); Dynamic analysis of a pendulous suspension system, Kanianthra,JA and Speckhart,FH; Track model for computer studies of railway vehicle dynamics, Amyot,JR and Mufti,IH. For the covering abstract of the conference see IRRD abstract no. 219424. /TRRL/

Swets and Zeitlinger 1975, pp 31-66, Figs., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 219439)

PURCHASE FROM: Swets and Zeitlinger Amsterdam, Netherlands

03 052723
TRANSMISSION OF INFORMATION THROUGH THE AUTOMATIC COUPLING. EVALUATION OF THE PROPOSALS MADE BY THE FIRMS

Report No. 2 reports on the enquiry made in order to obtain an insight into the systems now available for the transmission of information and to permit a system of international validity to be selected or composed from the various proposals received. The systems proposed can, in principle, be split up into three groups:-systems based exclusively on time division multiplex procedures, -systems based on frequency and time division multiplex procedures,-systems based exclusively on frequency division multiplex procedures. In order to be able to make a selection from among the systems proposed or to compose a system by combining the various proposals made, it will first be necessary to determine, by measurements, the properties of the transmission cable and to test, if necessary, one or more systems, so that the final system can be proposed on the basis of the results obtained.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A103/RP 2/E, Oct. 1972, 25 pp, 2 Fig., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

03 052724
DEVELOPMENT OF A DEVICE FOR THE DETECTION OF WHEEL-FLATS OF A CERTAIN SIZE. RECOMMENDATIONS FOR THE CONSTRUCTION OF A SYSTEM FOR THE DETECTION OF WHEELFLATS

The report is concerned with devices for the automatic detection and indication of wheel-flats, developed on the DB, MAV and SJ, and with results obtained from tests carried out with these devices, first individually on the respective Administrations, and subsequently in joint work, conducted at one common test site.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A110/RP 2/E, Oct. 1971, 11 pp, Figs., Tabs., 12 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

03 052737
DEVELOPMENT OF A DEVICE FOR THE DETECTION OF WHEELFLATS OF A CERTAIN SIZE. DETAILED DESCRIPTION OF THE JUL 400

The JUL 400 device developed by L.M. Ericsson, in conjunction with the Swedish State Railways, is for detecting flat wheels. It is based on the principle that a wheel with a flat loses contact with the rail briefly at speeds above 30 km/h. High-frequency signals are transmitted through test sections in each rail of a track with shot circuiting of these signals resulting from passage of each wheel. Any interruption of this short circuit produced by flats on wheel treads is interpreted in terms of the size of the defect.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A110/RP 4/E, No Date, 16 pp, Figs., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052739
APPLICATION OF THE AUTOMATIC COUPLER TO PASSENGER COACHES. TESTING AUTOMATIC COUPLER EQUIPPED PASSENGER COACHES WITH AND WITHOUT SIDE BUFFERS

The B85 Committee produced a programme to test passenger coaches equipped with the automatic coupler. Coaches with and without side buffers were to be used, and the longitudinal play between the coaches was to be varied. Riding tests by the DB with a push-and-pull train of eight coaches showed that, in general, the results obtained without side buffers were not as good as those obtained with side buffers. The reduction of the play for the "automatic coupler without side buffers" improved the riding quality in the longitudinal direction. Riding tests by the FS with a locomotive hauled train of 18 coaches revealed that, in the case of the "automatic coupler", the modified side buffers used improved appreciably the riding quality without, however, attaining the riding quality resulting from the use of the screw coupling. Previous riding tests had shown quite clearly the effect of the longitudinal play between the coaches. The other tests have made it clear that the side buffers used increased the speed of coupling to an unacceptable extent, but that the protection of the end walls required devices to maintain the necessary distance.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B85/RP 3/E, Apr. 1975, 74 pp, Figs., Tabs., 5 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

03 052752
PROTECTION OF MATERIALS. SURVEY OF THE PRODUCTS USED FOR THE CLEANING OF RAINTED CARRIAGE EXTERIORS

A short survey on the cleaning of carriage exteriors is given; moreover the relative merits of the different chemicals used in cleaning and the types of dirt to be removed are discussed.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E17/RP 8/E, Nov. 1960, 7 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052758
PROTECTION OF MATERIALS. APPLIED PROCEDURES AND MACHINES USED FOR THE CLEANING OF PASSENGER COACHES

The importance of carrying out a regular external cleaning of the rolling stock so as to obtain an overall appearance of satisfactory quality for upholding the good name of the railways, the ever increasing difficulty of finding staff willing to accept this type of work, and the continuous increase of the ways, necessitates the use of as fully a mechanised equipment as possible. This equipment requires the investment of relatively large capital sums, which, in the majority of instances, are recoverable however after one year of operation at most. When the number of vehicles permits, a fixed type a washing installation is to be recommended. When the vehicles to be cleaned have a suitable profile, this installation should comprise rotating brushesì however, flannel flails may be used for the cleaning of vehicles with varying profile. In other cases, a semi-mechanised washing site with travelling brush- trolleys permits the desired result being obtained. Finally, according to local conditions, mobile washing machines with rotating brushes or washing installations of the platform type may also give interesting results. However, the siting of mechanised washing installations in existing stations, and more particularly, that of fixed washing machines with rotating brushes, sometimes presents serious difficulties; it is then advisable to include the installation of these machines in the alteration and modification projects of large stations. Indeed, it is highly desirable that the Administrations should have available, as rapidly as possible, a sufficiently dense system of washing machines so that at least all main-line train sets might be cleaned at one end of their scheduled run.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E17/RP 16/E, Feb. 1963, 8 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052790
ASSESSMENT OF THE EFFICIENCY AND AGGRESSIVE POWER OF CLEANING AGENTS
This questionnaire report was initiated on the grounds of a questionnaire answered by 19 administrations. It contains in the tables a large number of data concerning details of the cleaning agents used on the various administrations and of the methods they employ. It would, however, be premature to issue recommendations on the basis of these results and it is therefore proposed that the question be further considered with a view to the issuing of acceptance specifications, and that the search for the optimum testing methods should be continued. Special consideration should be given to the gradual introduction of new paint systems such as dispersion finished and polyurethane resin varnishes.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E119/RP 1/E, Oct. 1970, 25 pp, 1 Fig., Tabs., 26 Ref., 7 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052799
SPECIAL TECHNICAL REPORTS. PROBLEMS RAISED BY THE APPLICATION OF THE AUTOMATIC COUPLER TO LOCOMOTIVES
This report contains information provided by some ORE Member-Administrations about the problems raised by the application of the automatic coupler to locomotives and the solutions envisaged, particularly as regards the modification of locomotives which will continue to be used after the automatic coupler has been to fitted wagons in international service. It deals in particular with: the characteristics to be adopted for the elastic element and its technical features; the possibility of using a short arm and the problems which this will pose for the suspension and in curve negotiation; the methods adopted for making the underframe suitable for taking the automatic coupler; problems connected with heating (steam and electric); the mixed coupler.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways S1001/RP 1/E, Oct. 1970, 21 pp, 7 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052800
TYRE PROFILES
Many tests and studies relating to or involving tyre profiles have been carried out either by the various Administrations for their own purposes or as part of the work of ORE Committees. After indicating the advantage of having a single standard profile the report gives a few of the chief results obtained. A comparison between the profiles adopted by the SNCF, the DB and BR shows shows differences of small importance. The development of a sole profile may thus be considered possible, but this can only result from a future exchange of results and knowledge obtained.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways S1002/RP 1/E, Apr. 1971, 17 pp, 12 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052801
CONSTRUCTIONAL MODIFICATION OF BUFFER STOPS FOR USE WITH THE AUTOMATIC COUPLER
After examining the solutions adopted or envisaged by the various administrations, conditions are laid down which are to be fulfilled by modified or new buffer stops both for the interim period when the automatic coupler will be used in conjunction with side buffers, and for the final phase when side buffers are no longer used at all.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways S1003/RP 1/E, Oct. 1971, 21 pp, Figs., 7 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052849
VIENNA ARSENAL TESTING STATION. TESTS CARRIED OUT ON PASSENGER COACHES IN THE VIENNA-ARSENAL TESTING STATION DURING 1963
The present report sums up the results of the tests carried out in the Vienna Testing Station in 1963 on 15 passenger coaches belonging to various Administrations. Vehicles of the following types were tested: Open central-gangway saloon and compartment coaches, couchette coaches, diesel rail cars and driving trailer coaches respectively, and also air-conditioned coaches of luxury trains. Although the heating systems differed, it tried to carry out the same tests on all vehicles. The tests covered first the determination of the pre-heating and pre-cooling periods and that of the energy required for these processes at various outside temperatures. Subsequently, the quality of the regulation of the heating or air-conditioning equipment was tested and the energy consumption of the heating or air-conditioning equipment ascertained at various outside temperatures and speeds; comfort tests were also carried out. The latter chiefly covered the temperature distribution and the air circulation velocities in the compartments. Furthermore, cooling tests were made and also tests for ascertaining the resistance of the equipment to overheating and freezing. A series of k value tests were made with the vehicles at different operating conditions and at various wind velocities. These tests were supplemented by air leakage measurements using radio-active isotopes. Finally, special tests were made to meet specific requests of various Administrations; these tests included noise measurements, pre-heating tests both with voltages which were either lower or higher than the nominal voltage and with low steam pressures. The most important results obtained from these series of tests are given in tables and are graphically illustrated. The extreme values of the results of the tests made in 1961 and 1962 are also plotted, for the sake of comparison, in the same figures. Unfortunately, one series of regulating tests in particular could not be carried out under the same conditions as those applied during other tests, since the general programme of tests which was prepared by Committee B 30 was revised during the summer of 1963. Tables and figures precede a summary of the different series of tests and a critical examination of the test results.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. AZ 30/RP 3/E, June 1964, 94 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052850
VIENNA ARSENAL TESTING STATION. TESTS CARRIED OUT IN THE VIENNA ARSENAL TESTING STATION DURING 1964
This report gives an account of the results of the tests to which 14 railway coaches were submitted in the Vienna Arsenal testing station in 1964. The tests were conducted according to the principle laid down by Specialists Committee B 30 of the ORE. Some of the railway coaches were subjected to special tests which differed slightly from those included in the usual programme of measurements. These tests are briefly described in Chapter 10 of this report. Rolling stock of the following types were tested: Open central-gangway saloon and compartment coaches, couchette coaches, sleeping cars, diesel railcars, driving trailer coaches, air-conditioned coaches of a luxury train and dining cars. Although the heating systems and air-conditioning systems differed appreciably, attempts were made to carry out comparable tests on all vehicles. Generally, tests were first carried out to determine the pre-heating and pre-cooling periods and the energy required for these processes at various outside temperatures. The quality of the regulating devices, the distribution of the temperatures, and the energy consumption at various outside temperatures and speeds were subsequently measured. Comfort measurements provided information on the effects of temperature, air velocity and humidity on the passengers. Tests for ascertaining the resistance of freezing and excessive heating were conducted to investigate the strength of the material and the equipment of rolling stock

exposed to various climates. Time constants were determined and k values measured during cooling tests carried out to assess the insulation of coach bodies. A special procedure, using a radioactive mixture of gas and air, was employed in some cases to ascertain the lack of tightness of coach bodies due to their construction and the proportion of intentional ventilation. Various special tests were carried out at the request of some Administrations, such as measurements of the air quantities, the noise and the distribution of static pressure inside the vehicles, tests for ascertaining the rise in temperature of the main power cable at high loads and various outside temperatures, pre-heating and regulating tests at rather low or high voltages and at very low steam pressures. The most significant results are tabulated numerically and also shown diagrammatically. Extreme values of specific tests conducted in 1961, 1962 and 1963 have, if necessary, been plotted to facilitate comparison. Interpretations of the results obtained, in addition to remarks on the special tests carried out, conclude the report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. AZ 30/RP 4/E, June 1965, 89 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052851
VIENNA ARSENAL TESTING STATION. TESTS CARRIED OUT IN THE VIENNA ARSENAL TESTING STATION DURING 1965

This report gives an account of the results of the tests to which seven railway coaches were submitted in the Vienna Arsenal Testing Station in 1965. The tests were conducted according to the code of practice laid down by the B 30 Specialist Committee of the ORE. Some of the railway coaches were subjected to special tests which differed slightly from those included in the usual programme of measurements. These tests are briefly described in the Appendix to this report. Rolling stock of the following types was tested: Open central-gangway saloon and compartment coaches, diesel railcars, driving trailer coaches, air-conditioned coaches of a luxury train and dining cars. Although the heating systems and air-conditioning systems differed again appreciably, an attempt was made to conduct tests which were comparable on all vehicles. Generally, tests were first made to determine the pre-heating and pre-cooling periods and the energy required for these processes at various outside temperatures. The quality of the regulating devices, temperature distribution, and the energy consumption at various outside temperatures and speeds were subsequently measured. Comfort measurements provided information on the effects of temperature, air velocity and humidity on the passengers. Tests for ascertaining the resistance to freezing were conducted to investigate the strength of the material and the equipment of rolling stock exposed to various climates. Time constants were determined and k values measured during cooling tests to assess the insulation of coach bidies. A special procedure, using a radioactive mixture of gas and air, was employed in some cases to ascertain the lack of tightness of coach bodies due to their construction and also the proportion of intentional ventilation. Various special tests were made at the request of some Administrations, such as measurements of the air quantities, compartment illumination and distribution of static pressure inside the vehicles, pre-heating and regulating tests at rather low or high voltages and at very low steam pressures. The most significant results, together with appropriate remarks, are tabulated numerically and also shown diagrammatically. Extreme values of specific tests conducted during the years 1961 to 1964 have, if necessary, been plotted to facilitate comparison. Interpretations of the results obtained, in addition to remarks on the special tests, conclude the report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. AZ 30/RP 5/E, Oct. 1966, 65 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052852
VIENNA ARSENAL TESTING STATION. TESTS CARRIED OUT IN THE VIENNA ARSENAL TESTING STATION DURING 1966

This report has been split into four parts: passenger coaches, refrigerator vans, goods wagons, and motive power units. Each part contains a survey of the tested vehicles accompanied by a brief description and a sketch of the type involved, the programmes and compositions of the tests, and also important and comparable results, with relevant comment. A table of all the items subjected to testing in the Vienna Arsenal Testing Station in the course of 1966 concludes the report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 30/RP 6/E, Nov. 1967, 84 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052853
VIENNA ARSENAL VEHICLE TESTING STATION. TESTS CARRIED OUT IN THE VIENNA ARSENAL VEHICLE TESTING STATION DURING 1967

The report is divided into four parts: coaches, refrigerator vans, goods wagons, and tractive stock. Each part deals with one of these vehicle types, and contains a list of the vehicles tested, a short description and diagram of each vehicle, the test programme and preparation, then the more important and comparable results as well as a commentary. Finally, there is a general survey of the vehicles tested in the Vienna Arsenal Vehicle Testing Station during 1967.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ30/RP 7/E, Oct. 1968, 89 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052854
VIENNA ARSENAL VEHICLE TESTING STATION. ANNUAL REPORT 1968

A description of the vehicle climatic testing station at Vienna Arsenal, with details of the capacity and performance of the testing chambers and a summary of the activities of the testing station during the year 1968 are given. For passenger coaches and refrigerator vans, where a standard test programme, or variations on this, is used, the standard test programmes are described in detail. Details of the vehicles tested are shown and, for various important factors, comparable test figures given by each vehicle are shown anonymously on graphs. The results given during 1968 show that the thermal qualities of vehicles have improved over the eight years of operations of the station. A summary is given of tests carried out on tractive units, freight wagons and other items. No comparative results are shown for these items as the various tests were not comparable.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ30/RP 8/E, Oct. 1969, 43 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052855
VIENNA ARSENAL VEHICLE TESTING STATION. ANNUAL REPORT 1969

A description of the vehicle climatic testing station at Vienna Arsenal, with details of the capacity and performance of the testing chambers and a summary of the activities of the testing station during the year 1969 are given. For passenger coaches and refrigerator vans, where the standard test programme, or variations on this, is used, the standard test programmes are described in detail. Details of the vehicles tested are shown and, for various important factors, comparable test results relating to the various vehicles are shown anonymously on graphs. The results given during 1969 show that the

thermal qualities of vehicles have improved over the nine years of operations of the station. A summary is given of tests carried out on tractive units, freight wagons and other items.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ30/RP 9/E, June 1970, 52 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052856
VIENNA ARSENAL VEHICLE TESTING STATION. ANNUAL REPORT 1970
A description of the vehicle climatic testing station at Vienna Arsenal, with details of the capacity and performance of the testing chambers and a summary of the activities of the testing station during the year 1970 are given. For passenger coaches and refrigerator vans, where the standard test programme, or variations on this, is used, the standard test programmes are described in detail. Details of the vehicles tested are shown and, for various important factors, comparable test results relating to the various vehicles are shown on graphs. A summary is given of tests carried out on tractive units, freight wagons and other items.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 30/RP 10/E, Apr. 1971, 64 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052857
VIENNA ARSENAL TESTING STATION. REVIEW OF THE TECHNICAL PAPERS PRESENTED AT THE CEREMONY IN CONNECTION WITH THE TENTH ANNIVERSARY OF THE ESTABLISHMENT OF THE TESTING STATION (22 APRIL 1971)
Four papers are presented: The Vienna Arsenal International Testing Center and its Future assignments, Schausberger, Heiz; Problems connected with the Channel Tunnel Project, Moron, Pierre; Problems with high-speed refrigerated transport, Scheiblich, Richard; The data-transmission measuring center and electronics in the service of the railways, Sethy, Andreas.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ30/RP 11/E, May 1971, 44 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052858
VIENNA ARSENAL VEHICLE TESTING STATION. ANNUAL REPORT 1971
A description of the vehicle climatic testing station at Vienna Arsenal, with details of the capacity and performance of the testing chambers and a summary of the activity of the testing station during the year 1971 are given. For passenger coaches and refrigerator vans, where standard test programmes or variations on these are used, the standard test programmes are described in detail. Details of the vehicles tested are shown and, for various important factors, comparable test results relating to the various vehicles are shown on graphs. Tests were also carried out on an electric locomotive. The effects of the wind impact on running wagons with wagon sheets or containers and the effects of adverse weather condition on data trasmission through automatic couplings and on electronic number reading units were studied. Besides the tests on railway equipment, problems varying from the icing up of a helicopter flying through clouds to the wind resistance of skiers were examined.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 30/RP 12/E, Apr. 1972, 62 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 052862
MEASUREMENTS AND THEIR ANALYSIS IN RAILWAY TECHNOLOGY. (5TH INTERNATIONAL COLLOQUIUM OF ORE/BVFA ON RAILWAY VEHICLE TECHNOLOGY, HELD AT VIENNA, AUSTRIA FROM 6TH TO 8TH MAY, 1969)
Report on the 5th International Colloquium on railway vehicle technology held in May 1969 and jointly organised by ORE and the Vienna Arsenal Vehicle Testing Station. The special theme chosen for the meeting was "Measurements and their analysis in railway technology". The report gives a summary of the discussions and contains, in the appendices, the complete texts of the papers delivered and of the important technical contributions. The main subjects treated were: problems connected with the use of strain-gauges, new methods of evaluating experimental results (statistical methods and automatic processing), the application of these methods to special cases (riding quality of vehicles, railway bogie dynamics, geometric condition of the track) and certain specific problems relating to the organisation of the research work and the simulation in the laboratory of given experimental conditions. A survey table of the measuring technique used during the ORE studies in appended to the report.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 40/RP 1/E, Oct. 1969, Figs., 12 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053094
TRANSMISSION OF INFORMATION THROUGH THE AUTOMATIC COUPLER. ENQUIRY REPORT (TRANSMISSION OF INFORMATION WITH A TRAIN IN CONNECTION WITH THE AUTOMATIC CENTRE COUPLER)
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A103/RP 1/E, Apr. 1968, 73 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053105
STRENGTHS OF BODIES OF PASSENGER COACHES. CALCULATION METHOD
The present report shows that it is possible, to a certain extent, to calculate very closely the stresses in the various sections of a coach body which are not influenced by secondary phenomena. It will however only be possible to reconsider the basic conception of a coach body and to indicate the possibility of new improvements when we have acquired sufficient experiences from the calculation and measurement of a large number of coach bodies already existing or under construction. One will then see the extent of the extensions to be effected upon the calculation method in order to be able to introduce into it, at least partly, the additional stresses which are produced at certain singular points. In those cases where this will not be possible and as far as the divergencies between calculation and measurements will remain systematically comparable, empirical coefficients will be applicable. The chosen calculation method should also enable the longitudinal flexion and the natural frequency of the coach body to be determined. Up to present, we have however not succeeded in obtaining the desired values whilst starting from the purely theoretical results of the calculation of the stresses. This concerns a case where rightly the empirical coefficients should enable us to obtain, in due course, very close values. Concluding, the method explained in the present report constitutes a first step towards the solution of the problem to be solved. It affords, already now, the possibility of calculating numerous coach bodies. When these coaches are parallelly submitted to static load tests, the comparison of the results of these tests with those obtained from the calculation should make it possible to refine progressively the method chosen until it has become an efficacious tool for the research institutes.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B7/RP 4/E, Oct. 1962, 27 PP, Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053106
STRENGTH OF BODIES OF PASSENGER COACHES. CALCULATION METHOD. USE OF THE IBM 7070 COMPUTER
The ORE Specialists Committee B 7 recommends the use, for the future, of the IBM 7070 electronic computer for the calculation of coach bodies, on account of the following advantages: possibility of calculating coach bodies having up to 17 openings (i.e. window openings door openings); decrease in the number of work-hours required for carrying out the calculations; reduction of the possibility of committing errors, and decrease of the costs incurred by using the electronic computer. It should of course be under stood that the conclusions contained in document B 7/RP 4 are still completely valid, but the objectives stated in the conclusions of the latter report will be more rapidly attained thanks to the advantages afforded by the IBM 7070 computer.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B7/RP 5/E, June 1963, 10 pp, 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053107
STRENGTH OF BODIES OF PASSENGER COACHES, IMPROVED CALCULATION METHOD. USE OF A PROGRAMME WRITTEN IN FORTRAN IV (1966). (TEXT AND APPENDICES)
In investigating a calculation method for coach bodies, the ORE B 7 committee has decided on the method of the general theory of redundant frames. Report B 7/RP 4 of October 1962 gives a detailed description of the implementation of this method using the IBM 650 which was the most widely used computer at the time. Report B 7/RP 5 described a programme revised to keep abreast of the rapid progress in computer technology and designed for use on the IBM 7070. The present report goes a step further: (a) the programme has been further revised and improved and (b) its implementation has been further facilitated. The programme, revised on the basis of an improved form of Fortran, now makes it possible to calculate coach bodies with up to twenty door and window openings in each side-wall, while at the same time enabling certain simplifying hypotheses, originally found necessary, to be eliminated. Thus, we can now: take into account concentrated vertical loads; vary, from one field to another, the position of the neutral axes of the upper and lower flanges; take into account the possible asymmetry of the bogie centres. Furthermore, the preparatory work has been considerably facilitated by reducing the documentation to be provided to the calculation centre to a single data-sheet. Thus, using the new programme, almost any type of coach body can be calculated, and it is possible to proceed easily and rapidly with applied research with a view to the greatest possible reduction in the weight of coaches. Finally, it is reasonable to assume that the method as now formulated is sufficiently well developed and generally applicable to be used in its preesent form for several years.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B 7/RP 6/E, Apr. 1968, 11 pp, 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053109
STRENGTH OF BODIES OF PASSENGER COACHES. COMPLETE CALCULATION OF PASSENGER COACH BODIES (STRESSES, DEFLECTIONS AND NATURAL FREQUENCIES)
A detailed description is given of the complete calculation of passenger coach bodies (stresses, deflections and natural frequencies) using the general theory of redundant frames. A passenger coach chosen as application example permits a comparison to be made between the measured values and the calculation results. In addition, the report gives all the necessary instructions for the use of the calculation programme and the application arrangements.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B 7/RP 7/E, Apr. 1972, 71 pp, 15 Fig., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053116
STANDARDISATION OF WAGONS. RESULTS OF THE STATIC AND DYNAMIC TESTS CARRIED OUT ON THE PROTOTYPE WAGONS. TEXT AND ENCLOSURES
The present Report consists of three parts. The first part gives an account of the tests carried out according to a general programme at Vitry-sur-Seine, by the Test-section for the construction of rolling stock of the Rolling Stock Test Department of the SNCF, and at Minden by the Test Department for Rolling Stock of the German Federal Railways. These tests were carried out on: the BD 209, Soule, Arbel, and DB 210 wagons, and three open standard UIC wagons (type 2) of the DB, (1), the test results of which have served as a reference basis for judging the behaviour of the prototype wagons, since these should, according to the intentions of the "Design Competition", make it possible to arrive at the construction of a wagon at least as strong, but lighter and cheaper than the Standard wagon type 2 of the UIC. The tests concerning the wagons DB 211 and DB 324 will be dealt with in 2 special reports, one for each of them. The second part of the present report deals with the various tests likewise falling within the scope of activities of B 12 Committee of ORE and carried out independently of, or additionally to, those mentioned in the programme described in the first part. These tests were carried out either at Vitry or at Minden on the prototype wagons mentioned above, or on other wagons the behaviour of which seemed likely to provide interesting information, viz.: at Vitry: additional buffering tests with the Soule-wagon, up to the resistance limit of the shock-units; comparative tests during buffering, of the end swing doors fitted to a standard UIC-ORE open wagon. One swing door was identical with the original arrangement, the other was an interchangeable, reinforced, end swing door constructed according to a suggestion made by the SNCB. at Minden: deformability tests of the side doors carried out on open DB type Omm 52 wagon and on a CFF type L7 wagon; lateral tipping tests carried out with open DB type Omm 31, Omm 33, Omm 37, Omm 52 and OBB Omm 37 wagons. Finally, the third part contains the conclusions to be drawn from the tests already carried out and discussed in the two preceding parts.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B12/RP 3/E, July 1959, 80 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053118
STANDARDISATION OF WAGONS. DETERMINATION OF HEAT TRANSFER THROUGH ROOFS AND WALLS OF THE TYPE 1 COVERED VANS
On behalf of the ORE B 12 Specialists Committee, four covered goods wagons of type 1 were subjected to thermal tests at the Vienna-Arsenal Testing Station (WKS). The object of these tests was to determine the thermal behaviour of covered goods wagons at different designs of sidewall, endwall and roof coverings.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B12/RP 10/E, Oct. 1964, 34 pp, 33 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053119
STANDARDISATION OF WAGONS, STANDARD BOGIE
In view of the anticipated development of bogie wagons the B 12 Committee has been charged with defining a bogie able to run at 120 km/h, both on standard (1.435 m) and on broad-gauge track (1.524 m), which will permit the automatic traction and shock coupler to be used on wagons and which could replace the bogie of the present standard flat wagon after the simple introduction of some suitable intermediate parts. The purpose of the 1st stage, which forms the subject of the present report, is to define a bogie with a good running behaviour at 120 km/h, which has 8 brake-shoe holders, arranged in pairs on both sides of each wheel, and which guarantees adequate braking under (S) running conditions (maximum speed of 100 mk/h). The interchangeability conditions for bogies to be used under standard wagons have also been defined. In order to arrive at a suitable choice, the Committee has drawn-up a set of criteria which must be satisfied and has recommended that riding stability tests for comparing the different solutions should be carried out by the SNCF (on normal-gauge track) and by the PKP (on broad-gauge track).
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B12/RP 14/E, Nov. 1967, 33 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053122
STANDARDISATION OF WAGONS. CONVERSION OF STANDARD WAGON UNDERFRAMES SO AS TO MAKE THEM SUITABLE FOR SUBSEQUENTLY TAKING THE AUTOMATIC BUFFING AND DRAW COUPLER
With a view to the future application of automatic coupler components on standard wagons and in order to avoid multiplication of the studies concerning the conversions to be made to the underframe, the ORE/B 12 Specialists Committee has examined different solutions already known by several Administrations and to which the attention of the Committee had been drawn. The present report: gives an account of the experimental application of various systems and contains a qualitative assessment concerning each of these (Chapter 2 and Appendix 1); gives the results of the mechanical strength tests to which the converted wagons have been submitted (Chaper 3 and Appendix 2), and formulates recommendations for ensuring the correct positioning and mounting of the prefabricated elements used and for ensuring a satisfactory connection of these with the remaining structures of the underframes to be converted.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B12/RP 18/E, Apr. 1972, 32 pp, 7 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053123
STANDARDISATION OF WAGONS, FLAT BOGIE WAGON, TYPE 2
This report contains the description of the design of the type 2 flat bogie wagon and the results of the tests made in accordance with the conditions laid down in ORE Report B 12/RP 17.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B12/RP 19/E, Oct. 1972, 9 PP, Tabs., 5 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053124
METHODS USED FOR THE MEASUREMENT OF STRESSES IN THE ROTATING AXLES OF RAILWAY VEHICLES. PRELIMINARY REPORT
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B24/CR.I/Eng, Aug. 1954, 9 pp, Refs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053125
MEASURING EQUIPMENT USED FOR THE STUDY OF COMFORT IN CARRIAGES. DOCUMENTARY REPORT
For the conveyance of passengers, various demands have to be met with respect to the movements of the coach body, the noise, heating, ventilation and lighting. As regards the movements, the assessment of the magnitudes measured in connection with comfort is closely connected with the frequency of this movement. Several research workers have established directives for the assessment of simple (or compound) vibrations by human beings. As regards the various frequency ranges of the movements, the maximum accelerations for low frequencies (up to 5 or 7 cps), for high frequencies (40 cps) the maximum displacements and for medium frequencies the maximum speeds are to be considered as determinative. When investigating the question of the noise intensity in coaches, a minimum intensity should be striven after, during which however also the physiological assessment by the human ear of the noise at various frequencies should be taken into account. Special attention should be paid to the range of sound vibrations situated between 1000 and 3000 cps as the human ear is the most sensitive to frequencies within this range. An analysis of the sound in the various frequency ranges is required for this purpose, so that also the instruments used for the assessment of the noise should fulfil special requirements. As regards heating and ventilation, it has become apparent that there exists a close relationship between the most comfortable temperature and the relative air humidity. The data supplied by the temperature registration instruments should be considered in combination with those of the measurement of the relative air humidity and the air circulation. As regards lighting, the requirements must mainly be made for those intensities exceeding a certain level (measurement by means of a luxmeter).
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B28/RE 1/E, July 1961, 27 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053128
TESTS TO BE CARRIED OUT ON BEHALF OF THE COMMISSION "AUTOMATIC COUPLINGS." WORK OF THE COMMITTEE B51 (AUGUST 1962-SEPTEMBER 1963)
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B51/RP 2/E, June 1964, 10 pp, Figs., 14 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053129
TESTS TO BE CARRIED OUT ON BEHALF OF THE SPECIAL COMMISSION "AUTOMATIC COUPLINGS." WORK OF THE B51 SPECIALISTS COMMITTEE FROM OCTOBER 1963-DECEMBER 1964
The present report, Interim Report No. 3, deals in detail will the continuation of the work of the B 51 Committee with respect to the development of an automatic coupler. The report covers in particular the activities of the Committee concerning: the finalisation of the technical conditions indicated in Leaflet 522 (Section 2); the study of drawings determining the fitting of the automatic traction and shock coupler on the vehicles (section 4); the continuation of the studies concerning the development of a mixed coupling system (Section 5); the results of the tests for determining the capability of coupling of a UIC/OSJD coupler with the SA 3 coupler (Section 6); the first conclusions relating to the viability of the automatic simple traction coupler (Section 7), and the first results concerning the running performance of trainsets equipped with the automatic traction and shock coupler (Section 8). On a more theoretical plane, the

Committee has drawn-up a first draft of the programme of tests, part C (Section 3), and has continued with the studies for determining the arrangements for the simultaneous conversion (Section 5). The programme of work and the initial activities of the Joint Sub-Group UIC/OSJD "Studies and Tests" have been indicated (Section 9).

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B51/RP 3/E, June 1965, 17 pp, 15 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053130
TESTS ON AUTOMATIC COUPLERS, WORKS OF THE B 51 SPECIALISTS COMMITTEE FROM JANUARY TO DECEMBER 1965

Investigations for defining the synthesised coupler of the UIC occupied a great deal of the time from January to December 1965, of which this report gives an account. In collaboration with the OSJD, the conditions specified in UIC Leaflet No. 522 were adapted to the findings obtained from the work for developing the automatic coupler (displacement of the coupler suspension, field of action, possibility of coupling of curves, intermediate coupling device, running on ferry boat access ramps, and traction coupler). Modifications to the synthesised coupler of the UIC by the Joint Group UIC/OSJD ought to be emphasised here; these led to a reduction of the horizontal field of action from 250 mm to 220 mm, and of the vertical field of action from 150 mm to 140 mm. The designs for the mixed coupling and the corresponding air-line connectors and also the plans for testing them, were provisionally approved by the Committee. The Group "Operating Questions" presented its programme for introducing the automatic coupler and this was duly noted by the Committee. This programme should be kept constantly in mind. Tests were also conducted with freight trains equipped with traction couplers and with traction and shock couplers, and also with passenger coaches (reactions in train formation and performance under normal operating conditions). Field tests and tests in the Vienna Arsenal testing station served to study performance in winter conditions. The tests have re-confirmed that the greater the longitudinal play between the wagons of a train, the more adverse its effect on the riding stability during starting and braking. On the other hand, the tests have shown that couplers operating on the Willison principle have to be provided with a longitudinal clearance of several millimetres between the coupled heads to ensure reliable coupling in winter conditions. The object of other tests made by the Committee was the investigation of the effect of an extended brake cylinder filling-time with the brake in the "P" position (from 3-5 seconds to 10-15 seconds). This extended filling-time, which causes a reduction of 6.5 to 8% in the value of lambda, has shown that, in these conditions, the longitudinal forces produced during rapid brake applications at low speeds are substantially reduced. Moreover, other tests with reinforced elastic systems fitted for the purpose of reducing the longitudinal forces, were promising. The investigations are being continued.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B51/RP 4/E, Oct. 1966, 12 pp, Figs., 10 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053132
HEAT TRANSMISSION PHENOMENA IN REFRIGERATED VANS. VARIOUS METHODS USED FOR MEASURING THE HEAT TRANSMISSION COEFFICIENT K

In 1962, the B77 Specialists Committee drew up a programme of work, visualizing three series of tests to be conducted in the Vienna-Arsenal test stations and at the Experimental Institute in Rome. The object of these tests is to compare the methods applying internal heating and internal cooling, while determining for each of these the influence of the fundamental parameters involved in the measurement of the coefficient K. The first Interim Report forming the subject of the following test contains a description of the procedures used by each of the test stations and the error committed during the measurement of the coefficient K according to the procedure applied. The tests on the internal cooling method were conducted by the Vienna-Arsenal test stations and by the Experimental Institute in Rome according to a procedure peculiar to each of them. Including all the precautions taken, the measuring errors are 8.7 and 9.7% respectively at a limit of 10% authorized by the Agreement. The error is 3.2% for the method applying internal heating while using comparable measuring instruments. Though therefore the method of internal cooling has been retained by the Agreement of the Economic Commission for Europe owing to certain advantages which it affords, it nevertheless presents some difficulties: need for a more complex equipment and for a very careful measuring process enabling adequate precision to be achieved and which, in spite of this, continues to be of a practical nature.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B77/RP 1/E, June 1964, 26 pp, Figs., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053133
HEAT TRANSMISSION PHENOMENA IN REFRIGERATOR WAGONS. RECOMMENDED METHOD FOR THE MEASUREMENT OF THE K VALUE OF REFRIGERATOR WAGONS

In 1962, the B77 Specialists Committee drew up a Programme of Work, visualizing three series of tests to be conducted in the Vienna-Arsenal testing station and at the Experimental Institute in Rome. The object of these tests was to compare the methods applying internal heating and internal cooling, while determining for each of these the influence of the fundamental parameters involved in the measurement of the coefficient K. The first Interim Report dated June 1964 described various methods used for measuring the heat transfer coefficient K of insulated and refrigerator vans and explains, on one hand, the maximum error committed in the measurement of this coefficient according to the method used and, on the other hand, the difficulties presented by the method of inner cooling, recommended by the ECE due to certain advantages which cannot yet be defined in a precise manner. With this in mind, the second Interim Report, (this report) describes the method which is considered the most practical, for measuring with sufficient accuracy the coefficient K of insulated and refrigerator vans by the method of inner cooling. It deals with three methods used for measuring the heat transmission coefficient K of insulated and refrigerator vans by the method of inner cooling and describes the precautions that must be taken in each case. The method of the cooling group placed inside the van is recommended as the best method because it is the most practical and the most accurate.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B77/RP 2/E, Oct. 1965, 20 pp, 10 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053134
HEAT TRANSMISSION PHENOMENA IN REFRIGERATOR VANS. THE EFFECT OF PHYSICAL AND PARASITIC FACTORS ON THE K VALUE

Since 1962, the B77 Specialist Committee has conducted a series of tests in the Vienna Arsenal Testing Station and at the Experimental Institute of the FS in Rome. The object of these tests was to compare the methods applying inner heating and cooling, while determining for each, the influence of the fundamental parameters involved in the measurement of the coefficient K. A third report has now been compiled (the present), in which the influence of the various physical and parasitic phenomena which occur in the determination of the coefficient K, are examined. The report gives a detailed account of the tests to ascertain the effect of physical and parasitic factors on the measurement of the k-value. Three significant parameters were specified, namely, the mean wall temperature of the insulation, moisture in the insulation, and the influence of the relative air speed. Certain rules must be observed when measuring the k-value to avoid serious errors. Report No. 3 concludes by comparing the two fundamental methods of measurement, inner heating and inner cooling, which will give approximately similar results when correctly applied during static tests (v = 4 km/h) and when certain rules are observed. It has been found that the inner heating method is simpler and more accurate, and that of inner cooling generally cheaper.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B77/RP 3/E, Apr. 1968, 18 pp, 12 Fig., 7 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053135
HEAT TRANSMISSION PHENOMENA IN REFRIGERATOR VANS. SHORTENED METHODS FOR THE DETERMINATION OF THE K-VALUE

Since 1962, the B77 Specialist Committee has conducted a series of tests in the Vienna Arsenal Testing Station and at the Experimental Institute in Rome. The objective of these tests was to compare the methods applying inner heating and cooling, while determining for each, the influence of the fundamental parameters involved in the measurement of the coefficient k.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. B77/RP 4/E, Apr. 1969, 22 pp, Figs., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053140
STANDARDISATION OF PASSENGER COACHES. DESIGN OF PASSENGER ACCOMMODATION

This report contains the information provided by some ORE member administrations concerning the design of the passenger accommodation of coaches used in long-distance and international services. It deals in particular with: arrangement of the passenger accommodation, inner lining of the body frame, structure of the walls between compartments and between compartments and corridor, structure of the inside doors, structure of the floor, fitting of the windows, arrangement of the heating pipes, arrangement of the seats. The report also contains some general details about the vehicles, such as: maximum speed, service life, material used for the framework, types of bogies, number of vehicles built, weight of the main components of the vehicles, etc.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B106/RP 1/E, Oct. 1971, 15 pp, 52 Fig., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053165
WHEELSETS WITH ASSEMBLED AXLEBOXES: DESIGN MAINTENANCE AND STANDARDISATION. STANDARDISATION OF WHEELSETS WITH ASSEMBLED AXLEBOXES FOR WAGONS EQUIPPED WITH 1000 MM DIAMETER WHEELS

The wheelset with assembled axlebox and fitted with 1000 mm wheels has been designed: for taking 22 t axleloads; to be interchangeable with existing UIC wheelsets, and for use with two-axled wagons and possibly bogied wagons. It has: a short journal, and a solid rim-sprayed wheel without offset and with curved web. The recommendations of ORE Committees B95 (RP 3 and RP 4), B98 (RP 9) and S 1002 (RP 2) are applicable to this standardised wheelset. The wheelset axle is the same as that recommended in B136/RP 1 for wagons with 920 mm phi wheels.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B136/RP 2/E, Oct. 1975, 18 pp, 3 Fig., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053167
NON-POLLUTING SANITARY INSTALLATIONS. TOILETS OF NEW DESIGN FOR USE ON RAILWAY PASSENGER COACHES

The last few years, the railway administrations have been urged by public opinion to replace the present train toilets of the open design by closed toilets or at least by toilets enabling the effluents to be properly treated before being discharged on to the track. From the various types of toilets possessing these characteristics, three have already been used on passenger coaches and a fourth could, in the opinion of some Specialists, be adapted. Some other types are under study. The four systems referred to above are described in detail. Subsequently, an account is given of the results of an enquiry, launched to obtain information on the administrative, sanitary and staff questions in the various countries and to ascertain the opinions of the administrations on the various aspects of the question. 22 administrations have sent information, considered highly valuable by the Rapporteur; however, the data referring to costs are rudimentary, because the administrations are not yet in a position to evaluate them in a satisfactory way. The number of systems already under test or planned for operation in the near future should, however, be sufficient to furnish valid results in this field too. The report concludes with some proposals, aiming at a higher degree of efficiency in the continuation of the studies and to make public opinion more conscious of the extensive scope of this problem.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B140/RP 1/E, Oct. 1975, 42 pp, 8 Fig., 3 Tab., 13 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053172
STANDARDISATION OF AIR-CONDITIONING AND HEATING INSTALLATIONS. EVALUATION OF THE TESTS MADE IN THE VIENNA ARSENAL CLIMATIC CHAMBERS WITH SEVERAL PASSENGER COACH AIR-CONDITIONING SYSTEMS. (TEXT, APPENDICES, TABLES AND FIGURES)

The ORE B 108 Specialists Committees have investigated various air-conditioning and energy supply systems in coaches of virtually identical design. This report evaluates and compares the results of the tests on various air-conditioning systems. A separate report will deal with tests on energy supply systems. However, since air-conditioning plants and energy supply systems are closely linked, reference will sometimes be made, also in this report, to the energy supply part for easier understanding.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B107/RP 4/E, Oct. 1975, 21 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

03 053173
STANDARDISATION OF WAGONS. STANDARDISATION OF A BOGIE WITH THE BRAKE IN THE UNDERFRAME FOR SS-TRAFFIC

This report describes the design of a bogie suitable for SS-traffic for an axle load of 20 t and with brake devices under the wagon body, based on the bogie already standardised for S-traffic. It contains the results of stability and mechanical strength tests carried out by different Administrations.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B12/RP 23/E, Oct. 1975, 25 pp, 27 Fig., 11 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

03 053174
CRITERIA FOR ASSESSING THE EFFICIENCY AND THE AGGRESSIVENESS OF CLEANING PRODUCTS. REPORT OF ENQUIRY AND TABLE OF CLEANING AGENTS CURRENTLY USED FOR CLEANING THE OUTSIDE OF COACHES
The present report consists mainly of a description of the results of a new inquiry into cleaning agents used by the ORE Member Administrations for exterior cleaning with special emphasis on environmental pollution and safety precautions. The cleaning agents currently used are listed in tabular form with advantages and disadvantages. Reference is made to new cleaning agents under development.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E119/RP 3/E, Oct. 1975, 15 pp, 12 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

03 080339
TANK CAR HEAD STUDY. PHASE 05 REPORT
During initial planning of the RPI-AAR Tank Car Safety Project, it was known that tank car heads were punctured in accidents with sufficient frequency to warrant assigning a specific Project Phase (05) for its study. The sequence of analyses and tests that were conducted under this phase were: Analysis of scale model laws for establishing feasibility of reduced scale tests; Preliminary drop weight tests on 1/12 scale tank car heads; Head impact tests on full scale old riveted tank cars; Development of head protection schemes and related cost/benefit analyses under contract to DOT; Head impact tests on 1/5 scale pressure and non-pressure cars with and without sill-head reinforcements; Head impact tests on 1/5 scale 112A340W pressure cars; Head impact tests on full scale new pressure cars to evaluate final head shield design; Analysis of all tests to correlate data, evaluate sensitivity of parameters, and predict degree of protection offered by final head shield design under various accident conditions. The purpose of this final Phase 05 Report is to present all the results under one cover, discuss them, and draw conclusions.
An RPI-AAR cooperative program.

Phillips, EA
Association of American Railroads Technical Center, Federal Highway Administration, Indiana State Highway Commission, (T-5-1) Final Rpt. RA-05-1-17(R-140), July 1972, 119 pp

ACKNOWLEDGMENT: Association of American Railroads Research Center
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246433/7ST, DOTL/NTIS

03 083943
PULLMAN-STANDARD TEAMS COMPUTER ANALYSIS WITH CAR-BUILDING KNOW-HOW
The new "family line" of open top gondolas and hopper cars by Pullman-Standard at the Champ Carry Technical Center, Hammond, Indiana features a prototype high side gondola. Built for unit train rotary dump service, the car described is the result of three years of research and engineering.

Railway Locomotives and Cars Vol. 48 No. 7, Oct. 1974, pp 17-18

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 093346
URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM
The report reviews the third year's efforts of the Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program. The objective of the Program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe and economical as possible. Accomplishments for the year ending June 1974 included the following: Completion of the review of BART data; completion of the SOAC test and simulated demonstration programs at the High Speed Ground Test Center, Pueblo, Colorado after repairing the damage to the SOAC cars resulting from a collision with a standing car on August 11, 1973; completion of SOAC demonstration runs on the NYCTA lines.
See also PB-224 141.

Boeing Vertol Company, Urban Mass Transportation Administration Ann. Rpt., 3 D174-10033-1, UMTA-IT-06-0026-74-1, July 1974, 125 pp

Contract DOT-UT-10007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245310/8ST, DOTL NTIS

03 094135
AN ASSESSMENT OF THE CRASHWORTHINESS OF EXISTING URBAN RAIL VEHICLES
No abstract available.
Set includes PB-249 142 thru PB-249 143.

Calspan Corporation, Department of Transportation Nov. 1975, 370p-in 2v

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC
PB-249141/SET-ST, DOTL NTIS

03 094136
AN ASSESSMENT OF THE CRASHWORTHINESS OF EXISTING URBAN RAIL VEHICLES. VOLUME I: ANALYSES AND ASSESSMENTS OF VEHICLES, CHAPTERS 1 THROUGH 7
The crashworthiness of existing urban rail vehicles (passenger cars) and the feasibility of improvements in this area were investigated. Both rail-car structural configurations and impact absorption devices were studied. Recommendations for engineering standards for urban rail vehicles were developed. The report covers: (1) The development of analytical tools to predict passenger threat -environment during collision; (2) criteria for predicting passenger injury due to train collisions; (3) an application of injury criteria and analytic models to predict passenger injuries resulting from collisions of trains that represent existing construction types; (4) a preliminary investigation of applying impact absorption devices to transit vehicles; (5) a design study of car structural configurations for improved impact energy management; (6) a review of engineering standards for Urban Rail Car Crashworthiness.
Paper copy also available in set of 2 reports as PB-249 141-SET, PC$13.00.

Cassidy, RJ Romeo, DJ
Calspan Corporation, Department of Transportation Final Rpt. UMTAMA06-0025-7516V1, Nov. 1975, 199 pp

Contract DOT-TSC-681

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-249142/1ST, DOTL NTIS

03 094137
AN ASSESSMENT OF THE CRASHWORTHINESS OF EXISTING URBAN RAIL VEHICLES. VOLUME II: ANALYSES AND ASSESSMENTS OF VEHICLES, CHAPTERS 8 THROUGH 12 AND APPENDIXES AND REFERENCES
This publication presents information related to the following: Railcar override; Priority areas for the development of cost effective improved car structures; Preliminary design study of impact energy absorbing device; Cost effectiveness of structural improvements; Development of uniform standards.
Paper copy also available in set of 2 reports as PB-249 141-SET, PC$13.00.

Cassidy, RJ Romeo, DJ
Calspan Corporation, Department of Transportation Final Rpt. UMTAMA06-0025-7516V2, Nov. 1975, 171 pp

Contract DOT-TSC-681

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-249143/9ST, DOTL NTIS

03 094257
RAILROAD CAR UNDERBODY WASHING SYSTEM CRITERIA AND DEFINITIVE GRAPHICS TECHNICAL STUDY REPORT
The purpose of this study is to define a reliable and economical system for removing oil sludge from the underside of railroad cars. The proposed system must reflect a balance of many factors, including cleaning effectiveness, initial capital investment, operating and maintenance cost, availability of utilities, conservation of resources and acceptability of operating conditions.

Sanders and Thomas, Incorporated, Naval Facilities Engineering Command July 1975, 126 pp

Contract N00025-75-C-0005

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
AD-A018987/8ST, DOTL NTIS

03 094717
OVERHEATED JOURNAL BEARING DERAILMENT PREVENTION SYSTEM
The patent application relates to an anti-derailment system to prevent train derailment due to axle failure resulting from journal bearing overheating. It includes a thermal sensor to continuously monitor the temperature of the bearing and to activate the brake system when the temperature exceeds a predetermined level. A thermally-responsive element located in the journal bearing adapter physically deforms to activate a power source. The resulting signal initiates an electro-explosive brake line venting mechanism, puncturing and venting the brake line to stop the train. Several configurations of the thermal sensor and the power source are possible.
Government-owned invention available for licensing. Copy of application available NTIS.

Armstrong, JH Kluge, FC
Department of the Navy PAT-APPL-622 355, No Date, 21 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
AD-D002104/8ST, DOTL NTIS

03 129816
FOREIGN LIGHT RAIL VEHICLE DEVELOPMENT
This paper begins with a brief description of how the light rail mode has been developed in several West European countries, expecially in the Federal Republic of Germany. The basic features of the light rail vehicle and how the vehicle was derived from the streetcar and the subway or heavy rapid transit car are explained. Finally, the various attempts at standardization of light rail vehicles in West Germany after World War II are discussed. Several modern light rail vehicles are described, and it is explained why standardization could only be partically achieved.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

von Rohr, J *Transportation Research Board Special Reports* No. 161, 1975, pp 99-110, 10 Fig., 1 Tab., 32 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

03 129824
TECHNICO-ECONOMIC EFFICACY IN THE PERFECTING OF AUTOMATIC COUPLING [Tehniko-ekonomiceskaja effektivnost soversenstvovanija avtoscepki]
The article examines the technico-economic effect resulting from the use of a more sophisticated automatic coupling. This coupling must comprise an inter-wagon train line of high reliability, controlling the uncoupling operations; it must provide for train formation without selection of wagons in accordance with coupler height, and allow for automation of the uncoupling procedure over marshalling yard humps. [Russian]

Kolomijcenko, VV *Vestnik Vniizt* Vol. 34 No. 6, 1975, pp 24-29, 1 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

03 129826
MODERN CALCULATION PROCEDURES FOR DETERMINING THE STRESSES AND DEFORMATIONS SUFFERED BY WHEEL SETS [Einsatz moderner Rechenverfahren zur Ermittlung der Spannungen und Verformungen bei Radsatzen]
On the basis of a number of examples, the author presents a whole range of possibilities that can be utilized in the preparation of a calculation programme for a precise analysis of the stresses and deformations suffered by wheel sets in accordance with the method of finite elements. A complete article, in which the illustrations provide as much information as the text. [German]

Raquet, E *Glasers Annalen ZEV* Vol. 99 No. 9, Sept. 1975, pp 249-255, 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 129827
DIRECTIONAL ROLLER BEARING RINGS AND BOGIES FOR THE PARIS METRO [Couronnes d'orientation et bogies de metro]
The author explains that a new link-up between body and bogie has been tested with success on coaches of the Paris Metro. The orientation of the bogies in relation to the body is effected by means of a crossed roller bearing ring. Small-radius curves can be taken very easily, and wheel flange wear is avoided. The directional roller bearing rings, which are pre-stressed during manufacture, provide a rigid assembly which gives the body excellent lateral stability. This rigidity also enables the bogie thrust centre to be lowered to axle level, which limits the transmission of bogie hunting movement to the body, and increases the comfort of the coaches. [French]

Bonnet, J *Revue des Roulements* No. 184, 1975, pp 20-21, 2 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Revue des Roulements Brussels, Belgium

03 129866
AN INVESTIGATION FOR THE WELDED JOINTS OF CAR BOGIE PARTS UNDER SERVICE LOAD
This paper presents a fatigue limit diagram which is based on failure data for the welded parts of car truck frames. The service loads are also reported. As the correlation between service load and failure rate, a modified Miner's law calculation was adopted and fracture fatigue life was estimated.

Tanaka, S Hatsuno, K Yaguchi, S *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 124-125, 2 Fig., 3 Tab.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC
DOTL JC

03 130674
A COACH BOGIE OF INTERNATIONAL COLLABORATION FOR VERY HIGH SPEEDS--THE Y32-FIAT
Cooperation between French National Railways and FIAT has produced two passenger car truck designs characterized by the flexibility of the connection between body and truck to give a maximum of dynamic freedom in the transverse and vertical modes while maintaining stability. Traditional center plate and sliding contact parts have been replaced by linkages located at axle level and flexibly anchored. These trucks are to be used on 500 Eurofima coaches after test running showed high quality ride at 250 kph.

Moron, P (French National Railways); Santianera, O (Societe FIAT) *Rail Engineering International* Vol. 5 No. 8, Nov. 1975, pp 318-328, 13 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 130788
AN OVERVIEW OF RAIL CAR EQUIPMENT FOR INTERMODAL TRAFFIC
A brief historical review of rail car equipment for carrying highway trailers and/or containers is given. The operational and service factors that set the requirements for equipment culminating in today's intermodal rail car are described. Car design and cost factors to be considered if substantial changes are planned for implementation in "tomorrow's" intermodal systems are discussed, and the interrelation between certain key considerations such as stability, car platform height above rail, and tare weight is shown.

Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Atlanta, Georgia, July 14-18, 1975.

Brodeur, RH (Trailer Train Company)
American Society of Mechanical Engineers 75-ICT-3, July 1975, 8 pp, 13 Fig., 1 Tab.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC

DOTL RP

03 130810
A NEW BOGIE FOR WAGONS [Ein neues Drehgestell fuer Gueterwagen]
The Belgian Company of "Usines Emile Henricot" has developed the Diamond-type wagon bogie to create the "Eurospeed" bogie which meets the requirements for underframe stability during running and radial axle adjustment. The author describes the structural changes made. [German]

Mertens, A *Eisenbahntechnische Rundschau* Vol. 24 No. 10, Oct. 1975, pp 369-370, 1 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

03 130825
CALCULATION OF BOGIES
Follow-up to an article published by the same author in the July 1973 issue of Rail International. This article gives an explanation, by means of some 40 formulae and equations, of stress calculations in bogie side frames for horizontal and braking loads.

Shadur, L *Rail International* Vol. 6 No. 11, Nov. 1975, pp 831-851, 9 Fig., 4 Tab., 11 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 130898
ON THE THEORY OF ARCHING IN MASS FLOW HOPPERS
Experimental evidence reveals an overdesign of the critical outlet widths in mass flow hoppers, when following the standard Jenike method for the estimation because A.W. Jenike did not account for the possibility that an arch across the outlet may slide along the wall, nor for the fact that the arch, in addition to its own weight, will have to sustain the weight of the powder above. A modified theory is presented, where these two factors are included. Furthermore, this theory includes simplified, purely analytical expressions for the distribution of active and passive stresses in the powder in the converging hopper section of a silo. The theory yields considerably less overdesign of the critical arching width of the hopper outlet than does the original A.W. Jenike theory. The remaining overdesign may be compensated for by the alternative principle of measurement which is given.

Enstad, G *Chemical Engineering Science* Vol. 30 No. 10, Oct. 1975, pp 1273-83, 15 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

03 131018
CONSTRUCTION OF LIGHT-WEIGHT VEHICLES AND CONSEQUENCES ON TRACK-VEHICLE INTERACTION [Der Einfluss des Fahrzeuggleichbaus auf die Wechselwirkung von Fahrzeug und Gleis]
The author reviews progress made in the construction of vehicles using light-weight metal since 1930-1940. He re-defines a few of the concepts in the specific area of vehicle-track interaction and stresses the critical points of the "complex oscillation system". He also compares the interactions dealt with in this article with the results obtained from previous experience and mentions work under way in various Transport Institutes. [German]

Nothen, J *Leichtbau der Verkehrsfahrzeuge* Vol. 19 No. 4, July 1975, pp 65-69, 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Leichtbau der Verkehrsfahrzeuge Munich, West Germany Repr. PC

03 131020
ULTRASONIC INSPECTION OF GRAIN SIZE IN THE MATERIALS FOR RAILWAY WHEEL SETS
This work outlines the present theory of attenuation of the ultrasonic waves, particularly the theory of scattering, and describes the measurement of attenuation in metals. Experiments were carried out to measure the attenuation of samples with different grain size taken from materials for railway wheel sets; in these experiments the pulse echo method, with elimination of the effect of the reflexion factor, was applied. The article presents the relation between the overall attenuation coefficient and its scattering component, the grain size and frequency. On the basis of our measurements and an analysis of the obtained results, two methods of evaluation of the structure of railway materials by ultrasonic inspection were derived.

Kopec, B *Ultrasonics* Vol. 13 No. 6, Nov. 1975, pp 267-274

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 131027
USE OF FINITE ELEMENT ANALYSES FOR RAILCAR DESIGN
The analysis of railcar structures is improved by the use of electronic computers. Outlined are specific applications of finite element analyses to total car systems, and stress concentration. Data are presented on modeling, dynamic characteristics, and correlation of results.

Dennis, MJ (Boeing Vertol Company) *ASCE Journal of Transportation Engineering* Proc Paper Vol. 102 No. TE1, No. 11921, Feb. 1976, pp 105-116, 5 Fig., 4 Tab.

ACKNOWLEDGMENT: ASCE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 131233
INCLINING BODY TECHNIQUE IN RAILWAY VEHICLES RUNNING IN CURVES [La technica de la inclinacion de las cajas de los vehiculos ferroviarios a su paso por curvas]
This paper, which won the first prize in Section B at the Caracas Congress, contains a brief description of procedures adopted by several Railways (in the United States, France, Japan, Sweden, England, Switzerland, Italy and Canada) on the subject of inclining vehicle bodies for running in curves, (a solution they consider as an optimum to reach the proposed objective). It then describes in great detail the constructional characteristics and operating principles of the solution adopted by the RENFE (electric train-set with inclinable bodies). A chapter at the end is devoted to details of expected results. [Spanish]

Thereau-Ahumada, LE
Pan-American Railway Congress Proc Paper Section B, Nov. 1975, 33 pp, 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France Repr. PC

03 131237

UNIT TRAIN CUSTOMERS WANT STILL HIGHER PAYLOADS

A greater appreciation of rail's suitability for bulk movements had produced a growing number of special purpose wagons. In line with development of sophisticated equipment train mineral hauls are also demanding improved wagon designs to raise payloads still further.

Railway Gazette International Vol. 132 No. 2, Feb. 1976, pp 58-60, 6 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 131258

METHOD FOR THE RAPID MEASUREMENT OF WHEEL AND RAIL WEAR BY MEANS OF RADIOACTIVE ISOTOPES [Kurzzeitverschleiss-Messverfahren an Rad und Schiene mit Hilfe radioaktiver Isotope]

No Abstract. [German]

Grohmann, HD *DET Eisenbahntechnik* Vol. 23 No. 12, Dec. 1975, pp 560-62, 1 Fig., 8 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany Repr. PC

03 131259

THE ELASTIC FACTOR OF RAIL VEHICLE WHEELS [Die radiale Radfederkonstante von Eisenbahnraedern]

There have been constant efforts to increase the elasticity of rail vehicle wheels, in other words the elastic factor to be applied. This is determined by calculating the maximum dynamic vertical stress borne by the wheel when passing over a rail joint in relation to the radial elastic factor. The authors, who use a system of ordinary differential equations to solve this problem, with the help of an analog computer, obtain a radial elastic factor for impact reduction. [German]

Beer, R *DET Eisenbahntechnik* Vol. 23 No. 12, Dec. 1975, pp 563-565, 9 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany Repr. PC

03 131264

OPERATING TEMPERATURE OF ROLLER BEARINGS IN WHEELSETS OF RAILWAY VEHICLES. CALCULATION-MEASUREMENT-EFFECTS-MONITORING [Betriebstemperatur der Radsatzrollenlager von Schienenfahrzeugen, Berechung-Messung-Auswirkung- Ueberwachung]

No Abstract. [German]

Pittroff, H Sommerfeldt, H *Glasers Annalen ZEV* Vol. 98 No. 11, Nov. 1975, pp 317-325, 2 Fig., 2 Tab., 8 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 131267

TANK CAR DESIGN [Kesselwagenentwuerfe]

The article describes the methods of calculating dimensions for tank cars in the USSR, and shows how these methods are constantly developed through research at the Moscow Institute of Railway Engineers, at the Adanov heavy machinery construction institute, and other organisations. Among the methods explained, approximate calculations are also given for use in preliminary projects, as well as methods for accurate stress analysis. [German]

Shadur, L Koturanov, V *Schienen der Welt* Vol. 6 No. 11, Nov. 1975, pp 862-884, 5 Tab., 9 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Schienen der Welt Brussels, Belgium Repr. PC

03 131272

EFFECT ON TRACK OF HEAVY AXLE LOADS

The author recalls and makes reference to numerous studies on the problems of damage to rails caused by heavy axle loads. He quotes recommendations developed by AREA with regard to permissible axle loads in relation to wheel diameter and vehicle speed, and the ultimate tensile strength of rail steels. He mentions the experience of Australian Railways operating meneral lines with block- trains made up of very heavy wagons. He then gives formulae and tables in which the track maintenace cost, as per traffic unit, is expressed in relation to various variables and parameters: speed, axle weight on rail, age of ballast, linear weight of rail, curve radius, etc.

International Engineering Conference Paper. 150th Anniversary of passenger railways.

Gordon, ER Brew, JR
Institution of Mechanical Engineers Sept. 1975, pp 40-43, 3 Tab., 14 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, icrofilm 3

DOTL JC

03 131273

THE FINITE ELEMENT METHOD APPLIED TO THE CHOICE OF THE SIZE OF RAIL VEHICLES [Methode der finiten Elemente bei der Auslegung von Schienenfahrzeugen]

The finite element method opens new possibilities for determining in the planning stages, the stresses and strains which will be borne by the supporting elements of rail vehicles. Examples are given to show how this method has already been helpful in determining the size of rail vehicles whilst it has also provided information on other aspects and how effective it is. [German]

Theile, F Tomschke, B *Eisenbahntechnik* Vol. 23 No. 11, Nov. 1975, pp 513-516, 1 Tab., 11 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Bohmann Verlag Canovagasse 5, A-1010 Vienna, Austria Repr. PC

03 131274

RESEARCH ON THE STABILITY OF THE GAUGE MEASUREMENT OF WHEELSETS WITH SOLID WHEELS AND BRAKE SHOES

The purpose of this research was to determine the effect of the shape of solid wheel centres on their permanent heat- induced axial deformation, when brake shoes were used for braking. First, mathematical analyses based on the finite element method were used to find wheel centre shapes with a minimum tendency to deformation under the effect of heat. Then braking tests with prototype wheels on a test bench were performed to confirm the mathematical analyses. Certain types of corrugated wheel centre show minimum deformation. [German]

Raquet, E Tacke, G *Glasers Annalen ZEV* Vol. 98 No. 11, Nov. 1975, pp 311-316, 8 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 131291

MAINTENANCE CYCLES FOR WAGONS AND COACHES AT THE DR [Instandhaltungszyklen fuer Gueter-und Reisezugwagen der DR]

The research and development department for coaches and wagons at the DR has just carried out a piece of work on "Maintenance cycles for wagons and coaches". The author deals with the principles for establishing maintenances cycles which lie behind optimum cycle definition. These involve measurement of wear on structural parts and elements, the limits of service and machining dimensions and assessment of damage in the case of incidental repairs. Examination shows that, even where maintenance cycles are extended, the increase in incident repairs is minimal since most damage is caused by accidental occurrences. [German]

Drossel, P *Schienenfahrzeuge* Vol. 19 No. 4, Apr. 1975, pp 129-133, 4 Tab.

ACKNOWLEDGMENT: UIC

PURCHASE FROM: VEB Verlag fuer Verkehrswesen Franzoesische Strasse 13-14, 108 Berlin, West Germany Repr. PC

03 131293
VIEWPOINTS ON THE APPROXIMATE DETERMINATION OF THE EXTENT OF TURNING IN BRAKING WITH HIGH-SPEEDS [Gesichtspunkte zur annahernden Bestimmung der Groesse der Drehhemmung fuer Hochgeschwindigkeitsfahrzeuge]
To stabilise vehicle running at high-speeds, swivel pin braking devices are fitted between the body and the bogies. This device has the effect of holding the wheelsets or bogies in their middle position and the movements of wheelsets or track irregularities are absorbed. For calculating the extent of the swivel braking torque, the author presents a formula and states the torque used with DB and SNCF bogies. [German]

Sperling, E *Leichtbau der Verkehrsfahrzeuge* Vol. 19 No. 1-2, Jan. 1975, pp 17-21, 2 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Leichtbau der Verkehrsfahrzeuge Augsburg, West Germany Repr. PC

03 131645
BEARING BRINELLING FROM COUPLING IMPACTS OF UNIT TRAIN CARS
Problems of "excessive" wear and failure have arisen in new cars in unit train service. Some were due to over-the- road running, others to rough handling of empty cars. Early and high incidence of failure of all roller bearings on a fleet of year-old unit train cars was the pessimistic prediction made for a western railroad. This paper describes their determining the cause and their solutions to this problem.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRIS No. 02 131638, Publication 7602.

Williams, AD Rhine, PE (Union Pacific Railroad); Driver, JB (Association of American Railroads)
American Society of Mechanical Engineers 1976, pp 123-163, 20 Fig., 12 Tab.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

03 131653
ACTION OF AIR PRESSURE ON CARRIAGE WINDOWS WHEN TRAINS PASS AT HIGH SPEED
Increasing relative speeds between two passing trains calls for re-appraisal of the bending stresses thus produced in the windows of passenger coaches. Measurement of the amount of bending allows conclusions to be drawn on the stress levels and hence on the related safety coefficients. [German]

Kalkbrenner, E *Eisenbahntechnische Rundschau* Vol. 24 No. 12, Dec. 1975, pp 459-462

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany
DOTL JC

03 131905
ECONOMIC LIMIT FREIGHT CAR REPAIR
This computer program, available in a time-sharing environment, enables a user to determine if a given freight car is more economically replaced or repaired. Input includes financial, economic and descriptive data.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

03 131927
NORTH AMERICAN LIGHT RAIL VEHICLES
This paper presents the evolution of North American light rail vehicles from the 1920s to the present. Emphasis is placed on conditions of the electric street railway industry in the 1920s, attempts of car standardization, and movement toward a radically new, high-performance car as background to the development of the Presidents' Conference Committee car of the 1930s. Events leading to the new standard light rail vehicle are presented along with its significant dimensional specifications and performance characteristics. The proposed Canadian light rail vehicle is described.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested, For handling charges add 5% for domestic and 10% for foreign orders.

Silien, JS Mora, J (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 161, 1975, pp 93-98, 1 Fig., 7 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

03 132922
NEW MOUNTING TECHNIQUES OF WHEELS AND AXLE (OIL INJECTION METHOD)
This report describes some new mounting techniques for railroad wheels and axles, called the Oil Injection Method, described to be applied to New Tokaido Lines. Authors and JNR staffs have found the most effective method for the application of these techniques and also investigated their merits, for example the improvement of grip-force and removal of scratch marks that sometimes appear in the case of Force-Fit. [Japanese]

Matsushita, K Mizushima, A Morita, K *Sumitomo Metals* Vol. 26 No. 3, July 1974, pp 86-97

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

03 132949
EFFECT OF THE DEVELOPMENT OF RESIDUAL STRESSES IN SOLID WHEELS ON WEAR [Evolution des contraintes residuelles dans les roues monoblocs. Influence sur les degradations]
After describing the special procedures employed to determine the residual stresses by destructive methods and X-ray diffraction, an assessment is made of the results obtained witn new solid wheels, to which different braking powers had been applied, over varied distances. The effect of these stresses is studied on the following mechanisms of wear: thermal flaws, fatigue cracks in the rim or the center and buckling. [French]

Revillon, A Leluan, A *Revue Generale des Chemins de Fer* Vol. 94 Nov. 1975, pp 647-662

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 132951
INVESTIGATIONS OF THE TRACK GAGE STABILITY OF WHEEL SETS WITH BLOCK-BRAKED SOLID WHEELS [Untersuchungen zur spurmasstabilitaet bei Radsaetzen mit klotzgebremsten vollraedern]
The investigations described were carried out to determine the influence of the shape of the wheel centers of solid wheels on their thermal distortion and permanent set in axial direction during or after heating of the wheel tire by the brake blocks. Analyses by computation using the method of finite elements served the purpose of finding wheel center shapes featuring a minimum thermal distortion. Subsequent braking tests on prototype wheels on the test stand proved that a small thermal distortion results also in small permanent set. [German]

Raquet, E Tacke, G *Glasers Annalen ZEV* Vol. 99 No. 11, Nov. 1975, pp 311-316, 8 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 132965
PROGRESS REPORT ON THE TRUCK DESIGN OPTIMIZATION PROJECT
The Federally funded Truck Design Optimization Project (TDOP) is being conducted by Southern Pacific Transportation Company to furnish new technical and economic insights into the procurement and use of freight car trucks. A variety of outputs are emerging, including digital data tapes that may prove useful to future investigators of freight car truck dynamics. TDOP will furnish railroads with technical and economic information on freight car truck performance. Performance data is required to correct existing problems and establish future truck system needs. Phase I effort is anticipated to include technical performance specifications and an economic methodology for use in evaluating trucks.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Byrne, R (Southern Pacific Transportation Company)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 59-64, 15 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

03 132966
IMPROVED SUSPENSION FOR 100-TON CARS ON ROUGH TRACK
American Steel Foundries set out to develop a freight car suspension defined as a highly refined, state-of-the-art, three-piece truck designed as a system rather than a collection of components. This article discusses suspension reserve work capacity, optimum damping, design process, ride quality findings in the vertical, lateral and rocking modes, and the determination of the wheel-rail forces as evidenced by factors such as flange wear and truck component wear.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Love, RB (American Steel Foundries)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 65-73, 20 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

03 132967
TRUCK DESIGN-A SYSTEMS APPROACH TO SOLVING PROBLEMS
The responsibility for freight-car truck design is difficult to fix. After examining the functions of various agencies involved in design, truck problems are examined. Two areas for improved truck performance are modification of existing trucks to improve reliability and complete redesign to improve performance.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Hawthorne, VT (Dresser Transportation Equipment Division)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 74-78, 9 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

03 132968
DESIGN SYSTEM APPROACH TO PROBLEM SOLVING
A systems approach to improved truck design has involved mathematical modeling and then field testing of arrangements for modification of existing trucks and for a completely redesigned radial truck. Railway Engineering Associates has worked with Canadian National Railways and with Dresser Industries in various phases of this self-steering truck. The economics of this method of controlling the tracking characteristics of the basic three-piece truck must still be worked out.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

List, HA (Railway Engineering Associates, Incorporated)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 79-84, 18 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

03 132969
MODIFIED THREE-PIECE TRUCK REDUCES HUNTING AND IMPROVES CURVING-STATUS REPORT
The often-condemned three-piece cast steel freight truck has two advantages: It is inexpensive to manufacture and it has excellent load equalization that allows it to negotiate large changes in crosselevation. This paper describes Standard Car Truck's work with the Anchor Truck design of the South African Railways which improves the basic three-piece truck's curving ability and yet gives it high-speed stability. Utilizing the creep theory in which a wheel is displaced from its position of pure rolling, various conclusions are drawn about wheelset and truck stability. The role of the SAR-developed diagonal anchors and the service experience on SAR's ore car and with a US installation on a 100-ton hopper are described.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Bullock, RL (Standard Car Truck Company)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 85-92, 16 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

03 134532
A TEST BENCH FOR HIGH SPEED TRAIN AXLE BOX BEARINGS [Banc d'essai pour roulements de boites d'essieux de trains a grande vitesse]
Different types of bearings are tested on a special test bench under identical operating conditions. The friction torque of bearings is measured for various combined loads. Temperature distribution is determined, and heat sources located. The behaviour of the bearings and different lubricants is also studied under real-life dynamic load conditions. [French]

Burnaby, LE *Revue des Roulements* No. 186, 1976, pp 1-7, 9 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Revue des Roulements Brussels, Belgium

03 134534
ALUMINUM COACH AND THE PARIS METRO [Voitures aluminium et metro de Paris]
Technical results of the construction of aluminium coaches for the Paris metro; a comparison is made between the manufacturing methods used for these coaches and for steel coaches. The difficulties arising from the use of special, very long metal sections, the assembly on a dummy of the chassis frame using prefabricated units, contraints imposed by certain alloys and distortions caused in the welding sequences, are described in detail. [French]

Brisseaux, A Fournier, R *Soudage et Techniques Connexes* No. 11, Nov. 1975, pp 415-426, 19 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

03 134536
TILTING OF VEHICLES IN CURVES [Inclinacion de los vehiculos en las curvas]
Most Railways carry out research on the problem of tilting vehicle bodies on curves so that speed may be maintained without causing discomfort to passengers. The author reviews current developments in the tilt system and its operative and logical progress. He refers to the safety limits for tilting and the economic aspects of this system. [Spanish]

Di Majo, F
Asociacion de Investigacion del Transporte-AIT No. 7, Dec. 1975, pp 7-15, 11 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Asociacion de Investigacion del Transporte-AIT Madrid, Spain

03 134542
ELIMINATION OF NOISE IN RAIL VEHICLES [Laermabwehr bei Schienenfahrzeugen]
The author reviews the most important standard acoustic measurements, present problems over measurements for conventional rail traffic and those due to vehicle development and vehicle acceptance, and splits his comments into sections, expecially on: sound propagated by air and solids in the body and running gear. [German]

Ivanauskas, J *DET Eisenbahntechnik* Vol. 24 No. 1, Jan. 1976, pp 32-35, 3 Fig., 14 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany

03 134552
USE OF IMPACT-ABSORBING DAMPERS IN ELECTRIC TRAINS [Primenenie antiavarijnyh amortizirujuscih ustrojstv v elektropoezdah]
It is known that in about 92% of cases, collisions between electric train coaches occur at running speeds of 15 to 20 km/h. For this reason, when designing the mechanical parts of suburban electric train coaches, it must be borne in mind that, to comply with strength calculation standards, the body bearing sections should not be liable to deformation which would be dangerous for passengers in a collision at 20 km/h. The article contains regulations for the construction of electric train bodies to protect passengers in the event of a collision, examines the problem of using dampers to absorb a considerable part of impact energy, and, finally, gives the results of tests on a prototype of a device of this kind. [Russian]

Ivanov, AV Solodkov, SP *Vestnik Vniizt* No. 1, 1976, pp 31-35, 1 Fig., 1 Tab., 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

03 134554
MF 77 ROLLING STOCK: A NEW GENERATION OF "STEEL-WHEEL" TRAINSETS [Le materiel MF 77: nouvelle generation des rames "sur fer" de la RATP]
The construction programme begun in 1975 by the Paris Transport Authority (RATP), covers about a thousand coaches of the new generation MF type (materiel fer = steel-wheel trainsets as opposed to rubber-tired trainsets). This rolling stock, which is designed to be attractive (comfort, heating, sound-proofing), has been adapted to meet the many operating requirements (running control, automatic driving). The description of the technical specifications and especially the chopper or KESAR "traction-braking" equipment (sequential electronic supply-current switching and regenerative braking), is illustrated by numerous tables. [French]

Guibereau, S *Revue Generale des Chemins de Fer* Vol. 95 Jan. 1976, pp 26-39, 6 Tab., 10 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 134557
MODERN METHODS OF FATIGUE ASSESSMENT
A report on modern methods of fatigue assessment. The authors discuss: positions of stress concentration zones; service records and cycle counting; criteria (Neuber analysis) and equations relating to the stress-strain curve and the properties of materials. They give some examples of practical applications to certain railway equipment. The article is followed by a discussion.

Watson, P Rebbeck, RG *Railway Engineer* Vol. 4 No. 6, Nov. 1975, pp 10-23, 4 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mechanical Engineering Journal Penthouse 1, 15 West 55th Street, New York, New York, 10019
DOTL JC

03 134558
COMPUTER-AIDED DESIGN OF RAILWAY VEHICLES
An account of computer-aided design of railway vehicles on BR. The article describes the studies carried out since 1962, and the organisational aspects at the Derby Technical Centre: its equipment, computer programmes; coordination with the users-designers and research engineers; present activities; costs and benefits; and future developments.

Taylor, DR Scholes, A *Railway Engineer* Vol. 4 No. 6, Nov. 1975, pp 63-71, 1 Tab., 3 Phot., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mechanical Engineering Publications Penthouse 1, West 55th Street, New York, New York, 10019
DOTL JC

03 134559
DEVELOPMENT AND STRUCTURAL TESTING OF THE CLASS 87 LOCOMOTIVE BOGIE FRAME
The article first describes the basic requirements of this bogie design, and some of the constructional problems (particularly welding). It then describes: the study of stress levels in the various components by finite element stress analysis; the static and dynamic tests to which the prototype was subjected; use of a Perspex scale model to measure strains in the prototype; the method of computer calculation of the fatigue life of components under random cyclic loading. Similar methods of investigation have been applied successfully to a wide range of other structures, such as coach bodies, and tank wagon bodies.

Lowe, CB *Railway Engineer* Vol. 4 No. 6, Nov. 1975, pp 54-62, 1 Tab., 10 Phot., 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mechanical Engineering Publications Penthouse 1, 15 West 55th Street, New York, New York, 10019
DOTL JC

03 134577
RESULTS OF TESTS FOR SMOOTH RUNNING ON TYPE MD 36 AND TYPE LD 70 BOGIES [Lauftechnische Ergebnisse mit Drehgestellen der Bauart MD 36 und LD 70]
High-speed test runs up to 250 km/h show that the greatest problem is to ensure smooth running. The traditional wheel profile is subject to rapid wear, and needs grinding after 20,000 to 30,000 km. Bogies with stabilizing devices and worn profiles, of the types DB II or ORE S 1002 may be operated at a speed of 250 km/h. Some coaches in service, with a DB II profile, can cover up to 450,000 km between grindings. [German]

Troche, G *Leichtbau der Verkehrsfahrzeuge* Vol. 19 No. 6, Nov. 1975, pp 124-127, 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Leichtbau der Verkehrsfahrzeuge Munich, West Germany

03 134578
BOGIES FOR HIGH SPEED PASSENGER COACHES FROM THE CONSTRUCTIONAL VIEWPOINT [Schnellfahrende Reisezugwagen-Drehgestelle in konstruktiver Sicht]
Economical high speed running of over 160 km/h can be obtained with wheels with a worn profile. This requires stabilization of the running of the

wheelset or bogie by means of an additional damper in the form of mechanical rotation braking or fluid shock absorbers. The method of supporting the body on the bogies is important for smooth running. The author uses examples to show solutions for different construction methods. The problem of smooth running at high speeds and radial axles has not yet been solved from the constructional viewpoint. [German]

Madeyski, T von *Leichtbau der Verkehrsfahrzeuge* Vol. 19 No. 6, Nov. 1975, pp 121-124, 5 Fig., 1 Tab., 9 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Leichtbau der Verkehrsfahrzeuge Munich, West Germany

03 134583
APPLICATION OF THE STATISTICO-MATHEMATICAL ANALYSIS OF TIME SERIES FOR PLANNING ACCEPTANCE OF OPEN WAGONS FOR ROUTINE MAINTENANCE [Primenenie matematiko-statisticeskogo analiza vremennyh rjadov dlja prognozirovanija processa postuplenija poluvagonov v tekuscij remont]
The article proposes a model for planning the rate of acceptance of open wagons for routine maintenance using the weighted exponential averages method. This model is based on the statistico-mathematical time series analysis given taking account of the regular, periodical and random elements. [Russian]

Birjukova, NM *Vestnik Vniizt* No. 1, 1976, pp 54-58, 2 Tab., 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

03 134585
VARIABLE RIGIDITY AND RESISTANCE ADJUSTORS FOR COMPUTERIZED DESIGN OF PASSENGER COACH BODIES [Variatory Zestkosti i procnostirdlja proektirovanija kuzovov passazirskih vagonov pri pomosc EVM]
Variable rigidity and resistance adjustors are the structural elements which determine the resistance and rigidity of the whole body. An analysis of the behavior of the assemblies and separate components making up the body leads to the classification of these elements into two groups: one with a variable cross-section (variable adjustors), the other with a constant cross-section. The article discusses and solves the problem of the choice of rigidity and resistance adjustors in the design of passenger coach bodies. [Russian]

Podlitov, NI *Vestnik Vniizt* No. 1, 1976, pp 36-40, 1 Tab., 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

03 134589
ULTRASONIC METHOD OF MONITORING THE SECURING OF WAGON WHEEL HUBS ON THE AXLE [Ul'trazvukovok sposob knontrolja plotnosti posadki stupic vagonnyh koles na os']
The article presents the results of experimental studies into the monitoring of wheel securing by ultrasound vibration method, and goes on to assess the effect of the metal's structure on the speed of travel of ultrasonic waves. [Russian]

Lihacev, JV *Vestnik Vniizt* Vol. 34 No. 8, 1975, pp 29-31, 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

03 134597
STRESS, VIBRATION AND NOISE ANALYSIS IN VEHICLES
The 23 papers comprising this publication were presented at the Annual Conference of the Stress Analysis Group of the Institute of Physics held at the University of Aston, Birmingham, in September, 1974. The subjects covered include the theoretical and experimental analysis of static and dynamic effects, including noise, in a wide range of rail and road vehicles, with the emphasis on advanced theoretical methods which rely on the use of computers.

Gibbs, HG Richards, TH
Applied Science Publishers Limited 1975, 485 pp

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Applied Science Publishers Limited Ripple Road, Barking, Essex, England

03 135217
THE S.N.C.F. HAS PLACED ORDERS WITH FRENCH MANUFACTURERS FOR VERY HIGH SPEED ELECTRIC TRAINS TO RUN ON THE PARIS-SOUTH- EAST LINE
The parts of this article describe the development, design and testing of the high-speed motor car Z7001 of the French National Railways, a prototype of ultra-fast intercity passenger equipment. The topics: Description of the Experimental Unit; The Aims and Performance of the Test Programme; Results in Respect of the Main Objects of the Tests; Conclusions. These activities have been followed by the placing of orders for ultra-high-speed electric trains to operation on the Paris--Southeast Line which is to be built between Paris and Lyon.

French Railway Techniques Quart Rev No. 1, 1976, p 26

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 136263
LATERAL STABILITY OF BOGIES AT HIGH SPEEDS. THE INFLUENCE OF A NON-LINEAR TORQUE OF THE BOGIE-BODY SYSTEM [Querstabilitaet von Drehgestellen fuer hohe Geschwindigkeiten. Der Einfluss eines nichtlinearen moments der Verbindung Drehgestell-Fahrzeugkasten]
The lateral stability of a bogie at high speeds can be improved by greater torsional stiffness of the roll damper suspension system. The maximum critical speed which can be reached by increasing the roll damping torque is identical to that obtained by a linear analysis which takes into account the torsional stiffness of the suspension system. The maximum critical speed depends on the design features of the bogie and on the wheelset mileage. For a given bogie, the value of the torsional stiffness of the suspension system determines the highest critical speed which can be reached by increasing the amplitude of the roll damping torque. [German]

Joly, R *Glasers Annalen ZEV* Vol. 100 No. 2/3, Feb. 1976, pp 52-57, 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 136405
TRANSIT VEHICLE MAINTENANCE PROBLEMS--CAUSES AND SOLUTIONS. BART
Vehicle Maintenance Problems can be divided into two categories; scheduled maintenance and unscheduled maintenance. Scheduled maintenance involves for the most part problems of getting the maximum preventative maintenance for minimum manhours. The second, unscheduled maintenance, mainly involves problems of finding the trouble areas, isolating them, developing patterns, and recommending design changes.
Am Transit Assoc (ATA) Rail Transit Conf, San Francisco, California, April 14-16, 1974. Car Equip Sess. Available from NTIS, PB-234824, PB-234825, PB-234826.

Venturato, A (Bay Area Rapid Transit District)
American Transit Association Proc Paper ATA/RT-74/1,2,3, 1974, pp 34-41

ACKNOWLEDGMENT: EI
PURCHASE FROM: NTIS
DOTL NTIS

03 136418
AUTOMATIC SHIELDED ARC WELDING OF RAILROAD CAR BUFFER [Spawanie Automatyczne Lukiem Krytym Zderzakow Wagonowych]
A description is given of a special stand for carrying out automatic shielded arc welding of steel buffers. Tests carried out on this stand show that it is capable of eliminating the work of five welders making the same joint by manual arc welding with wrapped electrodes. [Polish]

Dziuba, S *Mechanik Miesiecznik Naukowo-Techniczny* Vol. 48 No. 8, Aug. 1975, pp 441-442

ACKNOWLEDGMENT: EI
PURCHASE FROM: Wydawnictwa Czasopism Technicznych NOT Czackiego 3-5, Warsaw, Poland

03 136604
RETROFIT AIR CONDITIONING OF SUBWAY CARS
Recognizing the desirability of air conditioning as an inducement to attract patrons and offer them amenities that make rail mass transit comfortable as well as convenient, new car orders specify inclusion of air conditioning equipment (where climatic conditions justify consideration). Married pair cars and shared undercar equipment paired cars, as well as improved packaging, permit relatively easy installation in new vehicle purchases. The challenge is to air condition existing subway cars whose remaining life precludes replacement. Resolution of complicated design and retrofit problems faced by the New York City Transit Authority in its effort to develop a method of air conditioned cars on its IRT Division are described in this paper.

Greene, FS
Transit Development Corporation, Incorporated Final Rpt. TDC/500-75/7, Dec. 1975, 17 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250811/7ST, DOTL NTIS

03 136669
INVESTIGATION OF FLUIDICALLY CONTROLLED SUSPENSION SYSTEMS FOR TRACKED VEHICLES
The use of fluidic components in a hydropneumatic suspension system is expected to significantly improve certain performance characteristics of the suspension system. Several candidate variable damping and variable springing systems are discussed. The damping and springing parameters are functions of relative position (between the wheel and the vehicle body), relative velocity, and vertical acceleration of the vehicle body. A mathematical model is derived for each candidate system. A brief performance analysis of selected systems is presented.

Eberle, WR Steele, MM
Purdue University, Army Tank-Automotive Command Final Rpt. TACOM-TR-12072, Sept. 1975, 96 pp

Contract DAAE07-75-M-2119

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
AD-A022636/5ST, DOTL NTIS

03 136828
ANALYTICAL METHODS AND DESIGN IMPLICATIONS OF DETERMINISTIC RIDE QUALITY CRITERIA
An alternative ride quality standard that involves the instantaneous values of acceleration and rate of change of acceleration (jerk) in all six degrees of freedom is proposed. The report develops an analytical form for the standard and discusses a twelve-dimensional 'comfort' ellipsoid along with possible maximum values for each axis. These values are obtained from a review of available data on human response to levels of acceleration and jerk. An analytical design approach, using such a deterministic standard, is developed employing linear system theory. The method developed allows the designer to design the vehicle's suspension system and/or to bound the allowable range of guideway disturbances so that the ride quality standard is satisfied. A rigorous development of the method is presented along with examples to illustrate its usage.

Hedrick, JK White, RCJ Firouztash, H
Arizona State University, Tempe, Department of Transportation Final Rpt. ERC-R-74014, DOT/TST-76/2, Apr. 1975, 74 pp

Contract DOT-OS-40101

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-253103/6ST, DOTL NTIS

03 137695
PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE ON VEHICLE DYNAMICS. PART 6: STRUCTURAL DYNAMICS
Part 6 contains the following papers: Dynamic analysis of container flatcars, Byrne,R and Cappel,K (this paper is presented in an abstract form); Parametric studies of the interaction of bridges and moving vehicles, Ginsberg,JH, Genin,J and Ting,EC (this paper is presented in an abstract form); A hydraulic spring-damper, Scott,RR (this paper is presented in an abstract form); Finite element analysis of automotive sheet metal under impact loading, Belytschko,T, Welch, RE and Bruce, RW. /TRRL/

Swets and Zeitlinger 1975, pp 229-252, Figs., Refs.

PURCHASE FROM: Swets and Zeitlinger Amsterdam, Netherlands

03 137698
APPLICATION OF THE FINITE ELEMENT TECHNIQUE TO THE STRUCTURAL ANALYSIS OF ROAD AND RAIL VEHICLES AT LONDON TRANSPORT
The structures of road and rail vehicles being used by London transport are of conventional design. Road vehicles consist of a separate body and chassis, the main structural members being steel and the skin panels being aluminum. Underground rolling stock, because of the constraints imposed on shape, size and interior layout, are of "tubular construction" and in most stocks consist of an aluminum roof and bodyside, with large openings for windows and doors, mounted on a heavy steel underframe. The structural design of these vehicles has been the responsibility of the carbuilders and has been based on traditional stress analysis techniques consisting, in the main, of equivalent framework type analyses and relying heavily on past experience. Recently, however, London transport has been taking a greater involvement in the design of these vehicles and there has been a departure from the conventional designs. An emphasis on light weight has meant the use of aluminum throughout the vehicles and there is a tendency towards a more integral type of structure (as opposed to separate body and chassis) in the case of road vehicles. This departure from conventionality has led to the need for a more refined stress analysis technique. An investigation into the structural behavior of an underground railway coach has shown that the finite element technique is superior to the other techniques in predicting stresses and deflections. The dynamics section which has recently been set up within the design division of the chief mechanical engineer's department at London transport, has been applying the finite element technique to anlaysing bus and railway coach structures (including wheels) and to the calculation of the natural frequencies of these structures. The computer program used is the newpac package developed by the engineering research division of British rail at Derby, the computation being performed at Derby on the IBM 370 computer. The computation facilities include an input/output graphical display which enables data checking and presentation. /Author/TRRL/

Hillel, H Sayer, J Phipps, RA (London Transport Executive); Gibbs, HG (Lucas (Joseph) Limited); Richards, TH (Ashton University, England)
Applied Science Publishers Limited Proc Paper pp 351-388, 22 Fig., 4 Tab., 4 Phot., 2 Ref.

PURCHASE FROM: Applied Science Publishers Limited Ripple Road, Barking, Essex, England

03 137704
THE APPLICATION OF STRESS, NOISE AND VIBRATION ANALYSIS TO DESIGN OF RAIL RAPID TRANSIT VEHICLES
This is a review paper dealing with design developments occurring with the aid of, or as a result of, noise and vibration analysis. To examine the main strength of A vehicle body, finite element techniques now provide a method vastly superior to previous methods, but its cost and complexity cannot always be justified at the present time. The much simpler framework analysis and approximate methods still have important functions. Comprehensive structural testing employing strain measurement techniques provides not only a final check on a new design but also yields information invaluable in the evolution of later designs. These techniques are applied to produce designs lighter in weight, cheaper in material or manufacturing costs, and hence more economic to the operator, whilst at the same time preserving the reliability and freedom from fatigue required for a vehicle life of 30 years or more. Increasing public awareness of noise being a form of environmental

pollution is leading to greater efforts to produce quieter vehicles, both from the passenger's point of view and with regard to wayside problems. Measurement and analysis techniques show that great improvements can be achieved, often without undue penalities in cost and weight. Attention is given to vibration isolation of the body from track irregularities, rotating machines on the body and to the effect of the body itself as a vibrating beam. (a). For covering abstract of the conference see IRRD no. 219564. /TRRL/

Bothan, GJM (Metro-Cammell Limited); Gibbs, HG (Lucas (Joseph) Limited); Richards, TH (Ashton University, England)
Applied Science Publishers Limited 1975, pp 1-19, 5 Fig., 2 Tab., 2 Phot., 17 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 219565)
PURCHASE FROM: Applied Science Publishers Limited Ripple Road, Barking, Essex, England

03 137705
A PRELIMINARY INVESTIGATION INTO THE STRUCTURAL BEHAVIOUR OF AN UNDERGROUND RAILWAY COACH
The specialised function of urban underground railways, that of providing a frequent-stop, mass transportation facility catering for a very high volume of passengers with a large amount of changing at stations, sets an 'architectural' form on underground rolling stock, which is much more prescribed than that possible for main-line railways. Thus, not only is the exterior geometry largely decided by loading gauge, tunnel height, platform curvature, etc. When an existing network is being used but the internal layout is also closely defined. In particular, the number of doorways, their position, size and type, along with the need for large windows, dominates the form of the structure of the coach sides. Furthermore, freedom of circulation internally inhibits the over-use of structural bulkheads and pillars. Thus, the structural designer is confined to a large extent as to the geometrical parameters which he can vary. An underground railcar conventionally has a very heavy chassis or underframe which includes two main longitudinals, the solebars. These alone constitute a large proportion of the structural cost of the entire car. Much of the work done in the project described in this paper was concerned with examining the effects of alternative sizing of the main structure, the solebars, doors and window pillars and roof, in an endeavour to make the coach body work more efficiently overall. The loading case mainly considered was the dead-weight plus 'super-crush' passenger load. The analyses were carried out by the finite element method. This was the first time, as far as is known, that this method has been used on underground rolling stock in this country. The computer program used was the newpac package, developed by the engineering research division of British rail at Derby, and the computation was performed on the icl 1903a computer at Brunel University. The paper describes the idealisations used for the analyses, the main results, with comparisons with existing data available from other methods, and general conclusions concerning the structural behaviour and design of railcars for the loading case considered.

Yettram, AL (Brunel University); Smith, DJ (London Transport Executive); Gibbs, HG (Lucas (Joseph) Limited); Richards, TH (Ashton University, England)
Applied Science Publishers Limited 1975, pp 313-350, 21 Fig., 1 Tab., 6 Phot., 13 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 219577)
PURCHASE FROM: Applied Science Publishers Limited Ripple Road, Barking, Essex, England

03 138312
NEWER TECHNOLOGIES FOR FREIGHT CARS
Efforts to solve freight car design problems have resulted in concentrated research programs. Design considerations must be thought of from a systems point of view-marketing and traffic requirements, design standards, operational characteristics, effect on track, maintenance criteria, and economics. New computer technologies are providing useful tools for the coordination of all these parameters.

Orr, DG (Louisville and Nashville Railroad) *Progressive Railroading* Vol. 19 No. 2, Feb. 1976, pp 25-30, 4 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606
DOTL JC

03 138314
NEW-GENERATION TEST TRAIN
American Steel Foundries' new test train is a rolling laboratory designed to gather fundamental data on freight car action and the performance of different designs. Information gathered by the train is analyzed at ASF's research in Granite City, Ill. ASF has been concerned with problems of higher speeds and heavier tonnages and has developed static and dynamic testing programs for truck components. A product of this research is a new truck with performance capabilities beyond those of present standard 3-piece trucks.

Progressive Railroading Vol. 19 No. 2, Feb. 1976, pp 43-46, 1 Fig., 4 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606
DOTL JC

03 138316
CABOOSE "MOVES UP" TO LOCOMOTIVE
General Electric's new cab design, referred to as "Q Cab" supplants the caboose with a combination in the locomotive.

Progressive Railroading Vol. 19 No. 3, Mar. 1976, p 86, 3 Fig.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606
DOTL JC

03 138322
HEAD SHIELDS MAKE HEADWAY ON TANK CARS
Recent accidents have spurred research into the problem of tank car head punctures. The article reports on a series of tests on the fatigue life of four different head shield designs built by GATX, UTLX, NATX and ACFX.

Progressive Railroading Vol. 19 No. 5, May 1976, pp 59-60, 4 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606
DOTL JC

04 093468
EVALUATION OF THE WABCO AC PROPULSION SYSTEM. VOLUME 1. CTS/UMTA AC PROPULSION PROJECT
In 1971, the Cleveland Transit System received a grant contract from UMTA to test, demonstrate, and evaluate a WABCO solid state AC propulsion system on three rapid transit cars (Project OH-06-0006). The independent evaluation was performed by Transportation and Environmental Operations, TRW, Inc, Redondo Beach, Calif. This is the final project report. AC Pulse Width Modulation propulsion test data is evaluated to determine whether the advantages claimed for AC PWM propulsion were demonstrated. Retrofit feasibility, AC/DC car compatibility, signal compatibility, and electromagnetic interference are assessed. Factors related to the relatively undeveloped state of the AC system limit the specificity of the results and conclusions relative to their applicability to other transit properties in the future. Chapters present project objectives, project description, summary and conclusions, principal task evaluations, the AC/PWM propulsion system, and ancillary task evaluations. A bibliography is furnished.
Paper copy also available in set of 2 reports as PB-245 388-SET, PC$15.00.

Hoppe, CF
Cleveland Transit System, Urban Mass Transportation Administration Final Rpt. UMTA-OH-06-0006-74-3, Sept. 1974, 211 pp

Contract UMTA-OH-0006

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
Repr. PC $7.75, Microfiche$2.25

04 093469
EVALUATION OF THE WABCO AC PROPULSION SYSTEM. VOLUME 2. RELATED REPORTS AND EXHIBITS
In 1971, the Cleveland Transit System received a grant contract from UMTA to test, demonstrate, and evaluate a WABCO solid state AC propulsion system on three rapid transit cars (Project OH-06-0006). The independent evaluation was performed by Transportation and Environmental Operations, TRW, Inc. Redondo Beach, Calif. This is the final project report. Measurements of wheel wear, window safety glazing, ride quality, and passenger reaction to the restyled car interiors and new AC propulsion system are discussed. Contents of this report are: experimental design description for the CTS/WABCO AC propulsion demonstration program; instrumentation assessment, AC propulsion project; life cycle cost analysis plan for the Cleveland Transit System AC propelled cars; passenger reaction to AC propelled restyled rapid transit cars; evaluation of safety glazing; survey of Cleveland Transit System rapid transit maintenance procedures and facilities; and, telephone influence factor measurements.
Paper copy also available in set of 2 reports as PB-245 388-SET, PC$15.00.

Hoppe, CF
Cleveland Transit System, Urban Mass Transportation Administration Final Rpt. UMTA-OH-06-0006-74-4, Sept. 1974, 301 pp

Contract UMTA-OH-0006

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245390/0ST, DOTL NTIS

04 094483
ENERGY STORAGE PROPULSION SYSTEM FOR RAPID TRANSIT CARS. SYSTEM DESIGN AND EQUIPMENT DESCRIPTION
When a transit rail car accelerates, it draws energy from a wayside electric power source; when it decelerates, the car must rid itself of this energy. Conventional rail cars dissipate this energy in the form of heat. This report describes a transit car propulsion system which will save much of this presently wasted energy by storing the car's kinetic energy in flywheels which are mounted below the car floor. The stored energy is then available for the subsequent acceleration of the car. Thus a significant reduction in energy usage is expected, along with a resultant reduction in subway tunnel heating. This energy storage propulsion system has been installed on two New York City subway cars and will be subjected to an extensive series of tests. This report discusses the background and design approach and describes the technical features of the Energy Storage propulsion system.
Sponsored in part by New York State Dept. of Transportation, Albany, and AiResearch Mfg. Co., Torrance, Calif.

Raskin, D Yutko, RT
Metropolitan Transportation Authority of New York, Urban Mass Transportation Administration, New York State Department of Transportation, AiResearch Manufacturing Company, (UMTA-NY-06-0006) UMTA-NY-06-0006-75-1, Sept. 1975, 52 pp

Grant DOT-UT-550

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249063, DOTL NTIS

04 094651
LITHIUM--WATER--AIR BATTERY: A NEW CONCEPT FOR AUTOMOTIVE PROPULSION
The lithium battery described in this report represents a new class of batteries. A modification of this battery, the lithium--water--air battery, is also discussed. The latter provides high specific energy and specific power and thus is a candidate power source for electric vehicle propulsion. The utilization of this battery class for such a purpose is examined. The report includes other possible batteries in this class. (16 figures, 11 tables).

O'Connell, LG Rubin, B Behrin, E Borg, IY Cooper, JF
California University, Livermore May 1975, 38 pp

Contract W-7405-eng-48

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
UCRL-51811, DOTL NTIS

04 094672
STIRLING CYCLE ENGINE DEVELOPMENT: A REVIEW
The elementary concepts of Stirling cycle machines, their historical development to date, and possible future applications are discussed. The high efficiency, versatility, low pollution, and nondiscriminatory energy input requirements of Stirling machines assures them of a place in the spectrum of thermal devices--both as prime movers and for heating and cooling purposes. (Author)

Urieli, I Rallis, CJ
Witwatersrand University ISBN-0-85494-327-7, REPT-61, July 1975, 20 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
N76-14465/8ST, DOTL NTIS

04 129176
EVOLUTION OF THE RAIL-WHEEL SYSTEM. DIESEL TRACTION'S CONTRIBUTION [Fortentwicklung des Rad-Schiene-Systems. Beitrag der Dieseltraktion]
The history of traction by heat engine at the DB and mention of some of the technical innovations of diesel engines in the railway rolling stock sphere : the V.T 627/628 flexible bogie, internal combustion engines. Diesel traction is now being replaced by electric traction, but it still has a role to play. The author mentions some of the adaptations made to diesel engines for their new roles and discusses the technical improvements which diesel specialists will have to make. [German]

Zuhn, W *Eisenbahningenieur* Vol. 26 No. 7, 1975, pp 235-239, 10 Fig., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

04 129177
AUTOMATED DRIVING OF ELECTRIC LOCOMOTIVES. ELECTRICAL INSTRUMENTS ON SKODA ROLLING STOCK [L'automatisation de la conduite des locomotives electriques. Organes d'appareillage du Materiel Skoda]
The first article is a detailed operating description of the standard automatic train driving instrumentation developed by Skoda: speed governor, tractive

force regulator, braking regulator, programmer which sorts the information received on the train running, and simultaneously plots the speed curve which the train must observe to comply with the timetable and reduce energy consumption to a minimum. These instruments will equip Skoda electric locomotives in future. The second article describes the technology of the solid- state instrumentation. [Frencb]

Pospisil, M Sula, B Kule, L *Skoda-Revue* No. 1&2, 1975, 12 pp

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Skoda-Revue Prague, Czechoslovakia

04 129825
METHODS OF REDUCING WEAR ON THE ROLLER BEARINGS OF WAGON AXLE BOXES AS CAUSED BY TRACTION CURRENT [Sposoby umensenija povrezdenija tjagovym tokom buksovyh rolikovyh podsipnikov vagonov]
The article examines the causes of wear by electric erosion occurring in the roller bearings of axle-boxes, and provides recommendations framed for the protection of bearings against damage caused by traction current. By equipping the electric locomotives with contact devices for evacuating the traction current in the rails, through the axle-boxes, the number of roller-bearings damaged through electric erosion is reduced by some 15%. This damage can be reduced by introducing, in the earthing circuit, an additional resistance between bogie-underframe and axles-boxes, themselves isolated from the underframe. The total resistance of the earthing circuit of a wagon must be roughly 0.0625 ohms. [Russian]

Orlov, MV *Vestnik Vniizt* Vol. 34 No. 6, 1975, pp 35-40, 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

04 129828
CONDITIONS FOR THE ADJUSTMENT OF THYRISTORS CONNECTED IN PARALLEL [Neobhodimye uslovija prinjatija nagruzki parallelno vkljucennymi tiristorami]
The simultaneous coupling of a group of thyristors connected in parallel in the converters of electric rolling stock is a complex problem, the satisfactory solution of which ensures the working reliability of the converters. In solving this problem, it is essential to take account of the volt-ampere characteristics of the thyristors, of the scale and duration of the control impulse, of the speed of current increase in the main circuit and of other factors. In this article, an examination is made of the thyristor coupling conditions in relation to the value and form of the control impulse, and in relation to the supply voltage curve, in a working temperature range between 20 and-50 degrees C. [Russian]

Muginstejn, LA *Vestnik Vniizt* Vol. 34 No. 6, 1975, pp 6-10, 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

04 129829
CUTTING POWER OF RAILWAY CONTACTOR SWITCHES [Das schaltvermogen von Bahnschutzen]
On railway tractive units, use is made of contactor switches which extinguish the electric arc in the air by electromagnetic blow-out. The cut-off power indicates the capacity as regards closing and opening of the circuits under specific load conditions. The author describes and analyses the mechanical components and the cut-off power of these devices. [German]

Munser, R *Schienenfahrzeuge* Vol. 19 No. 10, Oct. 1975, pp 349-352, 4 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag fuer Verkehrswesen Franzoesische Strasse 13-14, 108 Berlin, East Germany

04 129830
ELECTRICAL OSCILLATIONS PRODUCED IN THE SUPPLY SYSTEM BY DIRECT-CURRENT CONVERTER TRACTIVE UNITS [Elektrische Schwingungen im speicsenden Netz durch Gleichstromsteller Triebfahrzeuge]
Following a brief outline of the origin of oscillations produced in the supply system by the above-mentioned tractive units, the author deals with formulae determining the current harmonics of the converter resulting from the symmetrical rating and the asymmetrical rating of the converters of a tractive unit. In order to facilitate the calculations, he makes use of a harmonics generator and a resultant system filter which represents a multiple motor-coach trainset. [German]

Nikoloff, I *DET Eisenbahntechnik* Vol. 23 No. 9, Sept. 1975, pp 394-397, 1 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany

04 129838
A NEW TYPE OF INSULATION BETWEEN THE PLATES IN ELECTRIC TRACTION MOTORS [Novaja Mejvitkovaja izoljacija tajaovyh elektrodvigatelej]
The article describes the characteristics of the insulants between plates perfected by the CNIITEI for use with electric traction motors, and the technique covering the coating of these insulants by the pulverization of enamel in an electric field. The manufacturing chain of these insulants is also described. In comparison with the conventional enamelling process, this insulation between plates for electric traction motors is to be distinguished by a greater thickness and by the composition of the additional strengthening material (trade mark "aerosila-300"). Also, compared with insulation by micaceous tape, this insulation between plates is characterised by greater dielectric rigidity values and by other indices. Coating with pulverised enamel in an electric field allows for automation of one of the operations requiring most work in the repair of traction motors: preparation of the isulation between plates. [Russian]

Skvorcov, AA *Vestnik Vniizt* Vol. 34 No. 5, 1975, pp 9-13, 2 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

04 130819
AUTOMATIC STATIC COVERTER WITH SEQUENTIAL PHASE EXTINCTION AND FORCED SECONDARY DIRECT CURRENT [Selbstgefuehrter Stromrichter mit Phasenfolgeloeschung und eingepraegtem Strom]
Using static converters, the torque and turning speed of rotary field motors become adjustable independently of each other. In this connection, automatic converters are of particular interest since asynchronous motors with short-circuit rotors can be used to supply the drive force. The article describes in detail how a simple automatic converter with variable sequential phase frequency and forced secondary direct current works. Switching in the automatic static converter can only be provoked by means of the series diodes and switching condensors. [German]

Schroder, D *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 11, Nov. 1975, pp 520-523, 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

04 130891
NEW DEVELOPMENTS IN PISTON RINGS FOR THE MODERN DIESEL ENGINE
This paper presents unpublished data on new coating developments, new piston ring designs, and design consideration for the modern diesel engine. Data on the current state of the art of compression ring coatings along with technical data on new generation coatings are included as well as data on ring designs and/or design considerations which may be used to improve engine performance and life with respect to blow-by and oil control.
Prepared for a meeting, September 8-11, 1975.

McCormick, HE (TRW Incorporated); Anderson, RD Mayhew, DJ Rychlewski, WJ
Society of Automotive Engineers Preprint N 750769, 1975, 30 pp, 15 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

04 130904
DYNAMICS OF A POWER COLLECTOR WITH FRICTION DAMPERS
Using the friction damper, the construction of power collector for a very high-speed railway is considerably simplified. In this paper, the power collector with friction dampers is considered, and its dynamic characteristics are analyzed by the equivalent linearization technique. The main purpose of this paper is to investigate the effects of Coulomb friction forces on the mean squared value of contact force variation between a contactor and a rigid collecting rail with a randomly wavy surface. A numerical example is presented, and the optimal values of Coulomb friction forces which minimize the probability that the contact force becomes negative are found as a result.
Presented at a meeting held Sept. 17-19. 1975.

Yoshida, K (Keio University, Japan); Shimogo, T
American Society of Mechanical Engineers #75-DET-30, 1975, 6 pp, 10 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

04 130913
NONCONTACT MEASUREMENT OF SPEED BY MEANS OF CORRELATION METHODS [Beruehrungslose Geschwindigkeitsmessung Mittels Korrelationsverfahren]
An instrument for the measuremnt of speed and covered distance by railroad trains. It is independent of the wheels. Two optical detectors sequentially scan the surface of the rails. The resulting electric signals are displaced by the traveling time between the two scanning spots. By means of a correlation technique and a control circuit a value is obtained which corresponds to the traveling time. [German]

Meyer, H Ryser, H Zimmer, C *Hasler Mitteilungen/Hasler Review* Vol. 34 No. 2, Sept. 1975, pp 33-47, 9 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

04 130920
METHOD FOR DETERMINING THE TIME FOR CHANGING LUBRICATING OILS IN DIESEL ENGINES [Methode zur Bestimmung der Oelwechselperiode von Dieselmotoren]
A simple method which determines the time when the oil in diesel engines should be changed is described along with a portable testing device. Field tests conducted on diesel engines and based on this method indicate the usefulness of the test and the potential for lubricant savings. Systematic inspection of vehicles not only leads to considerable savings in lubricants but also makes it possible to obtain a good idea about the engine's working conditions. [German]

Freund, M Csikos, R Haag, D *Erdoel and Kohle Erdgas Petrochemie* Vol. 28 No. 9, Sept. 1975, pp 422-425, 5 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

04 130922
EXPERIENCES WITH CHROMIUM PLATING ON MEDIUM SIZED DIESEL ENGINE CRANKSHAFTS
The paper attempts to clarify the important features of chromium plate and makes comparison with other methods of surface treatment. Details of crankshaft preparation and machining operations are discussed together with a review of the desired standard of surface finish. The success of the technique is demonstrated by reference to the results of fatigue tests on full sized specimens and extensive experience with crankshafts in commercial service.

Byer, K Dalimore, VJ Lowe, CB *Institute of Marine Engineers-Transactions* Vol. 87 Ser A Pt 2, 1975, pp 49-65, 19 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 131043
NEW METHODS OF INDUCTION MOTOR TORQUE REGULATION
Two methods of induction motor torque regulation are described utilizing speed and current feedback into the frequency and amplitude channels of a pulsewidth modulated inverter. Transfer characteristics illustrating the steady-state behavior of the two configurations are presented. Transient characteristics are discussed in detail by examining the linearized system transfer functions. An analytical approach to design of a closed loop controller for a practical application is outlined. Experimental results are presented showing correlation with predicted results.

Plunkett, AB Lipo, TA *IEEE Transactions on Industry Applications* No. 1, Vol. IA-12, Jan. 1976, pp 47-55, 20 Fig., 2 Tab., 3 Ref.

ACKNOWLEDGMENT: IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 131255
ELECTRONIC CONTROL FOR SUBURBAN AND METROPOLITAN DUAL-VOLTAGE ELECTRIC RAILCAR SETS [Azionamenti elettronici bitensione per elettrotreni suburbani e metropolitani]
Paper on the advantages and general arrangement of 750/1500 V, 1500/3000 V and 3000/6000 V dual-voltage tractive unit systems with chopper control and variable frequency converter feeding induction motors. The system proposed is particularly adapted for rolling stock worked on both an urban network and on the FS network. [Italian]

Silingardi, M
International Communications Congress, 23RD Vol. 1 Oct. 1975, pp 687-703, 11 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France Repr. PC

04 131265
A METHOD FOR CALCULATING AND OPTIMISING THE CONTROL CIRCUITS OF THYRISTOR-CONTROLLED TRACTIVE UNITS [Verfahren zur Berechnung und Optimierung der Schaltung thyristorgesteuerter Triebfahrzeuge]
The purpose of the article is to find theoretical methods of studying the electrical behaviour of thristor-controlled tractive units, and thus obtain more reliable bases for an optimum design for these vehicles. The mathematical method described by the author enables a precise calculation to be made in relation to the use, to determine the flow of current and voltage values in time. [German]

Krittian, F *Archiv fuer Eisenbahntechnik* Vol. 30 Dec. 1975, pp 55-64, 1 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

04 131287
RESULTS OF THE TESTS WITH CHROME PISTON RINGS ON LOCOMOTIVE DIESEL ENGINES 10 D 100 [Rezul'taty ispytanija hromirovannyh prosnevyh kolec na teplovoznyh dizeljah 10 D 100]
The article shows that high-resistance cast chrome piston rings with oil-retaining threads do not break in service, wear 1.8-2 times less rapidly than series-built nickel- chrome cast rings, and reduce the wear of cylinder casings. [Russian]

Astaskevic, BM Fofanov, GA *Vestnik Vniizt* Vol. 34 No. 8, 1975, pp 22-25, 2 Tab.

ACKNOWLEDGMENT: Messerschmitt-Boelkow-Blohm GmbH
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

04 131289
DESIGN OF THE ELECTRONIC CONTROL AND REGULATION SYSTEM ON CHOPPER-CONTROLLED MOTIVE UNITS
[Konzeption der Steuer Regelelektronik auf Triebfahrzeugen mit Anschnittsteuerung]
No Abstract. [German]
Published in English, French and German editions

Zwahlen, R Bohli, WU *Brown Boveri Review* Vol. 62 No. 12, Dec. 1975, pp 517-527, 4 Fig., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

04 131624
A VERSATILE TWO-CYCLE DIESEL ENGINE--THE EMD MODEL 645 SERIES
Electro-Motive Division has produced the Model 645 two-cycle diesel engine of 9-1/16-in. (230.2-mm) bore x 10-in. this engine, increased reliability and performance have been achieved through a continuing program, which includes a reduction of visible exhaust emission and improved thermal efficiency. The result is the present production engine which has a wide versatility in many, varied, fields of application, among which are locomotives, industrial, marine, oil well drilling, emergency standby--including nuclear power plant protection units and off-highway trucks.
Presented at the Diesel and Gas Engine Power Conference & Exhibit, Chicago, Illinois, April 4-8, 1976.

Ephraim, M, Jr Kotlin, JJ Williams, HA, Jr (General Motors Corporation)
American Society of Mechanical Engineers 76-D6P-5, Dec. 1975, 15 pp, 20 Fig., 2 Tab.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ESL
DOTL RP

04 131630
REGENERATIVE DRIVE FOR SUBWAY TRAINS. PART 1: MECHANICAL ACCUMULATOR DESIGN
A regenerative drive system for subway trains is mathematically modeled and numerically evaluated for the Toronto Bloor-Danforth Subway Line. The scope of the study dictates a multipaper presentation of system and component modeling. This first paper designs and optimizes the mechanical accumulator subsystem (bearings, seals, losses) of the vehicle propulsion package. Preliminary design criteria (stress-energy relationships) predict the required performance capability of the one and two accumulator per vehicle systems; the need for high energy densities is of secondary importance compared to the required power density for vehicle operation. Accumulator performance tests suggest ease of integration with the current drive system. Subsequent papers model the external and internal drive systems, and numerically optimize the flywheel control concept and accumulator size; day savings, on a round-trip basis, are predicted in the order of 26 percent.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Flanagan, RC Suokas, LA (Toronto University, Canada)
American Society of Mechanical Engineers 76-RT-1, Jan. 1976, 7 pp, 14 Fig., 23 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

04 131631
REGENERATIVE DRIVE FOR SUBWAY TRAINS. PART 2: OVERALL SYSTEM MODEL
The external system (track, vehicle) for the regenerative drive study is modeled from actual construction drawings and performance specifications. A general duty cycle is constructed and found to compare within a few percent of actual measured data; furthermore, the duty cycle simulates all vehicle operational modes ("all out," cruise, coast, brake). Vehicle dynamics are simulated using current railroad engineering practice; the equivalent mass of rotational elements (transmissions, rotors), about 16 percent of the vehicle curb mass, is accounted for in the accelerated state. The internal d.c. electric drive system is modeled using current industrial design practice; the technique of energy flow-through efficiencies facilitates the determination of vehicle station-station tractive requirements.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Suokas, LA Flanagan, RC (Toronto University, Canada)
American Society of Mechanical Engineers 76-RT-2, Jan. 1976, 7 pp, 8 Fig., 4 Tab., 11 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

04 131632
REGENERATIVE DRIVE FOR SUBWAY TRAINS. PART 3: SYSTEM EVALUATION
The most efficient hybrid drive philosophy eliminates high-acceleration power peaking and operates as a fully regenerative system (little or no accumulator top-off during station stop). The optimal accumulator control concept is designed as vehicle velocity dependent and is shown to vary only slightly with vehicle load and station distance. Furthermore, accumulator sizing is numerically determined subject to this control concept. The effect of large coast (5 percent) or cruise periods opposes the justification of any regenerative system and is herein questioned as an integral part of the drive cycle. Conversely, short coast (2 percent) or cruise has little effect on the hybrid drive performance. As a basis of comparison (with other drive systems), the ideal vehicle concept is postulated.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Flanagan, RC Suokas, LA (Toronto University, Canada)
American Society of Mechanical Engineers 76-RT-3, Jan. 1976, 5 pp, 7 Fig., 3 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

04 131633
REGENERATIVE DRIVE FOR SUBWAY TRAINS. PART 4: OVERALL SYSTEM PERFORMANCE
Vehicle energy consumption and savings for the Toronto Bloor-Danforth Subway Line are evaluated. Two vehicle loads are chosen (for this evaluation) indicative of rush-hour and nonrush-hour operation. A comparison test run shows the numerical simulation to be within a few percent of actual measured data. Evaluation of round trip results indicate energy savings as high as 33 percent for a large vehicle weight, but based on daily operation, savings are more realistically 26 percent. The effect of long coasts (5 percent) on actual station runs is again shown to be detrimental to the energy savings for the regenerative system.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Suokas, LA Flanagan, RC (Toronto University, Canada)
American Society of Mechanical Engineers 76-RT-4, Jan. 1976, 5 pp

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

04 131635
ROHR TURBOLINER ELECTRICAL CONTROL PANELS
The Rohr Turboliner is a gas turbine, mechanically driven unit train based on highly developed European technology. To adapt this technology to American practice and usage required a number of changes. One of these was conversion of the electrical systems from 380 VAC 50 Hz to 480 VAC 60 Hz and expansion of the control functions to meet specified requirements. This paper deals with the design and manufacture of six major control panels from development of the train functional schematic through production of the hardware.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Pier, JR Williams, RM (Rohr Industries, Incorporated)
Institute of Electrical and Electronics Engineers C76 460-1 IA, Feb. 1976, 8 pp, 13 Fig.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

04 131646
DESIGN OF A TURBINE/ELECTRIC BIMODAL RAIL PASSENGER CAR

This paper presents the unique features of a rapid transit rail passenger car having two modes of power, conventional 650 volts DC third rail plus two on-board gas turbine power modules. Design objectives are defined with a description of the car's systems showing how the objectives were met. Early track test experience is also reviewed.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRIS No. 02 131638, Publication 7602.

Isler, NJ Clingerman, RL Paternoster, NL (General Electric Company)
American Society of Mechanical Engineers 1976, pp 165-176, 7 Fig.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

04 132932
POWER FACTOR IN STATIC CONVERTERS ON RAIL MOTOR CARS FED BY OVERHEAD CONTACT WIRES [Der Leistungsfaktor bei Stromrichtern auf Fahrdrahtgespeisten Schienenfahrzeugen]

The relationships of the power factor in rectifiers is discussed, with emphasis on its properties in the presence of light network impedances. The value and definition of the power factor according to the German standard DIN 40110 are considered. Conclusions for the operation of rectifiers on electric trains are presented. Illustrative examples of computed values for the power factor are included. [German]

Moeltigen, G *Elektrische Bahnen* Vol. 46 No. 9, Sept. 1975, pp 207-213, 6 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 132933
MEASURING THE GAP BETWEEN THE PISTON AND CYLINDER OF AN ENGINE BY MEANS OF AN ELECTRON BEAM

The component determining the service life of modern boosted diesel engines is usually the cylinder-piston assembly Previous methods for measuring gaps between parts of the piston-cylinder assembly have the drawback that the engine parts have to be specially prepared in advance, converters (or their sensitive elements) being inserted into the zone of measurement and the useful signal from these extracted from the engine. A back-scattered electron technique is proposed in a slightly modified form for measuring the gap behind an opaque wall, and verified on an internal-combustion engine in model form.

English translation of Izmeritel'naya Tekhnika.

Karataev, VD Machul'skii, FF Riskin, IV Rudenko, VN Ten, EP
Measurement Techniques Vol. 18 No. 4, Apr. 1975, pp 574-576, 7 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

04 134539
SEMI-CONTROLLED BRIDGE MOUNTING WITH EXTINCTION IN STAGES [Halbgesteuerte Brueckenschaltung mit unterteilter Loeschung]

To improve the power factor and reduce distortation, it is possible to use a semi-controlled bridge mounting with extinction in stages. If current is controlled by dephasing ignition adjustment towards a sinusoidal form code is achieved. [German]

Kahlen, H *Elektrische Bahnen* Vol. 46 No. 12, Dec. 1975, pp 279-285, 6 Fig., 21 Ref.

ACKNOWLEDGMENT: UIC

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 134569
HIGH-POWER THYRISTORS AND THEIR EFFECT ON THE MAINS CURRENT. METHODS OF CALCULATING THE ALLOWABLE POWER RATING OF CHOPPER CONTROLS [Leistungsthyristoren und ihre Netzrueckwirkungen Berechnungsmethoden der zulaessigen Anschnittsteuerleistung]

No Abstract. [German]

Oester, C *Bulletin des Schweizerischen Elektrotech Vereins* Vol. 67 No. 5, 1976, pp 249-255, 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Bulletin des Schweizerischen Elektrotech Vereins Zurich, Switzerland

04 134571
PROSPECTS FOR THE USE OF GAS TURBINE LOCOMOTIVES [Perspektivy primenenija gozoturbinnyh lokomotivov]

The characteristic features of the Baikal-Amour line are its extremely long upward and downward gradients (up to 18%), its tunnels and severe weather conditions. The plan for Phase One in the operation of this line provides for trains of up to 7,000 t, with a considerable increase in this limit later, and with a maximum use of the line's transport capacity. These requirements create an important problem in the choice of a type of locomotive capable of reliable operation under such conditions. The article discusses the advantages of the gas turbine engine, which may prove to be decisive in the selection of the type of self-driven locomotive for the Baikal-Amour line. [Russian]

Bartos, ET Mejlihov, ME *Zeleznodoroznyj Transport* No. 1, 1976, pp 46-50

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Zeleznodoroznyj Transport Moscow, USSR

04 134586
METHOD FOR EXPRESSING THE RESULTS OF ENERGY AND TRACTION TESTS WITH A.C. STATIC CONVERTER LOCOMOTIVES IN TERMS OF THE NOMINAL CATENARY VOLTAGE [Metodika privedenija rezultatov tjagovo energeticeskih ispytanij EPS peremennogo toka k nominal'nomu naprjazeniju kontaktnoj seti]

During these tests there are different, often variable levels in the effective voltage in the catenary and the graph of such voltage is thus considerably affected. It is, however, essential to be able to compare and assess the energy and traction qualities of electric locomotives for the nominal pantograph voltage, in other words when voltage follows a sinusoidal wave pattern and is an effective 25 kV. This is why, when dealing with the results of tests carried out under the voltage conditions quoted above, there is the problem of expressing the experimental data in terms of the nominal pantograph voltage. The article suggests a method for solving this problem. [Russian]

Basov, JA *Vestnik Vniizt* No. 1, 1976, pp 14-17

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

04 134592
HYDROSTATIC TRANSMISSION [Les transmissions hydrostatiques]

The article describes this type of transmission and examines its advantages: rigidity of this transmission; scope for mounting the pump and engines, which may be connected by means of flexible piping; small dimensions of the main elements. In addition, the possibility of readily obtaining a high and variable transmission ratio whilst keeping a high overall output ensures different applications ranging from the activation of circuit engineering powered units to the precision control of machine tools.

LeDocq, J *Revue Mecanique* No. 4, 1975, pp 331-338, 17 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

04 134593
HIGH-VOLTAGE STATIC CONVERTER FOR AIR-CONDITIONED COACHING STOCK [Stabilizirovannyj staticeskij vysokovoltnyj preobrazovatel' dlja passazirskogo vagona s kondicionirovaniem vozduha]
This article gives the results of theoretical and experimental studies into the development of a high-voltage static converter for electricity supply to coaching stock on electrified lines. [Russian]

Gomola, GG Rubcinkij, ZM *Vestnik Vniizt* Vol. 34 No. 8, 1975, pp 15-19, 2 Tab., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

04 134594
INSTRUMENTATION TECHNIQUES FOR LOCOMOTIVE TESTING
With reference to the basic diagram for measuring operations: sensor or transducer coding transmitter recording receiver, the author describes the instrumentation used by Indian Railways to measure: tractive effort, speeds, distances, acceleration, time, ratings, output, torque, etc.

David, R *Indian Railway Technical Bulletin* Vol. 31 No. 194, Aug. 1974, pp 81-87

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Research Design and Standards Organization Alambagh, Lucknow 5, India
DOTL JC

04 134598
SODIUM SULPHUR BATTERIES FOR RAIL TRACTION
British Railways' plans for main line electrification are now well under way; the West Coast main line has been extended to Glasgow, and electrification of the East Coast route is planned. Because of the high capital cost of lineside equipment however, it seems likely that many of the less intensively used lines will not be electrified. These lines could continue to be operated by diesel traction; but work in the Research and Development Division at Derby has shown that battery traction could be a viable alternative to diesel if a lightweight battery could be developed. This paper describes some of the problems encountered and the progress made.
Paper presented to the Tenth Intersociety Energy Conversion Engineering Conference, August 18-22, 1975.

Sudworth, JL
British Railways Board Research Department Aug. 1975, 5 pp

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: British Railways Board Research Department Electrical Research Division, Derby, England

04 135172
BRUSHLESS D.C. TRACTION DRIVE
A dc traction drive is described comprising a synchronous motor, which may be brushless, supplied by a force-commutated voltage-source inverter with thyristor firing controlled by rotor position. This implies control of load angle. An analytical basis for system design is presented, and the required ranges of variation of load angle to obtain motoring and braking operation with forward and reverse rotation are derived. A study of torque production at standstill with very high magnetic saturation yields a design method for synchronous motors used as traction motors in this type of system. New techniques for controlling current and torque are reported, and the performance of the system is demonstrated by test on two experimental drives, the larger of which involves peak currents of 330 amp.

Chalmers, BJ (Manchester University); Pacey, K Gibson, JP *Institution of Electrical Engineers, Proceedings* Vol. 122 No. 7, July 1975, pp 733-738, 8 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

04 135173
FURTHER DEVELOPMENT OF 956 SERIES DIESEL ENGINES FOR POWERFUL LOCOMOTIVES
The author reports that with a total of 360 engines of the 956 series in traction service, a 20-cylinder version has been developed extending the range to 5000 hp. Direct air cooling of the charge air brings economies both in weight and bulk, as well as reduction in maintenance work, and similar advantages can be gained from air cooling of lubrication oil. The trend towards higher speeds with less emphasis on adhesive weight could be met by a twin-engine Co-Co unit of 8000 hp within a 23-ton axleload.

Lohaus, KJ *Railway Gazette International* Vol. 131 No. 12, Dec. 1975, pp 10-15

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

04 135180
SELF-VENTILATED TRACTION MOTOR FOR BOTH DIESEL AND ELECTRIC TRACTION
Nose-suspended design applied by British Railways to 128 electric multiple-units under construction for the Great Northern suburban electrification is described. High torque with low-speed characteristics on full-field was incorporated to give required performance economically under suburban-train operations. High level of rheostatic braking was provided and flash-over risks minimized by low-voltage levels per communator segment.

Rail Engineering International Vol. 5 No. 7, Oct. 1975, 5 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

04 135185
NONSYMMETRIC, CROSSED BRAKING CIRCUIT [Unsymmetrische Gekreuzte Bremsschaltung]
One method of measuring the actual speed of vehicles in local traffic consists of measuring the revolutions of a driving axle where no slip occurs. The braking moment of this axle must be smaller than that of the remaining driving axles. In the crossed braking circuit, a motor with reduced excitation is used. The relationship between the braking forces of both motors as a function of speed is analyzed. [German]

Sliwa, H *Elektrische Bahnen* Vol. 46 No. 6, June 1975, pp 147-150, 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

04 135211
AUTOMATIC COUPLING OF TRAIN ELECTRIC BUS-BARS [Automatische Kupplung der elektrischen Zugsammelschiene]
In the proposed automatic coupling system, only the communication cables and air pipes are connected automatically, and the automatic connection of the electric bus-bars on trains has not as yet been envisaged by the UIC. To optimise the advantages of automatic coupling, the DB's Munich Research Centre, in collaboration with specialist firms, has develped an automatic coupling for electric bus-bars on trains, thus meeting the requirements for remote-controlled automatic coupling. The author describes the operation and testing of the coupling system for electric heating. The tests were carried out on two trains. [German]

Strecker Grzonka *Eisenbahningenieur* Vol. 27 No. 2, Feb. 1976, pp 59-61, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

04 136261
THREE-PHASE A.C. TECHNIQUE FOR ELECTRIC AND DIESEL ELECTRIC TRACTION VEHICLES. EXPERIENCE AND OUTLOOK [Drehstromtechnik fuer elektrische und dieselelektrische Triebfahrzeug. Erfahrung und Ausblick]
In the field of three-phase current driving technique BROWN BOVERI has not only acquired experience with De 2500 diesel-electric locomotives, but

also the results of two prototypes supplied from 16 2/3 Hz networks. The results obtained in practical operation confirm the most favourable expectations. Information is also provided on the first 18 three-phase locomotives of this power range, which are now being constructed. [German]

Koerber, J *Glasers Annalen ZEV* Vol. 100 No. 2/3, Feb. 1976, pp 58-64, 5 Fig., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

04 136264
GERMAN FEDERAL RAILWAY'S SERIES 181.2 DUAL-SYSTEM LOCOMOTIVE. AN EXAMPLE OF THE APPLICATION OF POWER ELECTRONICS IN MODERN TRACTIVE UNITS [Die Zweisystem-Lokomotive der Baureihe 181.2 der Deutschen Bundesbahn. Beispiel der Anwendung der Leistungselektronik in Modernen Triebfahrzeugen]
In 1972, the DB ordered 25 Bo'Bo' dual-system electrical locomotives for universal service in passenger and mine freight traffic towards France and Luxembourg. The wide variety of work to be done by these locomotives required a high tractive effort in the lower range of speeds, and a top speed of 160 km/h. The best driving technique for this purpose at present is the use of undulating current traction motors with thyristor rectifiers and a fast, stepless electronic control. The article describes the main characteristics and reports on experience acquired after more than a year in service, as well as on the test and trial runs. [German]

Tietze, C *Glasers Annalen ZEV* Vol. 100 No. 2/3, Feb. 1976, pp 65-72, 5 Fig., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

04 136265
MODERN CONTROL TECHNIQUES FROM THE USER STANDPOINT [Die moderne elektrische Antriebstechnik aus der Sicht des Anwenders]
The use of phase control in conjunction with undulatory current motors is in a very advanced technological stage, while that of vehicles with mains current control or three-phase current systems techniques is still in the early trial stage. Since electric traction vehicles with conventional equipment comply fully with railway requirements, the following questions must be answered before new traction techniques are adopted: 1) What changes will there be in maintenance costs? 2) What will the effect be on the power supply system? 3) How will it improve rail transport? The article describes the relationships between the different points involved and the conclusions that can be drawn. [German]

Wolters, H *Glasers Annalen ZEV* Vol. 100 No. 2/3, Feb. 1976, pp 73-79, 2 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

04 136274
A THREE-PHASE CURRENT TEST VEHICLE-THE DE 2500 AND A CONTROL VEHICLE. TESTS ON A THREE-PHASE CURRENT TRACTION SYSTEM WITH 15 KV 16 2/3 HZ POWER SUPPLY [Drehstromversuchfahrzeug-DE 2500 mit Steuerwagen Systemerprobung eines Drehstromantriebes an 15 kV 16 2/3 Hz]
The system is made up of a control vehicle and a diesel locomotive. The control vehicle is equipped with a transformer, coils, the input convertor, induction circuit and auxiliary equipment. In the diesel locomotive, the cooling equipment, synchronous alternator and rectifier have been removed and replaced by ballast, an a.c.-d.c. convertor and electronic equipment. A fairly smooth direct current is produced by phase displacement of the two rectifiers in a bridge arrangement. A three-phase current convertor is used to transform direct current to alternating current of variable amplitude and frequency for the asynchronous traction motors. This system makes it possible to obtain a 0.98 power factor over a larger part of the system. [German]

Becker, E Gammert, R *Elektrische Bahnen* Vol. 47 No. 1, Jan. 1976, pp 18-23, 10 Fig., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

04 136392
STUDIES OF A CONTROL PULSE THYRISTOR CIRCUIT FOR DC LOCOMOTIVES [Badania ukladu tyrystorowego regulacji impulsowej lokomotyw pradu stalego]
Based on a theoretical analysis and tests of the individual components of a pulse control system of a mining locomotive, an equivalent circuit diagram is presented and quasi-steady electromagnetic processes for an electric KR-10 locomotive are investigated. The calculation has been made by means of digital and analog computers taking into account all parameters over the entire range of their changes. Regulation characteristics have been obtained within the entire range of voltage control at a constant value of motor current. [Polish]

Wolotkowski, SA Kigiel, GA Radkowska, GW *Przeglad Elektrotechniczny* Vol. 51 No. 7, July 1975, pp 307-310, 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

04 136393
TECHNICAL-ECONOMIC CHARACTERISTICS OF PULSE-WIDTH AND PULSE-FREQUENCY THYRISTOR SYSTEMS FOR AUTOMATIC CONTROL OF ELECTRICAL MACHINES
A quantitative comparison is presented of the additional energy losses occurring in pulse-width and pulse-frequency automatic control of DC electric motors. Recommendations are made with regard to choice of the type of pulse modulation as a function of the parameter values of the motor and of its operating conditions.

Chekhovoy, YN *Soviet Automatic Control* Vol. 8 No. 3, May 1975, pp 71-72, 5 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

04 136397
SAN FRANCISCO MUNI KINETIC ENERGY WHEEL PROPULSION SYSTEM (KEW)
Recent studies have shown that the incorporation of practical energy storage elements into vehicle drives offers the potential of significant reduction in emissions as well as improved overall efficiency. The recent "rediscovery" of the kinetic energy flywheel as a highly effective energy storage system provides several new candidate propulsion systems for use in urban transportation. Intended to demonstrate a practical kinetic energy (flywheel) propulsion system providing optimized electric transit with route flexibility and increased quality of service. Dual-mode electric trolley coaches selected for the demonstration.

Am Transit Assoc (ATA) Rail Transit Conf, San Francisco, California, April 14-16, 1974. Car Equip Sess. Available from NTIS, PB-234824, PB-234825, PB-234826.

Lawson, LJ (Lockheed Missiles and Space Company Incorporated) American Transit Association Proc Paper ATA/RT/-74/1,2,3, 1974, pp 1-20

ACKNOWLEDGMENT: EI
PURCHASE FROM: NTIS
DOTL NTIS

04 136401
ANALYSIS OF CHOPPER-FED DC SERIES MOTOR
The main problem in the analysis of chopper-fed dc series motor is the interdependence of armature induced voltage and the armature current and the fact that the relation between the two is nonlinear. The different aspects of analysis such as performance equations, methods of their solution, and the representation of nonlinear magnetization characteristics of the dc series motor are described. The calculated performance has been compared with the measured results.

Damle, PD (Indian Institute of Technology); Dubey, GK *IEEE Transactions on Indust Elect & Control Instru* VIECI-23 N1, Feb. 1976, pp 92-97, 23 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

DOTL JC

04 136402
ELASTIC CHARACTERISTICS OF TRACTION DRIVES OF TRANSPORT VEHICLES
A wide application has been found among the traction, drives of transport vehicles (rail and road vehicles) for designs in which the motor and the distributor reduction gear are fixed to a sprung vehicle frame, and the driving axles (the pairs of wheels) are connected to this gear by elastic transmission mechanisms. The presence of a reduction gear which is fixed on a vibrating base and works in connection with it as a planetary mechanism is responsible for a substantial interconnection between the torsional vibrations of the revolving masses of the drive and the angular vibrations of the vehicle frame. The selection of the elastic drive parameters is an important factor for such a design because in case of their deviation from the optimum values the drive becomes sensitive to disturbances which act on the vehicle from the direction of the track. The processes of interaction between the torsional vibrations of a drive which has a distributor reduction gear, and the angular vibrations of the vehicle were investigated in an example of a single-motor traction drive which has been adopted in the locomotive manufacture in the USSR.

Pavlenko, AP *Russian Engineering Journal* Vol. 54 No. 12, 1974, pp 8-12, 5 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

04 136417
CLASS 74 ELECTRODIESEL LOCOMOTIVES OF BRITISH RAIL SOUTHERN REGION, WITH PARTICULAR REFERENCE TO THE CONTROL SYSTEM
The paper traces the reasons for, and the development of, the booster-type locomotives used on the Southern Region of British Railways. The latest locomotives of this type, introduced in 1967 on the electrification of the Waterloo- Bournemouth line, are described with particular reference to the multiple unit of 'push-pull' train-control system, and the application of solid-state equipment to the locomotive- control scheme. The subsequent service experience with these locomotives is related, and the lessons to be learned from this development are discussed.

Hawes, A (British Railways) *Institution of Electrical Engineers, Proceedings* Vol. 122 No. 8, Aug. 1975, pp 829-836, 6 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

DOTL JC

04 138083
GERMAN THREE-PHASE TRACTION DEVELOPMENT
The German Federal Railway has commissioned Brown Boveri & Co. to develop a high-power general-purpose electric locomotive with asynchronous traction motors with five units due for delivery in 1978. Three prototype diesel-electrics have been in service on DB testing this traction technique. The advantages of this propulsion system from the standpoint of electrical supply, operating performance, maintenance and capital costs are listed. The inherent wheel slip control and dynamic braking characteristics are also discussed.

Teich, W *Railway Engineer* Vol. 1 No. 3, May 1976, pp 47-49, 2 Fig.

PURCHASE FROM: Mechanical Engineering Publications Penthouse 1, 15 West 55th Street, New York, New York, 10019

DOTL JC

04 138296
CONDITION MONITORING OF DIESEL ENGINES
This paper describes the development of new and advanced instrumentation systems for the monitoring of diesel engines. The most important aspects are dealt with. The basis of an efficient system is thorough knowledge of possible failure mechanisms which is necessary for the development of methods and sensors which can provide meaningful process and component data. Modern instrumentation technology has made the design and construction of advanced electronic units for condition monitoring of components possible. Some of the experience gained from design and operation of such installations is discussed with particular reference to large bore diesel engines.

Langballe, M Tonning, L Wiborg, J *Norske Veritas* No. 91, Jan. 1976, 15 pp, 7 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

04 138328
TWO MANUFACTURERS TRY THREE-PHASE MOTORS IN DC TRACTION
The three-phase a-c traction motor, lighter and lower maintenance than the traditional d-c traction motor in railway applications, has been made possible by solid-state power coversion systems. One area where the a-c motor should ofer particular advantage is in rapid-transit and light-rail applications. Two short articles describe experimental drives installed by Siemens in a Nurnberg tramcar and by Oy Stromberg in three two-car prototype transit vehicles in the Helsinki Metro.

Rudiger, W Brunnecker, U *Railway Gazette International* Vol. 132 No. 6, June 1976, pp 228-29, 2 Fig.

PURCHASE FROM: ESL

DOTL JC

04 138329
DIESEL DEVELOPMENT: RAIL-TRUCK MOTIVE POWER
Locomotive development promises to be evolutionary, rather than revolutionary, because the diesel engine seems to be peaking out in performance. Work on alternative prime movers indicates little competition for the diesel, with even the regenerative gas turbine being less efficient and with higher first cost. Turbocharging produced the second generation diesel locomotive; the author sees solid state electronics applied to propulsion and control systems as being the basis for further performance improvements. While any revolutionary motive power development probably would involve electrification, American railroads already have adequate motive power and scarce capital may well be better applied in improving inadequate right-of-way, outdated signaling and control systems and obsolete yards. The article also discusses technological innovation in trucking.

Smith, HL (General Motors Corporation) *Traffic World* Vol. 166 No. 12, June 1976, pp 33-36

PURCHASE FROM: Traffic Service Corporation 815 Washington Building, Washington, D.C., 20005

DOTL JC

05 053121
STANDARDISATION OF WAGONS. STANDARDISATION OF THE AIR-BRAKE RIGGING OF STANDARD WAGONS
This report describes the progress made in the work of standardising the articulations of brake rigging. Standardised dimensions and tolerances are fixed for: the pins and holes, the thickness of the central equalizing strength of the material used for the rods and the equalizing levers has also been stipulated. Allowance has furthermore been made for the possible increase in axle loads (at present being examined by UIC) on both S and SS services.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B12/RP 16/E, Oct. 1969, 23 pp, 8 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

05 053136
ELECTRO-PNEUMATIC BRAKE. TRACK TESTS
Plain-line tests were organized by the DB with trains of 100 two-axled wagons (up to 1260 m in length), and then with trains of 75 two-axled wagons. The tests involved uniform trains (all wagons unloaded) and mixed trains (consisting of wagons differing both in loading and brake power) and they were carried out: to compare the results obtained with each of the two types of electro-pneumatic brake. Tests were organized by the SNCF on both plain and mountain lines, with trains up to 750 m in length, which was the maximum admissible length on the lines in question. In these tests uniform trains (all wagons unloaded) were used. Their purpose was: to check the compatibility of both systems with the various types of distributor already approved; to settle on one or more systems of circuit- checking; to determine the characteristics of both systems having regard to the transition period; and to compare the results obtained with each of the two types of electro-pneumatic brake.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B83/RP 2/E, Nov. 1967, 44 pp, Figs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

05 132986
STATE OF THE ART OF UNDERGROUND COAL MINE TRACKED VEHICLE BRAKE SYSTEMS. REVISED REPORT
Underground coal mine tracked vehicles were studied to determine the state of the art and how brakes might be added to the coal haulage cars. Specific areas of interest were brake systems, couplers, car trucks, and car handling procedures. Problems related to adding brakes to the haulage cars appeared to be the limited amount of room to mount the brakes on the cars, brake line connection between rotary dump cars, achieving desirable braking characteristics without over complicating the system, and keeping the installation cost to a reasonable figure.
Available as reference material only during working hours at Bureau of Mines Libraries in Denver, Colo., Twin Cities, Minn., Bruceton, Pa., Pittsburgh, Pa., Spokane, Wash., Energy Res and Devel Admin Library, Morgantown, W.Va., and the Central Library, U.S. Dept of the Interior, Washington, D.C.

Bendix Research Laboratories Oct. 1973, 48 pp, 26 Fig.

Contract H0110896

ACKNOWLEDGMENT: Bureau of Mines
PURCHASE FROM: Department of the Interior Central Library, Washington, D.C.

05 135170
AUTOMATION OF VEHICLES IN ELECTRIC TRACTION [Fahrzeugautomatisierung in der Elektrischen Traktion]
The use of electronic control equipment for the automatic operation of power-propelled vehicles is discussed, with special emphasis on braking installations. Further possibilities are considered. [German]

Scholtis, G *Elektroniker* Vol. 14 No. 12, Dec. 1975, pp EL1-EL5, 5 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Elektroniker Verlag Aargauer Tagblatt AG, Aarau, Switzerland

05 136260
NOMOGRAPHIC METHOD OF DETERMINING THE MAIN PARAMETERS OF BRAKING EQUIPMENT FOR BRAKING AT SPEED AND ACCORDING TO LOAD [Nomografische Methode zur Bestimmung der Hauptparameter der Bremseinrichtungen bei geschwindigkeits-und lastabhaengiger Bremsung]
No Abstract. [German]

Tonew, S *OSShD Journal* Vol. 18 No. 6, Nov. 1975, pp 11-15, 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Organization for the Collaboration of Railways Hoza 63/67, Warsaw, Poland

05 136518
AUTOMATIC BRAKES FOR MINE-TRACK TRANSPORTATION SYSTEMS IN UNDERGROUND COAL MINES
An automatic braking system for mine track equipment was developed in compliance with Section 314(e) of P.L. 91-173 to prevent break-in-two and runaway accidents. The braking system can be defined as spring applied and pneumatically released. Service braking and an automatic electronic tachometer-type overspeed control were incorporated in the design. A 4-ton battery locomotive and five mine cars at the Bureau Safety Research Coal Mine were equipped with this automatic braking system. The report covers the state-of-the-art, maintenance, regulatory standards, and design standards for automatic brake applications.

Kiwior, AM
Bendix Research Laboratories, Bureau of Mines Final Rpt BRL/TR-74-7173, BuMines-OFR-84-75, Feb. 1975, 89p

Contract H0110896

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250941/2ST, DOTL NTIS

06 052668
USE OF ELECTRONIC COMPONENTS IN SIGNALLING. TECHNICAL REQUIREMENTS FOR THE DESIGN OF CIRCUITS OPERATING ACCORDING TO THE FAIL-SAFE PRINCIPLE
This report deals with the technical requirements imposed by electronic switching techniques operating according to the fail safe principle.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A118/RP 8/E, Apr. 1975, 17 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052684
SAFETY DEVICES FOR TRACK LAID ON CONCRETE OR STEEL SLEEPERS. THE ELECTRICAL RESISTANCE OF TRACK CIRCUITS ON TRACKS WITH WOODEN, CONCRETE AND STEEL SLEEPERS AS WELL AS WAYS AND MEANS OF IMPROVING THE INSULATION
Contents: 1. Requirements of the signalling Departments. 2. Methods of electrical insulation for various types of sleepers and various methods of rail fastening. 3. Loss of electric resistance and measure to improve the electrical resistance. 4. Final conclusions.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A25/RP 1/E, June 1957, 8 pp, 7 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052685
TRANSMISSION OF INFORMATION BETWEEN RAIL AND MOTIVE POWER UNIT. GENERAL DESCRIPTION OF SPEED CONTROL SYSTEMS. DETERMINATION OF INFORMATION REQUIREMENTS. TEXT AND APPENDICES
To solve the task entrusted to the Committee, the sixth development stage (complete speed control and signal repetition) is first studied. The number of the units of information required for the first five development stages can readily be inferred from the sixth development stage. The transition from stage 6 to stage 7 (automatic train control) would, however, require still further studies. This should be the subject of another interim report. The Specialists Committee has studied different systems for putting into practice the sixth development stage. These systems are described in the present report, and the information required for each system has been computed. The results of these computations are summed up in the tables of Appendix B. The total figures for all systems studied are given in the adjacent table. The information requirement for the control systems under consideration varies within wide limits. It is, however, impossible to judge the merits of the control system only according to the number of information units required because of the widely divergent possibilities afforded by the individual systems to the Operating Departments. It should furthermore be mentioned that the various systems dealt with by this report are described only in outline. The A46 Specialists Committee is ready to intensify the study of those systems, the further investigation of which is judged to be promising from the Operating point of view.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A46/RP 3/E, June 1964

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052687
TRANSMISSION OF INFORMATION BETWEEN RAIL AND MOTIVE POWER UNIT. TECHNICAL SOLUTIONS AND COSTS OF DIFFERENT CONTROL SYSTEMS FOR A TRACK OF COMPARISON. TEST AND APPENDICES
This report is intended to serve as a basis for a technical and financial comparison of control systems. For this purpose the Committee is investigating a fictitious "track of comparison" equipped with different control systems, the principles of which have been described in Interim Report No. 3. The means of transmission on which the systems are based have been explained in Interim Report No. 2. A basis for ascertaining the costs is provided by the call for tenders issued by the Committee and subsequent further enquiries of the tendering companies. After the introduction, in which the requirements for the present study, in particular the documents forming its basis, are briefly referred to, the track of comparison is described in detail. The control systems are described in Chapter 3, and the costs of equipping the "track of comparison" with these systems are also ascertained there. The systems are compared from the operating point of view in Chapter 4, the relevant study being based on the "Requirements of the Operating Department (UIC)". The extensibility of the systems based on the programme of Portsmouth (Informatory Memorandum for the UIC with a description of the development stages) is also always borne in mind. The conclusions contain references to further steps which would have to be adopted to achieve a European system.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A46/RP 4/E, June 1966, 40 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052689
TRANSMISSION OF INFORMATION BETWEEN RAIL AND MOTIVE POWER UNITS. RESULTS OF PRACTICAL TRANSMISSION TESTS AND MEASUREMENTS OF TRACK-CONDUCTOR CHARACTERISTICS (TEXT AND APPENDICES TO CHAPTERS 3 AND 4)
The appendices to this report contain accounts of the different tests and studies carried out at the initiative of ORE Specialists Committee A 46, namely: study of the methods of cable laying and of the measurement of the distance covered; measurement of track-conductor characteristics according to the pattern of laying of these, and effect of climatic conditions; transmission tests between track and stationary vehicles with various cable configuration and fraction voltages and fixed station on ground, supplying data on the bit error rate as a function of the transmitted power level; and measurement of the bit error rate with a moving motive power unit, for the direction of transmission track-loco, with various traction voltages as a function of the speed, traction power, transmission power and frequency.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A46/RP 5/E, Apr. 1970, 43 pp, Figs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052703
MEDIUM-SPEED DATA TRANSMISSION ON TELEPHONE CIRCUITS (500 TO 1200 BAUDS). TEXT AND APPENDICES
The report provides information about the test measurements taken during 1964 on existing telephone circuits. In the light of the experience thus gained and taking into account the information provided in technical literature, a measurements programme was then drawn up with a view to the practical application of the chapter of the working programme entitled "Study of existing railway telephone circuits". This measurements programme is also mentioned in this Interim Report. The results of these measurements and an analysis will form the subject of Interim Reports which will be prepared later. In the appendices will be found bibliographical references and also comments on technical literature published so far.
Restrictions on the use of this document are contained in the explanatory materials.

International Union of Railways A76/RP 1/E, Oct. 1964, 49 pp, Figs., Tabs., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052704
DATA TRANSMISSION BY MEANS OF RAILWAY TELEPHONE CIRCUITS AT SPEEDS EXCEEDING 600 BAUDS. PROGRAMMES OF MEASUREMENTS. DESCRIPTION AND SCOPE OF THE MEASURING INSTALLATION

This report gives a brief description of the measuring equipment designed by Professor Marko and used at the Vienna Arsenal at the request of ORE. Theoretical programmes for testing modems and complete systems for data transmission are covered by Chapters 1 and 2.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A76/RP 5/E, Oct. 1968, 20 pp, Figs., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052705
DATA TRANSMISSION BY MEANS OF RAILWAY TELEPHONE CIRCUITS AT SPEEDS EXCEEDING 600 BAUDS. DESCRIPTION OF THE DIFFERENT PARTS OF THE MEASURING INSTALLATION AND ITS OPERATION. RESULTS OF THE FIRST MEASUREMENTS

This report, includes detailed descriptions of the different parts of the measuring installation and their operation. Also, the results of the first measurements, which were based on the test programmes, are summarised. The first tests were made in Munich University in order to ascertain whether the programmes of measurement were as comprehensive as they were intended to be.

For use by members of the ORE. Not available to third parties.

International Union of Railways A76/RP 6/E, Oct. 1968, 10 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052706
DATA TRANSMISSION BY MEANS OF RAILWAY TELEPHONE CIRCUITS AT SPEEDS EXCEEDING 600 BAUDS. INTERFERENCE IN ADJACENT AUDIO-FREQUENCY AND CARRIER-FREQUENCY TELEPHONE CIRCUITS DUE TO THE METHODS OF TRANSMITTING LOW-FREQUENCY SELECTION PULSES, AND MEASURES TO BE ADOPTED FOR REDUCING THEM

This report principally deals with the results of tests carried out on various Administrations for the purpose of determining the interference produced by inductive dialling methods (pulse generator, type DB Ed 5) in adjacent audio-frequency and carrier-frequency circuits. The cross- talk attenuation between circuits has been artifically reduced to 8 nepers with 800 Hz by means of capacitances. The noise was tape-recorded with a view to the subsequent simulation of actual transmissions on the ORE measuring installation at Vienna. Corrective measures: modification of contacts of relays, filtering, smoothing circuits for inductive pulses, reduction of transmission voltage, synchronisation of a.c. dialling pulses. The mode application of these measures is also given.

Restriction on the use of this document are contained in the explanatory material.

International Union of Railways A76/RP 7/E, Oct. 1969, 32 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052707
DATA TRANSMISSION BY MEANS OF RAILWAY TELEPHONE CIRCUITS AT SPEEDS EXCEEDING 600 BAUDS. INFLUENCE OF THE WESTERN ELECTRIC DISPATCHING SYSTEM AND OF MOTIVE POWER UNITS WITH "THYRISTOR" FIRING-ANGLE CONTROL OF TELEPHONE CIRCUITS INTENDED FOR DATA TRANSMISSION

Part 1 of this report contains a description of the composition and layout of the Western Electric dispatching system and of its influence on data transmission circuits, established on the basis of measurements made by the SNCF. Part 2 of the report deals with the influence exerted by motive power units with thyristor firing-angle control (thyristor-control led locomotives) on data transmission circuits. The results of the measurements with the Western Electric dispatching system show the following: Different modulation procedures are used. (Particular mention is made of the transmission systems with d.c. and those with a.c. (50 Hz) Data transmission is unfavourably influenced by both procedures. Disturbance voltage peaks of the order of 50 mV are produced in the data circuits by the calling-pulses of the dispatcher system. Those carrier-channels situated close to the audio-frequency band are the most strongly disturbed. As the lowest permissible signal voltage of the data transmission system is about 8 mV for the audio-frequency circuits and about 18 mV for the carrier frequency circuits, the disturbance voltage peaks should not exceed 2 mV for the audio-frequency and 4 mV for the carrier frequency circuits (at the point of relative zero level). The disturbances produced by the calling-pulse can be reduced by modifying the circuit-switching arrangement. For orientation purposes, the Committee has carried out measurements on the SNCF concerning the disturbance-voltages produced by the operation of thyristor controlled locomotives. Results: Thyristor-controlled locomotives constitute an important source of interference. According to recommendation G 123 of the CCITT (International Telegraph and Telephone Consultative Committee), only values of 0.5 mV (effective value, A-filter network) are permissible for the disturbances produced in conductors by high-voltage circuits. This applies to a circuit terminated with a characteristics impedance. In the other hand, the appearance of disturbance voltages of up to 15 mV have been observed. The maximum disturbance voltage peak was 47 mV. It follows from this that the effective disturbance voltages are higher by a factor of 30 than those permissible.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A76/RP 8/E, Apr. 1970, 101 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052709
THE USE OF MICROWAVE FOR TRAIN CONTROL CIRCUITS

This report contains a brief outline of the technique of microwave followed by a summary of the present experience of the Member Administrations of ORE in the use of microwave as obtained in replies to a Questionnaire.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A78/RP 1/E, Mar. 1974, 12 pp, 14 Ref., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052720
IDENTIFICATION OF WAGON NUMBERS. DESCRIPTION OF THE SYSTEMS TEXT AND APPENDICES

This introduction to the UIC study of Automatic Car Identification lists eight potential methods, indicates some of the benefits and drawbacks of each and then describes 19 proposed methods from Europe, U.S. and Japan involving four of these--optical reflection, acoustic reflection, electromagnetic reflection and electromagnetic induction. UIC had previously indicated general requirements for ACI systems and this reports that the optical and electromagnetic systems would be the types on which future studies would be concentrated. The optical system is seen as of low initial investment but subject to errors due to environmental conditions and needing frequent maintenance while the electromagnetic systems would have high initial cost but would require little maintenance.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A97/RP 1/E, Oct. 1967, 93 pp, Figs., Phots., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052721
IDENTIFICATION OF WAGON NUMBERS. RECOMMENDATION FOR THE CHOICE OF A SYSTEM
Report No. 3 contains a survey of the studies carried out in this field. Two systems have been retained, namely, an optical system (SYLVANIA) and a microwave system (SIEMENS). These two systems have been simultaneoulsy submitted to numerous operating tests, the results of which are summarised. Both systems comply with the conditions set-out in UIC Leaflet 916-1-I, with a better insensitivity however in the case of the microwave system to the disturbances caused by snow and ice. The Committee has made an economic comparison of the two systems, which shows a lower annual cost for the microwave system. Taking into account the different advantages mentioned in the course of the report, the Committee unequivocally recommends the choice of the SICARID system using the microwave technique.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A97/RP 3/E, Apr. 1972, 48 pp, Figs., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052722
WARNING DEVICES USING RADIO. ENQUIRY REPORT: RADIO WARNING OF ONE TRAIN BY ANOTHER, EITHER DIRECT OR THROUGH A FIXED OR MOBILE RADIO ON THE TRACK, AND RADIO WARNING OF A TRAIN BY MEANS OF A FIXED OR MOBILE RADIO ON THE TRACK
The problem of the warning of trains by radio in cases of danger has been entered in the ORE programme of work as Question A 99. This report contains an introduction and a copy of the questionnaire sent out, and also a summary of the replies from 21 administrations. The general observations and the documents provided by the administrations have also been incorporated.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A99/RP 1/E, Oct. 1968, 51 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052725
USE OF ELECTRONIC COMPONENTS IN SIGNALLING. GENERAL CONSIDERATIONS
After having recalled the safety aspect involved in railway signalling, the report deals with the introduction of electronics in signalling installations and defines two different lines of thought:-System based on "single path" processing-System with "multiple path" processing and output control. The report then gives a general survey of the studies already carried out and of the final aims set each of the Working Groups "Components" and "Methods".

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A118/RP 1/E, Oct. 1971, 14 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052726
USE OF ELECTRONIC COMPONENTS IN SIGNALLING. CATALOGUE OF FAILURES OF ELECTRONIC COMPONENTS STANDARDS
The report contains a list of defects of electronic components, which are used, to a growing extent, in electronic signalling equipment. A component will be considered defective in the case of an unacceptable deviation of a technical feature, on account of internal and external effects, even though the prevailing conditions are suitable for its perfect operation. The following types of defects of components will be studied: short circuit, interruption, increase, decrease, by-pass, variation of magnetisation state, variation of magnetisation curve and fissures in magnetic material. The list contains 27 items, but it can be extended, if desired, in the future. The section dealing with useful standards refers to several sources, where numerous standards connected with electronic components have been elaborated.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A118/RP 2/E, Oct. 1972, 41 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052727
USE OF ELECTRONIC COMPONENTS IN SIGNALLING. FAULTS AND SAFETY IN RAILWAY SAFETY SYSTEMS
This report is composed of two parts. In the first part, it is shown that the investigation of the safety concept involves the design of a fault detecting mechanism. In the second part, a calculation method is proposed by means of which the availability and safety of a system can be theoretically evaluated, incorporating the effects of maintenance and repair times.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A118/RP 3/E, Oct. 1972, 31 pp, 8 Fig., 7 Ref., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052728
USE OF ELECTRONIC COMPONENTS IN SIGNALLING. SYSTEM STRUCTURES FOR ACHIEVING SAFETY IN THE SIGNALLING TECHNIQUE-INTRODUCTION
The report gives a review of the possible system structures through which safety can be achieved when using electronic circuits, such as process computers, in railway signalling.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A118/RP 5/E, Oct. 1975, 16 pp, 6 Fig., 2 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052729
USE OF ELECTRONIC COMPONENTS IN SIGNALLING. METHODS FOR CALCULATING THE PERFORMANCE OF SAFETY SYSTEMS
In Report No. 3 it was shown that three classes of state could be distinguished in a safety system, namely, operational state, failure state contrary to safety, and safe failure state. From these states, the availability, reliability and safety of a system can be defined. The present report describes the calculation techniques for systems which are non-repairable during a mission. A theoretical study is made of possible system structures in revealing the general characteristics of these. Then, by way of example, several special cases are treated numerically.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A118/RP 6/E, Apr. 1975, 45 pp, Figs., 5 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052730
USE OF ELECTRONIC COMPONENTS IN SIGNALLING. HOW CAN SAFETY BE GUARANTEED BY MEANS OF ELECTRONIC PROCESS COMPUTERS USED IN SIGNALLING TECHNIQUES? INTRODUCTION AND DEFINITION OF PROBLEMS

The report deals, in the form of an introduction, with problems related to guaranteeing safety when electronic process computers are used in signalling.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A118/RP 9/E, Oct. 1975, 23 pp, 6 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052738
APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. SIGNAL INSTALLATION INTERFERENCE FROM THE OPERATION OF THYRISTOR CONTROLLED TRACTION VEHICLES ON THE CSD RAILWAY SYSTEM

Interference in track circuits by thyristor controlled traction vehicles (for 25 kV/50 Hz) was investigated by CSD during 1970/1971. Measurements of 25 Hz, 75 Hz and 275 Hz track circuits did not produce any values exceeding the permissible limits. For 400 Hz track circuits, however, unacceptably high interference values were determined. Of the three different traction vehicles used thyristor controlled electric trainset SM 488.00 caused the greatest interference.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A122/RP 20/E, Oct. 1975, 24 pp, 24 Fig., 5 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 052803
STUDY OF SIGNALLING RELAYS WITH A VIEW OF OBTAINING THE LONGEST LIFE IN SERVICE HAVING REGARD TO THEIR PHYSICAL DIMENSIONS

In this report an account is given of the tests, their results and interpretation; these tests were deemed necessary by the A31 Specialists Committee in order to complete the task with which it had been entrusted, viz. the compilation of a statement on the measures required to increase the duration of life or to reduce the dimensions of a safety relay. Test results, the findings obtained by the Specialists and other data are compared with each other and the essential conditions are laid down which have to be met by the constructional elements of a safety relay, in order to ensure the operational security of the relays. These essential points were summed up in the "Conditions for safety relays" (both for proved and non-proved relays). While taking these conditions as a basis, the questions involved by the task to be completed (increased duration of life or reduction in the dimensions of a safety relay) can be answered as follows: 1. If a type of relay meets the minimum requirements contained in the above "Conditions for safety relays", it also meets the requirement pertaining to the minimum duration of life considered to be feasible in an economic respect (for defined contact loads: 2.10 to 6th power switching operations, equivalent to an average duration of life of 20 years) without entailing additional manufacturing costs. 2. The reduction in the dimensions of the relay is set limited by: (a) the conditions bearing on contact gaps and contact pressure, (b) the minimum distances between "live" components of the contact and its connections considered necessary for the sake of safety, (c) the power input of the coil. However, these possible minimum dimensions cannot be realized, amongst other factors, because of: (a) the use made of the relays (e.g. for section block installations) (b) the cross sections of the cable conductors, and (c) switching principles. The advantages and disadvantages resulting from the reduction in the dimensions of the relays are briefly mentioned in the report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. A31/RF/E, Oct. 1962, 110 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052808
SHUNTING SENSITIVITY OF TRACK CIRCUITS. ELECTRICAL CONTACT BETWEEN RAIL AND ROLLING WHEEL IN THE CASE OF OXIDISED SURFACES. IMPEDANCE OF WHEEL-SETS AS A FUNCTION OF THE FREQUENCY

No Abstract.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A4/RP 7/E, Mar. 1962, 30 pp, 45 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052809
SHUNTING SENSITIVITY OF TRACK CIRCUITS

This report briefly recalls in the first place the problems entrusted to the Specialists Committee. The report then discusses the theoretical studies and laboratory tests made in order to determine the nature of the physical phenomena concerned and the conclusions deduced from these tests. These studies and tests have been described by the following reports: "Interim Reports" No. 1 of July 1957, No. 4 of November 1958, No. 5 of November 1960 and No. 7 of March 1962. It is emphasized that these investigations have shown that there are sound reasons for replacing the previously customary concept of the "shunt limiting resistance" (that is that greatest ohmic resistance which, when it becomes effective between the rails of an insulated section, is still capable of de-energising the track relay) by the new concept of the "disruptive voltage" or "breakdown voltage", so as to take into account those cases where an insulating layer exists between rail head and tyre, which has to be "broken down" by means of a high voltage. Especially recommended, in order to ensure correct functioning of a track circuit in any possible operating conditions likely to be met, is the high-voltage impulse track circuit, which has been developed by the SNCF and which this Administration uses on non-electrified lines just as much as on line electrified at direct current or at single phase alternating current. This solution, which has been described in Interim Report No. 3 of March 1958, consists in the use of short high-voltage impulses (in the order of magnitude of 100 V during several milliseconds) for feeding the track circuit. It therefore permits the employment of considerable power on the one hand and, because the track is not constantly "live", avoids any danger to the personnel on the other hand. However, the maximum value of the voltage used permits to achieve a break down of even heavily oxidised layers or thick layers of other impurities which may cover the rail surface. Furthermore, the employment of high-frequency track circuits may be mentioned as a recommended solution. The report gives details on the frequencies which are actually used. Furthermore, the report gives an account of the tests made by the FS for the determination of the axle impedance as a function of the frequency. The problem of sanding is likewise dealt with by way of a summary concerning the conclusions in which the many tests made by the SNCF, and partly also those made by the NS, have resulted. The solutions which are to be adopted in practice have been summarized in Interim Report No. 6 of November 1960. Finally, full information is given concerning the question of the functioning of track circuits when passed by vehicles equipped with disc brakes.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. A4/RF/E, Mar. 1962, 16 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052814

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. THEORETICAL INVESTIGATIONS TO DETERMINE THE DISTURBANCES OF SIGNALLING AND COMMUNICATION INSTALLATIONS CAUSED BY THYRISTOR-CONTROLLED LOCOMOTIVES

This report covers the investigations which were required to determine the relevant factors for enabling a theoretical calculation of interference to be made. An "influence model" was constructed consisting of the four principal elements: data transmitter, noise source, transmitting medium, and object of interference. These basic elements are more closely defined from the standpoint of reciprocal connections and inter-relationships, and mention is made of the difficulties of covering all the parameters. The methods so far adopted for determining the disturbances enable only certain questions of detail to be solved. It is therefore suggested that statistical methods be used. Further investigations will be required, however, in order to enable a method of solution to be formulated, and these are covered in an action scheme.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A122/RP 1/E, Oct. 1971, 21 pp, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052815

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. EFFECTS CAUSED BY 16 2/3 THYRISTOR CONTROLLED MOTIVE POWER UNITS ON 100 HZ TRACK-CIRCUITS WITH MOTOR-TYPE RELAYS

This report describes the investigations carried out concerning the effects caused by 16 2/3 thyristor controlled motive power units on track-circuits with 100 Hz motor-type relays. The disturbances observed on the motor-type relays have been mainly attributed to the influence of the 6th harmonic of the traction current. However, the investigations have shown that the motor-type relays are above all influenced by the fundamental wave of the high traction currents. Only in certain special cases can the 6th harmonic reach such a value where its influence produces not only an operational disturbance but also an operational danger. The nature and extent of the possible disturbances are described, and also the measures for remedying these.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A122/RP 2/E, Oct. 1971, 16 pp, 1 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052816

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. EFFECT OF BOOSTER TRANSFORMERS ON THE MAGNITUDE AND PROPAGATION OF HARMONICS PRODUCED BY THYRISTOR CONTROLLED MOTIVE POWER UNITS

This report concerns various investigations made by the SJ for the purpose of reducing the electro-magnetic coupling between a.c. overhead contact systems and telecommunication circuits laid alongside the track. After as early as 1943/44 comparative tests were made with and without booster transformers in operation with conventional a.c. locomotives, the measurements in 1970/71 were made after the introduction of the thyristor controlled Rc 2 locomotive. The results show that the values of the induced weighted longitudinal electromotive force were considerably reduced when use was made of booster transformers.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A122/RP 3/E, Apr. 1972, 17 pp, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052817

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. TESTS TO COMPARE THYRISTOR- CONTROLLED TRACTIVE UNITS FOR 16 2/3 HZ ON THE SAME TEST TRACK

This report covers the results of comparative measurements which, in 1970 and 1971, were taken with thyristor- controlled locomotives of different administrations (181 series of the DB, Rc 2 of the SJ and Re 4/4 of the BLS) on the systems of the German Federal Railway and the Swedish State Railways. The object of these investigations was to ascertain whether it would be possible to explain the different results of tests as being due to the various supply systems, as previous studies of UIC Study Group 5/A/22 gave reasons to assume. The comparative measurements showed that, with the exception of the one overhead contact system on the test track of the SJ which was fed from one side only, the connection for feeding the overhead contract system did not exert an appreciable effect on the magnitude of the interfering current. The difference between the interfering currents of the three locomotives was mainly due to the varied stray reactions of the transformers.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A122/RP 4/E, Oct. 1972, 41 pp, 27 Fig., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052818

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. ADDITION OF PSOPHOMETRICALLY WEIGHTED INTERFERING CURRENTS PRODUCED BY SEVERAL THYRISTOR-CONTROLLED A.C. TRACTIVE UNITS

This report contains an account of the measurements taken by several railway administrations (SJ, SNCF and DB) on lines electrified with a.c., to ascertain the extent to which interfering currents increase when several thyristor-controlled tractive units are used in a section fed from the same supply points. The tests which, independently of one another, were made on various systems (15 kV, 16 2/3 Hz and 25 kV, 50 Hz) showed that the addition of the psophometrically weighted interfering currents which arose in the overhead contact system when several thyristor-controlled tractive units had been running was almost vectorial in relation to the number of tractive units. In addition, the effects on existing telephone circuits were determined at the same time, the results measured being also included in this report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A122/RP 5/E, Oct. 1972, 25 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052819

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. INTERFERENCE FROM CHOPPER CONTROLLED LOCOMOTIVES: INVESTIGATIONS ON THE 1.5 KV SNCF SYSTEM

The report describes measurements obtained in 1971 and 1972 by the French National Railways (SNCF) with a chopper controlled test set with a nominal rating of 4,400 kW, consisting of the two CC 20002 and BB 9252 locomotives. The purpose of these investigations was to determine the conditions, under which high power chopper controlled tractive vehicles may be used in normal services without causing interference in signalling and telecommunicaitons installations. The tests, therefore, mainly covered chopper sets consisting of six individual out-of-phase choppers as well as the choice of frequencies used in starting and their influence on track circuits and open telecommunications lines. By suitable division of the fundamental frequency the frequencies required during starting can be fixed so that the chopper harmonics will not coincide with the track circuit frequency bands.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A122/RP 17/E, Apr. 1975, 43 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052820
SAFETY DEVICES FOR TRACK LAID ON CONCRETE OR STEEL SLEEPERS. ELECTRICAL PROPERTIES OF A TRACK LAID ON WOODEN SLEEPERS AND PRACTICAL DETERMINATION OF ITS ESSENTIAL CHARACTERISTIC DATA

No Abstract.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A25/RP 6/E, Apr. 1963, 71 pp, Figs., 6 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052821
SAFETY DEVICES FOR TRACK LAID ON CONCRETE ON STEEL SLEEPERS. THE ELECTRICAL INSULATION OF RAILS ON CONCRETE SLEEPERS

This report deals with the insulation resistance of a concrete sleepered track section (electrical resistance between the rails). The increased use of concrete sleepers in the open track has given rise to difficulties in the case of long track circuits as required for automatic block installations. According to the location of the track section and the design of the concrete sleeper, these difficulties, arising from insufficient insulation resistances of the section, were of a more or less serious nature. The results of these measurements show that most concrete sleeper designs with the insulating means used in the test sections can only guarantee the minimum insulating values for the operation of track circuits under favorable conditions, i.e. when the ballast bed is dry; under unfavorable conditions, such as, for example, prolonged rain, large moisture content of the ballast bed, the values of the insulation resistance of concrete sleepered sections are decreased to magnitudes lower than the required minimum values, i.e. much lower than those of wooden sleepered sections.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A25/RP 7/E, Oct. 1963, 32 pp, 50 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052822
SAFETY DEVICES FOR TRACK LAID ON CONCRETE ON STEEL SLEEPERS. SUMMARY OF THE STUDIES OF THE COMMITTEE

The present Final Report contains a short survey of the contents of Interim Reports 1-7: RP 1: The electrical resistance of track circuits on tracks with wooden, concrete and steel sleepers as well as ways and means of improving the insulation, June 1957, RP 2: Study of the electrical characteristics of a track circuit, June 1957, RP 3: Methods of computing track circuit, June 1957, RP 4: Questionnaire on the insulating properties of track laid on wooden sleepers, March 1959, RP 5: Axle counters, March 1959, RP 6: Electrical properties of a track laid on wooden sleepers and practical determination of its essential characteristic data, April 1963, RP 7: The electrical insulation of rails on concrete sleepers, October 1963. The second chapter deals with the further development of the technique of insulating means and that of axle counters to the present state. Chapter 3 contains the conclusions obtained from all the studies, more especially those concerning the lower limit of the insulation resistance and the reliability of the axle counters. Finally, a survey is given of those problems recommended for additional research.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. A25/RP 8/E, Oct. 1964, 13 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052825
PROPAGATION OF RADIO WAVES. CLASSIFICATION OF RAILWAY TERRAIN FOR RADIO PROPAGATION

The report gives reasons for the advantages to be derived from constructing basic radio propagation curves for areas containing railway structures and deals with the principles of this process. It also gives a detailed classification of the types of terrain, which will latter be used as a basis for further work. Classification deals separately with stations, open routes and tunnels. Results for each of these types are given in the shape of tables. The use of the classifications for the planning of radio links, before the final propagation curves are produced, is facilitated by a list of publications concerned with radio propagation which is also included in this report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A133/RP 1/E, Apr. 1975, 34 pp, 5 Fig., 35 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052860
TEST INSTALLATION FOR DATA TRANSMISSION (VIENNA ARSENAL). TESTS MADE IN THE INSTALLATION FOR TESTING DATA TRANSMISSION EQUIPMENT FROM 4TH OCTOBER 1967 TO 31ST AUGUST 1968

Since the placing in operation of the measuring installation five items (modems or systems) have been tested, and testing of a sixth item has been begun. The test results are given in comparison tables and comparison curves. At the end of the first financial year of the measuring installation, operation of the complete data transmission equipment, including peripheral equipment was checked. The measuring results showed far-reaching agreement with those obtained from the measuring installation the year before (after it had been put in operation). This proved that the control of the operation of the equipment was satisfactory through-out. This report is only available to Member-Administrations of ORE.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 32/RP 1/E, Oct. 1969, 105 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 052861
TEST INSTALLATION FOR DATA TRANSMISSION (VIENNA ARSENAL). TESTS MADE IN THE INSTALLATION FOR TESTING DATA TRANSMISSION EQUIPMENT FROM 1ST SEPTEMBER 1968 TO AUGUST 1969

This is the second annual report of the Installation for testing data transmission equipment in Vienna which was set up jointly by the Office for Research and Experiments (ORE) of the International Union of Railways (UIC) and the Austrian Federal Institute for Research and Experiments. In the course of the financial year, five modems have been tested of which four with frequency modulation rating 600/1200 bauds and one with quaternary phase modulation rating 1200/2400/3600 bauds, but this report only contains the results obtained from four systems. The measuring programme for 2400 bauds has been modified so as to allow for possible correction devices present on the modems. The measuring installation has finally been fitted with a new error analyser, through an outer signal timing element (that of the tested modem, for example), enables measurements to be conducted to 4800 bauds.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 32/RP 2/E, July 1970, 96 pp, Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 053081
TRANSMISSION OF INFORMATION BETWEEN RAIL AND MOTIVE POWER UNITS. EVALUATION OF THE TENDERS RECEIVED FROM INDUSTRY
Interim Report No. 2 reports on the call for tenders issued in order to obtain a survey of the information transmission systems now available. The offered systems can be divided into 3 groups: those for transmitting continuously between given points, with the rail functioning as conductor; those for transmitting continuously between given points, and those for transmitting information at selected points. In order to arrive at an objective comparison of the systems forming part of the above groups, basic problems concerning transmission reliability and coding were studied and evaluation methods developed. This should lead to an evaluation method awarding merit marks to the various systems. A mutual comparison of the groups would meet with difficulties because the systems are fundamentally different. Also the possibilities offered by these systems to railway operation may be of divergent nature. The conclusions contained in this report are restricted to a comparison of the proposed transmission systems. During future studies the operating programme should be taken into account before taking a definite choice.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A46/RP 2/E, Oct. 1963, 30 pp, 6 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 053082
STUDY OF THE EFFECT OF THE HEATING RETURN CURRENT FROM THE CARRIAGES TO THE LOCOMOTIVE ON TRACK CIRCUITS
The introduction of an electric train heating system for Diesel traction has been considered by the Specialists dealing with the question of train heating. Disturbances to signalling installations (track circuits), caused by the return current of electric train heating plant, have so far prevented the use of electric train heating on non-electrified lines. Special measures are required to eliminate these disturbances. The present report deals with the problmes which arise in this connection in the field of the signalling technique. (1) Introduction of an electric train heating system insulated from the mass of the vehicles. And (2) Introduction of an electric train heating plant, according to UIC-leeflet No. 552, requiring special measures for the protection of the track circuits. The costs for both solutions have been estimated for some Administrations.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A48/RP 1/E, Oct. 1959, 35 pp, 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 053091
DATA TRANSMISSION BY MEANS OF RAILWAY TELEPHONE CIRCUITS AT SPEEDS EXCEEDING 600 BAUDS. EVALUATION OF THE MEASUREMENTS CONDUCTED ON EXISTING TELEPHONE CIRCUITS. (TEXT AND APPENDICES)
Measurements and data transmission tests were conducted to obtain information on the properties and possible use of existing telephone circuits. During the selection of the circuits to be incorporated into the programme of measurements, the Committee has made an attempt at selecting a representative number of types of each group (number of circuits with similar technical properties, e.g. carrier frequency connections) of circuits, which are considered for data transmission on railway systems. Therefore, the measuring programme does not include circuits which are known for their high noise voltages. During the overall assessment, the existance of such connection should however be taken into consideration. The measurements themselves and their immediate results were described in Interim Report No. 2. Interim Reports Nos. 2 and 3 are complementary, since this Interim Report No. 3 describes the evaluation and assessment obtained by Professor Marko from the results of the measurements. In connection with this contribution by Professor Marko the Committee describes the experience gained from the measurements and the conclusions drawn from the evaluation of the results for the railways. Finally, there are references to the work planned, and to subsequent work. The measuring records concerning the tests on the radio link Frankfurt-Essen and the results of the evaluation made by the Olivetti firm are appended to this report.
Restrictions on the use of this document are contained in the explanatory material. This report is in 4 volumes (text, appendices 1, 2, 3) all under the same accession number.

International Union of Railways A76/RP 3/E, Oct. 1965, 87 pp, Figs., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 053092
DATA TRANSMISSION BY MEANS OF RAILWAY TELEPHONE CIRCUITS AT SPEEDS EXCEEDING 600 BAUDS. DESCRIPTION OF MODEMS, TERMINAL EQUIPMENT, TRANSMISSION EQUIPMENT AND DATA TRANSMISSION SYSTEMS
The present document contains an account of the studies on the constituent components of data-transmission systems, which components may be interconnected. Apart from a description of the operating principles of the instruments, the instruments now available on the market and their main characteristics are enumerated in this report.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A76/RP 4/E, June 1967, 109 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 053156
ELECTRONIC TESTS INSTALLATION (VIENNA ARSENAL). TESTS MADE AT THE ELECTRONIC TEST INSTALLATION IN THE YEAR 1973/74 (FROM 1ST SEPTEMBER 1973 TO 31ST AUGUST 1974)
This is the seventh annual report on the electronic test installation, set up in Vienna Jointly by the Office for Research and Experiments (ORE) of the International Union of Railways (UIC) and the Austrian Federal Research and Test Institute for data transmission and electronics questions relating to railway engineering. The work carried out in the year covered by the report focused on two subjects: The testing of a series of data transmission equipment (MODEMS), of which reports on 4 types are presented here. Thus, the number of modem types included in the comparison tables and curves given in Appendix B has increased to 20. On the question of transmission of information through the automatic coupler, tests with equipped trains were carried out by the FS and the DB for the committee A 103. A summary of this work is contained in the report.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ32/RP 7/E, Apr. 1975, 116 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

06 093378
NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 4A. SIGNALING AND COMMUNICATIONS
The report includes description of the present signal systems, recommendations and description of the changes required to support high-speed passenger service, and corresponding cost estimates for the Northeast Corridor (Washington, D.C. to Boston, Massachusetts). Recommendations and descriptions cover the areas of proposed signal systems, track circuit requirements, impedance bonds, hazard protection devices, control systems,

communications systems, training devices, installation schedule, and estimates of costs to procure and install such systems. Typical construction and installation specifications are included as an appendix.
See also report dated Apr 75, PB-243 419.

Williams, J Pipas, G
Bechtel Corporation, Federal Railroad Administration Final Rpt. FRA/ONECD-75/4A, Sept. 1975, 110 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Micfofiche
PB-245956/8ST, DOTL NTIS

06 127637
AUTOMATIC TRAIN CONTROL AND COMMUNICATIONS FOR WASHINGTON METRO
The automatic train control and the communication systems for the Washington Metro rail are outlined.

Greenway, JP (Washington Metropolitan Area Transit Authority); Sheldon, RH *Communications Society Newsletter* Vol. 12 No. 6, Nov. 1974, 9 pp, 11 Fig.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

06 129655
BRITISH RAILWAY SIGNALLING. THIRD EDITION
The authors outline the development of British signalling and give details of the types of signal (semaphore, colour- light), allied safety devices, the block system, power operation, automatic warning systems and automatic train control, emergency working, and other signalling systems. /TRRL/

Kichenside, GM Williams, A
Allan (Ian) Limited, (07110 05710) 1975, 120 pp, Figs., Tabs., Phots.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 400172)
PURCHASE FROM: Allan (Ian) Limited Terminal House, Shepperton TW17 8AS, Middlesex, England Orig. PC

06 129783
PROGRESS IN SIGNALING FOR TRACK GUIDED SYSTEMS
The advantages of tracked systems over nontracked systems, e.g. the case of automation, are presented. Vehicle detection and communication are critical in automatic systems because of the safety, reliability, and cost factors. Current methods of tracked vehicle detection and communication are reviewed: fixed and moving block systems, the use of crossover wires and the choice of signaling frequencies. The advantages of using high frequencies and surface electromagnetic waves are given and current high frequency methods under investigation are reviewed. Because of the high cost of installing wavesguides alongside the track, an innovative method is proposed in which the track is used as a surface waveguide. A block diagram of a headway control and collision avoidance system is illustrated. The results are presented for the analysis of a rail adapted to form a waveguide and these indicate the feasibility of this idea.

McAulay, AD *ASCE Journal of Transportation Engineering* Vol. 101 No. TE4, 11695, Nov. 1975, pp 621-637

ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering
PURCHASE FROM: ASCE Repr. PC
DOTL JC

06 129794
TELECOMMUNICATION CABLES FOR THE FIRST ELECTRIFIED LINE ON THE KOREAN RAILWAYS [Cable de telecommunication pour la premiere ligne electrifiee des chemins de fer coreens]
Thirty-eight twin cables which were laid when the Korean National Railroad (KNR) was electrified (25 kV 50 Hz), provide telecommunications links for different transmission systems which serve a variety of purposes. They are designed to stand up to very severe geographical and climatic conditions and to high-density traffic conditions. The author mentions the measures taken to eliminate interference caused by thyristors and describes the cable configurations, the particular characteristics of certain lines and the precautions taken when they were laid. [French]

Rachel, H *Siemens Review* No. 6, Sept. 1975, pp 223-229, 8 Fig., 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

06 129814
ELECTRIFICATION AND CONTROL SYSTEMS FOR LIGHT RAIL SYSTEMS
This paper provides a broad overview of available electrification and control system technologies for new light rail systems. It is intended for groups with widely diverse backgrounds ranging from city planners to economists and consequently does not deal with detailed, specific, technical design parameters. The portion on electrification is subdivided into sections on power generation, distribution, and collection on the light rail vehicle. The portion on control systems is broader and is divided first into propulsion control on the vehicle and then into systemwide operational control features that are further subdivided into sections on control on the vehicle, control among a number of vehicles, control as a central status reporting area, and automation. The paper concludes with general recommendations for a typical light rail system but recognizes that conditions mights require additional or fewer optional features. This is done to emphasize the flexibility and adaptability of light rail systems.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Touton, RD, Jr (Klauder (Louis T) and Associates) *Transportation Research Board Special Reports* No. 161, 1975, pp 86-92

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

06 129831
CALCULATION OF THE PROCESSES OF DYNAMIC INFLUENCE WITH A SYSTEM OF INTERMITTENT AUTOMATIC CONTROL OF TRAIN RUNNING [Berechnung des dynamischen beeinflussungsvorgangs eines induktiven, punktformigen Zugbeeinflussungs-systems]
No Abstract. [German]

Abel, L Nitschke, E *DET Eisenbahntechnik* Vol. 23 No. 9, Sept. 1975, pp 407-409, 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany

06 129970
AN AUTOMATIC BLOCK SYSTEM OF A NEW TYPE GIVES FOR THE PRE-METRO A MODERN SOLUTION TO THE PROBLEM OF PUBLIC TRANSPORT IN VILLAGES OF AN AVERAGE IMPORTANCE [Un block automatique de type nouveau fait du pre-metro une solution moderne au probleme des transports en commun dans les villes de moyenne importance]
In order to attain its objectives transit must fulfil A certain number of conditions of which the main are: comfort, speed and frequency. The first part of the paper describes how to optimize the commercial speed and how to obtain, by A rational block system, a short vehicle headway, at the same time ensuring safety. The notions of mobile block, fixed block and buffer block are dealt with and illustrated by suitable applications. The second part gives a detailed description of the solution chosen for the Brussels pre-metro: four aspect block system controlled by logic fail-safe devices based on fully static technology, duplicated by pinpoint speed control using inductors and pick-up coils. The pre-metro so designed appears to be better able to solve public transit problems in medium size cities than does the traditional metro system. The covering abstract for the conference is IRRD no 215903. [French]

Brichaux, M *Traffic Control and Transportation Systems*Conf Paper 1974, pp 507-518, 6 Fig., 5 Phot.

ACKNOWLEDGMENT: Institute for Road Safety Research, Transport and Road Research Laboratory (IRRD 215933)
PURCHASE FROM: North-Holland Publishing Company 335 Jan van Galenstraat, Amsterdam, Netherlands Repr. PC

06 129971
TRAFFIC OPERATIONAL CRITERIA FOR THE AUTOMATION OF TRAIN SPEED CONTROL [Trafiktekniska Kriterier vid Automatisering av Hastighetsoevervakning]
The thesis presented is the result of research work on the subject of the traffic capacity theory. The main part of the thesis gives the definition of the term "traffic operational criteria" and analyzes the parameters that have influence on the traffic capacity of a line. The accepted definitions lead to the establishment of a general formula for minimal headways between two consecutive trains travelling in the same direction and it is also applicable to all levels of automatic train control. This makes it possible to proceed with the analysis of how different parameters can increase the traffic capacity of a line. As a result of a method of choice of an optimal automatic train control system for the imposed or desired traffic operational conditions was obtained. In addition, functions of different automatic train control and operation levels are described, systematized and classified. Also the existing information transmission techniques applied to different levels of automation in different railway companies are described and classified. [Swedish]

Masiewicz, A
Royal Institute of Technology, Sweden R&D Rept. No. 44, 1975, 153 pp, Figs., 18 Tab., Refs.

ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, Transport and Road Research Laboratory (IRRD 215493)
PURCHASE FROM: Royal Institute of Technology, Sweden Fack S-10044, Stockholm 70, Sweden Repr. PC

06 130673
SIGNALLING THE NEW LYON LINE OF THE PARIS/SUB-EST NETWORK FOR 260 KM/H AND MORE
Because fixed-aspect trackside signalling is not applicable for speeds of 250/300 kph, continuous cab signalling will be applied to the SNCF high-speed line. Braking distances of 7000 m are accommodated in five or six block-section increments conforming to the speed- curve/gradient characteristics of the line. Emergency stops within 5000 m are achieved with magnetic track brakes. The line is to be in operation by 1981.

Weber, O (French National Railways) *Rail Engineering International* Vol. 5 No. 8, Nov. 1975, pp 313-316, 5 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 130793
SAFE TRAIN SEPARATION IN MODERN RAPID TRANSIT SYSTEMS
Modern rapid transit systems are equipped with automatic train control, slip-spin control, brake assurance system and emergency braking system. Therefore, the reaction times and operating conditions are more predictable and the braking distances can be calculated with a high degree of confidence. This paper describes a computer model for designing speed profiles in a transit system to optimize headway and average speed characteristics without compromising safety margins. The model may also be used to calculate safety margins when the transit system operates under impeded mode conditions.

Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Atlanta, Georgia, July 14-18, 1975.

Kalra, P (Bechtel Corporation)
American Society of Mechanical Engineers 75-ICT-11, July 1975, 5 pp, 4 Fig.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC

DOTL RP

06 130798
REFINEMENT OF THE TECHNIQUE OF SIGNAL BOX MAINTENANCE [Soversenst vovanie tehnologii obsluzivanija centralizacii]
This article provides a scientific basis to the methodology for signal box preventive maintenance work. It also presents the test results (bench tests) obtained with the electric control mechanism of SP-3 type switches, in connection with high-speed train operation. The article goes on to explain a method of determining the period for verifying adhesion of the switch tongue to the stock rail. [Russian]

Kapitonenko, NG *Avtomatika, Telemehanika i Svyaz* Vol. 19 No. 10, Oct. 1975, pp 6-10

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mezhdunarodnaya Kniga Moscow G-200, USSR Repr. PC

06 130803
AUTOMATIC CONTROL OF POWERED UNITS [Automaticke rizeni trakcnich vozidel]
The Railway Research Institute in Prague has developed an electronic regulating device enabling completely-automatic running programmed according to the train schedule. The authors present the system's concept and outline the operation of blocks as well as the correlation of this system with the continuous automatic control of train running introduced on CSD main lines. Finally, they look into prospects for adapting automatic control on tractive units. [Czechoslovakian]

Pospisil, M Sula, B *Sbornik praci Vyzkumneho ustavu Zeleznicniho* No. 1, 1974, pp 7-28, 1 Fig., 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Czechoslovak State Railways Na prikope 33, Documentation Bureau, Praha 1, Czechoslovakia Repr. PC

06 130808
AUTOMATIC TRAIN DRIVING [Automatischer Lokfuhrer]
The article outlines the concept of automation and the use of computer techniques in the CSD for the automatic train driving of 20 motive power units on that railway. Test were carried out to determine speed settings for train journeys using a speed regulator, a tractive effort regulator and automatic braking equipment. These tests were also carried out for older model motive power units which were not necessarily designed for optimal use. A programmer works out the theoretical speed of the train. [German]

Skyva, L *Hochschule f Verkehrs F List Wissenschaft Zeitschr* Vol. 22 No. 1, 1975, pp 181-186

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hochschule fuer Verkehrswesen Friedrich List Friedrich List Platz 1, Dresden 801, East Germany Repr. PC

06 130811
MODULAR AUTOMATIC TRAIN-RUNNING CONTROL [Die modulare Zugbeeinflussung]
In a similar manner to electronic data processing, and unlike the present integrated systems, this modular system described by the author divides up all the aspects of the problem. Partial tasks are assumed by the different functional groups, i.e., the modules (blocks). The author explains the principles and the advantages of the system, and the functions of the various modules. [German]

Frank, W *Eisenbahntechnische Rundschau* Vol. 24 No. 10, Oct. 1975, pp 381-385, 1 Tab., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

06 130818
NEW METHODS FOR THE SUPPLY OF TELECOMMUNICATION INSTALLATIONS AND ELECTRONIC DATA PROCESSING EQUIPMENT. THE PROCESS COMPUTER PROJECT FOR THE MASCHEN MARSHALLING YARD [Neue Wege in der nachrichten und datentechnischen Beschaffung. Prozessrechnerbauvorhaben Maschen Rbf]
The author takes the example of the conclusion of the contracts for the provision of a process computer for the Maschen marshalling yard and shows how the clauses and conditions of contracts for the supply of telecommunications installations should be adapted to the specific technical requirements of an installation and how they should be given sufficient attention at commercial and technical level. [German]

Grunewald, H *Signal und Draht* Vol. 67 No. 9-10, Sept. 1975, pp 202-203

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

06 131016
INTEGRATED CIRCUITS IN THE EQUIPMENT OF THE PONAB DEVICE FOR HOT BOX DETECTION [Integralnye shemy v apparature PONAB]
No Abstract. [Russian]

Mironov, EG Brodnikov, IU *Avtomatika, Telemehanika I Svyaz* Vol. 19 No. 8, Aug. 1975, pp 8-10, 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Avtomatika, Telemehanika I Svyaz Mezhdunarodnaya Kniga, Moscow G-200, USSR Repr. PC

06 131017
NEVA 73: A CENTRALIZED TRAFFIC CONTROL SYSTEM [Dispecerskaja centralizacija "Neva 73"]
The article describes the Neva 73 centralized traffic control system, developed in the centralized control laboratory of the Signals and Telecommunications Section of the USSR Ministry of Communications' Central Research Institute. It describes the constructional diagrams of the main components, and gives the characteristics of subunits and units in the system. The outstanding feature of the Neva 73 System is that the multiplex and logic equipment works with silicon transistors, which have greater reliability and a wider temperature range for use than germanium transistors. The equipment uses low-power KT 201 B transistors and high-power KT 608 A transistors. [Russian]

Penkin, NF *Avtomatika, Telemehanika I Svyaz* Vol. 19 No. 8, Aug. 1975, 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Avtomatika, Telemehanika I Svyaz Mezhdunarodnaya Kniga, Moscow G-200, USSR Repr. PC

06 131023
WORK ON THE TRACK BY THE ENGINEERING DEPARTMENTS. 1.2
The first paper outlines the activities associated with work on the track which brings the Signal Department and Civil Engineer's Department into close contact and sometimes, conflict. It discusses the Signal Engineer's track problems and raises a number of particular ones which need a mutual approach for solution. It shows how machines have been developed to save time and manpower and ends with a pleas for greater co-operation between the two departments so that each may acquire a greater understanding of the other's disciplines. In the second paper the author describes briefly the history of track arrangements for both plain track and point and crossings before outlining the process of present day track renewals and drawing attention to problems relating to the installation of continuous welded rails. It shows how, in an endeavour to save time and reduce manpower, machines have been developed to assist both renewal and maintenance of track. The problems of maintenance are discussed and reference is made to the need for additional safety requirements for both men and machines.
Papers presented to the Institution of Railway Signal Engineers, December 1, 1975.

Kerr, F Goldie, J
Institution of Railway Signal Engineers Dec. 1975, 16 pp

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Institution of Railway Signal Engineers 1 Ashbourne Close, London W5, England Repr. PC

06 131042
LIGHTNING AND ITS EFFECTS ON RAILROAD SIGNAL CIRCUITS
This study discusses the occurrence of lightning, its effects on railroad signal equipment, and protection of such equipment from lightning damage, with special attention to known protective techniques which are employed in a variety of situations in the power, communications, and railroad industries. A brief review is offered of the causes of lightning and other surges, followed by an extensive treatment of the means by which lightning and power-line transients induce surges and over-voltages in signalling circuits. Specific topics include the effects of the direct stroke current, the collapsing electric field when the stroke occurs, inductive coupling, and the effects of ground currents in the earth. A survey of protective devices and techniques currently in use for specific types of equipment is presented, including categorization of arrestors by type and application. Preferred lightning protection practices in railroad signalling are examined and related to practices in other fields. The problem of lightning protection is addressed from an overall systems viewpoint, encompassing development and testing of protective systems and design of systems, so that they can more easily be protected. Recommendations for future research are made.
Lowell Technological Institute is under contract to Transportation Systems Center.

Holmstrom, FR
Lowell Technological Institute Research Foundation, (DOT-TSC-FRA-75-21) Final Rpt. FRA-OR&D-76-129, Dec. 1975, 106 pp, 16 Fig.

Contract DOT-TSC-589

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-250621/AS, DOTL NTIS

06 131230
CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT
Proceedings includes 31 papers dealing with various aspects of traffic and vehicle control, with emphasis on guided vehicles and the use and development of magnetic levitation techniques. A major portion of papers is devoted to urban rapid transit systems.
Proceedings of a meeting in London, Aug. 28-30, 1974.

Institution of Electrical Engineers Conf. Publ No. 117, 1974, 239 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

06 131249
HIGH SPEED TRAFFIC SIGNALLING
After recalling the SNCF's present signalling principles for speeds up to 200 km/h (RABIP System: On board repetition of pin-point information), the paper presents the basic specifications and technology of the future system to allow a maximum speed of 300 km/h. This system should qualify for all operational requirements for a least a 15 years period. It is a four carrier frequency system (1,700, 2,000, 2,300, 2,600 Hz), with an electronic audio-frequency track circuit, with no insulating joint, but with an electric separation joint (parallel resonant circuit), transmitting 10-bit continuous information and possibly pin-point information.
International Engineering Conference paper. 150th Anniversary of Passenger railways.

Weber, G
Institution of Mechanical Engineers Sept. 1975, pp 176-182

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Institution of Mechanical Engineers 1 Birdcage Walk, Westminster, London SW1H 9JJ, England Repr. PC

06 131269
REED RELAYS IN REMOTE CONTROL EQUIPMENT [Magnitoupravljaemye Kontakty v Ustrojstvah avtomatiki i telemehaniki]
The article describes the design, operation and applications of this type of relay in railway remote control installations. It points out their advantages and mentions various installations where this type of relay is used. Recommendations are made concerning types of circuits and installations for which this relay is well adapted. [Russian]

Kovriga, AN *Avtomatika, Telemehanika i Svyaz* Vol. 19 No. 12, 1975, pp 12-15, 1 Fig., 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mezhdunarodnaya Kniga Moscow G-200, USSR Repr. PC

06 131270
ELECTRONICS: ITS PLACE ON THE MODERN RAILWAY AND THE ATTENTION IT DEMANDS IN SERVICE
The paper identifies the growing application and importance of electronics in railway signalling systems and assesses the engineering and managerial responsibilities which must be recognised and met for the effective operation of such electronic equipment.

Buchanan, IC
Institution of Railway Signal Engineers Jan. 1976, 12 pp, 4 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Institution of Railway Signal Engineers 1 Ashbourne Close, London W5, England Repr. PC

06 131275
AN ELECTROMAGNETIC BRAKE FOR MARSHALLING YARD HUMPS [Elektromagnitnyj putevoj zamedlitel]
The article describes the design and the operation of the "EMZ" electromagnetic brake which is used in the USSR for brake wagons at marshalling yard humps. Brake resistance is determined by the electrodynamic brake control and mechanical friction. In the three years that they have been used, EMZ brakes have proved to be extremely effective. [Russian]
Also available in the English edition entitled "Automation and Remote Control" from ESL.

Molodcov, VP *Avtomatika, Telemehanika i Svyaz* Vol. 19 No. 12, 1975, pp 6-8, 2 Fig., 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mezdunarodnaya Kniga Moscow G-200, USSR Repr. PC

06 131277
A CONTRIBUTION TO THE REGULATING OF HEADWAY AND SAFETY OF RAILWAY VEHICLES [Ein Beitrag zur Abstandsregelung und Sicherung von Schienenfahrzeugen]
Following certain criticisms of present systems for the automatic control of train running, this article is intended to give some basic ideas on regulating and maintaining the headway between trains. The author develops the idea of an automated system for train operation, using electronically simulated guided vehicles. [German]

Glimm, J *Archiv fuer Eisenbahntechnik* Vol. 30 Dec. 1975, pp 21-33, 1 Tab., 14 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

06 131281
THE INFLUENCE OF TRACK CIRCUIT PARAMETER VARIATION ON MAXIMUM PERMISSIBLE LENGTH
In an article published in Rail International in June 1974. this author described a method for determining the maximum length and optimum terminal impedance for track circuits which are compatible with the system and the parameters defined in that paper. These parameters were assumed to be constant. This second article is a study of the influence of parameter variations on the maximum permissible length of circuits. The author discusses line resistance, line inductivity and terminal resistance to signals.

Iancu, OD *Rail International* Vol. 7 No. 1, Jan. 1976, pp 39-43, 1 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 131285
AUTOMATIC TRAIN CONTROL [Die Linienzug-beeinflussung LZB-ORE]
Description of a system for the continuous automatic control of train running. The system was developed by Brown Boveri in collaboration with the Swiss Federal Railways and is based on the specifications drawn up by the ORE A 46 Experts' Committee.

Bogdan, VM Hahn, HJ *Brown Boveri Review* Vol. 62 No. 12, Dec. 1975, pp 528-538, 6 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

06 131288
USE OF THE "WINDING" TECHNIQUE FOR SIGNALLING AND TELECOMMUNICATIONS IN THE DR [Einsatz der Wickltechnik im Hauptdienstzweig Sicherungs-und Fernmeldewesen der Dr]
The DR uses a technique for telecommunications installations whereby wires are wound around the contact-studs of the connection strips and are attached by counterpressure rather than by being soldered on the contacts. This technique is not used for signalling and safety equipment. [German]

Hubner, J Kleineberg, F *Signal und Schiene* Vol. 19 No. 12, Dec. 1975, pp 413-416, 3 Fig., 3 Tab., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Transpress VEB Verlag fuer Verkehrswesen Franzoesische Strasse 13-14, 108 Berlin, East Germany Repr. PC

06 131296
REMOTE DATA TRANSMISSION ON THE SOVIET RAILWAYS [Die Datenfernuebertragung bei den sowjetischen Eisenbahnen]
The article describes the structure and operating method of the Soviet Railways "Svetofor" remote data transmission system. By means of block diagrams, an explication is given of data source operations and data transmission and sending equipment, without going into detail. [German]

Busse, H *Signal und Schiene* Vol. 19 No. 4, Apr. 1975, pp 123-126, 6 Fig., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Transpress VEB Verlag fuer Verkehrswesen Franzoesische Strasse 13-14, 108 Berlin, East Germany Repr. PC

06 131309
MEASUREMENT OF TRAIN SPEED AND LENGTH, THE NUMBER OF AXLES AND WAGONS, AND WAGON IDENTIFICATION BY HIGH FREQUENCY CIRCUITS [Messungen der Geschwindigkeit, der Laenge, der Achs und Wagenzahl sowie des Wagentyps von Eisenbahzuegen mittels hochfrequenter Gleisstromkreise]
A double symmetrical circuit is used which is supplied in the centre by a high frequency generator (40 to 80 kHZ) and closed at both ends by receivers. When the circuits are short-circuited by the axles of a train, the voltage and current intensity indicated train speed variations in speed along the entire circuit, train length and the number of axles. The main categories of rolling stock can even be distinguished (locomotives, coaches, bogie and axle wagons) by the space between axles. The author describes the principles of this equipment and suggests using it as a passive detector of information on train running for control desks. As such, they could replace the active transmitters on trains. [German]

Pagel, EO *Eisenbahntechnische Rundschau* Vol. 24 No. 6, 1975, pp 225-229, 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

06 131319
SEEING ROUND THE BEND
As the speed of vehicles and the density of traffic increase, transport networks are going to need reliable communications system if they are to run efficiently and if present safety standards are to be maintained. Today, attention is being paid mostly to services in which vehicles run along set paths, such as railways, where means of transmitting intelligence are needed for obstacle detection as well as for ordinary communication.

Midgley, D Boness, KD *Railway Engineering* Vol. 19 No. 5, Sept. 1975, pp 3-10, 6 Fig.

ACKNOWLEDGMENT: Railway Engineering
PURCHASE FROM: Thomson Publications SA (PTY) Limited P.O. Box 8308, Johannesburg, South Africa Repr. PC
DOTL JC

06 131532
MAINTENANCE OF THE RAILWAY SIGNALLING SYSTEM ON LONDON TRANSPORT
The author introduces his paper as complementary to his earlier paper 'Fail Safe' presented in the 1966/67 session and considers the Maintenance Engineer's approach to the problems. He reviews the limitations preventing perfect maintenance and shows how statistics and failure analysis can be used to identify and reduce maintenance diffculties. The pattern of maintenance adopted by London Transport is described together with the measures employed for routine overhaul of equipment.

Hadaway, HW
Institution of Railway Signal Engineers Feb. 1976, 11 pp

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Institution of Railway Signal Engineers 1 Ashbourne Close, London W5, England Repr. PC

06 131623
THE MINICOMPUTER--A FEASIBLE TOOL FOR AUTOMATING THE DISPATCHING FUNCTION
The use of minicomputers for automating the dispatching function is a logical step in the further evolution of mainline railway control systems. Historically, each logical step in the evolution is the result of a previous system becoming too limited to fulfill the new demands being placed upon it.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Morse, CW (General Railway Signal Company)
Institute of Electrical and Electronics Engineers C76 463-5 IA, Mar. 1976, 3 pp

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

06 131891
AUTOMATIC BLOCK SIGNAL SPACING
Computer program uses the AAR TTD train operations simulator (TOS) to evaluate the spacing of each pair of signals on its signalled lines. For each pair of signals, the timetable tonnage and maximum authorized speed is determined for each approach signal, and the model determines if a full service application of the automatic brake will stop the train short of the next signal. This is a high volume production use of one of Track/Train Dynamics models. The Southern, in addition to evaluating the spacing of all its existing signals, has studied all new proposed signal installations. An interface was developed between the model and the Southern's computerized track characteristics master file to facilitate the high volume profile needs of this application.

Research, Southern Railway. Publication: AAR Track-Train Dynamics Train Operations Simulator User Manual (Publication No. R-198).

Southern Railway System, Association of American Railroads No Date

ACKNOWLEDGMENT: Southern Railway System, AAR
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

06 133569
SIMULATION OF THE AUTOMATIC TRAIN OPERATION (ATO) OF THE ELECTRIC RAILCARS FOR SHINKANSEN
ATOMIC is the automatic train operation (ATO) system, based on a minicomputer, which is being tested for the high-speed trains on the New Tokaido Line. The system has been simulated to study extension of its functions and to promote its practical application. Simulation by high speed digital computer allowed estimation of its control accuracy in advance of performance tests on prototype cars. Road testing is not easy and the simulation model can be used not only for its original purpose but for other train performance simulations.

Yasukawa, S Kaneda, H Hasebe, T Sato, K *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 191-192, 2 Fig.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

06 133570
MEASURING DEVICES OF TESTING CAR FOR SIGNAL APPARATUS
The measuring devices used for testing the wayside signal equipment of Japanese National Railways are described. All these are mounted on the high-speed inspection cars used on the New Tokaido line and on the conventional network. The functions checked are the ground coil for the automatic train stop device, the detector circuits used for grade crossing protection devices, and the regular track circuits. An elapsed distance system is also used for correlating measurements on the digital output tape. A computerized system is under study.

Kurotori, S *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 189-190, 4 Fig.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

06 133571
PERFORMANCE TEST OF HARD COPY EQUIPMENT FOR FREIGHT CAR LABEL
To collect inbound information on car numbers and destinations, Japanese National Railways initially tested video-tape recording equipment as a means of reducing manpower requirements. A different concept of hard-copy collection system has been under development and actual tests were made in 1972. Reflective paper labels applied to freight cars actuate the wayside recording equipment that then records the label information which includes elements necessary for classification purposes.

Sasaki, S Ishizu, I *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 187-188, 4 Fig.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

06 134059
PERFORMANCE OF LEAKY COAXIAL CABLES UNDER SOME INSTALLATION CONDITIONS
Leaky coaxial cables are influenced by environmental conditions, particularly where their coupling loss is small. Transmission loss increases as the cable is installed closer to a concrete wall. Coupling loss changes according to the extension of the cable in a range of about 8 db. The influence on the cable performance of installation conditions was studied under the leadership of the Japan railway construction public corporation in a test which was carried out along the sound insulation walls of the experimental line for the shinkansen (nation-wide railway network). The test cables were installed above the wall, in the pipe, on the wall, and beside the wall. It was also confirmed that rain or snow hardly affects the performance. Hitachi cable, ltd. Developed an antenna which was confirmed to effectively reduce the coupling loss and fluctuations of received signal level. This antenna has a horizontal pattern oriented in the radiation direction of the leaky coaxial cables. (A) /TRRL/

Okada, S Watanabe, N Watari, T *Hitachi Review* Vol. 24 No. 2, 1975, pp 109-114, 10 Fig., 3 Tab., 4 Phot., 4 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217388)
PURCHASE FROM: ESL

7601122

06 134062
INTEGER PROGRAMMING FORMULATION FOR DERIVING MINIMUM DISPATCH INTERVALS ON A GUIDEWAY ACCOMMODATING THROUGH AND LOCAL PUBLIC TRANSPORTATION SERVICES
Vehicles are dispatched at regular intervals from station zero to station j. Vehicles 1,3, ... Stop at all stations along the guideway while vehicles 2,4,... Proceed directly to station j. Stations accommodating local vehicles are off-line to enable through vehicles to pass the stations without delay. A mixed integer programming model is formulated with an objective of minimizing the time interval between dispatches of vehicles having identical operating patterns. The major constraints provide lower bounds on the headway between successive vehicles at the merge points just downstream from the off-line stations. (A) /TRRL/

Bergmann, DR (General Motors Corporation) *Transportation Planning and Technology* Vol. 3 No. 1, 1975, pp 27-30, 7 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217381)
PURCHASE FROM: ESL

06 134546
THE A.T.C. (AUTOMATIC TRAIN CONTROL) AND A.P.B. (ABSOLUTE PERMISSIVE BLOCKING) SYSTEMS IN AUTOMATIC TRAIN RUNNING [Los sistemas A.T.C. y A.P.B. en la conduccion automatica de trenes]
A paper read by the author at the Symposium on automatic train running, held in Madrid in March 1975. The author describes in particular the Societe Alsthom's A.P.B. symmetrical signalling system, for which the continuous track circuit serves as a basis. This system offers attractive new possiblities in automatic train running and signalling. He also describes the S.C.A.R. safety system (Systeme de conduite automatique par rapport a la vitesse limite), also developed by the Societe Alsthom for the Lyons Underground. [Spanish]

Lebrun, M
Asociacion de Investigacion del Transporte-AIT No. 6, Oct. 1975, pp 4-23, 12 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Asociacion de Investigacion del Transporte-AIT Madrid, Spain

06 134548
TRACK-LOCOMOTIVE TRANSMISSION THROUGH THE RAIL [Transmision via maquina por el carril]
A paper read by the author at the Symposium on automatic train driving, organised by the AIT in Madrid in March 1975. He describes a permanent track-locomotive data transmission system, based on the use of a track circuit with electrical separation joints. The article also mentions the track-side equipment and the devices aboard the locomotive, also the use of compensating blocks for increasing the range of track circuits on long-distance lines. The SNCF has an already tried out this system and plans to use it on the Paris-Lyons line. [Spanish]

Vanderventer, C
Asociacion de Investigacion del Transporte-AIT No. 6, Oct. 1975, pp 24-33, 13 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Asociacion de Investigacion del Transporte-AIT Madrid, Spain

06 134551
TECHNOLOGICAL VALUES AS THE MEANS FOR QUANTITATIVE DEFINITION OF THE PROCESS OF REPAIRING RAIL SAFETY INSTALLATIONS [Technologische Groessen als Mittel zum quantitativen Charakterisieren des Entstoerungsprozesses von Eisenbahnsicherungsanlagen]
The author gives briefly the characteristics of the breakdown service process as a system and determines the technical values such as average duration of a breakdown, average repair time, average running time without failure, journey time per breakdown, in the system. The author ends by mentioning the possibility of applying digital simulation to the breakdown service for signalling installations during technical research. [German]

Lahn, A *DET Eisenbahntechnik* Vol. 24 No. 1, Jan. 1976, pp 24-25

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany

06 134561
INSTALLATION METHODS IN POWER SIGNALLING
The author outlines a procedure for the planning and carrying out of modern major signalling installations, highlighting some of the problems which may be encountered and their possible solution.

Morton, WS
Institution of Railway Signal Engineers Mar. 1976, 11 pp, 9 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Institution of Railway Signal Engineers 1 Ashbourne Close, London W5, England

06 135168
FUNDAMENTAL CHARACTERISTICS OF SYSTEMS FOR CONTINUOUS DETECTION OF VEHICLE POSITION BY INDUCTION LINES
This paper proposes a multiphase induction-line vehicle position detection system. This system responds so quickly that it is applicable to a high-speed linear motor system. The basic principle of the proposed system and the detection accuracy characteristics of this system are discussed.

Itakura, E (Japanese National Railways); Sasaki, I *Electrical Engineering in Japan* Vol. 95 No. 1, Jan. 1975, pp 115-119, 3 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

06 135181
METHOD OF PROGRAM SYNTHESIS FOR FAILSAFE INTERLOCKING DEVICE IN RAILWAY SIGNALLING
The functions are analyzed of conventional interlocking relay devices used for train control. It is indicated which parts should be designed on the failsafe basis. A method is also proposed for synthesizing a failsafe logic system which is fed with non-failsafe inputs. A universal digital computer program using an interlocking matrix is proposed for the failsafe logic system. The effectiveness of the proposed method has been confirmed by field tests and 20,000-hour test operations.

Okumura, I (Japanese National Railways) *Electrical Engineering in Japan* Vol. 94 No. 6, Nov. 1974, pp 96-102, 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

06 135190
PROCESS CONTROL COMPUTERS APPLIED TO TRACK DIAGRAM INTERLOCKINGS
For the control of trains, primarily pushbutton interlocking, automatic block installation and alphanumeric train describer systems designed in modern technology are available. By means of these facilities stagewise automation has been achieved in the railway signaling technique; further stages were tested in the "Cybernetic Island Hannover", where the use of computers plays an essential role. The author treats the general problem of computer use for track diagram interlockings and describes the special functions and the technical solution.

Schmidt, J *Siemens Review* Vol. 42 No. 10, Oct. 1975, pp 415-419, 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

06 135191
SPEEDING TRAFFIC IN WEST GERMANY
A unique communication and train control system has allowed the German state railway system to decrease train headway markedly and increase train

speed on a high density, 100 km stretch of track between Hamburg and Bremen. A similar system has been installed at the Gotthard Tunnel, a major 32 km link between Italy and northern Europe. Operation of this system permits train headways (the time interval between two trains traveling in the same direction on the same route) to go as low as 60 to 90 seconds. The train control system handles three major tasks. First, trains are not allowed to exceed a certain speed limit, depending on their location in the network. Second, the system spaces trains at "the minimum braking distance", the minimum time needed to stop the train (depending on its speed) after it determines that a dangerous situation exists. And third, the system checks whether the switches are set up and locked within the minimum braking distance of a train. A series of computer complexes are located trackside at approximately 25 km intervals, each equipped with three 16-bit minicomputers with 24K words of memory. The next major component is the communication link between computer and train. In these systems, the link is called a "wiggle wire", and it lies on the ties between the tracks, looping around at the end of the line and endlessly crisscrossing itself at specific intervals as it returns down the tracks. The purpose of the wiggle wire is twofold. It is a 36/56 kHz fm digital communications link between the computer and the moving train, and it allows the computers to determine the exact location of the train. These and other chores are handled by on-board microprocessors that count the number of times the wire crisscrosses.

Trifari, J *Electronic Products Magazine* Vol. 18 No. 6, Nov. 1975, pp 65-66

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

06 135195
LONGITUDINAL TRACK TO VEHICLE COMMUNICATIONS
Two systems of track-train communications are among those being developed in the United Kingdom for use on train control projects. These are inductive loop communication at low frequencies and communication at radio frequencies using radiating cable. This paper outlines the salient features of the inductive loop system including the method of transmission, system security and special features and details the transmission principles and techniques, choice of frequency and possible applications for radiating cable.

Hutchings, BW (British Railways Board); Cree, DJ
Institution of Electrical Engineers No. 117, 1974, pp 153-169

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

06 135196
LONGITUDINAL CONTROL STRATEGY DERIVED FROM THE BASIC SAFETY CONSTRAINT
The work described in this paper is derived mainly from the authors' studies for the British Rail Autowagon system. However it is felt that the fundamentals of vehicle following investigated are relevant to a wider range of automated guided vehicle systems.
Prepared for Meeting August 28-30, 1974.

Thomas, PD Hopkinson, J
Institution of Electrical Engineers No. 117, 1974, pp 20-29, 11 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

06 135197
LONGITUDINAL CONTROL IN GUIDED TRANSPORTATION SCHEMES USING THE MOVING-CELL PHILOSOPHY
The longitudinal control of vehicles in automated transportation systems using the moving-cell approach is considered. A linear, sampled-data controller has been derived which has been shown to yield good vehicle response characteristics; the responses being optimal with respect to a defined quadratic performance index. An extended system model has been proposed which considers the problem of inaccessible state variables and which attempts to deal with the effects of random disturbances and measurement noise. The resulting optimum controller and linear state estimator have been shown to be extremely effective at maintaining the vehicle at or near to its desired position, and at smoothing out fluctuations in the rate of change of propulsive force, despite very noisy measurements and large input disturbances.
Prepared for meeting August 28-30, 1974.

Rumsey, AF (Manchester University, Institute of Science & Tech); Power, ET
Institution of Electrical Engineers No. 117, 1974, pp 30-37, 12 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

06 136271
AUTOMATIC CABLE TESTER FOR SAFETY INSTALLATIONS ON THE AUSTRIAN RAILWAYS [Kabelpruefautomat fuer Sicherungsanlagen bei den Osterreichischen Bundesbahnen]
No Abstract. [German]

Ploderer, H *Signal und Draht* Vol. 68 No. 1-2, Jan. 1976, pp 14-20, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

06 136404
TRACK CIRCUITS AND NEGATIVE BONDING
The paper discusses crossbonding of running rails to improve negative return path for propulsion current and to minimize electrolysis to adjacent structures. A standard application method is investigated to prevent interaction with railway train control systems when rails are used simultaneously for single rail track circuits or double rail track circuits. Application to audio frequency track circuits is discussed, and the effect of cross- bonding on broken rail protection is examined.
Am Transit Assoc (ATA) Rail Transit Conf, San Francisco, California, April 14-16, 1974. Power and Signals Sess. Available from NTIS, PB-234824, PB-234825, PB-234826.

Kalkhof, C (New York City Transit Authority)
American Transit Association Proc Paper ATA/RT-74/1,2,3, 1974, pp 80-117

ACKNOWLEDGMENT: EI
PURCHASE FROM: NTIS
DOTL NTIS

06 136566
RECOMMENDED PREREQUISITES FOR REPLACING CABS WITH SOR IN THE BART TRAIN CONTROL SYSTEM
An evaluation is given of the prerequisites for the replacement of the train control system for the Bay Area Rapid Transit (BART). The Sequential Occupancy Release System (SOR) has several potential advantages for long-range improvement over the currently used Computer Augmented Backup System (CABS): (1) better resolution capability--train occupancy information for more than 1500 individual blocks can be displayed; and (2) better maintenance capability--an automatic problem reporting system is compatible with the SOR system. SOR will, however, have some shortcomings with respect to certain operational problems, failsafe reliability, and failure detection. It is concluded that SOR, used as a backup system, can provide a level of safety comparable to that provided by CABS.

Scalise, DT Evans, DM Elischer, VF Louis, R
California University, Berkeley July 1975, 12 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
UCID-3776, DOTL NTIS

06 136567
LBL ROLE AND RECOMMENDATIONS WITH RESPECT TO PUC HEARINGS ON BART SAFETY APPLIANCES AND PROCEDURES
Methods are discussed for increasing the level of safety of the Bay Area Rapid Transit (BART) by reducing the susceptibility of the BART system to human error. Recent incidents clearly demonstrated the vulnerability of operations carried on in the manual mode. The recommendations emphasize that: (1) the potential of the automatic systems be more fully used, particularly with respect to maintenance vehicle detection; (2) the safety

regulations for manual operations be analyzed thoroughly; and (3) an intense task force be assigned to address high-priority problems.

Scalise, DT Evans, DM
California University, Berkeley Feb. 1975, 23 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

UCID-3775, DOTL NTIS

06 136568
EVALUATION OF BART, AUGUST 3 TEST FOR TRANSBAY SERVICE
A full-scale performance test is reported of the Computer Augmented Backup System (CABS) for the Bay Area Rapid Transit (BART). The test, involving 36 trains, was performed to analyze the original computer augmented train control system as it would operate in a failure situation. Recommendations for improved automatic safeguards were made to achieve two objectives: (1) to improve the CABS ability to automatically maintain a one-station separation between trains; and (2) to have the protection revert to that provided by the basic Automatic Train Control system for the worst case that could arise in the computer augmented system.

Scalise, DT Evans, DM Wiley, KG Louis, R
California University, Berkeley Aug. 1974, 24 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

UCID-3774, DOTL NTIS

06 136569
BART TRAIN CONTROL SUBSYSTEM: SUMMARY AND STATUS OF RECOMMENDATIONS FOR CABS AND THE TRANSBAY CROSSING
Progress is reported on the effort to evaluate the Computer Augmented Backup System (CABS) proposed for the Bay Area Rapid Transit (BART) transbay service. A summary of recommendations resulting from a detailed study, the status of these recommendations, and conclusions with respect to the CABS system development are presented. Findings and recommendations on the CABS hardware and software already adopted and those intended for future action are reviewed.

Scalise, DT Evans, DM
California University, Berkeley July 1974, 19 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

UCID-3773, DOTL NTIS

06 136570
BART TRAIN CONTROL SUBSYSTEMS: CABS AND SOR FOR THE TRANSBAY CROSSING
Preliminary progress is reported on two control subsystems of the Bay Area Rapid Transit (BART): (1) the Computer Augmented Backup System (CABS); and (2) the Sequential Occupancy Release System (SOR). CABS is an interim system for train separation to be used until the SOR Backup System is activated. CABS was analyzed, failure modes of both software and hardware were studied, and preliminary suggestions of corrective measures are made.

Scalise, DT Evans, DM
California University, Berkeley May 1974, 18 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

UCID-3772, DOTL NTIS

06 136783
SURVEY OF GROUNDING, BONDING, AND SHIELDING PRACTICES
In May 1974 detailed surveys were made of the grounding, bonding, shielding, and lightning protection networks in FAA facilities at Hartsfield International Airport, Atlanta, GA and in selected AF facilities at Robins AFB, GA and Aiken AFS, Aiken, SC. At the facilities the earth electrode system, the lightning protection system, fault protection and signal ground networks, bonding practices, and facility shielding were evaluated. Similarly, the equipments in each facility were examined to determine the grounding procedures used for both low frequency and high frequency signals, the type of signal interfacing used, the bonding practices employed, and the type of shielding available for both personnel protection and EMI control. This report presents the findings of the surveys, compares the existing networks and practices with those which have been recommended for new facilities, and suggests corrective measures for the noted deficiencies. (Author)

Denny, HW Woody, JA
Georgia Institute of Technology Final Rpt. FAA-RD-76-68, Apr. 1976, 76 pp

Contract DOT-FA72WA-2850

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

AD-A025244/5ST, DOTL NTIS

06 138302
PACKAGING SYSTEM ESAS600 FOR ELECTRONIC RAILWAY SIGNALING EQUIPMENT [Aufbausystem ESA600 fuer elektronische Geraete in der Eisenbahnsignaltechnik]
Siemens has adapted its established ES902 packaging system to meet the future needs of rail traffic control, marshaling, continuous automatic train control, driving and braking control and other associated functions. The resulting ESA600 packaging system conforms to international standards governing rail safety and reliability. The special features of the new system and its wiring scheme are described. [German]

Maschgan, H *Siemens Review* Vol. 50 No. 3, Mar. 1976, pp 162-167

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

06 138311
SIGNAL DRAWINGS BY COMPUTER
A new minicomputer at Union Pacific's Omaha headquarters produces, stores and retrieves signal department drawings within seconds of entry. At present 5 drafting stations are equipped with dual 19-in CRT screens tied in with the minicomputer. Production of the signal drafting section is expected to triple as a result of the new installation.

Progressive Railroading Vol. 19 No. 1, Jan. 1976, p 77, 2 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606

DOTL JC

06 138323
CN'S CTC COAST TO COAST
With final installations in 1975, Canadian National now has the world's longest stretch of track (4,492 miles) under continuous signalling. Twelve CTC centers handle the track coast to coast, supplemented by radio coverage by 5000 mobile units and 600 wayside stations. The article includes a detailed system map showing the location of major control centers and their areas of control.

Progressive Railroading Vol. 19 No. 5, May 1976, pp 54-56, 1 Fig., 1 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606

DOTL JC

07 092698
VIBRATIONS TRANSMITTED TO HUMAN SUBJECTS THROUGH PASSENGER SEATS AND CONSIDERATIONS OF PASSENGER COMFORT
An experimental study was conducted to determine the vertical and lateral vibration-transmission characteristics of several types of transport vehicle seats (two aircraft and one bus) to obtain preliminary estimates and comparisons of the ride acceptability of the various seat types. Results of this investigation indicate that from the standpoint of human comfort the seats exhibit undesirable dynamic response characteristics. Amplification of floor vibrations occurred at the frequencies known to be most critical for human comfort in both vertical and lateral axes. An average transmissibility function for aircraft seats was tabulated together with the associated variability for use by designers who incorporate similar types of seats in their vehicles. The acceptability of vibrations resulting from floor inputs of 0.10g and 0.15g was low over a broad range of frequencies for both axes and all seat types, and was especially low at frequencies where the input was being amplified. (Author)

Leatherwood, J
Langley Research Center NASA-TN-D-7929, June 1975, 56 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
N75-25582/8ST, DOTL NTIS

07 093655
HUMAN COMFORT RESPONSE TO RANDOM MOTIONS WITH A DOMINANT LONGITUDINAL MOTION
Subjective ride comfort response ratings were measured on the Langley Visual Motion Simulator with longitudinal acceleration inputs with various power spectra shapes and magnitudes. The results show only little influence of spectra shape on comfort response. The effects of magnitude on comfort response indicate the applicability of psychophysical precepts for comfort modeling. (Author)

Stone, RWJ
Langley Research Center NASA-TM-X-72746, July 1975, 88 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
N75-32746/0ST, DOTL NTIS

07 093819
PASSENGER NOISE ENVIRONMENTS OF ENCLOSED TRANSPORTATION SYSTEMS
To determine the extent to which noise environments of enclosed transportation systems are deleterious to passenger health, an analysis was made of both information collected by past transportation studies and of new data collected for this project. The analysis consisted of identifying trends among various transportation modes, noting areas of data deficiency, calculating the effect of noise exposure on health under various assumptions of travel duration and workplace noise exposure levels, and assessing measurement methodologies.

Environmental Protection Agency EPA/550/9-75/025, June 1975, 155 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245409/8ST

07 094016
A STUDY ON MAKING TRANSPORTATION FACILITIES ACCESSIBLE TO THE HANDICAPPED AND ELDERLY
The study presents a classification scheme for vertical circulation devices, a classification scheme for fixed facilities, a station questionnaire for recording barriers and a transit user scenario which considers psychological as well as physical barriers. Vertical circulation devices currently used in transportation facilities, their assets and shortcomings are detailed. New concepts of vertical circulation are grouped into ramp, stair, escalator and elevator devices. The concepts are designed to stimulate creative design approaches to the problem. Conclusions center around the applicability of existing circulation devices, the aspect of human engineering, problems related to various devices, and improvements concerning escalators and elevators.

Dougherty, EJ DeBenedictis, JA
Franklin Institute, Urban Mass Transportation Administration, Washington, D.C., (F-C3956-1) Tech. Rpt. FIRL-F-C3956-1, UM-TA-PA-06-0031-75-2, June 1975, 101p

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS
PB-248597/7ST

07 094049
PROCEEDINGS OF 1975 CONFERENCE ON THE DETECTION, PREVENTION, AND REHABILITATION OF THE PROBLEM DRINKING EMPLOYEE IN THE RAILROAD INDUSTRY HELD AT EVANSTON, ILLINOIS ON 23-24 APRIL 1975
This publication contains speeches and workshop summaries from the conference on problem drinkers in the railroad industry. The conference was sponsored by the Federal Railroad Administration, in conjunction with the United Transportation Union and Cornell University. The purpose of this conference was to analyze the characteristics of the problem drinking railroad employee and to discuss the alternatives of government regulations versus voluntarism in dealing with this problem.

New York State School of Industrial & Labor Rel, Federal Railroad Administration Final Rpt. FRA/OPPD-75/2, Apr. 1975, 58p

Contract DOT-PR-5106

ACKNOWLEDGMENT: NTIS, FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248906/0ST, DOTL NTIS

07 094308
HEALTH HAZARD EVALUATION/TOXICITY DETERMINATION REPORT 73-190-148, THE PURDY COMPANY, BURNHAM, ILLINOIS
A service industry which reconditions air brakes and wheel assemblies of railroad cars was studied by NIOSH. Naphthol spirits was used a cleaning solvent to clean brake parts by pouring the liquid from a can onto a rag. It was determined that airborne concentrations of naphthol spirits are not toxic in the conditions as used or found. However, skin contact with the naphthol spirits was found to have a drying and irritating effect on hands.

Bloom, TF Kramkowski, RS
National Institute for Occupational Safety & Hlth Final Rpt. NIOSHTR-HHE73-190-148, Oct. 1974, 6 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246473/3ST, DOTL NTIS

07 094398
EVALUATION OF THE USE OF SALT BRINE FOR DEICING PURPOSES
The formation of dense snowpack and ice on high volume roadways is of major concern during snow removal operations. The use of conventional snowplow blades, which normally lack the ability to deeply penetrate a snow cover of this type, results in the excessive use of chlorides, equipment, and time. This report covers both current problems encountered during snow removal operations and a new concept for the removal of a dense snowpack and ice from a pavement surface. The concept proposes using a NaCl brine solution under high velocity jet stream conditions to penetrate a snowpack. The abrasive qualities of a turbulent boundary layer around a jet stream, and the drag produced by the pack in changing the momentum of the brine stream, destroys or loosens the pack sufficiently to enable economical and effective plowing.

Kasinskas, MM
National Institute for Occupational Safety & Hlth, (HPR-PR-PL-1(12)) Final Rpt. NIOSHTRHHE73-190-148, Oct. 1974, 6 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246473/3ST, DOTL NTIS

07 094796
HEALTH HAZARD EVALUATION/TOXICITY DETERMINATION REPORT H.H.E. 74-28-212, WESTINGHOUSE AIR BRAKE COMPANY, WILMERDING, PENNSYLVANIA
NIOSH conducted a health hazard survey at a plant manufacturing railroad air brake and emergency braking systems. Environmental air samples were collected for cadmium, chromium, cyanides, nitric acid, and organic solvents. Medical histories were also reviewed and cutaneous examinations of exposed employees were performed. A chrome sore was observed on one worker and ten other workers were found to have various types of occupational dermatitis. It was concluded that the dermatitis cases were due to primary irritation to various chemicals, primarily lubricants. Airborne concentrations were judged to be not toxic to exposed employees.
See also PB-249 393.

Rosensteel, RE Lucas, JB
National Institute for Occupational Safety & Hlth Final Rpt. NO-ISH-TR-HHE-7428212, July 1975, 16 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249392/2ST, DOTL NTIS

07 127974
STATISTICAL STUDY OF TRAM DRIVER ACCIDENTS
This statistical study considers two basic hypotheses on industrial and traffic accidents-the accident proneness theory and the spell theory. The two hypotheses were tested on the basis of a correlation analysis of accident distribution in a group of tram drivers over a five year observation period. Using the chi-square goodness of fit test, the analysis showed the negative binomial distribution and the "short" distribution were successfully fitted, while the Poisson distribution significantly differed from the observations. Correlation analysis showed a significant correlation between the number of tram driver accidents over different periods, and that this correlation, although decreasing with an increase of the interval between observation periods, remained significant. The conclusion is that the proneness hypothesis explains more satisfactorily than the spell hypothesis the occurrence of accidents in mass transit vehicles during the observation period.(A) /TRRL/

Milosevic, S Vucinic, S (Psychotechnical Laboratory, Yugoslavia) *Accident Analysis and Prevention* Vol. 7 No. 1, May 1975, pp 1-7, 1 Fig., 6 Tab., 8 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-214416)
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

07 129560
MIST, MURK AND VISUAL PERCEPTION
An experiment was conducted which showed that distance estimates of a series of targets (at 5M to 25M distance) were greater and that size was over-estimated under fog conditions. Instances of apparent growth in size of objects with increased distance are discussed, particularly in relation to driving. The physics of visibility is discussed. It is pointed out that an object becomes invisible when its contrast with the background reduces to 2 per cent. An experiment confirmed that the contrast drops off exponentially with viewing distance in a given medium. The author discusses other distance clues and the adaptation of people moving to a climate of differing visibility. The influence of colour contrast on aerial perspective is considered in relation to the psychology of distance estimation. The part played by poor visibility by reducing visual clues is discussed, particularly by the impairment of stereoscopic acuity and the reduced visibility in the peripheral field of view. This is related to driving, particularly on motorways. The author concludes by stressing that the visual system (eyes and brain) becomes less efficient when the amount of visual information is low, and so fog not only reduces visual information but also leads to distortion. /TRRL/

Ross, H (Stirling University, England) *New Scientist* Vol. 66 No. 954, June 1975, pp 658-680, 3 Fig., 3 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-214941)
PURCHASE FROM: IPC Magazines Limited 66-69 Great Queen Street, London WC2E 5DD, England Repr. PC

07 129784
VENTILATED APPROACH REGIONS FOR RAILWAY TUNNELS
A possible method of reducing the magnitudes of the pressure transients generated when railway trains enter tunnels at high speeds is described. Some such method will be required in the near future to avoid causing severe aural discomfort to passengers as a result of rapid changes in the ambient pressures in tunnels. It is proposed that a long continuously ventilated precompression tube should be built onto the outside of a tunnel so that the pressure build-up in the unventilated region will occur only gradually. The analysis includes both unsteady and compressible effects and a numerical solution is obtained by the method of characteristics. It is shown that very little ventilation is required and that it is better to distribute the ventilating holes evenly along the approach region than to concentrate them close to the entrance. From the passengers' point of view, the optimum situation occurs when the sudden pressure rise on the front of the train as it enters the tunnel is only slightly reduced.

Vardy, AE *ASCE Journal of Transportation Engineering* Proc Paper Vol. 101 No. TE4, 11691, Nov. 1975, pp 609-619

ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering
PURCHASE FROM: ASCE Repr. PC
DOTL JC

07 131013
THE MEDICAL ASPECTS OF TRANSPORT AND THE COMPLEX ERGONOMETRIC ANALYSIS OF WORK TASKS: VISUAL DISPLAY RELAY CONTROL DESKS AND DIESEL LOCOMOTIVES [Verkehrsmedizinische Aspekte der ergonomischen Komplexanalyse der Arbeitsplatz: Gleisbildstellwerk und Dieseltriebfahrzeug]
The forms of effort to be made in carrying out a job and the extent of the effort to be made by the Chief Safety Officer at visual display relay control desks have been defined and it was concluded that staff working at visual display relay control desks must undergo special medical and psychological tests. As a result of changes in traction modes, diesel operation has caused an increase in noise disturbance for staff working on motive power units. Medical checks should be carried out to avoid professional diseases. [German]

Lessing, G *Verkehrsmedizin und Ihre Grenzgebiete* Vol. 22 No. 8/9, Aug. 1975, pp 290-297, 3 Fig., 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Transpress VEB Verlag fuer Verkehrswesen Leipziger Strasse 125, 108 Berlin 8, East Germany Repr. PC

07 131014
THE IMPORTANCE OF ERGONOMICS IN TRANSPORT JOB ARRANGEMENT IN GERMAN STATE RAILWAY [Die Bedeutung der Ergonomie bei der Gestaltung verkehrstypischer Arbeitsplatz bei der Deutschen Reichsbahn]
No Abstract. [German]

Weinhold, B *Verkehrsmedizin und Ihre Grenzgebiete* Vol. 22 No. 8/9, Aug. 1975, pp 284-289

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Transpress VEB Verlag fuer Verkehrswesen Leipziger Strasse 125, 108 Berlin 8, East Germany Repr. PC

07 131308
METHODOLOGICAL CONSIDERATIONS IN THE STUDY OF HUMAN DISCOMFORT TO VIBRATION
Statement and discussion of vibration discomfort tests carried out with the NASA's Passenger Ride Quality Apparatus (PRQA). A random sample of 60 subjects were subjected, over a period of time, to sinusoidal frequencies from 0 to 20 Hz with 0.05 g to 0.25 g amplitudes. The paper explains the test equipment used, the method adopted to measure discomfort, the discomfort levels evaluated according to this method and their various correlations. The results are summarized into seven well-defined conclusions relating to the influence of frequencies and accelerations, of the floor or seat level at which the accelerations are measured, of the previous experience of the subjects, and their personality.

Dempsey, T Leatherwood, J

High Speed Ground Transportation, Intl Conf Jan. 1975, pp 67-88, 1 Fig., 10 Tab., 19 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Planning Transport Associates, Incorporated, P.O. Box 4824, Duke Station, Durham, North Carolina, 27706

07 131534
PROBLEMS RELATED TO SHIFT WORK A FIELD STUDY OF SWEDISH RAILWAY WORKERS WITH IRREGULAR WORK HOURS
A group of 132 engineers from the north of Sweden was included in the study. A subsample of about 50 subjects was selected for further laboratory investigations during a light and warm summer period and a dark and cold winter period. The mean for the hours of sleep noted on the sleep records was significantly lower for night work than for day work. The amount of sleep during night work was significantly less during the light period than during the dark period as was the amount of sleep during the day off. Body temperature measured during work followed a daytime pattern and had a low amplitude. Potassium excretion and the blood levels of cortisone displayed a stable circadian rhythm with a daytime pattern. Many environmental factors made the results of catecholamine data difficult to interpret. The frequency of reported peptic ulcers was higher in the engineer group than in some other groups.

Kolmodin-Hedman, B Swensson, A *Scandinavian Journal of Work, Environment & Health* Vol. 1 1975, pp 254-262

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Scandinavian Journal of Work, Environment & Health Repr. PC

07 131894
WAGE PREDICTION MODEL
This computer program is used to estimate net lifetime financial loss to survivors on union employees fatally injured on the job. A linear regression equation for predicting gross expected income based on the employee's income history with the Company is developed. Appropriate amounts for personal consumption and income tax are deducted, while an allowance for fringe benefits and non-market services is added. All figures are discounted to "present value" using a reasonable interest rate.
Direct requests to R.L. Sauder, Director, Operation Research, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

07 132201
PROPOSED QUALIFICATION REQUIREMENTS FOR SELECTED RAILROAD JOBS
This report proposes minimum, safety-related knowledge, performance and training requirements for the jobs of railroad engineer, conductor, brakemen and train dispatcher. Analyses performed were primarily based upon job and task analytic documentation already in existence, and were critically reviewed by government and civilian railroad specialists. Recommendations are also offered for the conduct of job training and for techniques to measure and evaluate job knowledge and performance.
Sponsored by the Federal Railroad Administration, U.S. DOT.

Hale, A Jacobs, HH
Dunlap and Associates, Incorporated, Federal Railroad Administration, Transportation Systems Center, (DOT-TSC-FRA-75-8) Final Rpt. FRA-OR&D-75-44, May 1975, 130 pp, 1 Fig., 12 Tab., Refs., 3 App.

Contract DOT-TSC-736

ACKNOWLEDGMENT: FRA, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-251115/AS, DOTL NTIS, DOTL RP

07 134068
HUMAN RESPONSE TO MECHANICAL VIBRATION [Invloed van mechanische trillingen op de mens]
Human response to vibration is a fast growing subject of research. Vibration is sensed at different locations in the human body at different frequencies. Considering the human body as a system, equal sensation curves are calculated comparable to early results. If the effect of motion sickness is taken into account the differences between interpretations in the lower frequency range are explained. The sensitivity of the human body to vibration is determined at the input of the body. People making field measurements put transducers at rigid places of a structure. The results may be compared if the transfer functions between the various measuring points are known. Those transfer functions e.g. of seats, may be determined in the laboratory. /TRRL/ [Dutch]

Francken, AJ (Instituut Tno Voor Voertuigkundige Constructies) *De Invloed van Trillingen en Lawaai op de Mens* No. 31, May 1975, pp 1-12, 5 Fig., 13 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217080), Institute for Road Safety Research
PURCHASE FROM: Nederlands Akoestisch Genootschap P.O. Box 162, Delft, Netherlands

07 134600
THE SYMPTOMS REPORTED BY LONG DISTANCE TRAVELLERS
The incidence of 14 symptoms experienced following car and train travel over a two year period was investigated in a sample of 165 white collar workers in the West Midlands. Two main conclusions were drawn from this survey: first that the incidence of the symptoms increased with the frequency of making long distance journeys by train but not by car; secondly, that the reporting of symptoms following long distance journeys by car were correlated with neuroticism whereas no similar correlations were found for train journeys.

Tainsh, MA *Applied Ergonomics* Vol. 6 No. 4, Dec. 1975, pp 209-212

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfiche

07 134602
TASK ANALYSIS FOR THE JOBS OF FREIGHT TRAIN CONDUCTOR AND BRAKEMAN
This document describes the results of a research effort undertaken to detail the tasks of freight train conductors and brakemen. Included with text are detailed operational sequence diagrams for both conductor and brakeman. This task analysis is subsequent to a similar study conducted by McDonnell Douglas describing the tasks of freight train engineers.

Sanders, MS Jankovich, J
Naval Ammunition Depot, (DOT-TSC-FRA-75-10) Final Rpt. FRA-OR&D 75-69, May 1975, 236 pp

Contract RDTR 263

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
AD-A007528, DOTL NTIS, DOTL RP

07 136587
THE 1975 RIDE QUALITY SYMPOSIUM
A compilation is presented of papers reported at the 1975 Ride Quality Symposium held in Williamsburg, Virginia, August 11-12, 1975. The symposium, jointly sponsored by NASA and the United States Department of Transportation, was held to provide a forum for determining the current state of the art relative to the technology base of ride quality information applicable to current and proposed transportation systems. Emphasis focused on passenger reactions to ride environment and on implications of these reactions to the design and operation of air, land, and water transportation systems acceptable to the traveling public. Papers are grouped in the following five categories: needs and uses for ride quality technology, vehicle environments and dynamics, investigative approaches and testing procedures, experimental ride quality studies, and ride quality modeling and criteria.
Conf-Symp. Held at Williamsburg, VA., 11-12 Aug. 1975; Sponsored by

NASA and DOT.
National Aeronautics and Space Administration NASA-TM-X-3295, Nov. 1975, 648 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
N76-16754/3ST, DOTL NTIS

07 136690
EXECUTIVES' KNOWLEDGE, ATTITUDES AND BEHAVIOR REGARDING ALCOHOLISM AND ALCOHOL ABUSE
This report comprises detailed findings of a personal interview research survey conducted among 868 business and industry executives as to knowledge, opinions, and behavior relative to alcohol abuse and alcoholism. The executive sample was drawn from top-and middle-level management personnel selected from the 500 largest manufacturing companies, and each of the 500 largest banking, utilities, transportation, merchandising, and life insurance companies. The data provide insight into the executives' understanding of occupational alcoholism, their awareness of company programs to deal with the problem drinker, and their personal drinking habits. A technical appendix and exhibits of the interview are appended.
See also PB-248 696.

Opinion Research Corporation, National Institute on Alcohol Abuse Survey Rpt NIAAA/NCALI-76/02, Jan. 1972, 70 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-248695/9ST, DOTL NTIS

07 137690
BARBITURATES AND DRIVING
Barbiturates are general nervous system depressants which are commonly used as sedatives and hypnotics. Approximately 4% of the adult population, 12% of high school students and 19% of college students have reported using barbiturates. The lack of controlled studies comparing barbiturate involvement in traffic accidents and in the at-risk population has restricted any conclusive interpretations which can be made about the causal relationship between barbiturates and traffic accidents. Barbiturate incidence in traffic accident involvement varies from 2 to 9%. The variance in numbers represents different methods in data collection, different techniques in identifying barbiturates in body fluids and the differences in the populations sampled. Laboratory studies have found barbiturates at moderate doses to degrade driving skills. Motor skills performance, perceptual and tracking task performance and vehicle-handling test performance are impaired under barbiturates. This impairment is further degraded by the combined use of alcohol and barbiturates beyond that found under either drug alone. It is clear that barbiturates are dangerous for driving and its effects are likely to produce impairment on those components of driving necessary for safe operation of a motor vehicle. (author) /TRRL/ /TRRL/

Sharma, S (California University, Berkeley) *Accident Analysis and Prevention* Vol. 8 No. 1, Feb. 1976, pp 27-31, 36 Ref.

PURCHASE FROM: ESL
DOTL JC

08 053089
APPROACH TIME EQUALISER FOR FLASHING LIGHT INSTALLATIONS FOR LEVEL CROSSINGS. BASIC THEORETICAL STUDIES

This report deals with the theoretical possibilities for the use of time-equalisers. It presents analytical and graphical methods permitting, under various pre-determined circumstances, the operating conditions for these installations to be determined. The conclusions, particularly those which concern the saving in distance, are shown on speed-distance diagrams (see figure 16, Sg; tg). When reading these diagrams it is possible to decide at what point the train, which is approaching the level crossing at the speed which it is desired to study, begins the warning period. The report therefore allows judgment to be passed on the principles of operation which hold for a chosen rate of acceleration. Various other numerical studies show, for example, the effect of various rates of acceleration and will form the basis of the next report. The present report shows, in addition, the findings of the enquiry carried out by the Committee with the object of fixing the constants which will subsequently be used.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A73/PR 1/E, Oct. 1963, 9 pp, 18 Fig., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

08 053090
APPROACH TIME EQUALISER FOR FLASHING LIGHT INSTALLATIONS FOR LEVEL CROSSINGS. EFFECT OF REDUCED ACCELERATION-DRAFT SPECIFICATION

This report gives the kinematic conditions of operation for an approach time equaliser which is valid for trains having a maximum acceleration of 1.6-10 to the minus 2nd power V. (In Interim Report No. 1 a value of maximum acceleration of 2.7-1.4 x 10 to the minus 2nd power V was used.) Two cases are considered: (a) a device measuring the speed only at certain points, and (b) a device measuring continuously the position of the train with respect to the level crossing. This report also includes a specification for equalisers of both types (a) and (b) above.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A73/RP 2/E, Mar. 1964, 7 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

08 080399
ANALYSIS OF DRIVER REACTION TO WARNING DEVICES AT A HIGH-ACCIDENT RURAL GRADE CROSSING

The objectives of this research were to analyze the effect on motorists of improving the warning devices at a high-accident, rural grade crossing, from 8-inch flashers to automatic gates and 12-inch flashers activated by a Marquardt speed predictor and having additional strobe lights; to evaluate suitable parameters to make the analysis; to study accident history and site conditions and relate these to motorist reaction to the system-before and after; and to evaluate the data collection system itself. Spot speeds were taken at eight points on each approach to obtain an approach speed profile for various groups under various conditions after the signal system was improved. These were compared to similar data taken before system improvement. It was shown that an activated gate arm can be as effective in slowing the average approaching vehicle as a train across the road. Train and signal conspicuity were a problem and contributed to the poor accident record of older drivers. The Strobe lights made the warning system more visible after activation. Most drivers approach a grade crossing safely and mean speed of various groups shows trends but is a relatively weak parameter to test effectiveness, because they do not isolate the occasional, unsafe driver. Percent reduction of fastest cars, along with examining individual "fastest" cars, is a better parameter than mean speeds and decelerations to show improved effectiveness.

Russell, ER

Purdue and Indiana State Highway Commission, JHRP, Federal Highway Administration, Indiana State Highway Commission, (C-36-59N) Final Rpt. Aug. 1974, 233 pp

Contract HPR-1 (11) Part II

ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-30627), Federal Highway Administration (T-0126)
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB0245608/5ST, DOTL NTIS

08 092148
NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 10S. GRADE CROSSINGS AND FENCING, WASHINGTON, D.C. TO NEW HAVEN

The report identifies the status of the current program for the elimination, separation, or other complete protection of all grade crossings along the Northeast Corridor (NEC) from Washington, D.C. to New Haven, Connecticut, and develops an overall plan for the completion of fencing of the railroad right-of-way. The plan includes fencing of overpasses and provides cost and schedule information. State grade crossings separation programs were evaluated with respect to the state's projected construction schedules to determine the impact on the overall NEC project. The benefits resulting from grade separation include both safety benefits and non-safety benefits. Typical guide specification for standard chain link fence was developed for immediate and future requirements and is included as an appendix.

See also PB-242 445, and PB-243 419.

Miller, CG Picco, JJ Arnlund, R McInnis, M
Bechtel Corporation, Federal Railroad Administration Final Rpt. FRA/ONECD-75-10S, Apr. 1975, 134 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243420/7ST, DOTL NTIS

08 093443
ANALYSIS OF ALTERNATIVES IN ALLEVIATING RAILROAD-COMMUNITY CONFLICTS IN JEFFERSON PARISH, LOUISIANA. VOLUME 1

This report consists of two volumes reporting the results of the analysis of alternatives available to solve or alleviate the impact of railroad operations in Jefferson Parish, Louisiana. Volume 1 records the background and description material collected, the alternatives studied, a brief description of the methodologies used to analyze each alternative, and the costs and benefits of each feasible alternative. Both in-place and relocation alternatives were studied and analyzed in terms of construction costs, railroad costs, and community costs. The purpose of Volume 1 is to present probable impacts of each alternative upon the parties involved.

See also Volume 2, PB-246 310.

Consad Research Corporation, Federal Railroad Administration Final Rpt. FRA-RP-3007-Vol-1, May 1975, 357 pp

Contract DOT-FR-4-3007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246309/9ST, DOTL NTIS

08 093444
ANALYSIS OF ALTERNATIVES IN ALLEVIATING RAILROAD-COMMUNITY CONFLICTS IN JEFFERSON PARISH, LOUISIANA. VOLUME 2

This report consists of two volumes reporting an analysis of alternatives available to solve or alleviate the impact of railroad operations in Jefferson Parish, Louisiana. Both in-place and relocation alternatives were studied and analyzed in terms of construction costs, community costs and railroad costs. Volume 2 contains the engineering drawings associated with each alternative.

See also Volume 1, PB-246 309.

Consad Research Corporation, Federal Railroad Administration Final Rpt. FRA-RP-3007-Vol-2, May 1975, 34 pp

Contract DOT-FR-4-3007
ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246310/7ST, DOTL NTIS

08 094029
NORTHEAST CORRIDOR HIGH-SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 1 ON GRADE CROSSINGS AND FENCING
Recommendations for the eliminations of at-grade crossings and provisions of fencing programs for safety on the Northeast Corridor from New Haven to Boston are developed. Construction and land acquisition cost estimates are included. Each at-grade crossing site is discussed in detail, including alternate proposals which were considered. The special crossing problem at New London is investigated. Fencing standards are developed. Alternative applications are discussed. Special problem areas such as commuter stations and overhead bridges are investigated.
See also PB-243 420.

Kraffmiller, SE Moore, WE White, RJ
De Leuw, Cather/STV, Federal Railroad Administration Final Rpt. 2503-10, 2503-11, Sept. 1975, 213 pp

Contract DOT-FR-40026

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248704/9ST, DOTL NTIS

08 129845
COLLISIONS BETWEEN TRAIN AND CAR AT LEVEL CROSSINGS [Kollisioner mellan tag och vagfordon i plankorsningar]
Sweden has about 26,000 level crossings and at these crossings about 100 collisions occur each year. More than 50% cause personal injuries. The report questions the rational of the present allocations to the different forms of crossing safety devices. [Swedish]

Thorson, J Sande, J *Svenska Vagforeningens Tidskrift* Vol. 62 No. 6, 1975, pp 4-5

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Svenska Vagforeningen Fridhemsgaten 15, 11240 Stockholm K, Sweden Repr. PC

08 130988
THE EFFECTIVENESS OF AUTOMATIC PROTECTION IN REDUCING ACCIDENT FREQUENCY AND SEVERITY AT PUBLIC GRADE CROSSINGS IN CALIFORNIA
To assist the California PUC in performing its duties related to grade crossing regulation, the Office of Traffic Safety sponsored this project to determine the scope of the vehicle-train accident problem in California, to gauge the effectiveness of various types of protective devices and to investigate critically the possible use of warrants or criteria to assist in recommending where money should be spent on railroad-highway crossing protection improvements. A questionnaire was mailed to all cities and counties. The before-and-after accident histories of 1,552 crossings currently protected by automatic devices were examined. The actual and estimated costs of installing automatic devices at 1,296 locations were summarized. The feasibility of criteria to assist in placing grade crossing protection devices was examined. Information on each crossing was used to develop accident rate predictions and hazard indices.

California Public Utilities Commission June 1974, 196 pp, Tabs., 4 App.

PURCHASE FROM: California Public Utilities Commission Transportation Division, San Francisco, California, 94102 Repr. PC

08 131300
CONSTRUCTION AND MAINTENANCE OF LEVEL CROSSINGS [Bau und Unterhaltung von Bahnuebergangsbefestigungen]
A chapter on level crossings in the well-known German manual of railway technology. The chapter states and discusses the possible solutions to level crossing problems such as the closing of the flange way, elasticity of the road surface, and the track bed. Economic requirements should take into account the cost of maintenance and renewal. According to the solutions adopted, costs may vary between 50 and 300 DM per/sq m. [German]

Endmann, K *Elsners Taschenbuch der Eisenbahntechnik* 1975, pp 71-105, 2 Tab., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Elsners Taschenbuch der Eisenbahntechnik Frankfurt am Main, West Germany Repr. PC

08 131531
MORE MONEY FOR CROSSING PROTECTION?
An interview with Patrick J. McCue, executive director of AAR'S Highway-Rail Programs, explains the implications of the funding of the 1975 Federal Highway Act for elimination of grade crossing hazards. Over 3 1/3 years, an inventory has identified 402,000 rail crossings of Federal and non-Federal-aid public roads, private crossings, pedestrian crossing and grade-separated crossings which is now incorporated in FRA's information center files. The $175 million for grade-crossing projects on Federal-aid and other roads should permit automatic warning devices on 10,000 crossings over a 27 month period.

Railway Age Vol. 177 No. 3, Feb. 1976, pp 21-22

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

08 131903
GRADE CROSSING CATEGORY ANALYZER
Computer program use input describing grade crossings in terms of signal units, physical descriptors, installation date, and percent of maintenance paid by public agency. The program, in time-sharing mode, enables the user to quickly assess maintenance cost implications of categorizing crossing on physical characteristics basis and implications of altering maintenance cost per signal unit.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

08 132886
IS A NEAR-ACCIDENT NEARLY AN ACCIDENT? AN EXPLORATIVE ANALYSIS OF NEAR-ACCIDENTS ON RAILWAY-CROSSINGS [Is een Bijna-Ongeval Bijna een Ongeval? Een Explorative Analyse van de Bijna-Ongevallen op Overwegen]
1915 so-called near miss accidents on level crossings were counted by railway drivers in 1971 in the Netherlands. A near miss was defined as the traversing of a level crossing when the safety installation was working, or-in absence of this-the traversing when the train according to the judgement of the driver was already very close. With the aid of a prediction formula, by which the number of expected accidents on level crossings can be forecasted, it is possible to pursue a policy based on objective safety norms for example regarding the kind of level crossing safety measures. /TRRL/ [Dutch]

Paymans, PJ
Amsterdam University R&D Rept. June 1972, 84 pp, Figs., Tabs., Phots., Refs.

ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV46005E), Transport and Road Research Laboratory (IRRD 216263)
PURCHASE FROM: Amsterdam University Psychology Department, Amsterdam, Netherlands

08 132980
RAILROAD ACCIDENT REPORT: COLLISION OF READING COMPANY COMMUTER TRAIN AND TRACTOR-SEMITRAILER, NEAR YARDLEY, PENNSYLVANIA, JUNE 5, 1975
About 11:06 p.m. on June 5, 1975, a Reading Company commuter train struck a tractor-semitrailer (truck) at a grade crossing near Yardley, Pennsylvania. The truck was transporting three coils of steel, two of which penetrated the first commuter car. The three occupants of the lead car were killed and an occupant of the second car was injured slightly. The truck driver was uninjured. The semitrailer was torn from the tractor and damaged beyond repair and the lead commuter car was damaged extensively. At the time of the collision, the automatic grade crossing signal system was functioning. The truckdriver said he had not seen or heard the warning

signals. The National Transportation Safety Board determines that the probable cause of the accident was the failure of the truck driver to stop the truck in accordance with the warning signals.

National Transportation Safety Board NTSB-RAR-76-4, Mar. 1976, 24 pp, 8 Fig.

ACKNOWLEDGMENT: National Transportation Safety Board
PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

08 134300
AN OBSERVATIONAL STUDY OF DRIVER BEHAVIOR AT SIGNALIZED RAILROAD CROSSINGS
This is a study of the behavior that normally occurs when drivers approach railroad grade crossings. Observation of 2,344 cars and trucks at six Ontario grade crossings showed that high potential for accident is due primarily to the great variability in vehicles, track configuration and signal duration. A Sequential and Standardized Warning Signal (SSWS) systems is suggested as being unambiguous in that it clearly indicates the specific course of action and reduces the decisional uncertainty of motorists to a minimum. Other changes suggested include a standardized crossing surface, emergency sirens on trains, and slight alteration in the basic SSWS system in proximity to train stations. Further research plans are also indicated.

Wilde, GJS Cake, LJ McCarthy, MB
Canadian Institute of Guided Ground Transport CIGGT 75-16, Nov. 1975, 166 pp, Tab., App.

ACKNOWLEDGMENT: CIGGT
PURCHASE FROM: Canadian Institue of Guided Ground Transport Queen's University, Kingston, Ontario K7L 3N6, Canada

DOTL RP

08 135213
TEN YEARS FOR RAMA: A DECADE OF PROGRESS AND PROBLEMS
New Federal highway legislation, revised Federal regulations and a changed public attitude are all contributing to a more equitable attitude on the part of the public in dealing with grade crossing problems and expenses. This results from growing acceptance of public responsibility for highway-railroad crossings and came about because of concern for the safety of highway motorists at crossings. While legislation primarily fosters warning signals, funds may be used for signs, markings, grade separations, track relocations and crossing surface projects. Since 1973 the Federal Highway Administration has encouraged attention being given to surfaces. This article discusses various facets of the design, installation and maintenance of crossing surfaces.

Cors, BE *Railway Track and Structures* Vol. 72 No. 5, May 1976, pp 21-23

PURCHASE FROM: XUM

DOTL JC

08 136640
RAILROAD CROSSING SIGNALLING SYSTEM
The patent relates to a highway-railroad crossing signalling system using microwave telemetry to convey control information from a remote sensing location to a receiver coupled to an active motorist warning device.
Supersedes PB-216 155.

Hopkins, JB
Department of Transportation Patent PAT-APPK-184-828, PATENT-3 758 775, No Date, 8 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: United States Patent Office Washington, D.C., 20231

PB-249705/5ST, DOTL NTIS

08 138315
CROSSING "FLOATS" ON CONCRETE TIES
Florida East Coast Railway recently installed a Fab-Ra-Cast precast-concrete Slab system at a grade crossing. The System, modular in concept, permits one-day installation and consists of 8-ft. sections, supported by bags of quick-setting grout sandwiched between the ties and the slab for a flotation effect.

Progressive Railroading Vol. 19 No. 2, Feb. 1976, P 60A, 4 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606

DOTL JC

09 052741
MODERN NON-DESTRUCTIVE METHODS FOR MATERIALS TESTING
99 053126 of non-destructive testing which can be generally applied to the examination of several types of flaw. It is the character of the latter which decides whether or not a particular method of detection shall be employed. The shape of the parts under inspection, in addition to their dimensions, method of manufacture, and the type of metal from which they are made are also important factors, owing to the limitations which they impose. For these reasons, the present report is confined to a simple description, on the technological level, of the principles which form the basis of the methods of detection most widely used on an industrial scale; it is concerned only with their application to metallic specimens, and more particularly to those consisting of ferrous metals, which are by far the most commonly used in railway practice. Then too, the report provides no description of the apparatus used. All the methods used for the detection of internal flaws are based on a common principle; energy is supplied to the part under investigation and the way in which this is transmitted through the metal reveals whether the part is sound or not, or even makes it possible to determine the size of the flaws, and sometimes their shape. The form of energy transmitted to the test piece can therefore serve as a basis for the logical classification of processes adopted in the report. the British Railways apparatus, though capable of

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E29/CR 1/E, Mar. 1955, 34 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052750
PROTECTION OF MATERIALS. PRESERVATION OF TIMBER FOR STRUCTURAL PURPOSES
No Abstract.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17/RP 7/E, July 1959, 24 pp, 6 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052751
PROTECTION OF MATERIALS. RECOMMENDATIONS FOR THE PROTECTION OF METAL GANGWAY PLATES AND DECKING PLATES FOR RAILWAY BRIDGES. NEW CONSTRUCTIONS
Table of Contents: Article 1: Scope; Article 2: Classification; Article 3: General Observations; Article 4: Surface Preparation; Article 5: Protection of Steel; Article 6: Protection of Aluminum; Article 7: Plastic Coatings; Article 8: Application; Article 9: Methods of Control. Appendices.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E17/RP 7A/E, June 1960, 6 pp, 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052753
PROTECTION OF MATERIALS. PROTECTION OF MASONRY AND CONCRETE STRUCTURES
The length of life of masonry and concrete structures can be considerably prolonged if all types of humidity-e.g. rain, mist, condensation, ground water, river water and sea-water-are prevented from penetrating, because all harmful materials dissolved in the water have a disintegrating effect. Masonry is often porous whereas concrete can to a large extent be made compact. High quality compact concrete is capable of resisting mild attacks whereas most masonry and inferior-quality concrete has to be protected. If, however, the mild attacks are persistent protective measures should be taken in all cases. This report describes the most usual types of harmful agents and the materials used to combat them.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17/RP 9/E, Apr. 1963, 19 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052754
PROTECTION OF MATERIALS. RECOMMENDATION FOR SURFACE PREPARATION OF STRUCTURAL STEEL
Table of Contents: Article 1: Scope. Chapter I-General; Article 2-Methods of Surface Preparation; Article 3- General Observation. Chapter II-Description of Methods; Article 4-Surface Preparation by Blasting; Article 5-Surface Preparation by Acid Pickling; Article 6-Flame Cleaning; Article 7-Cleaning with Power-Driven Hand Tools; Article 8-Manual Cleaning. Chapter III-Application; Article 9-Particulars Concerning the Work in Plants; Article 10-Particulars Concerning the Work on the Site; Article 11-Particulars Concerning Surface Preparation Prior to Repainting.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E17/RP 11/E, Oct. 1962

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052755
PROTECTION OF MATERIALS. RECOMMENDATION FOR THE PROTECTION AGAINST CORROSION OF NEW STEEL STRUCTURES
Table of Contents: Article 1: Scope; Article 2- Classification; Article 3-Surface Preparation; Article 4- Protective Systems; Article 5-Application; Article 6- Methods of Control.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E17/RP 13/E, Oct. 1962, 7 pp, 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052756
PROTECTION OF MATERIALS: RECOMMENDATION FOR THE PROTECTION OF STEEL MASTS, THEIR ACCESSORIES AND SUPPORTING FOUNDATIONS
Table of Contents: Article 1-Scope. Chapter I-General; Article 2ì Classification. Chapter IIì Design and Construction; Article 3-Design and Construction of Steel Parts; Article 4-Design and Construction of Concrete Foundations. Chapter III-Surface Preparation and Protective Systems; Article 5-Surface Preparation of Steel Components Prior to Painting; Article 6-Protective Systems for Steel Components; Article 7-Protective System for Concrete Foundations; Article 8-Observations.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E17/RP 14/E, Oct. 1972, 6 pp, 3 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052757
PROTECTION OF MATERIALS: METHODS OF CONTROL DURING THE APPLICATION OF PAINT SYSTEMS ON STEEL STRUCTURES
Table of Contents: Chapter I-Ispection of Painting Work; Article 1-Paint and Painting Conditions; Article 2- Reference Areas of the Paint System Including the Surface Preparation; Article 3-Inspection by the Official of the Administration; Article 4-Methods of Control; Article 6- Records of Climatic Data. Chapter IIì Acceptance of Paint Work; Article 7-Conditions of Acceptance.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E17/RP 15/E, Oct. 1962, 6 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052759
PROTECTION OF MATERIALS. CORROSION PROTECTION OF PASSENGER-COACHES

The factors which affect the life of protective systems are divided into the following two groups: Part A-Factors affecting design, assembly methods, and structural materials; Appendix-Examples of typical constructions. Part B-Concerning the paint coatings on passenger-coaches; Appendixi Table of the painting-systems to be applied.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E17/RP 18/E, June 1963, 8 pp, Figs., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052760
PROTECTION OF MATERIALS. AIRLESS PAINT SPRAYING METHOD

Painting materials have so far been applied either by brush or by spraying, using compressed air. This document describes the initial experience gained with the airless (hydraulic) paint spraying method). The painting materials are, if necessary, to be adapted to this new method.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt E17/RP 19/E, June 1963, 3 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052761
PROTECTION OF MATERIALS. METHODS OF REMOVAL OF PAINT FROM EXTERIORS OF ROLLING STOCK

Methods utilized: 1) Abrasive blasting; 2) Stripping with solvent based removers; 3) Stripping with alkaline removers; and 4) Stripping by heat by means of suitable burners. It is concluded that the only acceptable method for removing coats of paint from aluminium surfaces is the stripping with solvent based removers.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt E17/RP 20/E, Oct. 1963, 5 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052762
PROTECTION OF MATERIALS. DAMAGE ON ROLLING STOCK IN CONNECTION WITH THE USE OF ADHESIVE LABELS

The report summarises the information provided by 15 Administrations who responded to an enquiry sent to all Member-Administrations of ORE. This information confirms that damage is caused to the paint-work of rolling stock by pasting labels directly on to it. The conclusion reached by the Committee is that while the damage can be reduced by the adoption of regulations proposed in the report, some damage will always occur unless the labels are placed on the special panels (which must be of adequate size) which are recommended.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17/RP 21/E, June 1964, 12 pp, 3 Fig., 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052763
PROTECTION OF MATERIALS. DETERMINATION OF THE THICKNESS OF DRY PAINT FILMS APPLIED TO STEEL PARTS OF STRUCTURES AND ROLLING STOCK

It is now widely accepted that there is a direct relationship between the thickness of a paint film and its durability, and it has become the practice to specify the paint film thickness required. The means adopted to measure the film thickness of a paint have been studied by the Committee E17a. The present report contains a leaflet dealing with a standard method for determining the dry paint film thickness on steel surfaces. As a sufficient paint film thickness is of vital importance for the protection of a steel surface, and as the results obtained by measurements often give rise to difference of opinion as regards the real values obtained, a standard method for the determination of the dry paint film thickness has been formulated. This method is intended to be applied in all leaflets where a recommended dry paint film thickness is given.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17/RP 22/E, June 1964, 9 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052764
PROTECTION OF MATERIALS. PROTECTION OF THE INNER SURFACES OF WAGON BODIES OF OPEN GOODS WAGONS

The NS started service tests in January 1961 and the SNCF in November 1961; the object of these tests was to determine whether more recent painting procedures could ensure an economic protection of the inner surfaces. In both cases, the service results were observed within the frame of studies of the E17b Specialists Committee. The test results so far obtained have led to the conclusion that an economic protection is indeed possible when using zinc rich paints as primer and, if necessary, a bituminous finishing coating.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17/RP 23/E, Oct. 1964, 7 pp, 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052765
PROTECTION OF MATERIALS. SPECIFICATION FOR SPRAYED METAL COATINGS FOR THE PROTECTION OF STEEL STRUCTURES AGAINST CORROSION

Previous documents prepared by the E 17 Committees contain some recommendations regarding the preparation of steel surfaces which are to be protected by sprayed metallic coatings. The present document describes the methods of application of spayed metal coatings and the control procedures required in order to ensure a satisfactory application.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17/RP 24/E, Feb. 1965, 15 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052766
PROTECTION OF MATERIALS. REPORT ON THE ENQUIRY AND PROGRAMME OF WORK FOR THE DEVELOPMENT OF TEST-METHODS FOR THE DETERMINATION OF THE DURABILITY OF PAINT COATINGS

The test procedures for the assessment of the quality of paints at present in use, specially as regards their service performance or durability, were not, it was thought, sufficiently speedy or accurate, and an enquiry was undertaken to ascertain the views of all Administrations. The results of this enquiry are appended and lead to the conclusion that there is an urgent need to develop test procedures which could give rapid and accurate assessment. The purpose of the Programme of Work proposed is to study methods of determining paint properties which have a bearing on durability with the view to the development of a procedure which will yield results more rapidly. The provision of improved test procedures for the quality assessment of a paint will enable the selection to be made of the best available paint for a given purpose which will lead to economy in maintenance of rolling stock and structures.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17a/RP 25/E, Feb. 1965, 10 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052767
PROTECTION OF MATERIALS. AIRLESS (HYDRAULIC) SPRAY APPLICATION OF PAINT MATERIAL (FOR ROLLING STOCK)

A brief account of the airless spray application of paint material was given in Interim Report No. 19 to provide some general information. The experience gained subsequently with this method of spraying by the Administrations represented in the E 18b Specialists Committee is described in the present report, and this method is compared with other methods of paint application. It is recommended to the Administrations to benefit by the experience gained, particularly in view of the economic advantages offered by the airless spray application of paint material.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17/RP 26/E, Oct. 1965, 14 pp, 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052768
PROTECTION OF MATERIALS. PAINTING OF THE EXTERIOR OF VEHICLE BODY PANELS. PART 1-QUESTIONNAIRE REGARDING THE PAINTING SYSTEMS NOW APPLIED. PART II A-RECOMMENDATIONS CONCERNING THE DESIGNî THE PROTECTION AGAINST CORROSION AND THE PROBLEMS CAUSED BY THE APPLICATION OF FILLERS

Part I of the present report contains a questionnaire concerning the present painting systems for the exterior of vehicle body panels (both for those under construction and during maintenance operations). Appendix 2 shows the marked differences in the number of man-hours, standing times and quantities of material required, which lead to the conclusion that different painting materials and work procedures are applied by the Administrations concerned; in the absence of exact knowledge of the conditions prevailing on these Administrations, the Committee is unable to pronounce a relevant judgement. In this connection it should also be pointed out that recommendations for the composition of paints applied to vehicles used under temperate climatic conditions cannot be adopted without precautions under other climatic conditions. Most of the Administrations are using fillers for their paint systems which are generally based on oil and which are applied in thicknesses of several millimetres in places. Experience has shown that such a filler is the weakest link in the chain of the paint system, because it is exposed to a continuous oxidation process; it becomes brittle and finally breaks, thus cracking the whole paint system. Another disadvantage of the application of fillers is the necessary grinding which requires much skill and time, in addition to hard physical work. In order to improve the durability of the external paintwork and to save time and work, the technological conditions enabling the use of fillers in the paint system to be dispensed with, are given in the report (part IIA). Where fillers are required for welding seams and recesses the Committee recommends the use of two component fillers.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17b/RP 27E, Oct. 1966, 40 pp, 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052769
PROTECTION OF MATERIALS. TECHNICAL SPECIFICATIONS FOR THE SUPPLY OF TWO-COMPONENT PAINTS AND FILLERS FOR THE EXTERIOR PAINTING OF VEHICLE BODIES

The purpose of this technical specification is to define the required properties of two-component paints and fillers for the exterior painting of vehicle bodies, and to specify the required test-methods. (See E 17/RP 27).

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17/RP 29/E, Nov. 1967, 21 pp, 1 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052770
PROTECTION OF MATERIALS. DEVELOPMENT OF TEST PROCEDURE FOR THE RAPID DETERMINATION OF THE CURABILITY OF PAINT COATINGS. PART II-CHANGES OF PROPERTIES DURING NATURAL WEATHERING

Three carriage paint systems were exposed to natural weathering for two years. During this period measurements were taken to follow the changes in their gloss, colour and mechanical properties. The purpose of this work was to see whether the process of deterioration can be followed by test methods selected in such a way that the service performance of the coat systems can be estimated at an early stage of weathering. Some of the tests e.g. on gloss, colour, hardness and adhesion gave good results whereas others were less satisfactory. The work will be considered in conjunction with experiments based on similar principles and carried out earlier on the same paint systems weathered artificially (see RP 28).

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17a/RP 30/E, Apr. 1968, 18 pp, 12 Tab., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052771
PROTECTION OF MATERIALS. DEVELOPMENT OF TEST PROCEDURES FOR THE RAPID DETERMINATION OF THE DURABILITY OF PAINT COATINGS. PART III-COMPARISON OF ARTIFICIAL AND NATURAL WEATHERING RESULTS AND FINAL CONCLUSIONS

In two previous reports (RP 28 and 30) were given the results of a study of three carriage paint systems weathered artificially as well as naturally. In this report the value of the various test methods applied is discussed in respect of their use for assessing the rate of deterioration of the paint coats during aging. Also the correlation between results obtained with both types of weathering is analysed. In addition, results of the performance of the paints in railway practice have been obtained from a questionnaire.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17a/RP 31/E, Oct. 1968, 12 pp, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052772
PROTECTION OF MATERIALS. EXTERIOR PAINTING OF VEHICLE BODY PANELS. PART IIB-RECOMMENDATIONS FOR THE FINISHING COAT

An enquiry among the railway administration represented on the E17b Specialist Committee, has shown that four different systems are currently used for the finishing coat of vehicle body-walls, i.e.ì dispersion paints, synthetic resin-based paints, nitrocellulose alkyd-resin-based paints, and two-component paints. The purpose of the recommendations given in this Report is to enable the most suitable finishing coat system to be selected. The Committee, however, wishes to emphasise that insufficient experience has been gained with the two most recent systems, dispersion paints and two-component lacquers, to permit a definitive assessment to be made. Publication of this report was mentioned in item 5 (finishing coat) of part II A of Interim Report No. 27 concerning the painting of the exterior of vehicle body panels.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17b/RP 32/E, Apr. 1969, 19 pp, Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052773
PROTECTION OF MATERIALS. PROTECTION OF THE INTERIOR SURFACES OF THE BODIES OF OPEN WAGONS AND OF SPECIAL WAGONS OF VARIOUS TYPES

An account of the investigations into the protection of the interior surfaces of the bodies of open wagons was given in Report No E 17/RP 23 (October 1964). Tests with wagons made is possible to ascertain that there are products which provide such a protection resulting in the extension of the life of the steel panels. However, tests on a large scale were desirable to enable more experience to be gained. The replies to an inquiry launched in 1968 are summarised in the tables of this report. This inquiry enables the Committee to issue recommendations for the protection of the interior surfaces of open wagons.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E17b/RP 33/E, Apr. 1970, 19 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052774
PROTECTION OF MATERIALS. EXTERIOR PAINTING OF VEHICLE BODY PANELS. PART IIB: RECOMMENDATIONS FOR THE FINISHING COAT. SUPPLEMENT TO REPORT NO. 32 CONCERNING MODERN FINISHING COAT SYSTEMS

This report describes the operating results obtained from modern finishing coat materials for vehicle body panels.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. E17b/RP 34/E, Apr. 1974, 15 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052782
PROCEDURES FOR THE RECONSTRUCTION OF WORN COMPONENTS. CATALOGUE C. PROCEDURES FOR THE RECONSTITUTION OF WORN TRACK COMPONENTS

The E 34 Specialists Committee had the task of drawing up a documentation on the methods of reconstituting worn components of vehicles and permanent way material, in so far as the wear results from mechanical stresses. When applying a new material on to worn components in replacement of lost material (reconstitution) it is, above all, a question of adopting for economic reasons, procedures capable of reducing the wear in the future (defence against wear). The questions of reconstitution and of defence against wear could not therefore be separated and have been dealt with simultaneously. The general section of this documentation is assembled in Catalogue Aì Documentation on procedures for reconstituting worn components; Catalogue B-procedures for the reconstitution of worn components of vehicles; and Catalogue Cì procedures for the reconstitution of worn components of permanent way material. Supplements and modifications to catalogues A, B and C are included.

Two supplement reports E34/RP 2/E published October 1962 and E34/RP 3/E, October 1973 are also accessioned under RRIS #052782. Restrictions on these reports are contained in the explanatory material.

International Union of Railways E34/RP 1/E, July 1959, 6 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052785
METHODS OF CHECKING RESISTANCE TO CORROSION OF COPPER BEARING STEEL PLATE FOR GOODS WAGONS AND BASES FOR A SPECIFICATION FOR THIS TYPE OF STEEL

The problem confronting the Committee concerns the definition of a steel quality slightly liable to oxidation, which makes it possible to construct, for the wagon of the future, wagon bodies with the same duration of life as that envisaged for the whole wagon. The Committee was also requested to define a method for checking the resistance to corrosion of a type of steel. After having taken note of the numerous tests carried out by the Specialists, the Committee thinks it impossible to develop an accelerated laboratory method, the results of which would be in accordance with the corrosion in service. Contrary to this, the Committee is of the opinion that some Administrations have acquired such an experience that they can recommend a type of steel having proved its value in current use for twenty-five years. This concerns a semi-stainless copper bearing steel-with a copper content of 0.25 to 0.50%-high mechanical properties-tensile strength 52 kg/sq mm-weldable without special precautions. The Committee is however of the opinion that the Mn-Cr-Cu and P Cu-Cr-Si steels can also offer interesting possibilities, and proposed to envisage the construction of wagons from these types of steel in view of the comparative large scale practical tests.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. E39/RP 1/E, July 1958, 10 pp, 2 Fig., 2 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052786
USE OF PLASTIC INSULATING MATERIALS ON OVERHEAD EQUIPMENT; THE PROBLEM OF DOUBLE INSULATION

The object of this report is to collate articles published in the general technical literature of recent years and the relevant experience obtained on the systems of the various railway administrations and to evaluate them with respect to further handling of the question by ORE. Appendix 1 contains a draft of the programme of work for the E54 question; Appendix 2 is titled "Summaries and excepts of the most important articles published"; Appendix 3 is a bibliography and Appendix 4 contains the draft specification of the Italian State Railways for the supply of glass fiber reinforced synthetic materials to be used for equipping overhead contact systems electrified at 3 kV direct current.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E54/RE 1/E, Mar. 1962, 17 pp, 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052787
SYNTHETIC INSULATING MATERIALS ON OVERHEAD EQUIPMENT. LABORATORY TESTS ON TEST SPECIMENS OF INSULATING MATERIALS. ORE PROGRAMME OF TESTS

Procedures for laboratory tests on synthetic materials for insulators are indispensable in order to arrive at classification and pre-selection of these new materials; they should also permit quality checks on current deliveries. Several international and national commissions of technical experts have elaborated and published such test conditions. Insulators for railway overhead contact systems are exposed to special effects which are generally not encountered in the power supply systems of electric energy generating plants. The ORE E 54 Specialists Committee has therefore compiled a programme of laboratory tests on synthetic materials for insulators, allowing for the special strains to which the insulators of overhead contact systems are exposed.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E54/RP 2/E, Oct. 1965, 13 pp, Figs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052788
SYNTHETIC INSULATING MATERIALS ON OVERHEAD EQUIPMENT. SITE TESTS ON SPECIMENS OR INSULATORS MADE OF SYNTHETIC INSULATING MATERIALS
The following tests were made: Laboratory tests-1. Included plane method according to American Standard ASTM D 2 303. This method is designed to indicate the resistance of insulators to tracking under a flow of electrolyte. 2. Dry arc-resistance method. This method is specified in the American Standard ASTM D 495. It involves a dry test on an unpolluted surface. Line Testsi In Italy on 3,000 V d.c. lines in coastal areas; In England on 25 kV 50 Hz lines in an area where there is moderate industrial pollution as well as urban and railway contamination. On the basis of the laboratory and line tests, the following partial conclusions may be drawn: Fairly simple and perfectly reproducible laboratory test methods make it possible to choose materials offering sufficient resistance to tracking and to rapidly eliminate materials which are patently unsuitable. It would seem that as regards the category of homogeneous resins with fillers, the specimens made of cycloalipatic type resins with hydrated alumina filler might give good results. Tests on these materials are in progress at the moment. Regarding composition materials, insulators consisting of a fibreglass and resin core with a polytetrafluorethylene sheathing have so far given the most favourable results.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E54/RP 3/E, Apr. 1970, 24 pp, Figs., 7 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052789
SYNTHETIC INSULATING MATERIALS ON OVERHEAD EQUIPMENT. SUMMARISED REPORT OF LABORATORY AND SERVICE TESTS. CONCLUSIONS AND PROSPECTS
This report gives the conclusions of the studies of the E 54 Specialists Committee concerning the application possibilities of synthetic insulating materials for the insulation of the overhead equipment. The laboratory tests and line tests have shown that, at the present stage of development, no suitable material is known which can reliably be used for the manufacture of an insulator intended for general use on overhead electric traction lines. It seems, however, that the cycloalipatic resins with fillers might offer interesting solutions. The Committee considers that, in the future, the investigations should be directed towards the development of constructional parts formed of insulating materials rather than towards the use of insulators in non-insulated structures.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. E54/RP 4/E, Apr. 1971, 46 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 052791
ASSESSMENT OF THE EFFICIENCY AND AGGRESSIVE POWER OF CLEANING AGENTS. OPTIMUM METHODS OF CLEANING MODERN EXTERIOR PAINT COATS OF PASSENGER COACH AND TRACTIVE UNIT BODY PANELS
The problems arising from the techniques of cleaning modern paint coats of tractive unit and passenger coach body panels are discussed in this report, taking into consideration different operating conditions. The kinds of dirtying, cleaning intervals, cleaning methods, cleaning agents and the conditions to be fulfilled for the protection of waters against pollution are entered into.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E119/RP 2/E, Apr. 1972, 15 pp, 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 053074
MANUFACTURE AND USE OF RAILWAY WAGON SHEETS. REPORT OF INQUIRY
Replies have been received from 17 Administrations, the majority of which purchase coated fabrics, sometimes in the form of the complete cover. The majority of the covers consist of flax or hemp fabrics coated with linseed or wax/metal soap dressings. Experimental use of synthetic fibres for the fabric and synthetic resins or elastomers for the coating material is in progress in some Administrations. Three types of cover appear to be required for the future: 1) Light weight covers; 2) Heavy duty covers; and 3) Insulating covers. The requirements of the ideal wagon cover are listed and indications given of the steps necessary to produce wagon covers of greatly improved performance mainly by introducing the use of fabrics based on synthetic finishes and coatings of the elastomer type. The need for giving adequate consideration to the economic factors involved has been stressed.

International Union of Railways Intrm Rpt. E17d/RP 1/E, July 1959, 8 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 053120
STANDARDISATION OF WAGONS. RESULTS OF CORROSION TESTS ON VARIOUS TYPES OF COPPER BEARING AND NON-COPPER BEARING STEEL PLATE
The B 12 Specialists Committee was entrusted with the study of materials employed in wagon construction which were resistant to atmospheric corrosion and the effects of abrasion, the object of their study being to facilitate an increase in the periods between maintenance overhauls. The B 12 Committee instituted laboratory (or in the open air) tests and practical tests on wagons with a view to confirming that the selection of the 2 carbon bearing steels, non-alloyed, but containing between 0.20 and 0.50% copper or possibly the E 39 Committee's recommended choice of certain slightly alloyed and diversely composed steels was well-suited to the line of research being followed. Although the wagon tests were not conducted over a very long period, there was no significant contradiction between the results of the different tests (laboratory, open air, wagon), and thus it was possible to draw the following conclusions: the steels with a copper content greater than 0.25% behave appreciably better than those without copper additive as regards resistance to weathering; the slightly alloyed steels of diverse composition but with a copper content greater than 0.25% behave as satisfactorily as the carbon bearing steels having added copper and also offer the advantage of a better resistance to abrasion, and the performance of copper bearing steels with regard to the adhesion of protective paints is no different than that of ordinary carbon bearing steels. Thus the B 12 Committee recommends the Administrations use the copper bearing steels for body plates less than or equal to 4 mm thick and for components forming part of the underframe and made of bent steel plate less than or equal to 8 mm thick. Broadly speaking, when the corrosion problem is very serious, copper bearing steels (steels complying with UIC leaflets or brand steels) are recommended, and when the corrosion is accompanied by abrasion effects preference is given to the steels.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B12/RP 15/E, Apr. 1968, 31 pp, 12 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 053126
SHOCK RECORDERS. INTERIM REPORT AND ENCLOSURES
At the request of the 2nd, 4th and 5th Commissions of the UIC, the Control Committee of ORE, at its 26th Meeting, placed the question of shock-recorders on the work-programme of ORE. Two problems were propounded, viz., determination of the permissible speed limit of the impact

between two vehicles, and comparison of the different shock-recorders used by the Administrations. The restricted B47 Specialists Committee arranged laboratory studies at the TNO Institute at Delft and buffering tests at the SNCF test installation at Vitry-sur-Seine. In addition tests on the ramming apparatus have been carried out. From the tests and studies it would seem that the relation between the deflections given by the shock-recorders and the difference in speeds of two vehicles at the moment of impact depends, above all, upon the load of these wagons and upon the types of buffers with which these wagons are equipped. Utmost caution should and the Pieseler apparatus shows itself to be at the same time sensitive, reliable and strong. be formulated. The buffering tests on wagons containing a typical load and a reputably fragile load have shown that the permissible speed limit of impact below which normal loads, correctly stowed and packed, are not subjected to harmful impacts is, in the most favourable case, 7 km/hr. But shunting yard staff experience much difficulty in estimating this speed, and certain tests have shown that the staff consistently and systematically underestimate the actual speed of a vehicle. For this reason, in any instructions given to the staff, the permissible speed limit of the impact would have to be limited to 5 km/hr, namely, to walking speed. The 4 recorders most currently used by the Administration, namely, the British Railways, Cornet, Peiseler and Stout Recorders, have been subjected to test and to laboratory research. It would seem that: the Stout Recorder lacks reliability and only reacts at accelerations greater than 3 g; thus it is not suitable for checking the permissible impact speed referred to above; the british Railways apparatus, though capable of registering the impact speed indicated above, shows however a limited sensitivity to the lower speeds; the Cornet apparatus has, on the whole, shown a satisfactory behavior, but its maintenance in service must be very closely watched, maintenance in service must be very closely watched, and the Peiseler apparatus shows itself to be at the same time sensitive, reliable and strong.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways B47/RP 1/E, July 1959, 25 pp, Figs., Tabs., Phots.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

09 094120
EVALUATION OF STRUCTURAL STEEL COATINGS IN RELATION TO INDUSTRIAL ATMOSPHERIC CONDITIONS

Project No. 23 has supplied added technical information on the durability of coatings applied to structural steel and exposed to the atmosphere plus chemical fumes from nearby industrial plants. The amount and nature of those chemical fumes were recorded and averages established for later use in the accelerated testing program. The coating system was designated failing when the degree of rusting of the steel had reached 10% on the ASTM D-610 pictorial standards. Sets of steel panels were blast-cleaned to commercial and to white metal and one set was pre-rusted and then cleaned by wire brushing. Paints were applied by brush and spray. Some one coat primed applied panels were exposed. The general types of available primers and some recommended top coats were included. The most important result of this project is the economy of blast-cleaning the structural steel to at least the Commercial Standard prior to coating. Vinyl top coats show some checking. Aluminum top coats are satisfactory.

Prepared in cooperation with Moore Research Labs., Inc., Southampton, Pa. and Federal Highway Administration, Washington, D.C.

Moore, JC O'Leary, JR
West Virginia Department of Highways, Federal Highway Administration, Moore Research Laboratories, Incorporated, (WVDOH-RP-23) Final Rpt. WVDOH-23, Jan. 1975, 78 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-248604/1ST, DOTL NTIS

09 094316
FRACTURE MECHANICS AND RESIDUAL FATIGUE LIFE ANALYSIS FOR COMPLEX STRESS FIELDS

This report reviews the development and application of an influence function method for calculating stress intensity factors and residual fatigue life for two-and three-dimensional structures with complex stress fields and geometries. Through elastic superposition, the method properly accounts for redistribution of stress as the crack grows through the structure. The analytical methods used and the computer programs necessary for computation and application of load independent influence functions are presented. A new exact solution is obtained for the buried elliptical crack, under an arbitrary Mode I stress field, for stress intensity factors at four positions around the crack front. The IF method is then applied to two fracture mechanics problems with complex stress fields and geometries. These problems are of current interest to the electric power generating industry and include (1) the fatigue analysis of a crack in a pipe weld under nominal and residual stresses and (2) fatigue analysis of a reactor pressure vessel nozzle corner crack under a complex bivariate stress field.

Besuner, PM
Failure Analysis Associates, Electric Power Research Institute, (EPRI-217-1) Tech. Rpt. FAA-75-4-10, EPRI-217-1-TR-2, July 1975, 88 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-246254/7ST, DOTL NTIS

09 094760
POLYMER-CONCRETE COMPOSITES FOR ENERGY RELATED SYSTEMS. PROGRESS REPORT NO. 3, OCTOBER--DECEMBER 1974

Polymer-concrete (PC) materials were exposed to a synthetic geothermal brine at 177 exp 0 C for up to 100 days; changes in compressive strength, dimensions, and composition were determined. Thermal shock tests on PC-lined steel pipe and tests on use of PC in geothermal systems were initiated. Research is continuing on the use of solid waste in glass polymer composite sewer pipe. Tests are underway on the use of polymer-impregnated concrete to prevent ice formation on canal lock walls and as railroad ties.

Manowtiz, B Steinberg, M Kukacka, LE
Brookhaven National Laboratory 1974, 19 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

BNL-19746, DOTL NTIS

09 126195
FATIGUE OF STRUCTURAL STEELS

A resume is given of some basic concepts relating to the fatigue of steels, leading to the differentiation between the crack initiation and crack propagation stages of the process, and then to the application of fracture mechanics concepts for monitoring the rate of propagation of fatigue cracks. Reference is made to the four main fatigue design philosophies-infinite-life, safe-life, fail-safe and damage-tolerant-and to the fatigue design requirements of various codes and specifications. Particular attention is given to the fatigue properties of welded and bolted joints in different steels. It is shown that, when relatively long fatigue lives are involved, the fatigue performance of a structure is dependent primarily on the detail design and configuration of the joints incorporated in its manufacture; the steel actually selected for the product having only a secondary influence on its behavior under repeated loads. In the case of low-cycle fatigue, or under conditions of high static mean stress, the choice of a high static tensile steel may, nevertheless, be well justified. /Author/TRRL/

Presented at the First Australian Conference on Engineering Materials.

Mann, JY
New South Wales University, Australia Conf Paper No Date, 85 pp, 5 Fig., 2 Tab., 53 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-213804)
PURCHASE FROM: New South Wales University, Australia School of Civil Engineering, P.O. Box 1, Kensington, New South Wales 2033, Australia Repr. PC

09 129178
FRACTURE MECHANICS AND PLANE FRACTURE TOUGHNESS OF CAST STEELS

Definition of the critical stress coefficient, K1c, of a cracked steel and the heat, mechanical and metallurgical factors that affect it. Study of the fracture toughness of certain examples of cast steel, cases of brittle fracture and correlation between such toughness and Charpy impact strength.

Wieser, PF *AREA Bulletin* Vol. 76 No. 653, June 1975, pp 665-686, 7 Fig., 3 Tab., 35 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 129298
STUDY OF NEW RAIL STEELS AND OF THE APPROPRIATE WELDING PROCESSES [Untersuchung von neuen Schienenstaehlen und hierfuer geeignetes Schweissverfahren]
The rail metal for high-speed railways carrying heavy traffic must have an elastic limit of 60-100 km/mm2, a tensile strength of 100-150 km/mm2, a high fatigue resistance, a rail corrugation resistance and welding aptitude. In the scope of these tests, 180 materials were examined; the properties demanded were to be found in perlitic steels, bainite steels and steels with a low carbon content, but it is still necessary to seek the optimisation of these steels. [German]

Heller, W *Technologische Forsch & Entwickl Transp & Verkehr* Res. Rpt. T74-42, 1974, pp 69-83, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: German Federal Railway Freidrich Ebert Anlage 43-45, Documentation Bureau, Frankfurt am Main, West Germany

09 129795
DYNAMICS OF INTERNAL STRESSES IN RAILS AND BUCKLING DURING CORE HARDENING [Dinamika obrazovanija vnutrennih naprjazenij i iskrivlennost rel'sov pri obemnoj zakalke in v masle]
This article explains a method for studying stresses in a rail when it is core hardened. It is possible to: -monitor the dynamics of stresses in the rail section and -obtain a diagram of these residual and temporary stresses. By the analytic and experimental method, the rail section is divided into zones having equal cooling times, and the increase in stresses is noted at fixed moments after cooling has begun. The values in the diagram obtained by this method tally with those provided by extensometric methods as regards residual stresses in the surface layers of the rail. The article also gives an analysis of the buckling mechanism which may occur in rails during hardening. [Russian]

Murav'ev, EA Mihalev, MS *Trudy CNII MPS: Ostat naprja i proc zelez relsov* Vol. 491 1973, pp 45-56, 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Trudy CNII MPS: Ostat naprja i proc zelez relsov Moscow, USSR Repr. PC

09 129832
METHOD FOR CALCULATING THE TRANSITORY HEAT FIELD DURING RAIL SURFACE AND CORE HARDENING [Metodika rasceta nestacionarnogo temperaturnogo polja pri obemnoj i poverhnostnoj zakalke relsov]
The authors explain the main requirements for establishing a method for calculating the heat field during rail surface and core hardening. The results of these calculations are compared against experimental rail cooling graphs of core hardening at three characteristics points in the rail section. The comparison shows that the calculations and experimental results tally. This calculation method can be used to determine the structure and hardness of rail sections which have been cooled by different methods and hardening mediums for which the heat transfer coefficient is known. [Russian]

Konjuhov, AD Potapcenko, SS *Trudy CNII MPS: Ostat naprja i proc zelez relsov* Vol. 491 1973, pp 42-49, 8 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Trudy CNII MPS: Ostat naprja i proc zelez relsov Moscow, USSR

09 129833
EFFECT OF RAIL FLANGE CORROSION ON FATIGUE STRENGTH OF RAILS [Vlikanie korrozii podosvy relsov na ih ustalostnuju procnost]
The article describes: a method of assessing flange surface irregularities and the results of tests to determine the fatigue strength of rail flanges which have been damaged by corrosion. [Russian]

Konjuhov, AD *Vestnik Vniizt* Vol. 34 No. 5, 1975, pp 44-47, 1 Fig., 1 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow USSR

09 129834
RESIDUAL STRESSES IN RAILS [Ostatocyne naprjazenija v zeleznodoroznyh relsah]
The article examines the effect of residual stresses on rail breaks along the length of the web and on stability during rupture tests on core hardened rail: the aim of decreasing residual stresses in core hardened rails and the formation of residual stresses in the rail head can be achieved by making further improvements to the cold hardening process; residual stresses do not have any substantial effect on stability during rupture tests on rails when the break begins because of a drop hammer failure and, before the break occurs, the rail changes considerably; this is precisely what happens in tests on core hardened rails when the temperature changes from-60 degrees to 20 degrees C. [Russian]

Konjuhov, AD *Trudy CNII MPS: Ostat naprja i proc zelez relsov* Vol. 491 1973, pp 10-27, 3 Tab., 11 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Trudy CNII MPS: Ostat naprja i proc zelez relsov Moscow, USSR

09 129835
THE EFFECT OF RESIDUAL STRESSES ON RAIL STRENGTH [Issledovanie vlijanija ostatocnyh naprjazenij na procnost relsov]
The article describes a method for determining residual stresses in rails which show wear due to rail-wheel contact fatigue and in rails which have been bent before being placed on track sections on curves. The authors mention how residual stresses can be the cause and propagator of rail fatigue defects due to rail-wheel contact. [Russian]

Kislik, VA Karmazin, AL *Trudy CNII MPS: Ostat naprja i proc zelez relsov* Vol. 491 1973, pp 37-42, 2 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Trudy CNII MPS: Ostat naprja i proc zelez relsov Moscow, USSR

09 129837
TRENDS IN THE PROTECTION AGAINST CORROSION OF METAL STRUCTURES ON THE DB [Tendenzen im Korrosionschutz von Stahlbauwerken der DB]
Since the usual painting methods employed to date, with two basic coats and two finishing coats, are inadequate in a corrosive environment, a new method has been introduced which provides for three heavy coats with a total thickness of 0.24 mm. Paints have also been introduced that are impervious to saline moisture and a method comprises galvanising with a single thick coat of paint, together with a list of fourteen shades. A universally valid basic norm, which includes directives and planning for anti-corrosive protection, is in course of preparation. [German]

Landwehr, E *Eisenbahningenieur* Vol. 26 No. 8-9, Aug. 1975, pp 277-281, 1 Fig., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

09 129839
USE OF THE MAGNETIC ANISTROPIC METHOD TO ASSESS THE STRESSES OF TEMPERED RAILS [O vozmoznosti ispolzovanija metoda magnitnoj anizotropii dlja ocenki ostatocnogo naprjazennogo sostojanija zakalennyh relsov]
The most practical method of determining residual stresses without damaging the rail is by magnetic anisotropy which makes it possible to

obtain information rapidly and without difficulty. A special device called "Pion" was built in the Soviet Union for application of this method. It is made up of a magnetic core in the form of a cross with a coil which generates a magnetic field in the centre and measurement coils (2 to 5) on the sides making up the arm of the bridge. The article gives the results of tests on certain types of rail in the Soviet Union using this device. [Russian]

Sahov, VI Konjuhov, AD *Trudy CNII MPS: Ostat naprja i proc zelez relsov* Vol. 491 1973, pp 56-65, 2 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Trudy CNII MPS: Ostat naprja i proc zelez relsov Moscow, USSR Repr. PC

09 129855
FATIGUE STRENGTH OF STEEL WIRE FOR PRESTRESSED CONCRETE SLEEPER
This paper describes calculation of the fatigue strength of steel wire used for prestressing concrete cross ties. From the results of rotating bending fatigue tests of deformed prestressing wires and plain wires pretreated in various ways, the following conclusions were obtained: (1) Suitable deformed prestressing wires are available for concrete cross ties; (2) Some surface damage may decrease the fatigue strength of the prestressing wire (corrosion, notching and sparks, for instance); (3) JNR's present prestressing loads are sufficient. The effects of spark damage to wires are particularly critical.

Watanabe, S *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 131-134

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

09 130843
DETECTION DIAGNOSIS AND PROGNOSIS--PROCEEDINGS OF 22ND MEETING OF THE MECHANICAL FAILURES PREVENTION GROUP
These Proceedings consist of a group of nineteen submitted papers and discussions from the 22nd meeting of the Mechanical Failures Prevention Group which was held at the Grand Hotel in Anaheim, California on April 23-25, 1975. Failure detection, diagnosis, and prognosis represent the central theme of the Proceedings. Technology and techniques, ongoing diagnostic programs, and coming requirements in the field of DD&P are discussed. In addition, several case histories are presented. These include Oil Analysis in Perspective by R.S. Miller; An Overview of Current Efforts to Detect and Prevent Steel Wheel Failures by G.L. Leadly; Diagnostics for Refrigerator Car Diesel Generating Sets by R.F. McKee; and Using Acoustic Emission Technology to Predict Structural Failure by H.L. Dunegan.

Proceedings of the 22nd Meeting of the Mechanical Failures Prevention Group, Anaheim, California 92802, April 23-25, 1975. Sponsorship was by the Office of Naval Research NASA, Frankfurt Arsenal U.S. Army, FAA and National Bureau of Standards.

National Bureau of Standards NBS SP-436, Dec. 1975, 366 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: Department of Commerce
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

DOTL RP

09 130911
ESTIMATING THE DEGREE OF DEHYDROGENATION OF RAIL STEEL BY THE BATCH METHOD [Ocena stopnia odwodorowania stali na szyny metoda porcjowa]
A study was made of the effectiveness of dehydrogenation of open-hearth steel in a vacuum installation by the batch method. It is found that the optimal degree of dehydrogenation of molten rail steel by the batch method of degassing is attained when the steel circulation coefficient is greater than 3.0 and the pressure in the vacuum collector ranges from 0.5 to 1.0 torr. The hydrogen content in rail steel after degassing by the batch method ranges from 2.0 to 3.7 cu cm per 100 g. An electrode addition of about 1.5 kg per ton of steel increases the hydrogen content after degassing by about 0.5 cu cm per 100 g. [Polish]

Mazanek, T Klisiewicz, Z Sowa, L Kupka, H *Hutnik* Vol. 42 No. 8-9, Aug. 1975, pp 335-338

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

09 130923
USING NDT EFFECTIVELY-EDDY CURRENT TESTING
The principles and the advantages of eddy current testing for casting defects are reviewed. Equipment and recommended procedures are discussed.

Heine, HJ *Foundry Management and Technology* Vol. 103 No. 0, Sept. 1975, 5 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

09 131039
A METALLURGICAL INVESTIGATION OF A FULL-SCALE INSULATED RAIL TANK CAR FILLED WITH LPG SUBJECTED TO A FIRE ENVIRONMENT
An analysis of the failure of an insulated rail tank car, RAX 202, which had been tested to failure in a fire environment at White Sands Missile Range, New Mexico, was requested by the Federal Railroad Administration, Department of Transportation. The tank car, filled with approximately 33,000 gallons of liquefied pertoleum gas (LPG), failed after approximately 94 minutes of exposure to a JP-4 jet fuel fire. The car fractured into four fragments which were examined in the field. Five plate samples from the four fragments were selected for laboratory study at the National Bureau of Standards.

Early, JG Interrante, CG
National Bureau of Standards, Federal Railroad Administration, (NBSIR 75-657) Final Rpt. FRA-OR&D 75-52, Jan. 1975, 71 pp, 31 Fig., 3 Tab., 7 Ref.

Contract DOT-AR-40008

ACKNOWLEDGMENT: FRA, NTIS
PURCHASE FROM: NTIS

PB-250587, DOTL NTIS

09 131040
A METALLURGICAL ANALYSIS OF FIVE STEEL PLATES TAKEN FROM A TANK CAR ACCIDENT NEAR CRESCENT CITY, ILLINOIS
A metallurgical analysis of five steel samples (numbered FRA-1 through FRA-5) was requested by the Bureau of Railroad Safety, Federal Railroad Administration, Department of Transportation. These steel samples were taken from two tank cars (numbered SOEX 3037 and SOEX 3219) which had been involved in an accident near Crescent City, Illinois. Sample FRA-1, FRA-4, and FRA-5 were reported to be shell plates and sample FRA-3, a head plate. Sample FRA-2 was a welded sample of head plate and shell plate and it was used for most of the mechanical properties determinations in this report. An investigation was conducted at the National Bureau of Standards to determine if the samples conformed with the appropriate specifications for tank car materials and to gather information pertinent to the question of the suitability of these steels for use as plate materials of tank cars. Samples FRA-1,-2, and-5 were reportedly produced to the specification for ASTM A 212-65 Grade B, flange quality steel (A 212-B); and FRA-3 and-4 were reportedly produced to specification AAR M128 Grade B, flange quality steel (M128-B).

Interrante, CG Hicho, GE Harne, DE
National Bureau of Standards, (312.01/39) Final Rpt. FRA-OR&D 75-48, Mar. 1972, 95 pp, 26 Fig., 9 Tab., 12 Ref., 2 App.

Contract DOT-AR-10023

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

09 131246

POSSIBILITIES FOR THE DEVELOPMENT OF RAILS FOR HIGH- CAPACITY, HIGH-SPEED TRANSPORT [Moeglichkeiten der Schienentwicklung fuer einen Hochleistungsschnellverkehr]

High-capacity, high-speed transport makes additional demands on the rails. The article discusses the possibility of developing materials for self-hardening rail steels. He presents the results of tests carried out on experimental rails produced industrially. These are mainly made of perlitic steels, steels with a bainitic structure, and low-carbon steels. [German]

Heller, W *Technische Mitteilungen Krupp* Vol. 33 No. 2, May 1975, pp 73-77, 2 Fig., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

09 131266

MEASUREMENT OF WEAR BY THE LAYER THICKNESS DIFFERENTIAL METHOD [Verschliessmessungen nach dem Duennschicht-Differenzmessverfahren]

The principle for determining the wear is based on the fact that the radioactivity of a component subjected to radiation by protons or deuterons will be destroyed by wear under operating conditions. The difference between initial and final radioactivity is a measurement of wear. The author describes this measuring method used by the DB Test Centre at Minden (Westphalia). [German]

Schmidt, W *Eisenbahntechnische Rundschau* Vol. 24 No. 11, Nov. 1975, pp 425-426, 1 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

09 131301

DEVELOPMENT OF CORRUGATIONS ON SURFACES IN ROLLING CONTACT

The self-generation of corrugation on metal surfaces in rolling contact has been studied experimentally in a rolling contact disc machine and theoretically using a computer simulation. The system vibrates in the "contact resonance" mode excited by surface irregularities, and these vibrations may be severe enough to cause plastic indentation of the surface in one revolution which then amplifies the vibration in the next revolution.

Johnson, KL Gray, GG *Institution of Mechanical Engineers Proceedings* Vol. 189 No. 13, 1975, pp 45-58, 14 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 131533

CRACK GROWTH RATE. ITS MEASUREMENT AND A CONTROLLING FACTOR IN ROLLING CONTACT FATIGUE

An optical method has been developed for measuring the extent of cracking in test specimens which have failed by fatigue under rolling contact conditions. The data from these measurements are expressed in terms of the overall crack growth rate, and it is found that an excellent correlation exists between fatigue life and the rate at which cracks branch and propagate. The correlation appears to be independent of stress, lubricant chemistry, and probably metallurgy; this shows that crack branching rate controls fatigue life. The results do show that lubricant chemical factors affect fatigue life through the crack branching rate.

Polk, CJ Rowe, CN *American Society of Lubricating Eng-Transactions* Vol. 19 No. 1, Jan. 1976, pp 23-32

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL

09 132205

PREPARATION OF THE BRL TANK CAR TORCH FACILITY AT THE DOT, TRANSPORTATION TEST CENTER, PUEBLO, COLORADO

The Tank Car Torching Facility was designed and fabricated on a site located at the Transportation Test Center, Pueblo, Colorado. The torch configuration was calibrated and the operational procedures and requirements determined. A series of thirteen (13) tests were run on specimen tank car plates, both bare and thermally insulated with the two different coatings. This report concerns itself with the instrumentation and procedural requirements; however, none of the data from these tests are reported at this time. The next phase of the program is briefly discussed.

Townsend, W Markland, R
Ballistic Research Laboratory Final Rpt. FRA-OR&D 76-72, Nov. 1975, 24 pp, 12 Fig.

Contract DOT-AR-30026

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-251151/AS, DOTL NTIS, DOTL RP

09 132929

APPLICATION OF FRACTURE MECHANICS TO THE BRITTLE FRACTURE OF STRUCTURAL STEELS

Calculation of defect size based on current theory, from measurements of K1c or COD in laboratory tests and demonstration of the influence of various design factors, stress concentration and residual stress effects on the defect tolerance calculated are given in graphical and equation form.

Barr, PR Terry, P *Journal of Strain Analysis* Vol. 10 No. 4, Oct. 1975, pp 233-241, 34 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 132930

FRACTURE MECHANICS: A SUMMARY OF ITS AIMS AND METHODS

The strength of fracture mechanics is the separation of geometrical features from mechanical properties in the presence of cracks, so that unique values are defined for given circumstances, and these can then be used in assessing the behaviour of components. If offers a logical basis for extrapolations into hitherto unused sizes of components or strength ranges of materials.

Journal of Strain Analysis Vol. 10 No. 4, Oct. 1975, pp 258, 1 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 132939

AMERICAN WOOD-PRESERVERS' ASSOCIATION, 71ST ANNUAL MEETING, PROCEEDINGS, 1975

Thirty-three papers by various authors are presented. The topics discussed are: Tropical woods, treated wood samples, EPA liaison, chemical modification, poles, railway ties, quality control, preservation research, construction and biodeterioration, pollution control, productivity, preservatives, foundations, techniques, particle boards, treatment of lumber, piles, and posts, cross ties, switchties, accelerated evaluation, statistics, and wood preserving plants.

Meeting held in San Francisco, Calif., Apr. 28-30, 1975.

American Wood-Preservers' Association, Proceedings Vol. 71 1975, 441 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Wood-Preservers' Association 1625 Eye Street, NW, Washington, D.C., 20006

09 132940

CHEMICAL MODIFICATION OF WOOD: ADVANTAGES AND DISADVANTAGES

The properties of and reaction conditions for the chemical modification of wood as a method for decay prevention are reviewed. Treatments for wood with such chemicals as anhydrides, isocyanates, formaldehyde, dimethyl sulfate, alkyl chlorides, Beta-propiolactone, acrylonitrile, and epoxides are discussed. Requirements for chemicals to be considered for the chemical modification of wood are given. Data are tabulated.

Meeting held in San Francisco, Calif., Apr. 28-30, 1975. See RRIS 02 132939, bulletin 7602.

Rowell, RM (Forest Products Laboratory) *American Wood-Preservers' Association, Proceedings* Vol. 71 1975, pp 41-51, 51 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Wood Preservers' Association 1625 Eye Street, NW, Washington, D.C., 20006

09 134553
MICROWAVE MEASUREMENT OF STRESSES AND STRAINS IN REVOLVING PARTS [La mesure par voie hertzienne des contraintes et des efforts sur pieces tournantes]
The microwave equipment for measuring the dynamic stresses in revolving parts picks up the information by means of an aerial fixed near the moving part. The modulated and amplified signals are fed into an oscilloscope. The various units in the equipment have been miniaturised by the Testing Section of the SNCF Rolling Stock Department. The equipment is used for measuring the stresses and strains in the axles of RTG trainsets, and in the cardan shaft transmission system of the Z 7001 railcar.

Moreau, M *Revue Generale des Chemins de Fer* Vol. 95 Jan. 1976, French

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 135182
COATING FOR THE PRESERVATION OF FRACTURE SURFACES
In order to perform a meaningful examination of a fracture surface in the scanning electron microscope it is necessary for the examined surface to be in a condition as close to the fractured condition as possible. Laboratory preservation techniques are not available to the engineer in the field so that fracture surfaces are best preserved by coating them with a material that can be easily removed later without damage to the fractures. In this paper, a preservative is described that is suitable for the protection of fracture surfaces both in the field and in the laboratory. The restrictions and limitations of the preservative are discussed and examples of fracture surfaces before coating and after coating and exposure to a humidity cabinet are shown.

Broadman, BE Zipp, R Goering, WA
Society of Automotive Engineers Preprint No. 750967, 1975, 10 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

09 135189
REASONS FOR THE OCCURRENCE OF INTERNAL STRESSES IN RAILS OF S60 TYPE AND QUANTITATIVE EVALUATION OF THESE STRESSES [Przyczyny powstawania naprezen wlasnych w szynach S60 i ich ilosciowe oznaczenie]
The effect of the cross-sectional configuration, structural changes, and the process technology on the occurrence of internal stresses in rails made of steel S60 during or immediately following straightening between rollers is discussed. A method of investigating these stresses and determining the resulting strains is described which assumes the existence of static stresses in the rails in the unloaded state and involves the use of electrical strain gages and photoelastic measurements of the strain distribution in the rails. [Polish]

Wosiek, E Morawiecki, M Schmidt, J Wojcicki, Z Jamroz, L *Hutnicke Listy* Vol. 42 No. 10, Oct. 1975, pp 381-388

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

10 052746
NOISE ABATEMENT. MEASURING PRINCIPLES
The object of the present note is to inform ORE of the arrangements already made by the Sub-Committee "Measurements." A bridge selected by the DB (at Rosenheim) for conducting various tests concerning rail laying systems (Sub-Committee E 82b), for which arrangements concerning the installations on the sites have been made, has been studied. The present note supplies: a survey of some general characteristics concerning measurements of sound levels, the directives adopted concerning: the measuring chain and the measuring units to be used for the tests, and the evaluation of the tests and the presentation of the results and also the measuring arrangements for the Sub-Committees "Diesel" and "Bridges".

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E82/RP 1/E, June 1964, 11 pp, 4 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

10 052747
NOISE ABATEMENT. COMPARATIVE SOUND MEASUREMENTS
The object of the comparative measurements, conducted at Brunswick in October 1964 with measuring instruments of the Administrations of the DB, SNCF, SF and NS, was to determine the extent to which the results obtained by the various measuring groups were comparable and, if necessary, to give useful details concerning the method for evaluating the test results. These measurements were preceded by a calibration of the instruments at the Federal-Physico-Technical Institute. For the execution of the tests, the microphones were placed at a distance of five metres from the idling diesel engine of a locomotive of the V 60 series of the DB, the emitted noise being simultaneously recorded by all the measuring arrangements. The results obtained were registered were registered on level recorders. One test, moreover, was registered on tape-recorders, the results being subsequently evaluated in the laboratory. This report contains the figures and tables relating to the evaluation and explains the differences found, these, as a rule, being small. Summing-up, the following might be concludedì provided that certain fundamental rules are respected, the noise measurements conducted by several Administrations can supply reasonably comparable results.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E82/RP 2/E, June 1965, 14 pp, 31 Fig., 9 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM:

DOTL RP

10 052748
NOISE ABATEMENT. PROPAGATION OF NOISE BY RAILWAY TRAFFIC
As shown in ORE-Report D 105/RP 1, many metal bridges must be regarded as considerable noise sources. The study of the possible reduction of noise radiated by such bridges led to the concept of noise-insulating encasements. However, it will never be possible to push this encasement so far that the bridge and the trains on it are fully enclosed as in tunnels. This leads to a through-shaped structure, open on top. The noise reduction afforded by such a structure is naturally limited by the noise emanating from the open part. In calculating the airborne sound insulation values obtainable for these structures, this limitation should be taken into account. It become apparent that insufficient bases were available for the calculation of sound propagated across obstacles. Since any evaluation of the efficiency of encased bridge structures must be based on these principles, the ORE Specialists Committee D 105 considered the investigation in question indispensable. In order to limit the costs of the tests, the measurements were taken in open track and not on specially-equipped bridges and, as far as possible, with existing sound-propagation obstacles. This report shows that useful methods are available for predetermining the efficiency of sound-progagating obstacles. The results of these calculations can be used both for the study of problems of sound propagation in open track and for those concerning encasing bridge structures. Using the methods described, the constructional problems peculiar to the use of encased structures as sound- insulating elements on bridges can best be dealt with by practical tests.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E82/RP 3/E, Apr. 1969, 13 pp, Figs., Phots., 13 Ref., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

10 052749
NOISE ABATEMENT. MEASURING PRINCIPLES FOR NOISE ABATEMENT IN THE FIELD OF RAILWAY TRANSPORTATION
This report is intended primarily for railway purposes and contains: general observations on the measurement of noise and vibrations; the units used and a definition of the reference quantities; the general measuring principles and the characteristics used for assessing noise-levels in decibels; a description of the measuring procedure and the characteristics of the equipment used: the method used for evaluating the results and the results themsleves: the particular arrangements with regard to: locomotives, shunting locomotives and light rail motor tractors (diesel or electric); railcars and permanently coupled trains (diesel or electric); special vehicles (tyred vehicles, air-cushion vehicles, turbine vehicles, cranes running on rails, etc.); the running of trains on bridges and in tunnels on non-conventional track and in underground stations. In order to obtain an accurate interpretation of the results, and to facilitate comparison and any trans-positions which might be necessary, it was agreed to adopt the international recommendations and standards in connection with the measuring equipment, the calculation methods and the test procedure. The references and designations of the chief standards are given in the report. The studies of the Committee have been limited to the definition of a noise and vibration measurement index permitting possible comparisons betwwen the different equipments. The interpretation of the results is principally based on the band analysis and the overall noise level in dB(A). The arrangements outlined in this document do not deal with the assessment criteria, nor do they define the permissible limits or treat the effects of noise on the individual.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E82/RP 4/E, Oct. 1969, 16 pp, 9 Fig., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

10 052880
TRACKS WITHOUT BALLAST FOR UNDERGROUND LINES IN URBAN CENTRES. MEASURING METHODS
This report on measuring methods proposes standards for measuring noise and vibrations, with the object of providing a comparison between track installations in tunnels. Furthermore, it contains tentative ideas on limits which the Committee considers desirable for noise and vibration in new installations.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D87/RP 2/E, June 1967, 13 pp, 3 Fig., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

10 053139
NOISE ABATEMENT ON DIESEL LOCOMOTIVES. EXHAUST SILENCERS ON RAILED DIESEL VEHICLES
The exhaust gas of large diesel engines still contains an appreciable amount of energy, part of which is noticed as exhaust noise. A sound level varying between 110 and 115 dB(A) has been measured at an unsilenced exhaust and the contribution of noise of this level to the ambient noise of a diesel locomotive is rather unfavourable. Damping of the exhaust noise is therefore a matter of some urgency. Requirements to be met by exhaust silencers arise from the field of physics, in the field of mechanical design and construction

and in that of economics. It is held that an exhaust silencer ought to obtain a noise reduction of 15 to 20 dB(A) in the exhaust flow, so that the noise level at the outlet of the exhaust pipe should not exceed, even in the most adverse conditions, a maximum value of 95 to 105 dB(A). The exhaust silencer ought not therefore to be considered in isolation as a separate unit, but as an essential part co-operating in the performance of a diesel locomotive. The exhaust silencers used in European diesel rail vehicles are listed in a table. From this it can be seen that the silencers in use are based on only three principles: reflection, resonance and absorption; the theories on which these principles are based are described in this report. Experience has shown that silencers which are theoretically based solely on one of these principles do not give optimum silencing. An exception is the jacketed tube absorption silencer. Optimum silencing can only be obtained by combining two or more of the basic principles. The development of new silencers for a given type of vehicle can therefore be based less on theoretical calculation than on empirical methods guided by theory. From the theoretical possibilities six silencer systems were worked out and these were related to the requirements of the different types of locomotive. From this it was possible to produce tabular recommendations for the design of diesel locomotives, from which the most suitable silencer may be selected in practically all cases. So far, the space generally available for the installation of exhaust silencers is, however, too small and consequently reduces their efficieny. Future designs should provide the necessary space for fitting exhaust silencers.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B104/RP 1/E, Mar. 1967, 34 pp, 16 Fig., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

10 053166
RAILWAY NOISE. NOISE ANNOYANCE FROM BRAKING AND NEGOTIATING SHARP CURVES; FUNDAMENTAL CONSIDERATIONS AND FIRST TEST RESULTS

This report describes chiefly the general principles for reducing noise annoyance, when negotiating sharp curves, by applying coatings to wheels and rails. A track installation with a 90 m curve and different types of vibration damped and normal rails is described; screech noise generated during the passage of four wagons, with and without damped wheelsets, was studied. A further section gives first results of measurements taken to investigate the influence due to the material composition of cast-iron brake blocks on noise generation during braking.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways C137/RP 2/E, Oct. 1975, 31 pp, 21 Fig., 3 Tab., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

10 092340
WHEEL/RAIL NOISE AND VIBRATION. VOLUME I: MECHANICS OF WHEEL/RAIL NOISE GENERATION

The final reports are reported of a project to develop a basic understanding of urban transit wheel/rail noise control measures. Analytical models of impedance, response, radiation efficiency, and directivity of wheels and rails are presented and compared with field and laboratory measurements. Analytical formulas for the prediction of noise in the three general categories of wheel/rail noise- squeal, impact, and roar-are presented and verified by comparison with laboratory measurements as well as field measurements using a small steel-wheeled personal rapid transit vehicle on a test track. Volume one deals with the theory of wheel/rail noise generation.

Prepared in cooperation with Bolt Beranek and Newman, Inc., Cambridge, Mass. See also PB-237 012, and Vol. 2, PB-244 515.

Remington, PJ Rudd, MJ Ver, IL
Transportation Systems Center, Urban Mass Transportation Administration, Bolt, Beranek and Newman, Incorporated Final Rpt. DOT-TSC-UMTA-75-1, UMTA-MA-06-0025-7510, May 1975, 210 pp

Contract DOT-TSC-644

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244514/6ST, DOTL NTIS

10 092341
WHEEL/RAIL NOISE AND VIBRATION. VOLUME II: APPLICATIONS TO CONTROL OF WHEEL/RAIL NOISE

The second volume of a two-volume report on urban transit wheel-rail noise control deals with the development of prediction formulas for wheel-rail noise, verification of these formulas by means of test vehicles operating on test tracks, techniques for the suppression of wheel-rail noise, and suggested testing procedures for improving control measures.

Prepared in cooperation with Bolt Beranek and Newman, Inc., Cambridge, Mass. See also PB-237 012 and PB-244 514.

Remington, PJ Rudd, MJ Ver, IL
Transportation Systems Center, Urban Mass Transportation Administration, Bolt, Beranek and Newman, Incorporated Final Rpt. DOT-TSC-UMTA-75-1-V2, UMTA-MA-06-0025-7511, May 1975, 169 pp

DOT-TSC-64 4 TOTAL FUNDS:

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PB-244515/3ST, DOTL NTIS

10 092773
NITROGEN OXIDE AIR POLLUTION. PART 5. EMISSIONS STUDIES (A BIBLIOGRAPHY WITH ABSTRACTS)

This bibliography presents selected references to research on nitrogen oxide air pollution. Emissions from both stationary and mobile sources, emissions factors, regional emissions inventories, and some general studies are included. Air quality data is excluded. Nitrogen oxide air pollution control, detection and analysis, atmospheric chemistry, and biological effects are covered in Parts 1 thru 4 of this series, NTIS/PS-75/607, 608, 609, and 610, respectively. (Contains 225 abstracts)

Partial revision of NTIS/PS-74/089.

Werner, KG
National Technical Information Service Bibliog. Aug. 1975, 230p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
NTIS/PS-75/611/4ST, DOTL NTIS

10 092776
NITROGEN OXIDE AIR POLLUTION. PART 1. CONTROL TECHNOLOGY (A BIBLIOGRAPHY WITH ABSTRACTS)

This bibliography covers all aspects of nitrogen oxide air pollution control. Technology and equipment for both mobile and stationary sources are covered, including exhaust and flue gas treatment, fluidized bed combustion and combustion modification, and engine, combustor and burner design as they relate to emissions reduction. (Contains 191 abstracts)

Partial revision of NTIS/PS-74/089. See also NTIS/PS-75/608.

Werner, KG
National Technical Information Service Report Aug. 1975, 196p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
NTIS/PS-75/607/2ST, DOTL NTIS

10 093146
THE TRANSPORTATION CONTROL PLANNING PROCESS: FINDINGS AND RECOMMENDATIONS FOR IMPROVED DECISION-MAKING. PHASE I

Findings and recommendations on methods of air quality maintenance and transportation planning are presented. The report focuses on transportation control plans and identifies several problem areas, including uncertainties in air pollution data, tight planning deadlines and limited resources, lack of information on transportation control options and their impacts, difficulties in intergovernmental and interagency relations, and breakdowns in communication with the affected public. The research indicates means by which the air quality planning process can be strengthened. More planning on the local levels and more explicit coordination with the ongoing activities of other agencies are recommended.

Bennett, E Harvey, G Manheim, M Suhrbier, J Bessey, M
Massachusetts Institute of Technology, Environmental Protection Agency
Final Rpt. CTS-75-4, Mar. 1975, 53 pp

Contract EPA-68-01-2476

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244138/4ST, DOTL NTIS

10 093363
VIBRATION PREDICTION MODEL FOR FLOATING-SLAB RAIL TRANSIT TRACK
This report presents the theoretical development of a model to predict the vibration reduction by floating-slab tracks in subway tunnels. Data from a field study in New York City are also presented. The report is one of three reports dealing with noise and vibration control for urban rail transit track and elevated structures. The theoretical model described allows for the prediction of the force transmissibility--the ratio of the amplitudes of the force on the tunnel floor and the force on the rail. Data from the field study support the use of a simple single-degree-of-freedom oscillator for predicting vibration reduction. The theoretical model developed allows predictions to be made for a more general case.

Manning, JE Hyland, DC Tocci, G
Cambridge Collaborative, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-75-17, Aug. 1975, 142 pp

Contract DOT-TSC-643

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245638/2ST, DOTL NTIS

10 093670
HEALTH HAZARD EVALUATION/TOXICITY DETERMINATION. REPORT 72-97-135, CHICAGO AND NORTH WESTERN RAILWAY, OELWEIN, IOWA
A health hazard survey was conducted by the National Institute for Occupational Safety and Health (NIOSH) to evaluate exposure to vapors from a chemical degreasing vat at Chicago and North Western Railway, Oelwein, Iowa. It has been determined that employee exposures to a heated caustic mist (sodium hyroxide) were toxic at the concentrations found during the time of this evaluation. While such exposures have resulted in the problem of irritant toxicity, it has also been determined that no apparent permanent or acute tissue damage resulted from these exposures.

Hervin, RL Cohen, SR
National Institute for Occupational Safety & Hlth Final Rpt. NIOSH-TRHHE-72-97135, May 1974, 19 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246442/8ST, DOTL NTIS

10 093919
EVALUATION OF DIESEL ENGINE PERFORMANCE WITH INTAKE AND EXHAUST SYSTEM THROTTLING. VOLUME II: APPENDIX 1
The appendix to the preceding volume presents the data for the subject diesel engine noise study, including an engine sound power level analysis and sound spectrums showing the effect of intake and exhaust restrictions.
See also Volume 1, PB-247 752.

Hern, R Eccleston, B Marshall, W
Bartlesville Energy Research Center, Transportation Systems Center Final Rpt. DOT-TSC-OST-74-42.II, Nov. 1975, 190 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247753/7ST, DOTL NTIS

10 094172
ABSTRACTS OF THE 1971-1974 UNITED STATES AND FOREIGN OPEN LITERATURE ON NOISE. PART I
This document is a task report of effort directed toward a search of the open literature to provide some insight into the noise reduction effort outside of the Federal Government and in foreign countries. Abstracts from the search covered the period 1971 to 1974. Two primary sources were searched for abstracts: The Engineers Index and Pollution Abstracts. Nearly 1300 abstracts from 21 countries were screened and segregated into the following categories: Aircraft noise; building noise; general interest; machinery noise; noise effects on health; noise measurement instrumentation; and transportation noise. The distribution of abstracts within each technical area is summarized in the report, and a compilation of the abstracts is presented as an appendix and bound separately.
Environmental protection technology series.

Bergmann, EP Fieldhouse, IB
IIT Research Institute, Environmental Protection Agency, (EPA-J-6331) EPA/600/2-76/016a, Jan. 1976, 48 pp

Contract EPA-68-01-2234

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248116/6ST, DOTL NTIS

10 094765
NOISE FROM HIGH SPEED RAILWAY OPERATIONS
Developments in high speed railway operations are considered from the point of view of noise pollution. Existing methods of predicting railway noise are summarized and an assessment is made of the present day railway noise environment. Reasons are given for the acceptability of railway noise when compared to road or air traffic. Reactions towards future railway operations are outlined.

Walker, JG
Institute of Sound and Vibration Research ISVR-TR-75, May 1975, 26 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
N76-13640/7ST, DOTL NTIS

10 129407
SOUND-PROOF STEEL RAIL BRIDGES [Schallgedaempfte Stahlbruecken fuer Schienenverkehr]
Elastic rail support can only be used under certain conditions because permissible rail movement is limited; limiting the elasticity also reduces the sound-proofing effect. By coating the large steel sheets of the bridge with sound-proofing materials and by use of cladding, good results can be obtained. Certain thickness conditions need to be respected. All these measures are only successful for certain frequency ranges (never below 200 Hz) and within given temperature limits. The non-bearing parts of the bridge can hardly be sound-proofed. Heavy concrete slabs, hanging and floating on steel girders are very effective but they increase the weight of steel that has to be supported. [German]

Kurze, UJ
Battelle-Institut EV, West Germany 1973, 45 pp, 33 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Battelle-Institut EV, West Germany Postschliessfach 900160, 6000 Frankfort/Main, West Germany Repr. PC

10 129848
SUBWAY ENVIRONMENTAL DESIGN HANDBOOK
This handbook is a guide and reference for the planning, design, construction and operation of underground rapid transit systems. Bulk of material has been prepared for those primarily responsible for environmental control. Report follows the logical flow path from criteria through load analysis, and from system conceptual design to selection of equipment.
Contributing to this handbook was Parson, Brinckerhoff, Quade and Douglas, Inc., Deleuw, Cather & Company, and Kaiser Engineers.

Transit Development Corporation, Incorporated Vol 1, 1975

ACKNOWLEDGMENT: UMTA
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

10 130921
NITRIC OXIDE FORMATION IN DIESEL ENGINES
A combustion model is presented to account for the nitric oxide formation in diesel engines at all operating conditions. The paper tries to introduce the concept of variable air-fuel ratio estimated to exist during diesel combustion. Analytical solutions are found to be in good agreement with experimental results. Further investigations will be directed to diesel engines having combustion systems other than the M.A.N.-FM system, and to possible remedies to reduce the formation of nitrogen oxides.

Cakir, H (Middle East Technical University, Turkey) *Institution of Mechanical Engineers Proceedings* Vol. 188 No. 46, 1974, pp 477-483, 12 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

10 131276
MEASURES TO REDUCE NOISE FROM RAILWAY VEHICLE WHEELS AND RAIL [Massnahmen zur Schalldaempfung an Schienenfahrzeugraedern und Schienen]
The author briefly explains the origin of noise from railway vehicles running in curves on the track, and discusses measures taken by the firms of Dr. A. Stankiewicz and Klockner-Werke in collaboration with the DB, on vehicle wheels and rails with a view to reducing poise. He describes special constructional devices, bench tests, and the first results obtained. [German]

Kurek, EG *Eisenbahntechnische Rundschau* Vol. 24 No. 11, Nov. 1975, pp 404-409, 8 Fig., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

10 131279
RAILWAY NOISE AND THE ENVIRONMENT
Summary of present knowledge on railway noise and its consequences for the environment. From work carried out by BR and by other railways, JNR in particular, the note Studies: 1) noises caused by normal rail/wheel contact; rail corrugation in the case of conventional track and of slab tracks, bridges, viaducts, embankments, in curves; 2) noises caused by braking, electric and diesel locomotive engines, motor train sets; 3) noises in depots, workshops, marshalling yards; 4) measurement indices of human reactions to noise; 5) noise abatement measures; 6) vibrations transmitted by the ground. The Research is presently carried out by BR, by Southampton University and by ORE. This note is accompanied by a brochure on noise in the Channel Tunnel.

British Railways Board Research Department 28 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: British Railways Board Research Department Library, London Road, Derby, England Repr. PC

10 132941
SOME ENVIRONMENTAL ASPECTS OF CREOSOTE
Two areas of environmental interest for creosote are discussed. Creosote treated wood piling and bulkhead materials as used in waterfront structures do not show, at this time, any potential hazard to the environment. The Environmental Protection Agency (EPA) indicated that bird and fish toxicity data would be necessary to assist in the monitoring of an accidental creosote spill situation. Data are given for the eight-day dietary feeding study with bobwhite quail and mallard duck; and for a fish bioassay using bluegill, goldfish and rainbow trout. Plates and tables illustrate data.
Meeting held in San Francisco, Calif., Apr. 28-30, 1975. See RRIS 02 132939.

Webb, DA (Koppers Company, Incorporated) *American Wood-Preservers' Association, Proceedings* Vol. 71 1975, pp 176-181, 8 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Wood-Preservers' Association 1625 Eye Street, NW, Washington, D.C., 20006

10 132950
NOISE RADIATION FROM ELEVATED RAIL STRUCTURES
Noise of a train increases substantially when it enters an elevated structure from on-grade track. A simple analytical model which incorporates all the essential components of the problem is presented. Equation illustrates model.
Presented at the Int. Congr. on Acoust, 8th, London, Engl., July, 1974.

Ver, IL (Bolt, Beranek and Newman, Incorporated)
Goldcrest Press Proc Paper Vol. 1 1974, p 17, 1 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Goldcrest Press Towbridge, Wiltshire, England

10 134055
SIMPLE PREDICTION EQUATIONS FOR WAYSIDE NOISE FROM TRAINS
In work being undertaken to assess the noise impact of a new urban railway system, it was found desirable to formulate one or two simple equations predicting wayside noise which are given in this short report. The equations were derived by looking at the curves obtained from experimental results of other researchers and they were tested against measured data. The equations refer to a ground level road bed at zero grade with a flat surrounding area free from reflecting or attenuating surfaces. /TRRL/

May, DN (Ontario Ministry of Transportation & Communic, Can) *Journal of Sound and Vibration* Vol. 43 No. 3, Dec. 1975, pp 572-574, 2 Fig., 12 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217351)
PURCHASE FROM: ESL

DOTL JC

10 134056
A METHOD OF ASSESSING THE NOISE NUISANCE ARISING FROM THE CHANNEL TUNNEL HIGH SPEED RAIL SYSTEM
Until recently railway noise has been accepted as a well established but dwindling source of noise nuisance, and has been subject to relatively little sociological study. The proposal for high speed trains through previously quiet areas has however called for the establishment of subjective noise zones. The paper puts forward such zones, based upon sociological data in other countries and on aircraft, road traffic and community data in the United Kingdom. Planning zones are calculated for the expected frequencies of rail services, and based upon the estimated and measured noise levels of high speed trains. Some comments are made upon the generalization of this information, and on the effects of barriers, cuttings and distance; and on vibration and shock effects near to the railway line itself. (A) /TRRL/

Richards, EJ (Loughborough University of Technology, England) *Journal of Sound and Vibration* Vol. 43 No. 4, Dec. 1975, pp 633-657, 11 Fig., 7 Tab., 25 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-217343)
PURCHASE FROM: ESL

DOTL JC

10 134296
BACKGROUND DOCUMENT FOR RAILROAD NOISE EMISSION STANDARDS
This document contains the technical, economic, health and welfare analyses and other pertinent data and information utilized by the Environmental Protection Agency in the development of the final Interstate Rail Carrier Noise Emission Regulation.

Environmental Protection Agency Final Rpt. EPA 550/9-76-004, Dec. 1975, 618 pp

ACKNOWLEDGMENT: Environmental Protection Agency
PURCHASE FROM: Environmental Protection Agency Office of Noise Abatement and Control, Washington, D.C., 20460

DOTL RP

10 134604
ANALYSIS AND TREATMENT OF DIESEL-ENGINE NOISE
Diesel engine noise is caused by vibration of the surfaces of the structure, accessories attached to the structure, and covers such as those over valves.

Two basic forces cause vibration--combustion and the engines mechanisms. These forces combine to vibrate the structure in its preferred modes. Noise reduction can be achieved by lowering any of the forcing functions, couplings or responses. Complete or partial shielding of external surface is also effective.

Jenkins, SH (Cummins Engine Company) *Journal of Sound and Vibration* Vol. 43 No. 2, Nov. 1975, pp 293-304, 10 Fig., 2 Tab., 6 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

.0 134605

NOISE CONTROL OF HIGH-SPEED RAILWAYS

Japanese National Railways is devoting efforts to environmental problems---particularly the noise and vibrations caused by Shinkansen trains. Target values have been set by the environmental agency for residential and commercial areas. Noise around elevated structures have been carefully measured. Noise abatement techniques have been utilized and are discussed. Techniques are being developed to minimize transmission of wheel-rail noise and that arising from vibration of structures.

Ban, Y Miyamoto, T (Japanese National Railways) *Journal of Sound and Vibration* Vol. 43 No. 2, Nov. 1975, pp 273-280, 6 Fig., 5 Tab.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

10 134606

AN ANALYSIS OF RAILWAY VEHICLE ACOUSTICS

With higher train speeds and less traditional methods of vehicle construction, forecasting of any internal sound field deterioration is important. This investigation has shown that identification of components of internal noise in a vehicle is possible. As operating speeds increase, it is also necessary to take into account turbulent boundary- layer noise. The sound field around a vehicle resulting from the wheel-rail noise alone can be calculated reasonably accurately from a model, and this should remain useful unless a major change in cross-section of a passenger vehicle is proposed.

Bickerstaffe, R Eade, PW Hardy, AEJ Peters, S Woodward, B *Journal of Sound and Vibration* Vol. 43 No. 2, Nov. 1975, pp 265-272, 7 Fig., 3 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

10 134607

THE CONTROL OF NOISE FROM SURFACE TRANSPORT

While road traffic, railways and hovercraft each contribute to degradation of environment, road traffic is the greatest offender. The sources of noise from each of these modes is discussed. Rail/wheel noise is identified as the principal culprit in the case of high-speed trains. The potential of barriers, control of prime-mover noise and of exhaust systems are discussed. The potential for legislative control is examined.

MacMillan, RH *Journal of Sound and Vibration* Vol. 43 No. 2, Nov. 1975, pp 173-187, 15 Fig., 36 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

10 135194

USE OF COHERENCE TECHNIQUES TO PREDICT THE EFFECT OF ENGINE OPERATING PARAMETERS ON DIESEL ENGINE NOISE

A technique is presented in which the effects on noise of changing diesel engine operating parameters can be predicted. Traditionally, the effects have been determined by experiment. The technique presented in this paper utilizes experimentally determined frequency response functions between each cylinder pressure input and the engine noise. Once the frequency response are measured, the engine noise can be calculated for an arbitrary cylinder pressure input. The effect of injection timing, engine load, and engine speed are predicted using cylinder pressure histories obtained from a single cylinder research engine.

Prepared for meeting September 17-19, 1975.

Seybert, AF (Purdue Research Foundation); Crocker, MJ

American Society of Mechanical Engineers N75-DET-73, 1975, 7 pp, 17 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

10 136498

GUIDELINES FOR QUALITY ASSURANCE PROGRAMS FOR MOBILE SOURCE EMISSIONS MEASUREMENT SYSTEMS. PHASE II. HEAVY-DUTY DIESEL ENGINES-TEST PROCEDURES

Test procedures for heavy-duty diesel engines mobile source emissions measurement systems are presented with the concept of a total quality assurance system. The test procedures are presented in document control format and give the detailed test procedures with quality assurance provisions for each part of the total testing system.

See also PB-251 332.

Pilkington, R Kelly, T Wimette, H
Olson Laboratories, Incorporated, National Environmental Research Center Final Rpt. EPA/650/4-75/024d, June 1975, 185 pp

Contract EPA-68-02-1740

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-251333/1ST, DOTL NTIS

10 136499

GUIDELINES FOR QUALITY ASSURANCE PROGRAMS FOR MOBILE SOURCE EMISSIONS MEASUREMENT SYSTEMS: PHASE II. HEAVY-DUTY DIESEL ENGINES

Quality Assurance guidelines for Heavy-Duty Diesel Engines Mobile Source Emissions Measurement Systems are presented with the concept of a total Quality Assurance System. The guidelines apply to Quality Assurance Principles and techniques in the areas of procurement, standards and calibration, test quality control, data validation and corrective action. Model Quality Management Procedures are presented to describe the relationships and responsibilities of the various organizational elements in accomplishing the quality functions.

See also PB-245 788 and PB-251 333.

Pilkington, R Kelly, T Wimette, H
Olson Laboratories, Incorporated, National Environmental Research Center Final Rpt. EPA/650/4-75/024-c, June 1975, 296 pp

Contract EPA-68-02-1740

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-251332/3ST, DOTL NTIS

10 136620

PROCEEDINGS OF THE CONFERENCE ON AIR QUALITY IMPACT ANALYSIS FOR APPLICATION IN LAND USE AND TRANSPORTATION PLANNING HELD IN BERKELEY, CALIFORNIA ON JUNE 24-26, 1974

The conference proceedings covered the following topics: Air quality and land use, Air quality management and land use regulation, Institutional issues in air quality management, Air quality considerations and local land use planning, A needed framework for relating air quality content of EIRs to decision making, Interaction of the planning and regulatory communities, General aspects of air pollution, The role of meteorology in air quality, The state of the art in air quality modeling, Air pollutant emissions and emission factors, Meteorological modeling input, Simplified techniques for air quality impact quantification, Elements of an adequate impact presentation, and a Critique of sample impact reports.

Hussey, ET Thuillier, RH Hagevik, G
California University, Berkeley, Environmental Protection Agency EPA/450/3-76/009, Sept. 1975, 304 pp

Grant EPA-T-900345

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250560/0ST, DOTL NTIS

10 138303
SUBJECTIVE ASSESSMENT OF TRANSPORTATION NOISE

The purpose of this paper is to concentrate on the perceived noisiness components of community noise criteria, and to show that useful contributions towards the understanding of the "noise problem" may be achieved if closer account is taken of the inadequacies shown by existing rating-scale units. It should be noted that the "noise problems" is not limited to the reactions of noise exposed "communities". The noise "sources" themselves are being increasingly subjected to control and legislative procedures. These restrictions often impose high development, production and operating costs. Therefore, when required to meet obligatory noise standards, the rating scale unit used should not be seen to favor one "source" rather than another.

Proc 8th Int Congr on Acoust Symp on Noise in Transp, Univ of Southampton, England, July 22-23, 1974.

Rice, CG *Journal of Sound and Vibration* Vol. 43 No. 2, Nov. 1975, pp 407-417, 9 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

DOTL JC

10 138307
AIR-AND STRUCTURE-BORNE NOISE OF RAILWAYS

A summary of the sources of rail traffic noise as well as various steps taken in noise attenuation is presented. Internal and external vehicle noise and structure-related noise is discussed.

Proc 8th Int Congr on Acoust Symp on Noise in Transp, Univ of Southampton, England, July 22-23, 1974.

Stueber, C *Journal of Sound and Vibration* Vol. 43 No. 2, Nov. 1975, pp 281-289, 15 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

DOTL JC

11 093548
AUTOMATED GUIDEWAY GROUND TRANSPORTATION NETWORK SIMULATION
The report discusses some automated guideway management problems relating to ground transportation systems and provides an outline of the types of models and algorithms that could be used to develop simulation tools for evaluating system performance. The system management problems are related to the routing and scheduling of both passengers and vehicles, as well as to control strategies such as synchronous and quasi-synchronous. The simulation outline provides background material for model descriptive, functional requirements, and simulation structure that can be used in future development activities.

Toye, CR
Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-18, UMTA-MA-06-0048-75-1, Aug. 1975, 57 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246758/7ST, DOTL NTIS

11 093564
THE AVAILABILITY SIMULATION OF AGT SYSTEMS
The report discusses the analytical and simulation procedures that were used to evaluate the effects of failure in a complex dual mode transportation system based on a worst case study-state condition. The computed results are an availability figure of merit and not an absolute prediction with associated confidence levels of system availability. The advantage of this procedure is that it avoids the use of a dynamic network traffic flow simulation which is both costly and time-consuming. The analytical and simulation approach taken encompasses fault tree and failure mode and effect analyses. The novel aspect of this approach is the use of the Monte Carlo technique to determine the physical location of failed vehicles in the system (on or off the guideway, in station berths, or at various merge/-demerge sectors).

Toye, CR
Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-14, UMTA-MA-06-0048-75-3, Feb. 1975, 33 pp

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247061/5ST, DOTL NTIS

11 094113
CONCEPTUAL DESIGN AND ANALYSIS OF THE TRACKED MAGNETICALLY LEVITATED VEHICLE TECHNOLOGY PROGRAM (TMLV). REPULSION SCHEME
No abstract available.
Set includes PB-247 931 thru PB-247 934. See also RRIS 11 129199, 11 129155, 11 094115, and 11 094116.

Philco-Ford Corporation, Federal Railroad Administration Feb. 1975, 639p-in 4v

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC
PB-247930-SET/ST, DOTL NTIS

11 094115
CONCEPTUAL DESIGN AND ANALYSIS OF THE TRACKED MAGNETICALLY LEVITATED VEHICLE TECHNOLOGY PROGRAM (TMLV). REPULSION SCHEME. VOLUME II. APPENDICES A-F
This report summarizes the studies of a program to establish the technology of magnetic suspension for ultimate use in a passenger-carrying high-speed ground transportation (HSGT) system-at speeds on the order of 134 m/s (300 mph). Magnetic Levitation (MAGLEV) is one of the advanced vehicle suspension concepts considered as alternatives to conventional transportation modes in the short-haul regime. This volume presents some details of the mathematical analysis associated with the MAGLEV vehicle dynamics and control (i.e., ride quality) in Appendices A through D; the noise or acoustic characteristics associated with the baseline Hamilton Standard Q-fan air propulsion system (Appendix E); and the Raytheon final report for the linear synchronous motor (LSM) studies (Appendix F).
Prepared in cooperation with Ford Motor Co., Dearborn, Mich. Scientific Research Staff. Paper copy also available in set of 4 reports as PB-247 930-SET, PC$22.00.

Philco-Ford Corporation, Federal Railroad Administration, First Atomic Ship Transport, Incorporated Final Rpt. PF-TMLV-TR-0037A, FRA-/ORD-75-21A, Feb. 1975, 142 pp

Contract DOT-FR-40024

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247932/7ST, DOTL NTIS

11 094116
CONCEPTUAL DESIGN AND ANALYSIS OF THE TRACKED MAGNETICALLY LEVITATED VEHICLE TECHNOLOGY PROGRAM (TMLV). REPULSION SCHEME. VOLUME III. APPENDIX G. 5 DOF COMPUTER PROGRAM
This report summarizes the studies of a program to establish the technology of magnetic suspension for ultimate use in a passenger-carrying high-speed ground transportation (HSGT) system-at speeds on the order of 134 m/s (300 mph). Magnetic Levitation (MAGLEV) is one of the advanced vehicle suspension concepts considered as alternatives to conventional transportation modes in the short-haul regime. This third volume contains the computer programs for the solution of the equations of motion for 5 degrees-of-freedom, and a summary of the analytical background. These programs provide the capability for performing stability analyses of magnetically levitated vehicles, and for evaluating vehicle response and ride quality characteristics for operation over guideways with irregularities. Each program is listed along with a sample run. The programs are written in BASIC language for use on time-sharing systems.
Prepared in cooperation with Ford Motor Co., Dearborn, Mich. Scientific Research Staff. Paper copy also available in set of 4 reports as PB-247 930-SET, PC$22.00.

Philco-Ford Corporation, Federal Railroad Administration, Ford Motor Company Final Rpt. PF-TMLV-TR-0037B, FRA/ORD-75-21B, Feb. 1975, 93 pp

Contract DOT-FR-40024

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247933/5ST, DOTL NTIS

11 094271
NUMERICAL CALCULATION OF LINEAR INDUCTION MACHINES
A numerical method for the calculation of linear induction machines based on the alternating direction implicit iteration method is described. The method was applied to the calculation of the performance of an experimental linear machine, and the results are discussed and compared to the measured data. The boundary value problem is defined and solved by taking into account the geometrical and physical reality of the machine cross section. The results enable the determination of overall field distribution including the stray and fringing fields inside and outside the machine, and hence the calculation of the machine's impedances and power. (Author)
In German; English Summary.

Carpetis, C
Deutsche Forschangs-u Versuchsanst f Luft-u Raumft PhD Thesis DLR-FB-75-25, Feb. 1975, 137 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
N76-10864-6/ST, DOTL NTIS

11 094413
TRACKED LEVITATED RESEARCH VEHICLE PERIODIC TEST SUMMARY REPORT INDEPENDENT CUSHION SUSPENSION AEROPROPELLED-SMOOTH GUIDEWAY
The results of the first tests of the aeropropelled Tracked Levitated Research Vehicle (TLRV) in the smooth guideway at the Transportation Test Center (TTC) are presented for the TLRV in the Independent Cushion Suspension mode. Vehicle and cushion dynamic response behavior are discussed. Braking performance is presented for the speed range from 0 to 90 mph.
See also PB-249 259.

Fischer, G Zetkov, G
Grumman Aerospace Corporation, Federal Railroad Administration
Summ Rpt. PMT-B4-R75-1, FRA/ORD/D-76-130, Aug. 1975, 120 pp

Contract DOT-FR-30041

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-249258/5ST, DOTL NTIS

11 094414
TRACKED LEVITATED RESEARCH VEHICLE PERIODIC TEST SUMMARY REPORT INDEPENDENT CUSHION SUSPENSION IN PERTURBED GUIDEWAY. AEROPROPELLED

The results of the first tests of the Tracked Levitated Research Vehicle (TLRV) in the Independent Cushion Suspension mode over the perturbed guideway at the Transportation Test Center (TTC) are presented. Vehicle dynamic response behavior is discussed for the speed range from 0 to 90 mph, including comparisons of test data with the responses computed using the TLRV Dynamics Simulation Program.
See also PB-244 282.

Bauer, E Magnani, E Zapotowski, B
Grumman Aerospace Corporation, Federal Railroad Administration
Summ Rpt. PMT-B4-R75-2, FRA/ORD/D-76-131, Sept. 1975, 247 pp

Contract DOT-FR-30041

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-249259/3ST, DOTL NTIS

11 094484
AUTOMATED GUIDEWAY TRANSIT SYSTEMS VEHICLE-ELEVATED GUIDEWAY DYNAMICS: MULTIPLE-VEHICLE SINGLE SPAN SYSTEMS

Analysis and design techniques are described for synchronously controlled AGT vehicles crossing elevated span structures. Computer simulation programs have been developed to determine time histories of guideway deflections, moments and stresses and vehicle accelerations (peak, total rms and rms in one-third octave bands) for a string of multiple AGT vehicles crossing flexible spans with random vertical, angular, camber and surface roughness irregularities. Specific data has been developed to identify operating conditions corresponding to potential span resonant conditions. A computer-aided design program has also been developed to determine span structural requirements needed to meet stress and passenger comfort conditions. Span designs for both large and small headway operation of 4, 6 and 12 passenger AGT vehicles have been determined.

Snyder, JE, III Wormley, DN Richardson, HH
Massachusetts Institute of Technology, Urban Mass Transportation Administration, (UMTA-11-0023) Final Rpt. EPL-81608-1, UM-TA-MA-11-0023-75-1, Oct. 1975, 230 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-249353/4ST, DOTL NTIS

11 126077
NATIONAL ECONOMIC ANALYSIS OF TRAFFIC SYSTEMS-A CAB TRACK SYSTEM IN VAESTERAAS [Samhaellsekonomisk Analys av Trafiksystem-Spaartaxi I Vaesteraas]

A method for the analysis of traffic systems from a national economic viewpoint is described; it involves taking whole traffic system into consideration and investigating alternative traffic solutions with different public transport systems. In the evaluation all factors that are affected should be accounted for. The proposed methodology is applied to a case study for a Swedish town, Vaesteraas, involving a new means of public transport, a cab track system, which the authors find technically possible and fully realizable in this town in 1990. Three alternatives, reflecting different courses of development have been analyzed in the report, for the year 1990; the first is an extension of the present trend, that is car traffic dominating, the second includes the introduction of a cab track system as a public means of transport, the third furthermore includes a forced limitation of private car traffic. Economic and other consequences are discussed. /TRRL/ [Swedish]

Kreitz, PA Nelldal, BL
Royal Institute of Technology, Sweden R&D Rept. No. 4, 1974, 71 pp, Figs., 12 Tab., 1 Phot., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-213455)
PURCHASE FROM: Royal Institute of Technology, Sweden Fack S-10044, Stockholm 70, Sweden Repr. PC

11 127697
ECONOMIC AND ENVIRONMENTAL ASPECTS OF PERSONAL RAPID TRANSIT-A FURTHER STUDY

A parametric study of system variables of personal rapid transit (PRT) networks is presented. The analysis examines the effect that the detour penalty associated with one-way networks has on system ridership. A preliminary estimate of the potential PRT ridership from kiss-and-ride access is given. The analysis further considers modal split, reduced-auto emissions, cost per mile, benefit-cost ratio, electrical-power requirements as dependent variables. Independent variables are population density, trip length, PRT operating and fixed costs, mesh spacing, auto speed, perceived-auto-mileage cost, parking cost, PRT speed and fare. Particular attention is paid to the effects that parking cost, auto speed, perceived-auto-mileage cost and trip length have on the dependent variables. /Author/TRRL/

Dais, JL (Bell Laboratories); Kornhauser, AC (Princeton University)
Transportation Research Vol. 9 No. 2/3, July 1975, pp 149-157, 8 Fig., 2 Tab., 30 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215066)
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

11 129789
SIMULATION OF A NEW CONCEPT IN SHORT DISTANCE PASSENGER TRANSPORT SYSTEMS [Simulation von Personentransporten mit neuartigen Nahverkehrssystemen]

A cabin with a capacity of 18 persons was used for the simulation programme which is based on a normal timetable (vehicles stop at all stations), express vehicles and a community taxi service. A circular route, a double-track line and a Y-shaped network were examined. Consideration was also given to the number of passengers travelling between several large cities in Federal Germany. The simulation programme makes is possible to evaluate the attractiveness and the productivity of new cabin-type railways particularly as regards travel and stopping times. [German]

Rahn, WH *Eisenbahntechnische Rundschau* Vol. 24 No. 9, Sept. 1975, pp 313-318, 1 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlay Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

11 129974
FOCUS ON GUIDED URBAN TRANSPORT. MINITRAM IN SHEFFIELD: A CONSULTANT'S VIEW

An outline is given of the minitram demonstration project proposed for Sheffield by Robert Matthew, Johnson-Marshall and Partners, in consultation with TRRL' The aim is to test minitram in public use, and in particular to answer questions related to public acceptance, vandalism and reliability. After giving consideration to hardware, minitram vehicle dimensions, guideways and stations, the author indicates that: (1) the elimination of drivers by automation necessitates the use of new skills in the control room, and thus reduces the expected savings in costs; (2) the location of guideways close to buildings brings about problems of visual intrusion; and (3) if minitram is to be comparable with buses, stations have to be closely spaced and are hence fairly expensive to build. It is concluded that minitram might be suitable for some cities at present considering the introduction of rail rapid transit systems, but that only a public demonstration will reveal its true potential. /TRRL/

Bordass, W (Matthew (Robert)ú Johnson, Marshall and Partners) *Traffic Engineering and Control* Vol. 16 No. 4, Apr. 1975, pp 172-174, 4 Fig., 4 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215209)
PURCHASE FROM: Printerhall Limited 29 Newman Street, London N1P 3PE, England Repr. PC

11 130791
FREIGHT PIPELINE
Since the congestion of highways and streets is due to both passenger vehicles and freight traffic, reduction in either will serve to improve the effectiveness of the transportation system. The purpose of this paper is to present the arguments in favor of utilizing pipeline as a mode of transporting goods and materials between and within the cities. It attempts to synthesize the available information in a manner that will permit the evaluation of the role of the pipeline as a component of transportation systems.
Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Atlanta, Georgia, July 14-18, 1975.

Zandi, I (Pennsylvania University, Philadelphia)
American Society of Mechanical Engineers 75-ICT-20, July 1975, 15 pp, 6 Tab., 48 Ref., 2 App.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC
DOTL RP

11 130792
STATUS OF SLURRY PIPELINE TRANSPORTATION OF BITUMINOUS COAL
A comprehensive theory of pipeline transportation costs for bituminous coal is of special importance at this time. Empirical data on pipeline operations are too meager to serve as a basis for realistic conclusions. Yet, with the high portion of delivered costs of coal being transport related, finding new and improved methods of transporting the coal is urgent. Unit train operations are extensive and expanding, but Western coal traffic poses a special problem, as rail lines are not in the immediate vicinity of all of the major coal deposits. Whether to construct slurry lines into these new areas had becomes a matter of real concern. Large scale economies in bituminous coal slurry lines are explored in order to conceptualize an approach toward further investigation of how unit costs of service vary among lines of different capacities. Recent studies of economies of scale relative to railroads and petroleum pipelines are considered along with those of slurry lines. These studies though largely theoretical, offer a sense of direction so vitally important to reach future decisions associated with the entire coal transportation system.
Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Atlanta, Georgia, July 14-18, 1975.

Campbell, TC (West Virginia University)
American Society of Mechanical Engineers 75-ICT-21, July 1976, 8 pp, 2 Fig., 1 Tab., 13 Ref.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC
DOTL RP

11 130795
CHARACTERISTICS OF THE RIDE QUALITY OF SUPERCONDUCTING MAGNETIC LEVITATION TEST VEHICLE
The experimental results of oscillatory acceleration due to the motion of the superconducing magnetic levitation test vehicle are discussed in comparison with theoretical values and the coefficients of ride quality which are used now in Sinkansen. The ride quality of the levitating vehicle was generally good and agreed approximately with calculated values.
Presented at the 5th International Cryogenics Engineering Conference, Kyoto, Japan, May 7-10, 1974.

Twahana, T (Railway Technical Research Institute); Kuzuu, T
IPC Science and Technology Press Limited Proc Paper Paper D9, 1974, pp 106-107

ACKNOWLEDGMENT: EI
PURCHASE FROM: IPC Business Press Limited Dorset House, Stamford Street, London SE1 0LU, England Repr. PC

11 130805
COMPARISON OF CALCULATIONS AND MEASUREMENTS MADE FOR THE AMERICAN LINEAR MOTOR ON THE PUEBLO TEST LINE [Vergleich von Rechnung und Messung beim amerikanischen Schnellbahn-Linearmotor von Pueblo]
The author compares calculations and measurements for various frequencies and speeds of voltage, primary current, power factor and efficiency. The comparison is very satisfactory. Calculations and measurements have shown that at a synchronous speed of 400 km/h, slip when empty is only about 1%. [German]

Oberretl, K *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 11, Nov. 1975, pp 533-535, 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130806
SINGLE-SIDED LINEAR MOTORS WITH MASS MAGNETIC SHUNT [Der einseitige Linearmotor mit massivem Eisenrueckschluss]
The author describes an analytical method for calculations of single-sided asynchronous linear motors. In the case of poor conduction or an armature without a conducting reaction rail, magnetic shunting plays a decisive role. If the magnetic shunt is divided into several layers with parallel air-gaps presenting constant permeability, it is possible to know the degree of saturation of the metal. The author gives the results of calculations and measurements and discusses them. [German]

Teichgraeber, U *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 11, Nov. 1975, pp 528-532, 1 Tab., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130885
MAGNETIC SUSPENSION OF TRANSPORT VEHICLES
A mathematical model of a magnetically suspended vehicle using electromagnets is established. Since such a system is unstable in open-loop mode, the authors suggest a method by which the values of the parameters of the control system that has to be introduced for the stabilization of the vehicle can be calculated. An experimental model of a vehicle was built. It consists of an experimental platform levitated by permanent magnets in opposition; it is laterally unstable and hence guided by means of two electromagnets.
Prepared for a meeting London, England, August 28-30, 1974.

Lhenry, M Gilles, G Ivanes, M
Institution of Electrical Engineers Conf. Pub. N117, 1974, pp 226-232, 5 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130886
MAGLEV VEHICLE OSCILLATIONS AND DAMPING MECHANISMS
The problems of designing a magnetically levitated vehicle to afford good riding qualities have been outlined. It is concluded that a satisfactory system will incorporate auxiliary coils in the cryostat, probably as part of an active control system. A British project directed specifically to produce a demonstration and test vehicle has been described. A vehicle is being designed, and calculations and model tests to establish the stability of the guideway are being undertaken. Propulsion of the model by a linear synchronous or commutator motor is being considered.
Prepared for a meeting London, England, August 28-30, 1974.

Rhodes, RG (Warwick University); Mulhall, BE Abel, E
Institution of Electrical Engineers Conf. Pub. N117, 1974, pp 214-225, 8 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130887
MODELLING AND STUDY OF A MAGLEV CONCEPT
The Ministry of Transportation and Communications of Ontario, Canada has awarded a contract for the delivery of a Transit Demonstration System

in 1975 which is to consist of 2.5 miles of elevated guideway, 4 stations and 12 vehicles. The system concept incorporates off-line stations, single vehicle and train operation, automatic driverless control, single sided linear induction motor (SLIM) propulsion and magnetically suspended and guided vehicles. The need to check the feasibility of a proposed magnetic suspension and guidance system led to the creation of a model on a hybrid computer. This model and some of the results are discussed.
Prepared for a meeting London, England, August 28-30, 1974.

Parker, JH (Urban Transportation Development Corporation); Charles, RJ Renfrew, RM Billing, JR Crate, GF Gagne, RE Amyot, R
Institution of Electrical Engineers Conf. Pub. N117, 1974; pp 207-213, 3 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130888
LONGITUDINAL CONTROL OF AUTOMATED VEHICLES IN GUIDED TRANSPORTATION SYSTEMS
A system model for a vehicle travelling on an automated mainline guideway under a synchronous moving-cell control philosophy is proposed. The model takes account of position, velocity and acceleration errors as well as the dynamics of the vehicle's propulsion system and the effects of stochastic input disturbances. It is assumed that not all the vehicle's states will be available for measurement and, in addition, any measured states will be corrupted by noise. It is further assumed that a sampled-data control system is to be employed. The dynamic behavior of the vehicle is initially described by a set of 1st-order, linear differential equations. The authors then develop the corresponding state-transition equation from which a state estimator and vehicle controller can be derived. The state estimator and controller are both optimal with respect to defined quadratic performance indices and, in addition, both are shown to be time-invariant and can be computed offline using simple recurrence relationships. The combined state-estimator and optimal-control law is shown to yield extremely good vehicle-response characteristics even with very noisy measurements and for large input disturbances.

Rumsey, AF (Manchester University, Institute of Science & Tech); Powner, ET *Institution of Electrical Engineers, Proceedings* Vol. 121 No. 11, Nov. 1974, pp 1435-40, 13 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130889
LOW SENSITIVITY, MODERN CONTROL APPROACH TO THE LONGITUDINAL CONTROL OF AUTOMATED TRANSIT VEHICLES
Modern control and estimation techniques are applied to the design of longitudinal controllers for automated transit vehicles. The sensitivity of dynamic response to changes in vehicle parameters and the effects of noisy sensors on control system performance are studied. A method for sensitivity reduction by augmentation of the state vector with the sensitivity vector is proposed and low sensitivity design is developed which provides excellent dynamic response over a wide range of operating conditions and vehicle parameters.
Jt Autom Control Conf, 15th Proc, University of Texas, Austin, June 18-21, 1974.

Yang, SC (Honeywell, Incorporated); Garrard, WL
American Institute of Chemical Engineers Proc Paper 1974, pp 128-138, 15 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Institute of Chemical Engineers 345 East 47th Street, New York, New York, 10017 Repr. PC

11 130895
SIMULATION OF TRAIN FOLLOWING BEHAVIOR IN H.S.G.T. SYSTEMS
A system in which vehicle speed is 400 km/hr and peak traffic density is 24 vehicles/hr (assuming braking rates of 0.05g and 0.1g for determining track capacity) is reported. Calculations suggest that the headway of 150 sec claimed by the proposers is realistic with a deceleration of 0.05g. Since this view has been challenged by railway operators, factors which may prevent the achievement of these headways are considered, including signalling systems, physical limitations, environmental variations, and traffic delays.

Barwell, FT (University College of Swansea); Leech, DJ
Institution of Electrical Engineers Conf. Pub. N117, 1974, pp 96-103, 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130899
ON-BOARD CRYOGENIC SYSTEM FOR MAGNETIC LEVITATION OF TRAINS: CRYOGENIC SYSTEM OF EET
An experimental car based on electrodynamic levitation with superconducting magnets has been developed and manufactured by AEG, BBC, Siemens and other partners, together with Linde AG as the firm responsible for the on-board cryogenic system. This system has to cope with new conditions and cryogenic tasks. It can be characterized in principle by liquid helium heat exchanger units, compressors, transfer lines, rotatable and movable couplings and junctions. All transfer lines and couplings consist of three coaxial ducts for three different streams. This paper reports on processes and components. A brief description of the test results for the whole system under simulation conditions is given.
Intl Cryog Eng Conf, 5th, Proc, Kyoto, Japan, May 7-10, 1974.

Asztalos, SL Baldus, W Kneuer, R Stephan, A
IPC Science and Technology Press Limited Proc Paper #B4, 1974, pp 37-41

ACKNOWLEDGMENT: EI
PURCHASE FROM: IPC Science and Technology Press Limited IPC House, 32 High Street, Guildford, Surrey, England Repr. PC

11 130901
HIGH-SPEED RAILWAYS IN JAPAN
Review of the development of conventional railways in Japan, leading up to the Shinkansen line, which at present runs at speeds up to 210 km/h, and will in the future be speeded up to 260 km/h. Also examined is the development of a superconductive, magnetically levitated train, which will constitute the next generation of railways, running at speeds of up to 500 km/h.
Intl Cryog Eng Conf, 5th, Proc, Kyoto, Japan, May 7-10, 1974.

Kyotani, Y (Japanese National Railways)
IPC Science and Technology Press Limited Proc Paper #A2, 1974, pp 17-20

ACKNOWLEDGMENT: EI
PURCHASE FROM: IPC Science and Technology Press Limited IPC House, 32 High Street, Guildford, Surrey, England Repr. PC

11 130902
HIGH-SPEED MAGLEV STUDIES IN CANADA
Report on Canadian studies of superconducting magnetic levitation and variable-speed linear synchronous motor propulsion for high-speed inter-city guided ground transport. Levitation is obtained by the interaction of vehicle-mounted superconducting magnets and the eddy currents induced in aluminum strip conductors on the guideway. No-contact propulsion by linear synchronous motor (LSM) is obtained by using vehicle-borne superconducting magnets and powered guideway coils. A suggested guidance schemes uses a flat guideway with 'null-flux' loops overlying the LSM windings. The propulsion magnets interact with the loops and the edges of the levitation strips to provide lateral stabilization. The test facility is a 7.6 m wheel, rotating with a peripheral speed of 33 m/s.
Intl Cryog Eng Conf, 5th, Proc, Kyoto, Japan, May 7-10, 1974.

Atherton, DL (Queen's University, Canada)
IPC Science and Technology Press Limited Proc Paper #B6, 1974, pp 46-50, 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: IPC Science and Technology Press Limited IPC House, 32 High Street, Guildford, Surrey, England Repr. PC

11 130903
EXPERIMENTAL EVALUATION OF A HIGH SPEED DOUBLE SIDED LINEAR INDUCTION MOTOR
The motor is double sided and of sector shape with radial slots. It has 4 poles, is 3 feet in length and is loaded by reaction with an 80 inch diameter rotating disc facility. Performance testing including efficiency, power factor, thrust, and normal force and moment are reported for operation over a speed range up to 300 MPH. A breakdown of losses, including end effects, and measurements of air gap flux density over the length of the motor are also reported. A description of instrumentation, the data acquisition system and the load loop is given. The results are expected to be used to increase the understanding of LIM behavior and design and to provide a data base for the verification of new designs and new theoretical models.

Coho, OC (General Electric Company); Kliman, GB Robinson, JI *IEEE Transactions on Power Apparatus and Systems* V-PAS-94, Jan. 1975, pp 10-17, 15 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

11 130906
DEVELOPMENT OF SUPERCONDUCTING MAGNETS FOR MAGNETICALLY SUSPENDED HIGHSPEED TRAINS
Results of a three-year program to develop superconducting magnets for magnetically suspended high speed trains, are outlined.

Ogiwara, H (Tokyo Shibaura Electric Company); Takano, N Okamoto, H Hayashi, K *Toshiba Review* No. 98, July 1975, pp 7-11

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130914
FIVE DECADES OF PROGRESS IN PIPELINING
The pipeline industry has grown in 50 yr from its infancy in the Appalachians to a trillion ton-mile (1.5 quadrillion kg-km) annual carrier in North America. Pipelining is one of the higher technology content exports that will help industrial nations balance their payments for imported energy. Pipelining has had boom periods in the 1920's and again in the 1950's, and may be on the verge of another. The energy crisis will be with us for the rest of our lifetimes, and demands unusual solutions and substitutions for rapidly depleting petroleum. New roles for pipelines to more remote energy sources and to transport other bulk commodities are looming. The dimensions of the problem are so great that only a mobilization of our entire economy will suffice.

Williams, DR, Jr *ASCE Journal of the Construction Division* Vol. 101 No. 4, Dec. 1975, pp 751-767

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

11 130919
LINEAR SYNCHRONOUS MOTOR WITH SUPERCONDUCTIVE INDUCTOR [Moteur lineaire synchrone a inducteur supraconducteur]
A data processing program to calculate performance in stabilized conditions is developed permitting, in particular, the determination of conventional values such as three-directional efforts, efficiency and power factor, as well as losses at the level of the superconductive inductor. As concerns the predetermination of the first dimensioning, this is approached, based on the effort to be delivered, through a coherent method of calculation, thanks to a suitable choice of parameters, simplified by the basic hypotheses including that leading to the cancellation of vertical effort, a method which has also been developed. The two parts performance determination program and simplifed calculation method-now constitute a complete dimensioning method for linear synchronous motors with superconductive inductor at the disposal of the manufacturer. [French]

Lancien, D (French National Railways) *Revue Generale de l'Electricite* Vol. 84 No. 7-8, July 1975, pp 553-565

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 130924
PLUS FACTORS FOR COAL SLURRY PIPELINES
Advantages and desirability of slurry pipelines for transporting coal are outlined. For the coal industry, coal slurry pipelines offer a means of expanding the energy transportation system beyond the physical and financial limitations of the present rail and barge system. Economic benefits, environmental advantages and water requirements of slurry pipelines are discussed.

Wasp, EJ (Bechtel Corporation) *Coal Mining and Processing* Vol. 12 No. 9, Sept. 1975, pp 68-71

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 131015
POWER COMPONENTS AND THEIR OPERATIONAL CONTROL IN THE CASE OF THE IRON-FREE SYNCHRONOUS LINEAR MOTOR [Kraftkomponenten und deren betriebliche Steuerung beim eisenlosen synchrolinearmotor]
The specific advantages of the iron-free synchronous linear motor lies in the low weight of the levitated vehicle, the extremely large air gap and the possibility of control independent of the drive force. [German]

Holtz, J *Elektrotechnische Zeitschrift* Vol. 96 No. 9, Sept. 1975, pp 396-400, 1 Fig., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VDE Verlag GmbH Bismarkstrasse 33, Berlin Charlottenbrg, West Germany Repr. PC

11 131024
SUPERCONDUCTING MAGNETIC LEVITATION AND LINEAR SYNCHRONOUS MOTOR PROPULSION FOR HIGH SPEED GUIDED GROUND TRANSPORTATION
This report describes the results of Phase II of the Canadian Maglev program, involving an investigation of the use of superconducting magnets for electrodynamic levitation and guidance and for linear synchronous motor (LSM) propulsion of high speed guided ground transportation. The technical and operating characteristics of a Maglev system with vehicles crusing at 480 km/hr (300 mph) have been investigated. Reference designs for the levitation, guidance and propulsion system and for the guideway have been compiled, and a first estimate of Maglev vehicle characteristics, including a weight analysis, aerodynamic effects, noise and energy efficiency, has been made.

Atherton, DL Eastham, AR
Canadian Institute of Guided Ground Transport CIGGT No. 75-5, Mar. 1975, 297 pp

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: CIGGT Repr. PC

11 131038
TRACKED LEVITATED RESEARCH VEHICLE. FINAL TECHNICAL REPORT: AEROPROPELLED
The results of the 1973 aeropropelled tests of the Tracked Levitated Research Vehicle (TLRV) at the Transportation Test Center (TTC) are presented for the three basic suspension modes (Primary, Body/Chassis and Independent Cushion) at speeds up to 90 mph attained in the 3 mile guideway, which includes straight, transition to curve and superelevated segments. General vehicle and suspension characteristics are reviewed, and the system performance with respect to the air supply system, acoustics, vehicle speed and braking, cushion lift and ride comfort is discussed. Vehicle dynamic responses to perturbations installed in the guideway are compared with the results computed by the TLRV Dynamics Simulation Program.

Magnani, E Zapotowski, B
Grumman Aerospace Corporation, Federal Railroad Administration, (PMT-B4-R75-3) Final Rpt. FRA-ORD&D 76-132, Oct. 1975, 139 pp, Figs.

Contract DOT-FR-30041

ACKNOWLEDGMENT: FRA, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-249126/4ST, DOTL NTIS

11 131228
DESIGN OF A MULTIVARIABLE CONTROLLER FOR A MAGNETICALLY SUPPORTED VEHICLE
This paper describes some of the theoretical and practical aspects of the design of a multi-variable control system needed to provide stable suspension of a vehicle. A number of sources of interaction between the variables of a magnetic suspension with several degrees of freedom have been discussed, in a first analysis the steady state interactions have been shown to depend on the relative positioning of transducers and magnets. Such interactions can be strongly influenced by introducing cross-coupling between measured and output variables in the controller. The nature of magnetically suspended vehicle is such that the dynamic interactions in the rigid body equations may be neglected and this leads to the possibility of reducing the multivariable controller design to a series of non- interacting single loop designs. Results from experimental apparatus and analog computer simulations have been found to be generally in agreement with the analytical principles.
Presenting at a meeting in London, Aug. 28-30, 1974.

Hazlerigg, ADG (Sussex University); Sinha, PK
Institution of Electrical Engineers Conf. Publ No. 117, 1974, pp 233-239, 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 131304
VEHICLE PROPULSION WITH SYNCHRONOUS LINEAR MOTORS [Fahrzeugantriebe mit synchronen Linearmotoren]
Compared to the asynchronous linear motor, the synchronous motor has a high specific thrust, but frequency variation control is necessary for changing its speed. Theoretically, 1 N/sq cm can be obtained with the asynchronous motor and 3.75 N/sq cm with the synchronous version for the surface area of the air gap. The synchronous motor can keep automatically to the track and eddy currents in the reaction rails can be suppressed, which is not the case with the asynchronous motor. [German]

Buchberger, H Leitgeb, W *Elektrische Bahnen* Vol. 46 No. 4, Apr. 1975, pp 82-85, 4 Fig., 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

11 131592
NETWORK MODEL STUDIES FOR AUTOMATED GUIDEWAY TRANSIT: ADVANCED GROUP RAPID TRANSIT MODELS
The development is described of models which include basic network geometries and trip-making characteristics, provide a baseline for service policy/cost trade-off studies and provide for the design of the various system management algorithms required to implement a chosen service policy. Pertinent planning studies were reviewed to determine special constraints considered in the urban implementation, and basic forms for the networks and travel patterns were determined. Conventional transit systems are reviewed for data on ridership, service quality, and operating parameters in order to provide a frame of reference for studying the performance of automated guideway systems. The design of the network models including the type of information and level of detail required, and format of the models is detailed, and five models (loop/shuttle, line-haul system, CBD circulation, limited urban network, full urban network) representative of potential urban applications of GRT are discussed.

Kershner, DC Rand, RC Roesler, WJ
Johns Hopkins University, Laurel, (APL/JHU) UMTA-MD-06-0018-75-3, Feb. 1976, 187 pp, 10 Fig., 12 Tab., 10 Ref., 2 App.

Contract DOT-UT-30010

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-251881/9ST, DOTL NTIS

11 131652
INTERCITY PASSENGER TRANSPORT STUDY. TRACKED AIR CUSHION VEHICLES IN THE CANADIAN CORRIDOR
Early in 1969, the Canadian Transport Commission, Research Branch initiated a study of intercity passenger transport in the urbanized corridor of Eastern Canada. One area investigated was the application of new technology in the corridor from a standpoint of technical, operational and economic feasibility. Many new concepts had been proposed for relatively high speed intercity travel, and one of the more promising concepts selected for analysis was the Tracked Air Cushion Vehicle (TACV). The contents of this volume do not attempt to represent an all encompassing picture of TACV development. The volume principally is intended as a supplementary publication to the "Intercity Passenger Transport Study".
See also RRIS 23 126515.

Canadian Transport Commission Report 07, Sept. 1970, 276 pp, Figs., Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Information Canada 171 Slater, Ottawa K1A OS9, Canada
DOTL RP

11 132893
A CONTROL SYSTEM FOR THE ELECTRO-MAGNETIC LEVITATION OF A HIGH-SPEED GROUND VEHICLE
This paper deals with the control of an electro-magnetic levitating frame for the support and guidance of track-bound vehicles. At the 4 corners of the levitating frame there are guidance and support magnets allowing the 5 degrees of freedom to be controlled. The simulation model for the controller synthesis and the dynamic analysis is presented. The control configuration is given in the form of a decoupled multi-variable control for the 5 degrees of freedom. It is shown that a disturbance-variable compensation has to be provided to minimize the need for the air gap during the beginning of curves and gradients. The efficiency of the systems is investigated and the air gap and magnet voltage requirements are given as a function of the ride dynamics. It will be seen that the required ride quality can only be ensured by air gap control alone up to a certain track quality. The electro-magnetic levitating frame has been tested on a test rig under actual operating conditions. All operational track and force disturbance can be simulated by means of position and forcecontrolled hydraulic jacks. The dynamic behaviour of the test stand and simulation model are compared by experimental analysis of the system. (A). The covering abstract for the conference is IRRD no. 215903. /TRRL/
Presented at a conference on Traffic Control and Transportation Systems.

Thun, HJ Zimmermann, H (Brown, Boveri and Cie)
North-Holland Publishing Company Conf Paper 1974, pp 565-576, 12 Fig., 1 Phot., 2 Ref.

ACKNOWLEDGMENT: Institute of Transport (IRRD 215938)
PURCHASE FROM: North-Holland Publishing Company 335 Jan van Galsenstrt, P.O. Box 103, Amsterdam, Netherlands

11 132923
HIGH-SPEED DYNAMIC PERFORMANCE OF THE LINEAR INDUCTION MOTOR RESEARCH VEHICLE
The linear induction motor research vehicle (LIMRV) recently set a world speed record of 255.7 mph for steel-wheel-on-steel-rail vehicles during a series of test runs conducted on the 6.2 mile-long experimental track at the Transportation Test Center, Pueblo, Colorado. This paper presents performance data on LIMRV dynamics associated with acceleration, steady-state operation, and braking, as recorded during these tests. Actual test results are compared with analytical predictions. Difficulties encountered are discussed and their solutions described.
Prepared for a meeting Nov. 17-20, 1975.

Chi, CC (AiResearch Manufacturing Company); D'Sena, G
Society of Automotive Engineers Preprint #751060, 1975, 11 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 132944
DYNAMICAL MODEL FOR VEHICLE ROUTING IN A TWO-WAY PRT NETWORK
The problem of routing automatically-controlled and guided vehicle through a closed two-way personal rapid transit PRT network is studied. Because of fluctuating passenger demands, a dynamical model is needed to describe the concentration of vehicles in the different network sections. Such a model is derived in this paper. The binary decision to be made at each divert junction

is treated as a control variable in the system model. Using a suboptimal strategy to minimize the maximum congestion in the network sections served, the decision is made in a feedback manner based on the average concentrations in the sections. The model was used to study the transient behaviour of flows and concentrations in a simulation of a specific closed two-way PRT network. Some results are presented for this example.

Cunningham, EP (Johns Hopkins University, Laurel) *Transportation Research* Vol. 9 No. 6, Dec. 1975, pp 323-328, 8 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

11 132945
REDUCTION OF ENERGY CONSUMPTION IN HIGH-SPEED GROUND TRANSPORTATION
The propulsion energy demands of land vehicles may be reduced significantly, at speeds at which aerodynamic forces are an important component of the drag, through a mechanism resembling some that have been considered in the past in connection with aeronautical applications: a mechamism combining boundary layer control with the utilization of boundary layer air in the generation of thrust. The feasibility and potential advantages of this mode of propulsion appear to be far greater in land than in air transportation.

Foa, JV (George Washington University) *High Speed Ground Transportation Journal* Vol. 9 No. 3, Sept. 1975, pp 175-180

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

11 132946
FLYING LAND VEHICLES USING SUPERCONDUCTING MAGNETS
The possibility of both suspending and propelling a land vehicle completely free of its guideway at a height of 20 to 30 cm represents an entirely new concept in transportation. Resiliently supported by magnetic forces and propelled at speeds up to 500 km/hr or greater, a vehicle such as this bears a closer resemblance in both its streamlined shape and behavior to a wingless aircraft than to the more conventional train riding on wheels along steel rails. Unlike the aircraft, however, from an environmental point of view it is almost noiseless and pollution-free. In this paper the basic specifications for a magnetically levitated test vehicle using superconducting magnets and linear synchronous motor propulsion along a powered guideway is discussed.

Presented at the Int. Hovering Craft, Hydrofoil and Adv. Transit Syst. Conf., Brighton, Sussex, Engl., May 13-16, 1974.

Rhodes, RG (Warwick University, England); Mulhall, BE Abel, E
Kalerghi Publications Proc Paper 1974, pp 157-166, 14 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Kalerghi Publications 51 Welbeck Street, London W1, England

11 133573
SYSTEM STUDY FOR TUBE-WAGON FREIGHT TRANSPORTATION
To increase the transport capacity in Japan, a new system known as "tube wagons" has been studied. The capacity of such a system for the proposed quantities of freight and equipment, and terminals and rights of way for such a system have been examined by simulation. A comparison between the tube system and long unit trains has been made.

Nakajama, I Maeda, K *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 181-184, 5 Fig., 2 Tab.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

11 133579
MODEL EXPERIMENTS ON THE AERODYNAMIC BRAKING OF SUCCESSIVELY RUNNING WAGONS IN TUBE TRANSPORT SYSTEM
To evaluate effects of aerodynamic braking of vehicles having large end plates in the tube-wagon transport concept, experiments on a 1/50th size scale model with 30-m tube have been carried out. Influence of the air compressibility was ignored because of the low Reynold's number of the set-up. It was demonstrated that the aerodynamic braking force increased with the blockage ratio of the end plates, approaching unity. The ratio decreased when the number of vehicles in the tube increased.

Fukuchi, G *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 156-159, 8 Fig., 3 Ref.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

11 133629
A NEW "TUBE" LINE FOR MILTON KEYNES
A full-scale pneumatic pipeline is to be built near Milton Keynes as the testing ground for a new method of moving bulk materials through pipes. The pipeline-a 500 metre closed loop-will carry wheeled capsules, each with a one tonne load, travelling at speeds of up to 20m/s. The really novel feature of the line to be tested by BHRA fluid engineering for the Transport and Road Research Laboratory (TRRL) is BHRA's "flap gate booster", which could allow much longer pneumatic pipelines. /TRRL/

New Scientist Vol. 68 No. 978, Dec. 1975, p 590

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216917)
PURCHASE FROM: IPC Magazines Limited 66-69 Great Queen Street, London WC2E 5DD, England

11 134067
ROUTING ALGORITHMS FOR URBAN RAPID TRANSIT
A basic routing algorithm is presented for finding optimal routes for cars in a rapid transit system. The algorithm uses predicted path cost, depth-first search, and threshold acceptance to minimize computation cost. It is applicable to synchronous, cycle-synchronous, and trans-synchronous control strategies, and will minimize either departure time, transit time, or arrival time as may be needed. Extensions of the algorithm to allow finding empty cars to answer service requests, to dynamically reroute cars in the system, and to handle multistation routes are presented. (A) /TRRL/

Rubin, F (International Business Machines Corporation) *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 215-223, 4 Fig., 2 Tab., 10 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217135)
PURCHASE FROM: ESL
DOTL JC

11 134302
PASSENGER REQUIREMENTS IN AN AUTOMATED TRANSPORT SYSTEM
This report presents the results from an experimental study which provided human factors data on passenger behaviour in relation to certain aspects of vehicle design and station layout on an urban rapid transit system. An extensive series of tests was carried out using full scale mock-up vehicle and platforms to study, inter alia, the effects on vehicle dwell time of: 1 vehicle size; 2 vehicle door size and using separate doors for entry and exit; 3 the number of people in the vehicle, on the platform and inter-changing between the two; 4 overloading the vehicle with passengers; 5 platform size and layout, including the provision of barriers. The tests were mainly carried out using a static vehicle but in some cases the vehicle was moved in and out of the station to determine the effect of vehicle movement, particularly deceleration, on passenger behaviour at the station. The rapid transit system under study will serve as great a proportion as possible of the urban community; the handicapped persons and those inconvenienced with luggage or pushchairs have been given special considerations in the experimental trials. The report also discusses the implication for passenger behaviour, and hence system performance, of choosing certain vehicle and station design features. (A) /TRRL/

Richardson, J Stroud, PC (Loughborough University of Technology, England)
Transport and Road Research Laboratory, (0305-1315) Monograph NSR 1, 1975, 150 pp, Figs., Tabs., 1 Phot., 16 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218053)
PURCHASE FROM: Transport and Road Research Laboratory Department of the Environment, Crowthorne, Berkshire, England

11 134307
PROCEEDINGS OF A SEMINAR ON RESEARCH AND INNOVATIONS IN GUIDED GROUND TRANSPORT
This publication contains the proceedings of the second Canadian Institute of Guided Ground Transport conference. The theme of the conference was research on and innovations in guided ground transport. 15 individual papers were presented and two panel discussions are appended. /TRRL/

Canadian Institute of Guided Ground Transport Nov. 1974, 406 pp, Figs., Tabs., Phots., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217421)
PURCHASE FROM: CIGGT

11 134544
RAIL SYSTEMS WITH CONTACT-FREE OPERATING TECHNIQUES [Bahnsysteme mit beruehrungsfreier Fahrtechnik]
Contact-free operating techniques may be better than the wheel/rail system for very high speeds. To determine the possibilities and limits of the different rail systems, and thus establish a basis for future transport policy decisions, a vast research and development programme is being completed in the German Federal Republic, with the support of the Federal Minister for Research and Technology. [German]

Muckli, W *Glasers Annalen ZEV* Vol. 100 No. 1, Jan. 1976, pp 16-19, 2 Fig., 6 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

11 134566
SUSPENDED CONCEPTS FOR HIGH-SPEED GROUND TRANSPORTATION
This article, for the benefit of the uninitiated, discusses in general terms the characteristics of the following transport systems: mechanical (wheel/rail), air cushion, magnetic levitation, aerodynamic, electrodynamic repulsion, with reference to high-speeds, drag/levitation force ratio, and energy consumption for both levitation and propulsion.

Barrows, TM *Technology Review* July 1975, pp 30-40, 15 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Massachusetts Institute of Technology 50 Memorial Drive, Cambridge, Massachusetts

DOTL JC

11 135165
COMPARATIVE ANALYSIS OF DYNAMIC SHUTTLE SYSTEM AND THE EXISTING HIGH SPEED GROUND TRANSPORTATION SYSTEMS
The dynamic shuttle system treated in this paper consists of main line trains traveling at a fixed speed. Passengers are shuttled to and from these fixed speed trains by means of shuttle cars. The shuttle cars can provide local service and thus alleviate the need for stations along the route of the main line trains. The main line trains have a peak volume, depending upon operating speed which is an order of magnitude greater than existing modes. They provide high speed service to travelers in the belt traversed by the trains.

Cosgriff, RL (Kentucky University); Yeh, HH *Vehicle System Dynamics* Vol. 4 No. 4, Dec. 1975, pp 249-271, 20 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 135167
END EFFECT OF A MAGNETICALLY SUSPENDED ULTRAHIGH-SPEED TRAIN
In the normal conducting coil-type levitation system, the vehicle coil end effect gives a steady-state disturbance force. Therefore it is very important from design viewpoints to establish a versatile method to analyze the vehicle coil end effect. The method proposed in this paper is particularly useful for a short train and makes it possible to analyze the vehicle coil end effect accurately. The influence of the end effect on levitation force and damping force is analyzed in detail.

Takano, I (Toshiba Research and Development Center); Saito, Y Ogiwara, H *Electrical Engineering in Japan* Vol. 95 No. 1, Jan. 1975, pp 59-66, 10 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 135171
EXPERIMENTAL STUDY OF HIGH-SPEED LINEAR INDUCTION MOTORS
The experiments described have been conducted using a constant voltage source. The experimental results are compared with the theoretical ones and new theoretical formulas are proposed for linear motors with a ferromagnetic iron plate or with an iron plate clad with an aluminum plate. These formulas are derived taking into account the end effect, magnetic saturation effect and the slip dependence of the secondary-conductor permeability. As a result of this study, it is shown that the end effect slightly worsens the operating characteristics of the ferromagnetic iron plate and the iron plate clad with an aluminum plate. Essential features of the three reaction plates are also discussed in detail.

Sakabe, S (Mitsubishi Electric Corporation); Iwamoto, M Shinryo, Y *Electrical Engineering in Japan* Vol. 95 No. 1, Jan. 1975, pp 87-92, 5 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 135178
MODEL OF ELECTRODYNAMIC SUSPENSION TRAIN [Modell einer Elektrodynamischen Schwebebahn]
City-connecting transport systems, which are to operate at higher speeds than 500 km/h. can only be realized by a levitation train on electrodynamic principle. In this case the power must be transmitted to the vehicle through the air gap. The reason for this is the difficulty of current transmission by conducting rails at so high speeds. A further reason is the problem of transporting goods and passengers. The placement of aggregates for propulsing, levitation and stabilization in the vehicle causes such a high weight that vehicle's payload must be reduced to nearly zero. A double-sided linear electric machine, which is placed in the track and which is constructed so that it provides simultaneously propulsing-(braking)-levitation- and stabilization-forces, accomplishes all conditions given above. [German]

Hochhaeusler, P *Elektrotechnische Zeitschrift, Ausgabe B* Vol. 96 No. 9, Sept. 1975, pp 394-396, 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: VDI-Verlag GmbH Postfach 1139, Graf-Recke-Strasse 84, 4 Duesseldorf 1, West Germany Repr. PC, Microfilm

11 135183
COAL TRANSPORTATION ECONOMICS
Transportation of coal by slurry pipeline has been proven to be technically and economically feasible in several commercial installations, the largest of which is a 438 kilometer (273 mile) 5 million ton per year system. Economics of slurry pipelines handling up to 30 million metric tons per year have been considered. Volume is an important determining factor, and at tonnage levels of about 20 million tons per year, a pipeline would offer substantial savings over rail. Due to its capital intensive character, a pipeline is much less subject to escalating costs than is a railroad. Data are presented in tabular and graphical form.

Presented at the 9th World Energy Conference, Trans, Paper and Discussion, Detroit, Michigan, September 23-27, 1974.

Montfort, JG (Black Mesa Pipeline, Incorporated); Wasp, EJ National Commission of the World Energy Conf Volume 6, 1975, pp 260-280, 1 Ref.

PURCHASE FROM: National Commission of the World Energy Conf New York, New York

11 135187
METHOD TO CONTROL THE SUSPENSION SYSTEM UTILIZING MAGNETIC ATTRACTIVE FORCE
According to modern control theory the suspension system utilizing magnetic attractive force can be stabilized by using all the state variables as feedback signals to control the exciting voltage of the electromagnet. This paper proposes a control system to stabilize the above- stated system, and analyzes theoretically and experimentally the system control characteristics taking into account the effect of the leakage flux. The behavior of the proposed control system is described by normalized equations which are expressed in terms of only two parameters. This paper considers only the vertical motion and neglects both the horizontal and rotational motions.

Matsumura, F (Kanazawa University, Japan) *Electrical Engineering in Japan* Vol. 94 No. 6, Nov. 1974, pp 50-57, 11 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

11 135206
OPTIMUM GOODNESS CRITERION FOR LINEAR-INDUCTION MOTOR DESIGN
LIM's have many possible applications but the end effects cause considerable deterioration in the performance in low-slip regions. The paper introduces the concept of realistic goodness factor which takes into account by appropriate coefficients the airgap leakage, secondary sheet skin effect and transverse edge effects.

Boldea, I Nasar, SA *Institution of Electrical Engineers, Proceedings* Vol. 123 No. 1, Jan. 1976, 4 pp, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

11 136416
PROBLEMS ARISING IN CONNECTION WITH THE USE OF SUPERCONDUCTING COILS IN A PASSENGER TRANSPORT SYSTEM
The aim of the paper is to offer a detailed review of the possibilities of repulsive magnetic suspensions, to define the requirements and constraints implied by the use of on-board superconducting coils on a transportation vehicle and mention a number of prospective applications. The advantages and disadvantages of magnetic suspension are weighted and it is questioned whether the operation at cryogenic temperatures of 4K with associated problems justifies investigation of transport application. In particular, it is argued that, for Western Europe and Eastern USA, distances between cities are too short to justify the use of high-speed magnetically suspended transport. On the other hand, in Western USA and in Japan (enormous traffic volumes and environmental considerations) such systems may be justified.
Presented at the 5th Int Conf on Magnet Technol, Rome, Italy, Apr. 21-25, 1975.

Autruffe, H (French National Railways)
Laboratorio Naz del Com Naz per l'Energ Nucl 1975, pp 468-476

ACKNOWLEDGMENT: EI
PURCHASE FROM: Laboratorio Naz del Com Naz per l'Energ Nucl Frascati, Italy

11 136825
MULTISPAN ELEVATED GUIDEWAY DESIGN FOR PASSENGER TRANSPORT VEHICLES. VOLUME I. TEXT
Analysis techniques, a design procedure and design data are described for passenger vehicle, simply supported, single span and multiple span elevated guideway structures. Analyses and computer programs are developed to determine guideway deflections, moments and stresses and vehicle accelerations resulting from a two-dimensional vehicle with finite pad length front and rear suspensions traversing a multispan elevated guideway. A preliminary design procedure is described to estimate guideway beam structural requirements so that a vehicle-guideway system will meet specified levels of passenger comfort. Design data for 150 mph and 300 mph intercity 40,000, 80,000 and 120,000 lb. air cushion vehicle single and multiple span (span lengths of 50 to 150 ft.) guideways is summarized. For both urban and intercity operating regimes, the data indicate that improvements in the vehicle suspension and the use of multiple span structures rather than single span structures may result in reduced guideway material requirements.
See also Volume 2, PB-253 009.

Wormley, DN Smith, CC Gilchrist, AJ
Massachusetts Institute of Technology, Transportation Systems Center, Federal Railroad Administration Final Rpt., ñFR DOT-TSC-FRA-75-4.I,, Apr. 1975, 137 pp

Contract DOT-TSC-349-1

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-253008/7ST, DOTL NTIS

11 136826
MULTISPAN ELEVATED GUIDEWAY DESIGN FOR PASSENGER TRANSPORT VEHICLES. VOLUME II. APPENDIXES
Contents: Appendix A-derivation of vehicle-guideway interaction equations; Appendix B-evaluation of pier support dynamics; Appendix C-computer simulation program of two-dimensional vehicle over a multi-span guideway; Appendix D-computer program to determine guideway midspan deflections and moments and vehicle suspension deflections and accelerations based on a constant force model; Appendix E-guideway design program based upon a constant force vehicle model; Appendix F-tables of nondimensional suspension deflection fourier coefficients; Appendix G- parametric data for sprung and unsprung mass inertia suspension forces; Appendix H-nomenclature; Appendix I- report of inventions.
See also Volume 1, PB-253 008.

Wormley, DN Smith, CC Gilchrist, AJ
Massachusetts Institute of Technology, Transportation Systems Center, Federal Railroad Administration Final Rpt., ñF DOT-TSC-FRA-75-4.II,, Apr. 1975, 213 pp

Contract DOT-TSC-349-2

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-253009/5ST, DOTL NTIS

11 138089
MATRIX ANALYSIS OF LINEAR INDUCTION MACHINES
A new method of analyses for linear induction machines, the matrix method, has been developed. The method handles linear induction motors, both single-and double-sided, and linear induction liquid metal pumps and generators, both flat and annular. The secondary is treated as a ladder mesh carrying unknown currents. The primary carries known currents. Matrices Z and Z1 are calculated from geometry, velocity, and frequency such that the secondary currents are given by Z I2 = Z1 I1, a set of N equations in N unknowns that can be solved for I2 by standard methods. The primary currents I1 can be prescribed, calculated from prescribed phase voltages, or optimized for maximum machine efficiency. The matrix method incorporates accurate modeling of the magnetic field of the finite-length iron including the fields due to fringing, variable gap, slots, coils, and phase belts. The coils may have any arbitrary phase connections. Drawbacks of the matrix method are long computing times, about (M/50) to the 2.7th power minutes, where M is the number of slots, and the use of only a crude approximation to transverse edge effects by means of secondary-impedance corrections from sheet-rotor motor theory. Calculated thrusts and normal forces agree well with low-speed measurements but thrusts are 7 to 12 percent below measurements above 100 m/s. Thrusts agree within 2 to 25 percent with other analysis methods, and normal forces agree within 10 percent in some cases but differ as much as a factor of three in others.
Computer programs described herein are available from FRA or JPL without cost.

Elliott, DG
Jet Propulsion Laboratory, (SP 43-24) 7209-7412 FRA-OR&D-75-77, Sept. 1975, 330 pp, 96 Fig., 20 Tab., 24 Ref., 5 App.

Contract NASA RD 152 Amdt. 1

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS

DOTL NTIS

11 138317
EMD PROPOSES BIDIRECTIONAL 125-MPH TRAIN
General Motors Electro-Motive Division has developed a new passenger train concept for long-range operations called AMT-125. Features include four-axle motive power at each end which obviates turn-around and other equipment handling. Maximum speed is 125 mph. Article describes the design features and drive system.

Progressive Railroading Vol. 19 No. 3, Mar. 1976, pp 82-84, 2 Fig.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606

DOTL JC

12 052823
AUTOMATIC WARNING OF TRACK MAINTENANCE GANGS. ENQUIRY CONCERNING THE STATE OF PROGRESS AND THE TYPE OF SYSTEMS AND EQUIPMENT USED BY THE MEMBER ADMINISTRATIONS OF ORE FOR THE AUTOMATIC WARNING OF TRACK MAINTENANCE GANGS

This report contains a description of the documents prepared by the Managerial Committee Way and Works of the UIC with a view to the development of an "Automatic warning device for track maintenance gangs". A brief description is given of the "automatic warning devices for track maintenance gangs" already known and used by the Administrations, and their respective advantages and disadvantages are assessed. To complete this survey and to define the Programme of Work for the development of a uniform technical solution, a questionnaire has been drawn up, dealing separately with existing equipment and new equipment to be developed. Replies of the Administrations are given in tabular form, and additional remarks are commented on in the text. The conclusions drawn were used to prepare the Programme of Work. This and the timetable to be followed during the planned investigations are included in the report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A124/RP 1/E, Oct. 1971, 53 pp, Figs., Tabs., 4 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

12 052824
AUTOMATIC WARNING OF TRACK MAINTENANCE GANGS. RESEARCH AND TESTS OF METHODS FOR THE VISUAL WARNING OF TRACK MAINTENANCE GANGS AT NIGHT AND IN TUNNELS. CONCLUSIONS AND RECOMMENDATIONS

The report presents a summary of the possibilities of the visual warning of maintenance gangs at night and in tunnels of the approach of trains. It contains recommendations on this subject, which are based on research and tests carried out in practical operating conditions and also take into account the existing knowledge concerning the physiology of vision.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A124/RP 6/E, Apr. 1975, 24 pp, 7 Fig., 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

12 053104
STRENGTH OF BODIES OF PASSENGER COACHES. REPORT ON THE ACCIDENTS. ENCLOSURES AND PHOTOGRAPHS

No Abstract.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B7/RP 2/E, Nov. 1958, 55 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

12 053127
CHARACTERISTICS OF THE ACOUSTIC SIGNALS USED BY MOTIVE POWER UNITS IN INTERNATIONAL SERVICE. COMPARATIVE TESTS WITH WARNING SIGNAL INSTALLATIONS WITH DIFFERENT ACOUSTIC CHARACTERISTICS

No Abstract.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. B49/RP 1/E, Feb. 1960, 12 pp, 12 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

12 093610
CRASHWORTHINESS ANALYSIS OF THE UMTA STATE-OF-THE-ART CARS

An engineering assessment of the crashworthiness of the UMTA State-of-the-Art Car (SOAC) has been conducted as part of a program to provide safer transportation to urban rail vehicles. Crash dynamics and crashworthiness methodology based on post-yield energy absorption characteristics and a 'weighted acceleration' severity index has been applied. Sensitivity studies have been conducted to show the effect of car buff strength, passenger relative velocity, passenger spacing, and cushioning on casualties as defined by the severity index. Major gains in injury reduction through improved internal cushioning are indicated. The prevention of car penetration by override is treated. The SOAC collision dynamics model is validated by comparison to the SOAC-gondola accident of August 11, 1973, and by comparison to a nonlinear finite element mathematical simulation of the SOAC in crash conditions.

Widmayer, E Tanner, AE Klump, R
Boeing Vertol Company, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0025-7515, Oct. 1975, 193 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247230/6ST, DOTL NTIS

12 094191
RISK ASSESSMENT OF STORAGE AND TRANSPORT OF LIQUEFIED NATURAL GAS AND LP-GAS

A method for assessing the societal risk of transporting liquefied petroleum gas (LPG) and liquefied natural gas (LNG) is described, and is illustrated by application to the transport of LPG by tank truck and LNG by tanker ship in the U.S. Data on past experience and projected future handling of these liquefied gases are used with analysis of flammable plume formation and ignition, and population distributions, to estimate the risks of fatalities from tank truck and tanker ship accidents. From an estimated 52 significant accidents per year with LPG tank trucks at the present truck-associated transportation rate of 20 billion gallons of LPG per year, a fatality rate of 1.2 per year is calculated. For the projected 1980 importation of 33 billion gallons by tanker ship, a fatality rate of 0.4 per year is calculated, using a conservatively high one chance in 20,000 of a significant accident per trip. Comparison with fires and explosions from all causes in the U.S. and Canada leading to 10 or more fatalities shows that these are 100 times more frequent than the predicted frequency of comparable LPG and LNG accidents. Tabulations of experience with spills of flammable volatile liquids are included.

Simmons, JA
Science Applications, Incorporated, Office of Radiation Programs Final Rpt. EPA/520/3-75-015, Nov. 1974, 88 pp

Contract EPA-68-01-2695

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247415/3ST, DOTL NTIS

12 094527
A STUDY OF INTERMODAL CONTAINER SAFETY

As a result of the International Convention for Safe Containers (CSC), in 1972, the U.S. Coast Guard, which will be responsible for implementing and monitoring a rational and effective program in the United States when the Convention becomes international law, has undertaken through this study to investigate the existing levels of safety to humans and property engaged in the multimodal transport of containerized cargo. A major conclusion is that the excellent safety record heretofore enjoyed by the container industry is continuing throughout the increasing development of containerization. The commercial environment to which containers are exposed is investigated in terms of the sea, highway and rail transport modes as well as the various handling modes within and between terminals to determine if damages which are sustained by containers substantially affect their structural integrity on either an immediate or long-term basis.

Cushing, CR Higgins, ML Kimball, PB
Cushing (CR) and Company, United States Coast Guard Final Rpt. USCG-D-22-76, Dec. 1975, 262 pp

Contract DOT-CG-42356-A

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
AD-A021928/7ST, DOTL NTIS

12 094690
A FIRE HAZARD EVALUATION OF THE INTERIOR OF WMATA METRORAIL CARS
A series of fire tests was conducted for the Washington Metropolitan Area Transit Authority to assist them in assessing the potential for fire hazard in the new Metrorail subway cars. Results of small-scale laboratory tests were found inadequate for this assessment. Results of full-scale tests on mock-ups of the interior (and on a real car for a smoke penetration test) show that the potential for hazard arises primarily from the seat padding and covering and from the plastic wall lining. The hazard arises both from smoke development and from spread of flame and heat. The times to reach unacceptable conditions has been determined for several test conditions. It is recommended that the authorities review these times in the context of what they consider to be appropriate times for safe escape. Recommendations are made for increasing the amount of time available for escape. These would require changes in the seating and wall lining materials.

Braun, E
National Bureau of Standards, Washington Metropolitan Area Transit Authority, (NBS-4927371) Final Rpt. NBSIR-75-971, Dec. 1975, 35 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249776/6ST, DOTL NTIS

12 095399
CONDITIONS FOR THE TRANSPORT OF DANGEROUS GOODS-PROBLEMS AND SOLUTIONS [Befoerderungsbedingungen fuer Gefahrengueter-Probleme und Loesungen]
The author summarizes several aspects of the conditions for the transport of dangerous goods from the railway point of view, mentions the problems involved and proposes optimal solutions. He also presents the standard symbols on labels used for the transport of dangerous goods to show the first results of work for the harmonization and unification of both road and railway transport conditions. [German]

Koppel, G *Chemische Rundschau* Vol. 27 No. 25, 1974, pp 1-7, 6 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Chemie-Verlag Vogt-Schild AG 4500 Solothurn 2, Switzerland Repr. PC

12 099172
COMPARISON OF THERMALLY COATED AND UNINSULATED RAIL TANK CARS FILLED WITH LPG SUBJECTED TO A FIRE ENVIRONMENT
Two fire test were conducted on 128 kiloliter, high pressure rail tank cars filled with liquified petroleum gas. Both tank cars were exposed to an intense hydrocarbon fire after being outfitted with appropriate instrumentation. The instrumentation was monitored and its output recorded throughout the fire tests. To test the feasibility of insulating railroad tank cars to protect them from fire exposure, one of the cars was coated with a 0.318 cm thermal shield. A comparison of data conclusively shows that a thermal shield significantly alters the thermal response of a rail tank car in a fire environment.
This document was prepared for the Department of Transportation, Federal Railroad Administration.

Townsend, W Anderson, C Zook, J Cowgill, G
Department of the Army Final Rpt. FRA-OR&D 75-32, Dec. 1974, 56 pp

Contract DOT-AR-30026

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-241702/AS, DOTL NTIS

12 127238
RELIABILITY CONSIDERATIONS IN STRUCTURAL DESIGN--A STATE OF THE ART REPORT
This report is concerned with the problem of designing civil engineering structures for adequate reliability, and examines a number of different approaches proposed for this purpose. In the context of limit-stage design, the problem is that of making an appropriate choice of safety factor for each combination of loading, structural material, type of member and limit-state considered in practice, so that the risks of occurrence of the different ultimate and serviceability limits are acceptably small. Solutions can be found only by adopting a probabilistic view of structural behaviour and by statistical analysis of loads, strength and other design variables. Three semi-probabilistic safety formats are compared with regard to their suitability for adoption in codes of practice. The basis for a fully-probabilistic treatment of structural safety is also outlined, but a number of theoretical and practical difficulties preclude the use of the latter at the present time. The adoption of a semi-probabilistic safety format necessitates 'calibration' of the new code to an existing code, until such time as acceptable risks of railure and unserviceability can be objectively defined, "Code optimisation" is discussed as a possible future method of establishing risk levels, but a prerequisite is a significant development of techniques for assessing the reliability of multi-member structural systems. A number of recent studies are discussed. Finally, the need for further research is considered. /TRRL/

Baker, MJ
Construction Industry Research & Information Assoc R&D rept. Technical Note 50, July 1973, 83 pp, 1 Fig., 48 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213637)
PURCHASE FROM: Construction Industry Research & Information Assoc 6 Storey's Gate, London SW1P 3AU, England Repr. PC

12 129840
ELECTROCUTION, VOLTAGE LIMITS FOR HUMAN BEINGS WHEN THEY TOUCH LIVE WIRES, SAFETY MEASURES [Korperstrome, Beruhrungsspannungsgrenzen und Schutzmassnahmen]
No Abstract. [German]

Biegelmeier, G *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 27 No. 17, 1975, pp 461-464, 2 Tab., 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

12 130670
RAILROAD ACCIDENT REPORT: REAR END COLLISION OF TWO TEXAS AND PACIFIC RAILWAY COMPANY FREIGHT TRAINS, MEEKER, LOUISIANA, MAY 30, 1975
About 8:52 a.m. on May 30, 1975, a Texas and Pacific Railway Company freight train, Extra 3311 West, passed an "approach" signal and a "low" signal and collided with the rear of train Extra 551 West, which was stopped on the main track in Meeker, Louisiana. The 4 locomotive units and the first 10 cars of Extra 3311 West and the last 5 cars and the caboose of the standing train were derailed and damaged. The engineer and the front brakeman of Extra 3311 West and the conductor of Extra 551 West were killed. The National Transportation Safety Board determines that the probable cause of the collision was the failure of the engineer of Extra 3311 West, while operating the train in violation of a "low" signal indication, to perceive the train ahead in time to prevent a collision. A cause of the severity of the collision was the subnormal braking capability of a significant number of cars. As a result of this investigation, five recommendations concerning use of radio, backup control system, "Stop and Proceed" procedure and enforcement of braking system regulations have been addressed to the Federal Railroad Administration.

National Transportation Safety Board NTSB-RAR-75-9, 1975, 23 pp, 1 Fig., 2 App.

ACKNOWLEDGMENT: National Transportation Safety Board
PURCHASE FROM: NTIS Repr. PC, Microfiche
DOTL NTIS

12 130841
PHASE II REPORT ON FULL SCALE FIRE TESTS
This report presents an analysis of the results obtained in two tests of propane-laden DOT class 112/114A340 tank cars completely immersed in

all-enveloping fires generated using JP-4 fuel. In the first test, an uninsulated car (RAX 201) ruptured at a pressure of about 335 PSIG after 24.6 minutes exposure to the fire. The safety valve incorporated on this car limited the maximum tank pressure to less than 350 PSIG, even in the all-enveloping fire. However, a rise in the temperature of the unwetted upper section of the steel shell to about 1200 degrees F precipitated rupture when the tank was about half full of liquid propane. In the second test, car RAX 202, insulated with a spray-on thermal protective coating, ruptured after about 93.7 minutes exposure to fire. With a heating rate averaging about 12,100 btu/hr/sq ft (43% of the 27,650 btu/hr-sq ft average from the first test), the longer time to rupture in this test is not solely due to insulation, as lower fire temperatures and other variables played an important part. As in the first test, rupture was precipitated by a rise in unwetted shell temperature to levels at which the shell strength could not withstand even the reduced tank pressures. As well as can be determined, it appears that the shell failure was initiated in an area which contained flaws or non-uniformities in the insulative coating.

An RPI-AAR Cooperative Program. Railroad Tank Car Safety Research and Test Project.

Manda, LJ
Railway Progress Institute, Association of American Railroads Technical Center RA-11-6-31, Dec. 1975, 114 pp, 14 Ref.

ACKNOWLEDGMENT: Railway Progress Institute
PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC
DOTL RP

12 130842
PHASE II REPORT ON SPECIFICATIONS FOR THERMAL SHIELD SYSTEMS ON DOT 112A (114A) TANK CARS
This study was prompted by the need to find a thermal shield system which will reduce the probability of rupture of DOT 112A(114A) tank cars in accident fires. Importantly, this will reduce the severity of the "chain reaction" type accident wherein a fire initiates from one car in the derailment and causes a sequence of thermally induced rupture of other cars. This study is directed toward insulation-steel jacket type systems; however, the proposed thermal qualification criteria apply equally well to any type system, including sprayed-on coatings. Over a hundred fire tests of various materials were conducted on a specially constructed laboratory apparatus at the AAR Technical Center using both "pool" fires (1550-1650 degrees F flame) and "torch" fires (2100-2200 degrees F flame). Data from two full scale fire tests and many accidents were used in developing this apparatus. Several of the attractive materials were also tested in full scale torch fires at the FRA Pueblo Test Center. With available clearance on many existing cars limited to one inch, most tests were conducted on materials near this thickness. The report concludes with a recommendation that the laboratory apparatus be adopted as a qualification device with acceptance criteria being that the candidate system not allow the back side plate (representing the tank car shell) to rise above 800 degrees F. The time criteria will be later developed from further correlation tests between the laboratory and Pueblo facilities; however, 35 minutes appears a probable time for the torch test.

An RPI-AAR Cooperative Program. Railroad Tank Car Safety Research and Test Project.

Phillips, EA Skogsberg, AM
Railway Progress Institute, Association of American Railroads Technical Center RA-11-7-34, Jan. 1976, 109 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: Railway Progress Institute
PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC
DOTL RP

12 130909
SAFETY-AVAILABILITY STUDY METHODS APPLIED TO BART
The paper describes the San Francisco Bay Area Rapid Transit (BART) system with emphasis of its underlying safety and availability concepts. The novel characteristics of this system which differentiate it from transit systems in other locations are pointed out.

Presented Jan 28-30, 1975.

Welker, EL (TRW Systems Group); Buchanan, HN *Annual Reliab Maintainability Symp, Proceedings* Proc Paper #1263, 1975, pp 269-275

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

12 130918
HAZARDOUS MATERIALS SHIPMENT DATA IN RISK ANALYSIS
An experimental integrated risk analysis system (IRAS) has been developed for analyzing the interstate transportation of explosives, corrosives, flammables, poisons and other hazardous materials. This system includes as components a risk analysis model and methods for obtaining estimates of its parameters relevant to the evaluation of the risks associated with alternative ways of transporting hazardous materials.

Philipson, LL (University of Southern California); Schaeffer, MS *Annual Reliab Maintainability Symp, Proceedings* Proc Paper #1304, 1975, pp 519-527, 3 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

12 131222
LOSS PREVENTION AND SAFETY PROMOTION IN THE PROCESS INDUSTRIES
The book contains forty-eight papers and the discussions arising from them. Topics include guidelines for safe design, reliability engineering, emergency planning, safety organization, unconfined explosions of gas clouds, dispersion of heavy gases in the atomosphere, safe transport of liquefied gasses, and explosibility tests. Papers of particular interest to railroad transportation include: Explosions of Unconfined Vapor Clouds; The Course of gas and dust explosions and their control; Design of Pressure Relief Vents; The Bulk Distribution of Toxic Substances: A Safety assessment of the carriage of liquid Chlorine; Secondary heat effect on LPG Storage spheres in case of fire; The cooling of LPG storage tanks in the case of fire; On the spreading of a heavy gas released near the ground; Propagation processes after the bursting of tanks filled with liquid propane-experiments and mathematical model; Phenomenology, test methods and case histories of explosions in liquids and solids; The thermal explosion of unstable substances; The inflammability of liquid mixtures with inflammable and non-inflammable components; Over-pressure and other risks-some myths of the Chemical Industry; The process engineering of pressure relief and blowdown systems.

Proceedings of the 1st International Loss Prevention Symposium of the Royal Institution of Engineers in the Netherlands and the Royal Netherlands Chemical Society. Sponsored by the European Federation of Chemical Engineering.

Elsevier Scientific Publishing Company 1974, 466 pp, 313 Ref.

PURCHASE FROM: Elsevier Scientific Publishing Company P.O. Box 211, Amsterdam, Netherlands
ISBN 0-444-41230-1

12 131655
RAILROAD ACCIDENT REPORT: PENN CENTRAL TRANSPORTATION COMPANY, TRAIN COLLISIONS, LEETONIA, OHIO, JUNE 6, 1975
About 11:00 p.m. on June 6, 1975, three freight trains of the Penn Central Transportation Company (PC) were involved in a collision near Leetonia, Ohio. Extra 6330 West collided with the rear of standing Extra 2278 West. Immediately thereafter, Extra 6259 East, which was on an adjacent track, struck the wrecked cars from the other two trains. One employee was killed and seven others were injured. Property damage amounted to about $1.25 million. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer and brakeman to assure the operation of the train at a speed slow enough to stop it within the visibility range. This violated the restricted speed rule required by the signal indication. Recommendations were made concerning operating rules and the use of radios.

National Transportation Safety Board NTSB-RAR-76-2, Feb. 1976, 28 pp

ACKNOWLEDGMENT: National Transportation Safety Board, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-251149/1ST, DOTL NTIS

12 131656
RAILROAD ACCIDENT REPORT: REAR END COLLISION OF AN ALASKA RAILROAD FREIGHT TRAIN WITH A PASSENGER TRAIN NEAR HURRICANE, ALASKA, JULY 5, 1975
About 3:46 p.m. on July 5, 1975, an Alaska Railroad freight train, Extra 1502 South, collided with the rear of passenger train No. 5, which had stopped south of Hurricane, Alaska, to permit the passengers on the train to view Mt. McKinley. All cars of the passenger train and the first four locomotive units of the freight train were derailed. Sixty-two persons were injured and one of the injured subsequently died. The National Transportation Safety Board determines that the probable cause of the accident was the failure of the engineer of Extra 1502 South to operate the braking system on the locomotive properly and the failures of both trancrews to comply with railroad operating rules. As a result of its investigation, the Safety Board made three recommendations to the Federal Railroad Administration concerning improvement and compliance with operating rules and a modification of locomotive brake valves.

National Transportation Safety Board NTSB-RAR-76-3, Feb. 1976, 24 pp

ACKNOWLEDGMENT: National Transportation Safety Board, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-251489/1ST, DOTL NTIS

12 134547
EFFECTS OF ACCELERATION ON PEOPLE [Einfluesse von Beschleunigungen auf den Menschen]
In high speed operation from 200 to 500 km/h, measures must be taken to avoid dangerous acceleration. Seats should be facing the running direction of the train, or equipped with safety belts and warning should be given before braking. Compartments should be provided for heavy luggage. The interior fittings and fastening points should withstand acceleration of up to 10 g. Centrifugal force in curves should not exceed 1 g. [German]

Garbe, J *Aerztliche Dienst der DB* Vol. 36 No. 7-8, July 1975, pp 96-100, 5 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Aerztliche Dienst der DB Darmstadt, West Germany

12 134563
AIRCRAFT-TYPE CRASH INJURY INVESTIGATION OF A COMMUTER TRAIN COLLISION
Methodology for investigating the causes and circumstances of rail accidents. An aircraft-type investigation conducted following a collision between two commuter trains in the Chicago area, was able to identify the weaker points in the organisation of public transport in heavy-traffic zones and fix technical safety standards for the construction of rolling stock.

Braden, GE *Aviation, Space, and Environmental Medicine* Vol. 46 No. 9, Sept. 1975, pp 1157-60, 1 Tab., 2 Phot., 1 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Aerospace Medical Association Washington National Airport, Washington, D.C., 20001

12 135186
ULTIMATE DISPOSAL OF SPILLED HAZARDOUS MATERIALS
Factors governing the disposal of sludges and slurries recovered during the cleanup of spilled chemicals are outlined. These include analyzing the constraints identifying available options; various types of existing disposal facilities; and factors that govern a choice between land disposal, chemical treatment and long-term storage.

Lindsey, AW (Environmental Protection Agency) *Chemical Engineering* Vol. 82 No. 23, Oct. 1975, pp 107-114, 21 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

12 135214
WHO SHOULD DECIDE ON ACCEPTABILITY OF WHAT RISKS FROM WHOM
Two different activities are required for determining how safe things are: measuring risk, an objective but probabilistic activity, and judging the acceptability of that risk, a matter of personal and social value judgement. Such decisions range from intensely personal to broadly social. Failure to appreciate how safety determinations resolve into two discrete activities is the root of many misunderstandings. Safety is a highly relative attribute that can change from time to time and can be judged differently in different contexts. The institutional organization, personal roles and distributed powers are not fully addressed.

This article is an excerpt from "Of Acceptable Risk: Science and the Determination of Safety", William W. Lowrance, in consultation with the Panel on Science and the Determination of Safety; Committee on Science and Public Policy, National Academy of Sciences. William Kaufmann publisher.

Lowrance, WW *News Report* Vol. 26 No. 8, pp 14-15

PURCHASE FROM: XUM
DOTL RP

12 136400
FIRE HAZARD EVALUATION OF CABLES AND MATERIALS
Test methods currently used for testing cables and cable materials are discussed and improved techniques are proposed. The virtues of the proposed techniques are illustrated by means of a typical fire retardant cable compound development. Finally the concept of a fire hazard rating system is introduced as a rationalization of the interpretation of cable and materials flammability testing.

24th Annual Int Wire and Cable Symp, Proceedings, Cherry Hill, New Jersey, November 18-20, 1975.

Gouldson, EJ (North Electric Company, Montreal); Woolerton, GR Checkland, JA
Army Electronics Command 1975, pp 26-36, 19 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: NTIS
DOTL NTIS

12 136606
MEASUREMENTS AND OBSERVATIONS OF THE TOXICOLOGICAL HAZARD OF FIRE IN A METRORAIL INTERIOR MOCK-UP
Oxygen depletion, carbon monoxide, carbon dioxide, hydrogen chloride and hydrogen cyanide were selected for measurement and identification in Metrorail fire tests. Male rats exposed to the combustion products were examined for changes in blood chemistry, gross pathology and loss of function. Hydrogen cyanide and carbon monoxide levels in blood were elevated and functional changes were noted.

Prepared in cooperation with Johns Hopkins Univ., Baltimore, Md. School of Hygiene and Public Health.

Paabo, M Pitt, B Birky, MM Coats, AW Alderson, SE
National Bureau of Standards, Johns Hopkins University, Baltimore, (NBS-4911677) Final Rpt. NBSIR-75-966, Feb. 1976, 20 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250768/9ST, DOTL NTIS

12 136814
A COMPREHENSIVE RAILROAD SAFETY REPORT (INCLUDING AN ANALYSIS OF THE STATE PARTICIPATION PROGRAM)
The report describes the mission of the Federal/state joint railroad safety enforcement program, its status as of June 30, 1975, and plans thru fiscal year 1981. Major emphasis is placed upon the state role in the grant program established under Section 206 of the Federal Railroad Safety Act of 1970. Detailed contents are prescribed in Section 203 of the Rail Safety Improvement Act of 1974 (Public Law 93-633). In brief, Section 203 calls for a review and projection of Federal railroad standards; an identification of any alternative cost-effective methods for inspection; a description of current and planned State railroad programs; an analysis of total staffing requirements; a discussion of program problems and recommendations for

legislation; a description of regulations and a projection of rail shipments of radioactive materials. The report, dealing largely with the enforcement countermeasure to ensure safety, represents a portion of the total system approach that is utilized by the Department of Transportation addressed to the goal of accident reduction.
Special Report to the President and Congress, 1976-1981.

Federal Railroad Administration FRA/RSS-7601, Mar. 1976, 359p

Contract DOT-FR-53060

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-252600/2ST, DOTL NTIS

13 052638

HIGH POWER TRACTION CURRENT COLLECTION AT HIGH SPEED. DYNAMIC BEHAVIOR OF THE "OVERHEAD CONTACT-PANTOGRAPH" SYSTEM. COMPARISON BETWEEN RESULTS OF BR SIMULATIONS AND SNCF TRACK TESTS

This report contains a description of a computer program developed by BR, which enables general forms of overhead contact systems and pantograph designs to be studied in one program. The variations of the various parameters of the overhead contact system and of the pantographs is easily made. The computer procedure is based on the equations of motion of the catenary wires and of the pantograph. The input and output data are mentioned and the report also contains an example of a calculation. A series of simulations representing tests performed by SNCF were done to afford a comparison between theory and experiment.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A129/RP 1/E, Oct. 1974, 27 pp, 27 Fig., 2 Tab., 2 App.

PURCHASE FROM: UIC

13 052690

PROTECTION OF TRACTION INSTALLATION AGAINST OVER-VOLTAGE. TESTS MADE WITH HORN TYPE LIGHTNING ARRESTERS ON DIRECT CURRENT OVERHEAD CONTACT SYSTEMS

The initial stage of the investigations by the A 50 Specialists Committee on the protection of electric installations and electric rolling stock against over-voltage concerned protective devices for direct current contact systems, which devices mainly consist of three different types of over-voltage arresters (horn type, non-linear resistor type and condenser type). The experience obtained in service with the horn type arresters as protective devices against overvoltages in the direct current systems of the Polish and Netherlands railways show that this system of protection is effective and yields satisfactory results in service. In consequence, first of all comparative tests with the horn type arresters on 3 kV and 1.5 kV direct current systems were made on the PKP and on the NS. In addition, comparative tests with the other types of arresters were planned of which part is being made now. The relevant report (Interim Report No. 1) deals with the tests with the horn type arresters and the conclusions and recommendations to be derived from these tests. The first part of this report contains, in addition, a summary of the replies to a questionnaire, which had been sent to those Member-Administrations using direct current train traction systems, in order to obtain more detailed data on the insulation and overvoltage conditions prevailing on the overhead contact systems, the substations and the track sectioning cabins as well as particulars concerning the rolling stock and the protective systems used; these data were required for the general guidance of the Committee. The tests made enabled the determination of those parameters which influence the capacity of the automatic current interruption by the horn type arresters. The following parameters were determined: the system voltage, the form of the horns, the length of the spark gap, the material of the horns and the magnitude of the continuous short-circuit current and also the inductance of the current circuit in which the arrester was installed. The results of the tests show that the horn type arresters possess an adequate capacity for interrupting by itself of the follow on current for all the current supply conditions of 3 kV and 1.5 kV direct current systems, when only the distance between the electrodes and their angular aperture are properly dimensioned. For those direct current systems having conditions similar to those prevailing on the PKP and the NS, it is therefore important to use the horn type arresters for the protection of overhead contact system against overvoltages.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A50/RP 1/E, Mar. 1962, 39 pp, 15 Fig., 9 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

-- 052691

PROTECTION OF OVERHEAD CONTACT SYSTEMS AGAINST THE EFFECTS OF ATMOSPHERIC DISCARGES. INTERNAL VOLTAGE SURGES CAUSED BY THE OPERATION OF FUSES ON 3DV AND 1.5 KV DIRECT CURRENT ELECTRIC TRACTION SYSTEMS

The investigations arranged for by ORE comprised measurements of internal voltage surges caused by fuses in 1.5 kV and 3kV direct current systems. The PKP and SNCF carried out tests with fuses of different types and current ratings in laboratories and on open track. In addition to these, a special series of comparative tests were conducted in the high-voltage laboratory of the KEMA Institute in Arnhem (Netherlands). During the tests, as many different types of fuses as possible were investigated, due allowance having been made for the possibilities available in service for mounting the fuses. Furthermore, various current intensities were used to cause the fuses to melt. The parameters enumerated influence the intensity of the resulting voltage surges. It has chiefly been possible to draw the following conclusions: Melting of fuses produced by short-circuit currents caused voltage surges which, in many cases, constituted a hazard, particularly when using fuses with low current ratings. Melting of fuses by means of current intensities which were of the order of from 10 to 15 times the current rating give much smaller voltage surges. The intensity of the voltage surge is moreover influenced by the ohmic and the inductive resistance of the circuits; the influence of the type of the fuse, however, predominates. The tests have shown that, by means of suitable design and construction of the fuses and by adapting suitable measures as regards the installations, it is possible to keep the inevitable internal voltage surges within limits compatible with the insulation level of the installations, without impairing the normal protective function of the fuse.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A50/RP 2/E, Apr. 1963, 30 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052692

PROTECTION OF INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVERVOLTAGES. DEFINITION OF THE CONSTITUENT PARTS OF THE EQUIPMENT TO BE PROTECTED AGAINST OVERVOLTAGES

During the revision of its Programme of Work in 1963, the Specialists Committee found that its studies were possibly too focused on the investigation of the characteristics and the behaviour of the various types of arresters, and, in particular, on the the horn type arrester. Under these conditions, it was, in fact, feared that certain important aspects of the problem would not be examined, because it was considered from too narrow an angle. This was why, inter alia, the question was raised concerning the earthing of the masts of the overhead equipment; this has a certain influence of the protection of the overhead contact systems and it can even be stated that earthing constitutes an essential part of this protection. In view of these considerations, the Specialists Committe decided that a new Chapter should be added to the first part of the new Programme of Work; this Chapter should deal with the definition of the constituent elements of the protective system for overhead contact systems, sub-stations and motive power units. This had led us to give, in this Chapter, some indications concerning the origin of the various types of the voltage surges, their order of magnitude, their propagation and also the danger they cause to the installations and electric traction engines. The study in question does not claim to be complete. It should rather be considered as informatory and as a basic document for the studies in progress. As the study of the protection of alternating current traction devices has already been described in an ORE report, the present report will deal with the problems involved in the protection of direct current traction devices.

Restrictions on the use of document are contained in the explanatory material.

International Union of Railways A50/RP 7/E, Oct. 1966, 19 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052693

PROTECTION OF INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVERVOLTAGES. ARCING TESTS ON CATENARY INSULATIONS

Adequate information has not hitherto been available on the development of phenomena occurring during thunderstorms and sometimes causing flashovers and damaging the insulators of the overhead contact system. Tests were conducted to investigate the performance of overhead contact system insultators under various earthing conditions when exposed to flash-overs by a d.c. arc or to a surge. Three series of tests were therefore made by the SNCF in the Electrotechnical Laboratory of the Research Department for Electric Traction, at Vitry, France, and by the Electrical Installations Division of the FS in the 3 kV d.c. laboratory of the Empoli sub-station in Italy. The tests have confirmed that, in the case of over-voltages due to surges on overhead contact systems electrified by d.c., if the follow current is sustained the insulators will be damaged. However, the absence of earth connections and connections with the rails provides a natural protection for the installations of the overhad contact system. On the other hand, the absence of these connections compels special safety measures to be taken. But if the masts are earthed or connected to the rails, special measures have to be taken, such as: 1) The use of lightning arresters; 2) A thorough study of insulator shapes with a view to increasing specific arc resistance; 3) Quicker action and greater operational reliability of the switches.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A50/RP 9/E, Nov. 1967, 24 pp, Figs., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052694

PROTECTION OF INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVERVOLTAGES. TESTS CONCERNING THE PROPAGATION OF IMPULSE VOLTAGES ON 1500 AND 3000 VOLT OVERHEAD CONTACT SYSTEMS

The propagation of overvoltage waves along transmission lines depends on a certain number of parameters the extent of whose influence, in the case of railway overhead contact systems at least, has not hitherto been investigated and checked by means of practical tests. This report contains a description and the results of such tests. The SNCF has carried out a series of low-voltage tests with a peak impulse value of about 500 V, and a series of high-voltage tests with a peak value of 40 kV. The FS have conducted a series of high-voltage tests with a peak value of 75 kV. These tests showed that the propagation phenomena along overhead lines, e.g. speed of propagation, reflection at the end of open-ended lines and of points where there are pronounced discontinuities, such as at metal bridges, conform with the calculated values, due allowance being made of course for the inevitable differences between the phenomena occurring when the impulse wave is travelling along the line and the unavoidable approximations which have to be made to deal with such phenomena mathematically.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A50/RP 10/E, Oct. 1968, 27 pp, Figs., 19 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052695

PROTECTION OF THE INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVERVOLTAGES. SERVICE TESTS ON DIFFERENT TYPES OF ARRESTERS FOR 1500 AND 3000 V SUB- STATIONS, PARALLELING POINTS AND VEHICLES

This report gives the results of the tests carried out by the various Administration with a view to comparing the efficacy of various means of protecting sub-stations, paralleling points and vehicles. The criterion used for assessing the efficacy of the capacitor-type and non-linear resistor-type arresters was the number of times damage was sustained by the equipment being protected. In certain cases counters were installed to provide a numerical record of the discharges. The tests carried out by the SNCB, SNCF, FS, PKP and NS have shown, in particular, that sub-stations as well as motive power units need to be protected against over-voltages, whether the overhead contact system is protected or not. In deciding on the type of protection to be used allowance has to be made for the insulation level of the equipment to be protected. Effective protection can be obtained by either capacitor-type or non-linear resistor-type arresters or by a combination of the two. When simple capacitors are used, however, allowance must be made for the stresses caused by the harmonics or else a spark-gap should be connected to the capacitor.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A50/RP 11/E, Apr. 1974, 37 pp, 20 Fig., 6 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052696

PROTECTION OF THE INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVERVOLTAGES. GENERAL SURVEY OF THE DIFFERENT SOLUTIONS FOR PROTECTION. FUTURE TRENDS AND QUESTIONS NOT YET RESOLVED

The report deals with the different solutions for protection, future trends and questions not yet resolved. It is preceded by a brief description of the phenomenon of lightning discharges, which is the origin of the studies in question. Basically, there are three methods for ensuring the protection of insulators against flash-overs, namelyì prevention, restriction, protective measures against the effects of flash-overs. Two methods of protection are recognised by the Committeeì shielding cables, lightning conductors, though radio-active lightning conductors are sometimes also used, the efficiency of which is uncertain. The comparison between the different limitation methods has involved a large number of tests (especially on mercury- vapour rectifiers) both in the laboratory and on the track. All the interesting characteristics of the different types of lightning arresters and also a summary of the conclusions drawn from the tests have been given. Moreover, in the case of semi-conductor equipment, where other protective methods with RC circuits and static screens in the transformers are used, the problem of protection has been studied as comprehensively as possible. A better knowledge of the means of protection permits the protection level to be reduced. A balance must be maintained however between this possibility and the general tendency to raise the insulation level. In the case of semi-conductors, particular attention should be paid to the means of protection against the effects of over-voltages as a new techniques is concerned here which is still in the development stage.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A50/RP 12/E, Apr. 1970, 20 pp, 7 Fig., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052697

WEAR OF CONTACT STRIPS AND OF THE OVERHEAD EQUIPMENT WHEN USING METALLIC OR COMPOSITE CONTACT STRIPS. LINE TESTS: PART 2

In Report A 69/RP 5 the results of tests, carried out after the publication of Report A 69/RP 3 (April 1969) are described. It contains precise data on the conditions in which the tests were carried out the also the results of each individual test. The present report contains no provisional conclusions, since Final Report RP 6 was being prepared simultaneously; this contains all the conclusions of the study. The Appendix to Report A 69/RP 5 contains a new version of Report RP 2 as a result of a recent enquiry with the Administration concerned. These data refer to the year 1967.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A69/RP 5/E, Apr. 1971, 32 pp, Figs., Tabs., 39 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052698
WEAR OF CONTACT STRIPS AND OF THE OVERHEAD EQUIPMENT WHEN USING METALLIC OR COMPOSITE CONTACT STRIPS
Table of contents: task to be carried out; data obtained from publications and reports; preliminary enquiries made at operating centers; evaluation of the results of the enquiry; further studies in order to obtain a definite solution of the problem; summary.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A69/RP 1/E, Oct. 1963, 12 pp, Tabs., 5 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052699
WEAR OF CONTACT STRIPS AND OF THE OVERHEAD EQUIPMENT WHEN USING METALLIC OR COMPOSITE CONTACT STRIPS. SECOND ENQUIRY REPORT
This report gives a summary of all the results of the analysis available at present and takes into account all the modifications which have been found necessary. The figures supplied by the Administrations which are represented by a member in the Specialists Committee have been examined in a general way and, if necessary, modified. The figure supplied by Administrations which do not have a representative in the Committee have again been inserted in the report for information. An attempt has been made to reduce the sources of errors by using better methods of calculation and making the questionnaire more readily understandable. After the causes of difference had been eliminated, the final figures for the comparative costs, of the wear of the contact strips and of the contact wire were sometimes so different that the figures given in the last report can be considered as unreliable. The layout of the report has been improved to exclude as far as possible misunderstandings and improve the overall comprehension of the relations which exist between the various factors involved.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A69/RP 2/E, Oct. 1966, 11 pp, Tabs., 11 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052700
WEAR OF CONTACT STRIPS AND OF THE OVERHEAD EQUIPMENT WHEN USING METALLIC OR COMPOSITE CONTACT-STRIPS. LINE TESTS PART 1
This report contains the results of the line tests carried out from 1965 until 1968, i.e. the first part of the programme of tests aimed at determining the most economic contact-strip material under all normal service conditions for each traction current system. After having defined the decisive wear parameters and having established the measuring method to be applied so as to obtain comparable results, each administration taking part in the tests first determined the wear produced by the standard contact strips for subsequent comparison with the wear obtained with other, 'foreign' contact strip materials. In this report the contact-strip wear is expressed in mm per pantograph- megametre (mm/Mm). The MAV tests were performed on an examining the performance of metal-impregnated carbon contact-strips. The measurements dealt with the interaction between contact strips and contact wire and with the different service parameters exerting an influence on the wear. Additional tests intended for studying the influence of the electric load and the phenomena appearing during the re-conversion from aluminum to metallised carbon contact strips, have shown that the latter have a longer life than the aluminum contact-strips, when used in mixed working. The NS has carried out three series of tests, the first of which was intended to determine the wear of standard metallised carbon contact-strips with 15% Cu, 7% Pb, 2% Sb, the second to determine the wear of sintered contact-strips which are used in Japan (composed of copper, tin, iron, powdered graphite), and the third series to test the metallic (copper-steel) contact-strips. During two winters the OBB has tested copper-coated carbon contact-strips, while the SNCB has carried out comparative tests on standard SNCB wear strips (non-metallised carbon) and carbon contact-strips coated with carbon-bearing copper. These tests have not yet been completed. The SNCF carried out comparative tests with contact strips of sintered material. They have especially followed, both for ac and dc systems, a large number of pantographs in service normally equipped with copper-steel and steel contact-strips, while the CFF, who have already decided to adopt the copper-coated carbon instead of aluminum, have been able to make some useful observations during the general re-conversion. Bearing in mind that the present report relates merely to the first part of the test-programme, the conclusions which may be drawn from the results are of a provisional nature.
Not available to third parties. Availably only to the member administration of ORE.

International Union of Railways A69/RP 3/E, Apr. 1969, 27 pp, 13 Fig., 19 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052701
WEAR OF CONTACT STRIPS AND OF THE OVERHEAD EQUIPMENT WHEN USING METALLIC OR COMPOSITE CONTACT STRIP: RECOMMENDATIONS FOR THE CONSTRUCTION OF PANTOGRAPHS FOR POWERED VEHICLES USED IN INTERNATIONAL TRAFFIC
Even since 1960, the West-European Railway Administrations have occupied themselves with the development of motive power units suitable for 3 and 4 current supply systems. The A 3 Specialists Committee then dealing with such equations, was requested to furnish a document concerning the use of some pantograph types for all the current supply systems to be taken into consideration. The results then obtained were assembled in Report A 3/RP 5. However, even though the recommendations made in this report had been strictly adhered to during the design of the pantographs, numerous difficulties were encountered, particularly when they were used on the 1.5 kV NS network. In view of the difficulties arising in the case of 1.5 kV d.c. overhead contact systems, the above report has been brought up to date, taking into account the developments during the last few years and the present state of knowledge.
Not available to third parties. Only for use by ORE and member administrations.

International Union of Railways A69/RP 4/E, Apr. 1970, 11 pp, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052702
WEAR OF CONTACT STRIPS AND OF THE OVERHEAD EQUIPMENT WHEN USING METALLIC OR COMPOSITE CONTACT STRIPS. GENERAL SURVEY--COMPARISON AND ANALYSIS OF THE LINE. TESTS--CONCLUSIONS AND RECOMMENDATIONS
The present document (Report No. 6-Final Report) contains a general survey of the results of the line tests carried out during the years 1965-1970. These tests were aimed at determining, for each traction current system and under normal service conditions, the most economic contact-strip material from the point of view of contact-strip and contact-wire wear. The detailed results are given in reports a 69/RP 3 and RP 5.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A69/RP 6/E, Apr. 1971, 29 pp, 14 Fig., 9 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052710
BEHAVIOUR OF PANTOGRAPHS AND OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 160 KM/H. TEST RUNS ON THE FS WITH MORE THAN ONE PANTOGRAPH
The general and extensive investigations carried out by ORE Specialist Committee A 3 in the field of pantographs and overhead contact systems have been continued by Specialist Committee A 84. The investigations of this Committee are more limited, however, and have been focussed exclusively on the case of electric traction at speeds exceeding 160 km/h. The present report describes the results obtained during high-speed test runs carried out on a line of the FS network. The runs were conducted with one pantograph raised or with two pantographs raised, and with different pantograph spacings. The overhead contact system of the test line was composed of sections comprising a total of nine overhead contact system variants, each with different constructional characteristics. The pantograph and contact wire movements were measured and also the contact quality (contact losses). The influences of passing trains travelling at high speed was also examined. The results show that, in the case of the FS, no difficulty is anticipated for traction up to speeds of 200 km/h, when using a suitably-improved conventional type of overhead contact system or even when using two raised pantographs of the most modern FS type with appropriate pantograph spacing.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A84/RP 2/E, Oct. 1966, 39 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC
DOTL RP

13 052711
BEHAVIOUR OF PANTOGRAPHS AND OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 160 KM/H. STATIC TESTS OF THE FS
During 1965, the FS carried out tests with their improved conventional type of overhead contact system to determine various static characteristics. The effect of varying the following parameters within the stated limits in the text was examined: span length; dropper configuration; contact wire sag. The compliance, natural frequency and impluse propagation velocity were determined for each solution tested and these formed the basis for evaluating the various factors examined. In general, it was found that compliance at the middle of the span (max.) is proportional to span length and is not affected by contact wire sag or non-uniform droppering. Increasing the dropper spacing in the neighbourhood of the mast does, however, decrease the stiffness of the system near the suspension points. Natural frequency is inversely proportional to span length and is not affected by contact wire sag although non-uniform droppering does affect it. Impulse propagation velocity was found to be very close to the theoretical value.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A84/RP 3/E, Nov. 1967, 16 pp, Figs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC
DOTL RP

13 052712
BEHAVIOR OF PANTOGRAPHS AND THE OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 160 KM/H. HIGH-SPEED TESTS CONDUCTED BY THE SNCF ON 1.5 KV DC SYSTEMS
This report describes the tests carried out by the SNCF on the Vierzon-Les Aubrais and Paris-Bordeaux 150C-V electrified lines the layout of which are given in Appendices 1 and 2 respectively. The chief object of the tests was to study the dynamic behaviour of the overhead system, particularly resonance, under the effect of high-speed traffic, and to devise ways of minimizing adverse effects. Two types of pantograph were used. The overhead system on the test section was of the usual compound type, but certain modifications had been made to it for experimental purposes (pre-sag of the contact wires, special spacing of the droppers, special droppers). It was found that by damping the pantograph the resonance oscillations were considerably reduced, and that a marked improvement was obtained by means of the pre-sag of the contact wires. On the other hand, the modifying of the dropper-spacing- although improving the elasticity of the overhead system- did not have any marked effect on current-collection quality. Various modifications of the overhead system have been recommended with a view to commercial speeds of 200 km/hr.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A84/RP 4/E, Nov. 1967, 32 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC
DOTL RP

13 052713
BEHAVIOUR OF PANTOGRAPHS AND OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 160 KM/H. SNCF TESTS AT VERY HIGH SPEED (SINGLE-PHASE TRACTION CURRENT)
Since 1954, the SNCF have carried out tests on 25 kV-50 Hz electrified lines at speeds varying between 169 and 230 km;h, the purpose of which isi 1) to improve rolling stock (locomtives-passenger coaches) and fixed installations (overhead contact system, track and signalling equipment), 2) to determine maintenance and operating methods suitable for high-speed running. The first test-runs showed that the effect of speed on the performance of the rolling stock and overhead contact system raised new and difficult problems regarding satisfactory current collection at all the speeds examined. Moreover, it was feared that, above a certain speed, the uplift and oscillations of the overhead contact system might cause the pantograph to foul the registration equipment at the supports. Consequently, it was essential to carry out tests in order to examine the behaviour of the overhead contact system and the pantograph at high speeds, to define the limits of certain parameters (especially the aerodynamic upward force of the pantograph) and to determine the most suitable characteristics of the overhead contact system for high-speed running. The present report gives the results of tests on the dynamic behaviour of the pantograph and the overhead contact system, carried out on the Colmer-Mulhouse line, in November 1961.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A84/RP 5/E, Oct. 1968, 22 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC
DOTL RP

13 052714
BEHAVIOUR OF PANTOGRAPHS AND OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 169 KM/H. DB TESTS IN NIRM AND EILENDORF TUNNELS
This report contains details of tests carried out on the lines of the DB between Cologne and Aachen during July 1967. The primary object of the tests was to investigate, at speeds up to 200 km/h, the aerodynamic effects on the pantograph and contact system of entry into tunnels, and when passing other trains both inside and outside tunnels. The pantographs used and the overhead contact system in the test section are described. Measurements were made on the test-train of the pantograph trajectory and aerodynamic upward force on the pantograph, and a cine camera was used to record the vertical movements of the contact system at various locations. The effects of varying different parameters are discussed-speed, length of tunnel, type of pantograph. Instances of loss of contact are also examined. The general conclusion is that no detrimental effects result from the entry into a tunnel at high speed, or the passing of two trains in a tunnel, as far as current collection is concerned.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A84/RP 7/E, Oct. 1968, 22 pp, Figs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC
DOTL RP

13 052715
BEHAVIOUR OF PANTOGRAPHS AND OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 160 KM/H. TUNNEL TESTS CARRIED OUT ON THE FS

In 1967 the FS conducted tests aimed at assessing the effects arising during tunnel entry and passing of two trains within a tunnel at speeds up to 200 km/h. Factors measured werei quality of current collection, aerodynamic upward contact force and air pressures on the windows. The tunnel used for the tests had the following measurementsi length 5,366 m, cross section 48.15 sq m, distance between track centres 3.55 m. Results showed that, up to the maximum speeds reached during tests, i.e. 200 km/h on entry and 360 km/h (relative) during passing, no phenomena occurred to endanger window or passenger safety. The main effect of the tunnel was to impart a sudden and appreciable increase in the aerodynamic upward force (approximately 38% to 24% for test speeds from 170 to 200 km/h); however, neither tunnel entry nor train passing were shown to have any noticeable effect on current collection. Finally, results of the tests proved that runs of up to 200 km/h in very long tunnels presented no major problems.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways. A84/RP 8/E, Oct. 1968, 15 pp, Figs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052716
BEHAVIOUR OF PANTOGRAPHS AND THE OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 160 KM/H. THEORETICAL INVESTIGATIONS AND EXPERIMENTAL TESTS BY BR (STATIC BEHAVIOUR)

BR have carried out a programme to develop methods for theoretical analysis of the static behaviour of the overhead contact system. Methods have been obtained, and computer programmes written, for calculation of static geometry and of static uplift characteristics. The results obtained are compared with those obtained from measurements made on test equipment. The report also contains a theoretical analysis of the oscillations of the overhead contact system and the results of this study are compared with experimental results. The way in which these results can be used in analysing the dynamic performance of the current collection system is considered, and finally an indication is given of the way in which BR are developing more complete theoretical methods for this dynamic analysis.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A84/RP 9/E, Oct. 1970, 28 pp, Figs., Tabs., 8 Ref., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052717
BEHAVIOUR OF PANTOGRAPHS AND THE OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 160 KM/H. THEORETICAL STUDIES AND TENTATIVE TESTS CONDUCTED BY BR (DYNAMIC BEHAVIOUR)

BR has conducted tests in order to develop a method leading to a better knowledge of the behaviour of the overhead equipment at high speeds and enabling the parameters, playing a predominant part in the physical system, to be represented in a convenient way. The method which has been used in the studies is the method of the finite difference of Abbott of the Royal Aircraft Establishment. The mathematical model has been developed so as to represent simple catenary equipment and the solution of the equations is performed at short, consecutive time intervals, using a computer, The validity of the results obtained from the mathematical model was checked by comparision with the results obtained from the line tests. Though there are numerous other variations of the parameters which could form the subject of detailed studies, it has been possible to draw useful conclusions and to compile recommendations from the study described in this report.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A84/RP 10/E, Oct. 1970, 28 pp, Figs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052718
BEHAVIOUR OF PANTOGRAPHS AND THE OVERHEAD EQUIPMENT AT SPEEDS HIGHER THAN 160 KM/H. COMPARISON AND ANALYSIS OF TEST RESULTS. RECOMMENDATIONS CONCERNING THE DESIGN OF PANTOGRAPHS AND OVERHEAD EQUIPMENT

The present report forms the Final Report for Question A 84. The first part gives a survey of the studies and tests carried out on behalf of the A 84 Specialists Committee and described in the ten previous reports. A comparison is then made between the different types of pantographs and overhead equipment examined. This is followed by: a) a comparison and analysis of the test results and b) by the results of theoretical studies and experimental tests by BR. The conclusions take into account all the studies made by the A 84 Specialists Committee concerning the design of pantographs and overhead equipment for all the systems examined. Finally, recommendations are given concerning pantograph and overhaed equipment designs and also some proposals for future studies.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A84/RP 11/E, Oct. 1970, 34 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

13 052804
INFLUENCE OF GLAZED FROST AND HOAR FROST ON THE INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS. TESTS IN THE LOW TEMPERATURE CABINET

This report contains the results of tests made in low temperature cabinets which have been carried out in 1962 in the Institute for Heating, Cooling and Fluid Dynamics (generally referred to as WKS, the initials of its German title) of the Austrian Federal Institution for Research and Experiments at Vienna and in the laboratory of the NS in Utrecht. The object of the tests was to determine those of the large number of preventive agents which brought about test pieces, having successively been coated with the most electric traction. The report describes the test installation developed for this purpose, in which tubular test pieces, having successively coated with the most diverse protective agents, have been subjected to icing under controlled conditions, resembling operating conditions as closely as possible. The following preventive agents were thus tested: water-soluble liquids (for reducing the freezing point and relieving the surface tension), water-repellent liquids (for example oils with or without additives), greases and pastes, solid materials, paints and sheathing materials. Subsequent to the icing of the test pieces, the quantity of the ice, the time necessary for the build-up of the ice and the shear forces required for removing the ice cover were measured. The results did not permit determination of one protective agent which either prevented the formation of ice or appreciably delayed it. Significant differences were, however, established regarding the values of the adhesion of the ice to the tube. Based on these results, which are of operational value, four preventive agents have been selected which should be used during the subsequent tests with complete pantographs in the dynamic test chamber of the WKS. Furthermore, tests were made with tubes fitted with an adjustable heating device, by means of which icing was prevented. Variation of some parameters made it possible to determine that heating output which just prevented icing of the tube. This showed the need for repeating these tests at various wind velocities in the dynamic test chamber. The tests and their results, collated in this report, form the basis of the tests which have meanwhile been carried out in the dynamic test chamber of the WKS and also that of future service tests and trials to be conducted on the systems of the Administrations.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A59/RP 1/E, June 1963, 23 pp, Figs., Tabs., 10 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052805
INFLUENCE OF GLAZED FROST AND HOAR FROST ON THE INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS. ICING PHENOMENA ON PANTOGRAPHS

The tests made in low temperature cabinets, described in Interim Report No. 1, permitted to determine five protective agents which made it possible to reduce the adhesion of ice to a remarkable extent, although they were incapable of either preventing or appreciably delaying the formation of ice, with these protective agents, and an additional one, were conducted icing tests on fully assembled pantographs of three different types in the chamber for dynamic tests of the ORE test installation in the WKS at Vienna. For this purpose, simple structures were erected in the dynamic test chamber for decreasing the airflow cross-section and for mounting the pantographs. As icing tests of such a nature were not previously carried out, the tests also represented a trial of the installation regarding its suitability for conducting experiments and its measuring technique. Five of the protective agents referred to were applied to the parts of the pantographs

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International Union of Railways Intrm Rpt. A59/RP 2/E, Oct. 1963, 22 pp, Figs., 21 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052806
INFLUENCE OF GLAZED FROST AND HOAR FROST ON THE INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS. ICING PHENOMENA ON PANTOGRAPHS

An account is given on a second series of laboratory tests on pantographs. The first series of tests (RP 2) had been conducted under unsatisfactory icing conditions. It was determined to what extent ice can be shed or shaken off by frequently lowering the pantograph when the surface has been treated with protective agents prior to icing. For verification purposes analogous tests were made on steel tubes. Also the efficiency of the heating of the pantograph was tested during which limit values of the heating output were found, enabling the pantograph to be kept free from ice. Finally, conclusions and recommendations are given.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A59/RP 3/E, Feb. 1965, 27 pp, Figs., Tabs., 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052807
INFLUENCE OF GLAZED FROST AND HOAR FROST ON THE INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS. DE-ICING TESTS ON OVERHEAD CONTACT SYSTEMS

The present Report constitutes the final report for Question A59. It first contains a summary of the results of the three other Interim Reports. Next, it gives the results of the tests carried out regarding the treatment of overhead contact systems with protective coatings and de-icing by means of the generation of mechanical vibrations. In addition, the report describes the results of various service trials carried out by the A59 Specialists Committee during several winters. A special section has been devoted to the description of the various electric heating methods developed for the de-icing of overhead contact systems and the mechanical methods applied by the FS and the SZD. Finally, in the conclusions and recommendations, all the studies of the A59 Specialists Committee, including the former ones, are taken into account. As the present report constitutes the final report for Question A59, a brief survey of the contents of the previous Interim Reports is given in Section 1.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. A59/RP 4/E, June 1967, 43 pp, 26 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052810
BEHAVIOR OF PANTOGRAPHS AND OVERHEAD CONTACT SYSTEMS AT HIGH SPEEDS. CHARACTERISTIC DATA ON THE DYNAMIC BEHAVIOUR OF PANTOGRAPHS AND OVERHEAD CONTACT SYSTEM

This report chiefly represents a summary of all the results, conclusions and recommendations that have emanated from the work done by the A3 Specialists Committee. The report refers especially to the characteristic data on the dynamic behaviour of pantographs and overhead contact systems. For this purpose a compilation of recommended design principles and data which offer a basis for further developments has been included. The report has been established after another analysis of all the results of the preceding series of tests, supplemented by investigations of a theoretical nature. Furthermore, additional measurements on overhead contact systems have, for the purpose of this report, been made by the OBB, DB and NS. The progress of the investigations has been rendered more difficult by the fact that it did not prove possible to determine, separately, the influence of each parameter affecting design and construction. This is due to the complexity of the designs and the large number of parameters involved. Despite all this, the report contains much advice of a practical nature pertaining to the design of the most important component parts. It is, moreover, explained in the report in what manner the complex movements of pantographs and overhead contact systems may be divided and analysed. As regards such investigations, forces, masses and elasticities are rather important. The report shows how these and other characteristic data on the dynamic behaviour have been measured. Furthermore, measured and calculated characteristic data are compared with each other. The principal object of these investigations has been to use the results of the tests as a basis for determining, by means of calculation, the combined action of pantograph and overhead contact system and also for determining beforehand, the behaviour of future designs. So far, this has only partly been achieved. The last chapter of the report contains a summary of characteristic data and recommendations for use in practice.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A3/RP 6/E, Oct. 1962, 50 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052811
BEHAVIOUR OF THE PANTOGRAPHS AND THE OVERHEAD EQUIPMENT AT HIGH SPEEDS. THE QUALITY OF CONTACT AS A FUNCTION OF THE AERODYNAMIC UPWARD FORCE AND THE EFFECTIVE MASS OF THE MOVEABLE PORTION OF THE PANTOGRAPH

No Abstract.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A3/RP 7/E, Apr. 1963, 12 pp, Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052812
BEHAVIOUR OF THE PANTOGRAPHS AND THE OVERHEAD EQUIPMENT AT HIGH SPEEDS. STATIONARY CURRENT COLLECTION (1500 V DIRECT CURRENT)

The purpose of the tests were to determine the maximum current intensity which could be collected without any difficulty by a pantograph with two pans having contact strips of metallized carbon from an overhead contact system with two contact wires of 100 square mm cross section each. The tests are described and the conclusions given with an analysis of the results.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A3/RP 8/E, Apr. 1963, 10 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 052813
BEHAVIOUR OF THE PANTOGRAPHS AND THE OVERHEAD EQUIPMENT AT HIGH SPEEDS. TESTS MADE TO INVESTIGATE THE "BLOW-OFF" OF CONTACT WIRES
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A3/RP 9/E, Apr. 1963, 9 pp, Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053075
STANDARDISATION OF CATENARY CONSTRUCTION: SECTION INSULATORS
No Abstract.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Prog. Rpt. A1b/CR 1/E, Aug. 1954, 12 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053076
CALCULATION OF CATENARY MASTS AND FOUNDATIONS
The ORE tests aimed at studying overturning, pushed to the limit, of isolated cylindrical and parallele piped foundations for supporting masts for contact wires along the electrified tracks. The results of these full scale tests can be applied to all isolated foundations subjected to stresses mainly caused by overturning moments, such as foundations of electric lamp posts, masts for the distribution of low and average voltage electric energy, signal portals, telephone lines etc. They do not apply in any case to multiple-footing foundations, generally used for high voltage distribution.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. Ala/RP 1/E, Feb. 1975, 34 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053077
SECTION INSULATORS FOR OVERHEAD EQUIPMENTS
The object of the present report is to examine the behaviour of various section insulators originating from different Administrations so as to obtain the necessary data for the development of new prototypes or the improvement of existing types. The two main aspects of this examination are: a) the dynamic behaviour at high speeds both as regards the permissible weight and the construction of guiding elements for the contact strip and of the suspension from the carrying cable; b) the electrical behaviour, determined on the one hand by the dielectric properties of the materials used and on the other hand, by the behaviour under arcs caused by the passing of the pantograph through a "dead" section (i.e. without current) or through a neutral or earthed section. The tests, the results of which are given in detail, and which have been illustrated by drawings and photographs, were carried out by the DB and by the SNCB.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A1b/RP 3/E, June 1960, 21 pp, 29 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053078
PANTOGRAPH CONTACT STRIPS. DESCRIPTION OF THE TEST APPARATUS FOR MEASUREMENTS OF WEAR. SUMMARY OF THE FIRST TEST RESULTS
The Office for Research and Experiments (ORE) has asked the DB to construct a test apparatus, according to the design prepared at the Experimental Institute, in order to carry out measurements of wear on pans and pantograph contact strips. The test installation has been designed for the measurement of the rate of wear of contact strips and contact wires made of various materials, as a function of several parameters (speed, distance, humidity, temperature, contact pressure, position of contact wire, current density, and tension of contact wire), according to purely physical methods. It will permit separate study of the factors always simultaneously affecting wear in electric traction, so as to create sure foundations for normal use in the track. Subsequently, the wear of various contact strips and contact wire materials will be investigated according to exact and scientific methods.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Prog. Rpt. A2/CR 1/E, Jan. 1956, 14 pp, Phots.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053080
DISTURBANCES CAUSED IN THE SUPPLY AND DISTRIBUTION NETWORK BY ELECTRIC TRACTION SYSTEMS
This report sums up the results of research work, the aim of which was to investigate the influence exerted on the power supply network and its other customers by single phase loads arising from the feeding of railways electrified on the 25 kV system. Feeding of electric railways in such a manner affects the three phase supplying systems in two ways: first through the unbalanced load due to the connection to only two phases, leading to voltage distortions and parasite currents, and secondly by harmonics due to the wide-spread use of rectifiers in the traction current circuits of motive power units. It has been found that the disturbances do not exceed limits which can be considered to be acceptable.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. A38/RF/E, Oct. 1964, 19 pp, 36 Fig., 10 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053083
PROTECTION OF INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVER-VOLTAGE. TESTS ON SURGE DIVERTERS (1500 V AND 3000 V DIRECT CURRENT)
Specialists Committee A 50 has been able to determine with the aid of a questionnaire that the means chiefly used for the protection of overhead contact systems against the effects of atmospheric discharges are horn gap arresters and surge diverters. It was therefore decided to conduct a comparative test under service conditions with both these types of lightning arrester. Completing these tests made under service conditions by laboratory tests on surge diverters proved to be advisable. The tests on surge diverters were conducted in accordance with a comprehensive test programme in the high-voltage laboratory of the KEMA at Arnhem. The test conditions were to a large extent adapted to serve conditions and, for this purpose, the NS put a rectifier set at the disposal of the laboratory. The tests made have permitted the determination of the most important parameters which influence the protective effect of the arresters. Such parameters are considered to be the impulse spark-over voltage and the residual voltage, which usually represent the level of protection of an arrester. The tests have shown to what extent the arresters are capable of withstanding service

conditions. The high- intensity current tests, simulating the load by means of lightning currents of a very high intensity, and the operating duty test, serving to determine the effects of the discharge current, are in this connection considered to be important. A correlation has been established between the level of protection and the follow current. Arresters with a high level of protection give low values of follow current, and vice versa. It has been established that, owing to the relative values of sparkover voltage, arresters having a high level of protection are not liable to damage by internal surges. On the other hand, internal voltages surges likely to arise in a system must be taken into account in the design and construction of arresters giving protection at a low voltage level. It should be borne in mind that the object of protecting overhead contact systems is to avoid spark-over of the insulators.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A50/RP 3/E, Mar. 1964, 14 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053084
PROTECTION OF INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVER-VOLTAGES. TESTS IN SERVICE ON SURGE DIVERTERS AND HORN GAP ARRESTERS (3000 V DIRECT CURRENT)

Specialists Committee A 50 has established by means of a questionnaire that the means generally used for the protection of the overhead contact system against the effects of atmospheric discharges are horn gap arresters and surge diverters. Damage to insulators of unprotected overhead contact systems has occurred in a large number of cases. Experience gained in service with horn gap arresters used for the protection of the direct current overhead contact systems of the PKP and NS has shown that this type of protection is effective and has proved satisfactory in service. It proved advisable to carry out tests in service for the comparison of horn gap arresters and surge diverters. It was decided to conduct these tests on railway lines in normal service on the systems of the PKP (3 kV), SNCB (3 kV) and NS (1.5 kV), fed from the usual DC supply system. The present Interim Report No. 4 deals with the comparative tests made on the 3kV overhead contact system of the PKP. The tests took place during the period from May 1960 to December 1962. The report contains a description of the tests made in 1960, 1961 and 1962, and their results. The criterion chosen for judging the effectiveness of the arresters was the number of times the installations protected by these arresters were damaged. None of the damage to insulators during the above period gave rise to sustained short-circuiting of the overhead contact system. It has been established that, given the same operating conditions on an overhead contact system of the PKP type, the protective effect of the PKP surge diverters of the GZM 3/10 type is equivalent to that of the PKP horn gap arresters and that the lower spark-over voltage of the surge diverters is not of any importance in this respect. It has moreover been established that, owing to this very much reduced spark-over voltage, the surge diverters are liable to be brought into operation by internal voltages surges.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A50/RP 4/E, Mar. 1964, 19 pp, 1 Tab., 5 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053085
PROTECTION OF INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST OVERVOLTAGE. ENQUIRY ON THE PROTECTION OF ALTERNATING CURRENT INSTALLATIONS AND MOTIVE POWER UNITS AGAINST OVERVOLTAGE

This report examines the means of protecting against overvoltage adopted by the Railway Administrations which use the a.c. system, and contains a statistical analysis of the damages caused by overvoltage. The information provided has been taken from the replies given by 11 Railway Administrations to a questionnaire sent out by the A 50 Specialists Committee. The Specialists Committee recommends that the study of the problem of protection against overvoltage of the catenary, of substations and track-sectioning cabins and also of high-voltage transmission lines should not be pursued in view of the fact that the stage of progress reached in this field and the very small number of cases of damage do not justify such a study. The Committee also recommends that the study of the problem of the protection of motive power units using the a.c. system should not be pursued insofar as such a study covers the traditional type of electrical structural components. The Committee does, however, considered it necessary that a special study of the general use of semi-conductor elements should be carried out under the auspices of ORE, and that at the same time it should be possible to study the problem of protection against overvoltage. (N.B. The Control Committee has not retained this proposal in view of the fact that other international organizations have inscribed this question on their programme).

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A50/RP 5/E, Oct. 1964, 45 pp, 6 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053086
PROTECTION OF INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVERVOLTAGES. TESTS ON NON-LINEAR RESISTOR TYPE ARRESTERS (1500 V D.C.) AND ON CAPACITOR TYPE ARRESTERS (1500 V AND 3000 V.D.C.)

The Specialists Committee A 50 has been able to determine with the aid of a Questionnaire that the means chiefly used for the protection of sub-stations, paralleling points and vehicles against the effects of atmospheric discharges are non-linear resistor type arresters and capacitor type arresters. It was therefore decided to conduct comparative tests under service conditions with both types of lightning arrester. Subsequently, it proved advisable to precede these tests by tests in the laboratory with a view to determining the most important characteristics. At the same time, it was decided to conduct some line tests of limited scope with capacitor type arresters for overhead contact systems and the programme of laboratory tests was extended accordingly. The laboratory tests were conducted, in accordance with the comprehensive test programme, in the high-voltage laboratory of the KEMA at Arnhem. The test conditions were, to a large extent, adapted to service conditions. With regard to the non-linear resistor type arresters, the tests revealed that the low level of protection required for the installations in question entailed, in conformity with Interim Report No. 3, a high follow current. The high follow current thus required special measures in order to extinguish the arc, e.g. magnetic blow-out. Concerning the capacitors, the laboratory tests have shown that the dielectric stability against harmonics is the critical point of many constructions. Although the capacitors reduce the overvoltage, it remains desirable, in the case of outdoor installations, to use adequately dimensioned feed-through insulators.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. A50/RP 6/E, Oct. 1965, 25 pp, 25 Fig., 12 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053087
PROTECTION OF INSTALLATIONS AND ELECTRIC MOTIVE POWER UNITS AGAINST THE EFFECTS OF OVER-VOLTAGES. COMPARISON IN SERVICE OF DIFFERENT TYPES OF LIGHTNING ARRESTOR FOR 1500 V AND 3000 V OVERHEAD CONTACT SYSTEMS

The tests were designed to compare the effectiveness of the catenary-protection provided, using non-linear arresters and horn-type arresters. They were carried out in service, and the effectiveness of the arresters was assessed on the basis of the number of cases of damage to the equipment protected and to the arresters themselves, and of the number of flashovers (recorded by means of counters installed in the arrester circuit) occurring before and after fitting the arresters. The number of flashovers indicates the frequency of over-voltage of the catenary which exceed the flashover voltage of the arresters. The SNCB tests on a 3000 V d.c. catenary more exposed to the effects of lightning lasted four years. Twenty-two horn arresters were installed. The spark-gap was 16 mm, which corresponds to an impulse sparkover voltage at about 45 kV (peak value). The number of times the arrester worked was estimated from the traces of beads on the horns. Eight non-linear arresters were used; they were fitted with discharge counters and had an impulse sparkover voltage of 12 kV (peak value). From the tests it may be concluded that arresters both of the horn-type and of the non-linear type provide a very effective form of protection against over-voltages of atmospheric origin. It seems that the distance between arresters may vary from 600 to 1200 metres depending on whether or not the section in question is in a region particularly exposed to lightning.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A50/RP 8/E, Nov. 1967, 18 pp, 22 Fig., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053155
HIGH POWER TRACTION CURRENT COLLECTION AT HIGH SPEEDS. POWER COLLECTION BY AN ELECTRIC ARC

This report gives an account of the various possibilities of power transfer from a fixed towards a moving installation and it concludes that the electric arc is the most advantageous method at high speeds. It also contains a description of the tests with the object of obtaining adequate stability of the arc at inter-electrode gaps between 1 and 10 cm. It enumerates the problems still to be solved: rapid wear of the electrodes, reduction of the disturbing electro-magnetic fields, influence of the wind.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A129/RP 4/E, Oct. 1975, 48 pp, 24 Fig., 44 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053170
HIGH POWER TRACTION CURRENT COLLECTION AT HIGH SPEEDS. QUESTIONNAIRE RELATING TO OVERHEAD LINE TYPES, POWER SUPPLY AND PROTECTION

The report is a summary of replies returned by 21 administrations in response to a questionnaire circulated by ORE Commiteee A129 and contains information about the different types of overhead line used, their protection against over-voltages, the methods used to calculate permissible power and the means for increasing power.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A129/RP 3/E, Oct. 1975, 12 pp, 9 Tab., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 053171
HIGH POWER TRACTION CURRENT COLLECTION AT HIGH SPEEDS. LIGHT A.C. OVERHEAD CONTACT EQUIPMENT FOR HIGH POWER COLLECTION AT SPEEDS UP TO 300 KM/H

This report gives general recommendations concerning the design of light overhead equipment and pantographs suitable for the collection of current at speeds up to 300 km/h. These recommendations are valid for high-voltage a.c. supplies. An examples of a practical constructional design is appended.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A129/RP 2/E, Oct. 1975, 11 pp, 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

13 072959
BRITISH RAIL: THE TIMESCALE FOR A STRATEGIC ELECTRIFICATION PROGRAMME

At the end of 1972, 17 percent (about 3200 km) of the British Rail network was electrified, a lower proportion than most of the other major railway systems of Europe. The author's premise is the oil will become either non-existent or at best prohibitively expensive (relative to other fuels) by 2000 to 2010 and that no easy replacement will appear. This is the case for electrification of a significant basic network within the next three decades in order than Britain not return to medieval transport and social conditions. The timescale for such an undertaking as electrification of major British rail routes is tight; a decision not to take this step would dim prospects for British economy and security.

Harman, RG *Modern Railways* Vol. 31 No. 314, Nov. 1974, pp 432-437, 10 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

13 094184
ASSURED ENERGY RECEPTIVITY STUDY

The study objective was to determine the amount of heat removed from rapid transit tunnels by adding wayside resistors which would absorb braking energy that could not be absorbed by normal regeneration. In addition, preliminary design and cost data for the installation of the wayside resistors was to be provided. As the study progressed it was found that the addition of the wayside receptive devices provided a very marginal improvement over normal regeneration, and a substitution in the direction of the study made; the effect of improving the regenerative capability of the trains was measured rather than completion of the design for the wayside resistors.

Westinghouse Electric Corporation, Transit Development Corporation, Incorporated Final Rpt. TDC-AER-75-3, May 1975, 138 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-247760/2ST, DOTL NTIS

13 094317
ASSURED ENERGY RECEPTIVITY. A PROJECT OVERVIEW

The program successfully verified the technical feasibility of wayside resistors and produced two alternative preliminary designs for the mechanization of this concept. It was further verified that such wayside resistors for assured receptivity would have a very beneficial effect on ventilating and air-conditioning apparatus for subway stations and tunnels. However, cost-effectiveness analysis showed that in the general case wayside resistors are not cost-effective. The program results conclusively demonstrated that natural regeneration is highly cost effective in a system designed or adapted for effective functioning of regeneration to a naturally-receptive distribution network. Additionally, this phase of the program established the feasibility of an alternative wayside system utilizing flywheel motor generator sets (based on state-of-the-art apparatus) for energy storage and reuse.

Phelps, DR
Transit Development Corporation, Incorporated Final Rpt. TDC/500-75/10, Sept. 1975, 30 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-246247/1ST, DOTL NTIS

13 094318
ASSURED ENERGY RECEPTIVITY PROGRAM. PHASE I

This is a study on the two methods for enhancing the receptivity of a transit system third rail power supply when trains employing propulsion equipment capable of returning power to the third rail are used. All available braking energy of such cars is intended to be returned to the third rail. During periods of heavy traffic, accelerating trains will generally be present to absorb the power made available by braking trains. However, during periods of light traffic, accelerating trains are not likely to be available on the line and other means must be provided to absorb the braking energy. The two methods for providing such a sink are: (1) Addition of resistor banks on the wayside equipped with notching control to match resistance values and line requirements. The excess braking energy will be dissipated as heat. (2)

Addition of DC motor driven flywheel sets on the wayside to absorb the excess braking energy. The excess braking energy will be conserved.
Prepared in cooperation with Transit Development Corp., Washington, D.C.

General Electric Company, Transit Development Corporation, Incorporated Final Rpt. TDC-AER-75-2, Aug. 1975, 127 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246245/5ST, DOTL NTIS

13 094319
ASSURED ENERGY RECEPTIVITY STUDY
The objective of this study is to compare a conventional chopper-controlled train propulsion system without regeneration with two schemes of regeneration: (1) natural receptivity and (2) assured receptivity. A system that employs natural receptivity regeneration converts the kinetic energy of braking trains to electrical energy which is used to power onboard equipment. An assured receptivity regeneration system operates in a manner similar to a natural receptivity system, except that the excess electrical energy is stored, dissipated, or redistributed. The objective of this study is to quantify savings achieved in power consumption and cooling capacity by the use of a regenerative braking system, and compare them to the added costs of the electrical system for both natural and assured energy receptivity.
Prepared by Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.

Transit Development Corporation, Incorporated, Parsons, Brinckerhoff, Quade and Douglas, Inc Final Rpt. TDC-AER-75-1, June 1975, 61 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246244/8ST, DOTL NTIS

13 129793
CONVERTER POWER FACTOR OF RAILWAY VEHICLES SUPPLIED BY OVERHEAD EQUIPMENT [Der Leistungsfaktor bei Stromrichtern auf fahrdrahtgespeisten Schienenfahrzeugen]
No Abstract. [German]

Moeltigen, G *Elektrische Bahnen* Vol. 46 No. 9, Sept. 1975, pp 207-213, 2 Tab., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

13 130671
FACTORS AFFECTING RAILROAD ELECTRIFICATION AS APPLIED TO CONRAIL
This report studies the possible electrification of sectors of the Conrail system which would be economically and operationally viable. Investments required and costs incurred for electrified operation are identified by areas. Economic viability is evaluated. Energy consumption for electrified and diesel systems are considered. An algorithm is developed and applied to establish the preference of sectors for electrification. The study concludes that electrification warrants serious consideration as one of the available options to improve rail transportation in the Northeast.

Little (Arthur D), Incorporated USRA-R-245, Nov. 1973, 116 pp

Contract USRA-C-50124

ACKNOWLEDGMENT: United States Railway Association
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248798, DOTL NTIS

13 130799
MODIFICATIONS OF THE UNDULATORY PHENOMENA IN TRACTION NETWORKS DUE TO CAPACITY COMPENSATION DEVICES [Izmenenie volvovyh processov v tjagovyh setjah ustrojstvami emkostnoj kompensacii]
The article examines:-the problem of the use of reactive-power capacity-compensation devices to reduce current harmonies in a traction network,-the problem of reduction of the induced disruptive voltage in telecommunications circuits. The authors conclude that installation of such devices at switching points reduces the induced disruptive voltage in telecommunications circuits. The article provides the layouts and working parameters of this device, and those of a traction network so equipped. [Russian]

Pavlov, IV Evminov, LI *Vestnik Vniizt* Vol. 34 No. 7, 1975, pp 19-23, 3 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

13 130807
PROBLEMS CONNECTED WITH THE RELIABILITY OF POWER SUPPLY IN ELECTRIFIED RAILWAYS [Probleme der Zuverlassigkeit der Energieversorgung elektrischer Bahnen]
Power supply availability and reliability for electric traction purposes can be calculated using the theory of reliability. Information can also be obtained concerning critical points and parts. The failure rate is an important characteristic in the evaluation of electrical components. The author explains and calculates system availability taking simple and dual bus-bar systems as an example. [German]

Schmidt, P Zimmert, G *Hochschule f Verkehrs F List Wissenschaft Zeitschr* Vol. 22 No. 1, 1975, pp 129-136, 3 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hochschule fure Verkehrswesen Friedrich List Friedrich List Platz 1, Dresden 801, East Germany Repr. PC

13 130822
ENERGY CONSUMPTION CALCULATION ERRORS IN TRACTION SUB-STATIONS [Pogresnosti uceta energii na tjagovyh podstancijah postojannogo toka]
The article describes the results of an experimental study on possible errors in calculations of energy consumption in traction sub-stations. The rectifier sets generate harmonic currents and thereby cause errors in the information recorded on the induction meters; moreover, these errors occur for all loads measured. Therefore, it is essential to design an energy consumption metering device which is not affected by the load curve or by voltage. [Russian]

Manusov, JB Skrjabinskij, VS *Vestnik Vniizt* Vol. 34 No. 7, 1975, pp 16-19, 2 Tab., 5 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

13 131251
THE ECONOMIC CASE FOR THE CONTINUED EMPLOYMENT OF THE DIESEL ELECTRIC LOCOMOTIVE. ELECTRIFICATION: THE ECONOMIC CASE
The first paper presents the comparative economics of these two types of motive power, according to American railroad practice, and discusses its elements. The second paper demonstrates, from the documents quoted in reference, how technical developments and modern conditions of railway operation secure further advantages to electric traction.
Presented at the International Engineering Conference, 150 Anniversary of Passenger Railways.

Barber, HW Clemow, CJ Goldring, AG
Institution of Mechanical Engineers Vol. 1 Sept. 1975, 4 pp, 4 Tab., 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Institution of Mechanical Engineers 1 Birdcage Walk, Westminster, London SW1H 9JJ, England Repr. PC

13 131278
BASES OF THE THEORY OF RELIABILITY, AND ITS APPLICATION IN ELECTRICAL SYSTEMS [Grundlagen der Zuverlaessigkeitstheorie und ihre Anwendung in elektrischen Systemen]
The author explains the concept of the theory of reliability, and the corresponding rules in technology. He then briefly discusses reliability analysis procedures, and examines the Boolean model in detail, describing the possibilities of application and the limits of this model. Using this procedure, he calculates three different installations for a d.c. current supply system, and compares the results.

Jansen, H *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 12, Dec. 1975, pp 537-542, 2 Tab., 22 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

13 131306
ELECTRIC TRACTION. MOTIVE POWER UNITS. FIXED INSTALLATIONS [Traction electrique. Le materiel moteur. Les installations fixes]
A technical and scientific study of the basic features of the electric railway traction used in France, of the evolution of the d.c. traction motor towards the a.c. motor, under the impulse of electronics, and the rules and principle which determine the characteristics of the fixed installations for supplying current to the electrified lines. [French]

Boileau, R *Techniques de L'Ingenieur* Vol. D 1975, pp 53-92, 81 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Techniques de L'Ingenieur Paris, France Repr. PC

13 131313
RAILROAD ELECTRIFICATION-A STATUS REPORT
The status of electrification is examined from the standpoint of North American railroads. Covered are definitions of high-voltage, commercial-frequency electrification; the rebirth of interest in the U.S.; advantages and disadvantages of electrified operation; changes needed in signal systems; estimates of costs; and tables showing extent of electification in the U.S. and other nations.

Kendall, HC *AREA Bulletin* Vol. 77 Bulletin 656, Jan. 1976, pp 404-13

ACKNOWLEDGMENT: AREA Bulletin
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

13 131636
CATENARY TENSION AND HIGH SPEED POWER COLLECTION
In the course of a study on the electrification of the Northeast Corridor for the Department of Transportation, a body of knowhow has been accumulated. Design formulas from various sources (US and foreign literature, cable and wire manufacturers, railroad officials and engineers) have been collected, and sometimes extended and an attempt has been made to present this in a coherent body. In this process it has become more and more apparent that the mechanical tension of the wires is the single most important parameter, and that the greater its value, the more advantages would be found for the catenary. It should only be limited so much that a reliable service life of at least forty years can be expected. A preliminary investigation has shown that for cadmium copper wires with at least 50% of cold working, and under constant tension for their whole service life, this is possible for stresses as high as 70% of the tensile strength. For other wires, or when their tension is not kept constant, 50% of the tensile strength seems the limit for a reasonable service life. However more studies and tests need to be undertaken before such tensions can be realized in a major project. Finally, a graphical representation has been developed for the design of a catenary with a given operating speed. A range of values of the catenary tension and span length can be found, taking into account the effect of the maximum lateral wind, the principal mechanical resonance frequency of the catenary and the dynamic forces, which depend on the pantograph dynamic mass and on the catenary elasticity.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Thomet, MA (Bechtel Corporation)
Institute of Electrical and Electronics Engineers C76 458-5 IA, Jan. 1976, 16 pp, 9 Fig., 14 Ref.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

13 131654
CALCULATION OF WIND LOADING ON COMPONENTS OF OVERHEAD LINES
The paper describes a procedure for the calculation of wind forces on components of overhead lines. The nature of the terrain in which the line is situated affects the properties of the atmospheric wind incident on the line. The effects of these changes in wind properties on the loading on the components of the line are discussed. Although the method is based on a statistical approach, the calculation procedure has been considerably simplified by presenting the results in terms of coefficients which depend on the type of terrain and the parameters of the line. These coefficients are in graphical form. Whenever possible, the effects of parameters which are of secondary importance presented have been simplified.

Armitt, J *Institution of Electrical Engineers, Proceedings* Vol. 122 No. 11, Nov. 1975, pp 1247-52

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Institution of Electrical Engineers Savoy Place, London WC2R 0BL, England

13 131766
ELECTRICAL POWER LOAD PROGRAM
Computer program to calculate power factors and energy consumption rates for a section of electrified railway line. Takes single train characteristics from TPC, combines these with specific traffic pattern to produce overall electrical power load for a period of time-from particular feeder stations established power factors and energy rates. Programmed in Fortran for CDC 6400.
Direct requests to R. Shea, Director of Technical and Operations Research, CP Rail.

Canadian Pacific No Date

ACKNOWLEDGMENT: Canadian Pacific
PURCHASE FROM: Canadian Pacific Windsor Station, Montreal, Quebec H3C 3E4, Canada

13 132947
COMPOSITE CONDUCTOR RAILS FOR RAPID TRANSPORTATION SYSTEMS-STATE OF THE ART
By way of introduction some details of the rapid transportation networks planned in various countries are given together with an account of the kind of development work involved. Rapid transportation systems are intended to operate over distances of 200 to 600 km. Speeds of up to 500 km per hour are planned and so a whole series of problems not previously encountered have to be solved. The paper deals mainly with the problems concerning the conductor rail which has to supply the electrical power to the vehicle. The need for a lightweight ac rail makes composite rails attractive. A wide range of conductor rails available is presented and it is shown that the need for a lightweight rail eliminates a number of otherwise interesting designs. Factors such as corrosion resistance, rigidity and safety are discussed with a view to their importance and limits which can be tolerated.
Presented at the Int. Hovering Craft, Hydrofoil and Adv. Transit Syst. Conf., Brighton, Sussex, Engl., May 13-16, 1974.

Maitland, A Rieger, W
Kalerghi Publications Proc Paper 1974, pp 111-119, 3 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Kalerghi Publications 51 Welbeck Street, London W1, England

13 132952
MODERNISATION OF THE CATENARIES OF THE FORMER MIDI RAIL NETWORK [La modernisation des catenaires de l'ancien reseau du Midi]
The authors retrace the origin of the Midi catenary, with its pointed suspension, and explain the disadvantages it presents for running at speeds in excess of 140 km/h. The results of various modification tests have led to replacement of the old catenary by a compound catenary with characteristics similar to those of the standard 1500 V catenary. The modernisation work concerns nearly 800 km of single-track line. [French]

Boulmer, A Vincent, J *Revue Generale des Chemins de Fer* Vol. 94 Oct. 1975, pp 568-587, 15 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

13 132984
ELECTRIFICATION: U.S. DAWDLES WHILE THE REST OF THE WORLD TURNS ON
While less than one percent of U.S. mainline routes are electrified, the figure ranges upwards from 25% in most other industrailized nations. Two developments are renewing American interest in electrification--higher costs for petroleum and technical developments in electric motive power. At least a dozen U.S. railroads have already conducted feasibility studies and some have found the economics of immediate electrification to be favorable. There are, however, features of North American rail operations which differ from those elsewhere than have been electrified. The fact that any American electrification undertaken will start from "scratch" may be a distinct advantage. The article summarizes major electric systems throughout the world.

Railway Age Vol. 177 No. 4, Feb. 1976, pp 28-35

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

13 133577
DURABILITY OF DC HIGH SPEED CIRCUIT BREAKER UNDER FREQUENT ACTIONS
A high-speed DC circuit breaker for electric railway service must interrupt a fault current or an overcurrent in the feeder circuit. The circuit breaker should be maintained in good condition so it will always act to interrupt an abnormal current without fail. Japanese National Railways has determined experimentally the durability of five types of circuit breakers under grequent operation and developed a method for expressing the reliability of a breaker in service.

Fujimura, T Suwabe, K Furusawa, J *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 165-168, 6 Fig., 1 Tab.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

13 134545
NEW TYPES OF MASTS FOR RAILWAY ELECTRIFICATION [Nuevos tipos de postes para electrificacion de ferrocarriles]
The author, who bases his experience on the use of the present "Vierendeel" type mast, composed of two U-shaped posts joined by two wide bars, proposes the use of a new type of mast, with a view to improving strength, easier manufacture, and a saving in costs. This new type of mast is formed of two parallel uprights, braced with round iron bar bent into a triangular shape. The securing devices have also been simplified. [Spanish]

Perez-Moralez, G
Asociacion de Investigacion del Transporte-AIT No. 7, Dec. 1975, pp 30-35

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Asociacion de Investigacion del Transporte-AIT Madrid, Spain

13 134560
PANTOGRAPH DEVELOPMENT FOR HIGH SPEEDS
An account of theoretical investigations to define the optimum pantograph with primary and secondary suspension for speeds up to 250 km/h, and tests of a prototype to measure the quality of the contact with the catenary, by recording the number and duration of losses of contact. Characteristics for the optimum prototype were selected, and a prototype servo pantograph was tested.

Beadle, AR *Railway Engineer* Vol. 4 No. 6, Nov. 1975, pp 72-81, 1 Tab., 2 Phot., 15 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Mechanical Engineering Publications Penthouse 1, 15 West 55th Street, New York, New York, 10019
DOTL JC

13 134590
CALCULATION OF THE ELECTRICAL FIELD OF STRAY CURRENTS TAKING INTO ACCOUNT THE DUAL-LAYER STRUCTURE OF THE EARTH [Rascet elektriceskogo polja bluzdajuscih tokov pri ucete dvuhslojnoj struktury zemli]
The article proposes a method for calculating the distribution of stray-current potentials in that part of the ground adjacent to the ballast layer, taking account of the heterogeneous electric properties of this part. It goes on to show that considerable effect of conductance of the earth's lower layer on the distribution of potentials in the upper layer. [Russian]

Kosarev, BI *Vestnik Vniizt* Vol. 34 No. 8, 1975, pp 19-22, 4 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

13 134596
POWER SUPPLY FOR ELECTRIC RAILROADS OF THE SWEDISH NATIONAL RAILROADS (SJ)-1,2,3 [Die Stromversorgung fuer den Elektrischen Zugbetrieb der Schwedischen Staatsbahnen (SJ)-1,2,3]
The development of power supply installations is reviewed beginning with test runs from 1905 to 1907. It is shown what changes have been introduced up to 1973. The electrification of the railroad line between Kiruna and Riksgransen used for the transportation of ore during 1915-1922 is described, along with the electric converter system. [German]

Lundberg, R *Elektrische Bahnen* Vol. 46 No. 6, June 1975, pp 132-136, 9 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

13 135198
CALCULATION AS A RANDOM NUMBER OF THE LOAD OF ELECTROTECHNICAL ROLLING STOCK OF ELECTRIC RAILROADS [Berechnung der Belastung Elektrotechnischer Betriebsmittel Elektrischer Bahnen als Zufaellige groesse]
Within the power supply system of electric railroads efficient new rail motor cars generate a high, mostly short-time, load of contact lines, rectifiers, transformers, etc. The load current of a supply section were calculated as a function of time by means of the polynomial distribution, when the motor car currents determined are accidently superposed. For this purpose a program was elaborated for the Minsk 22 (POLY 16-FTAM) computer. The accidential superposition of the load currents is the most exact representation of loads to be expected for a section. [German]

Schmidt, P (Hochschule fuer Verkehrswesen Friedrich List); Schnabel, D
Elektrie Vol. 29 No Date, 4 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

13 135203
PLANNING ELECTRIC RAILWAYS. SPECIAL ISSUE ON THE ETG CONGRESS IN DORTMUND ON THE 24TH AND 25TH SEPTEMBER 1975 [Planung elektrischer Netze. Tagungsheft zur ETG-Fachtagung am 24 und 25 September 1975 in Dortmund]
This issue contains the papers submitted at the Congress by: W. KIWIT: Planning a network, the need for it and the problems it poses; H. REISNER: Planning transmission networks; E.J. PREUSS: Including large power stations in a network; U. MULLER: Hign power transmission systems. Lined canalisations and cables; L. SCHIWECK: Distribution systems and instrumental techniques for high-efficiency transmission; K. GADEK: Transformers for high-efficiency transmission; H.C. MULLER: Configurations of distribution systems with special consideration to their developments; E. STEININGER: Choice of voltage and design of industrial systems; W. KAUFMANN and D. RUMPEL: Planning an automated network; M. ERCHE: Network task planning and current possible solutions using computers and models; H.J. KOGLIN: Methods for calculating distribution reliability; M. PROSKE: A method of predicting network loads. [German]

Elektrotechnische Zeitschrift, Ausgabe B Vol. 96 No. 10, Oct. 1975, pp 425-496, 3 Fig., 15 Tab., 125 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

13 136272
THE FIRST 6 KV D.C. ELECTRIC TRAIN [Pervyj elektropoezd 6KV postojannogo toka]
The authors describe the results of traction and power tests on an electric train with pulse frequency and thyristor power control, and 6 kV d.c. power supply An evaluation is made of interference by this traction system with telecommunications facilities and automatic block track circuits. [Russian]

Elektriceskaja i Teplovoznaja Tjaga Vol. 20 No. 2, 1976, pp 26-29, 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Ministerstvo Putei Soobhcheniia SSSR Moscow, USSR

13 136399
FUNDAMENTALS OF UNDERGROUND CORROSION CONTROL
The galvanic system and the impressed current system of cathodic protection are described. Application for cathodic protection include protection of underground utilities and protection of the interiors of above-ground structures. In complex structures such as tank farms, one structure may shield another, in which case distributed anodes may solve the problem. Bonds may be necessary to avoid stray current damage.

Fitzgerald, JH, III (Hinchman Company); Claes, AL *Plant Engineering* Vol. 30 No. 4, Feb. 1976, pp 105-108

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

13 138331
ELECTRIFICATION OF USSR RAILWAYS-THE 1964-1974 DECADE- RESULTS AND PROBLEMS
Over the past 50 years, USSR Railways has electrified 38,103 km (27.7%) of its network. This article analyzes the major problems encountered during the past decade when the portion of the system under catenary went from 17.5% to 27.7%, and when it was also necessary to increase the load capacity of previously electrified lines. Features of the traction power load, characteristics of locomotives, reliability of the power supply and automation of load control are described.

Serdinov, SM *Rail International* No. 5, May 1976, pp 249-263, 25 Fig., 6 Tab.

PURCHASE FROM: ESL

DOTL JC

13 138333
REACTIVE COMPENSATION AND HARMONIC SUPRESSION FOR INDUSTRIAL POWER SYSTEMS USING TYRISTOR CONVERTERS
This paper discusses the problems and solutions of applying reactive compensation, either static or dynamic, to industrial power systems supplying large blocks of dc power from diode or thyristor converters. The resonance between power capacitors and system reactance can produce high harmonic voltages caused by the harmonic currents generated by converters. The interaction between these harmonic voltages and regulating systems can be minimized by the use of suitable filters. The design of these filters should eliminate the interaction between power system and load and reduce harmonic current flow. Different methods of reactive power control are also discussed.

Steeper, DE Stratford, RP *IEEE Transactions on Industry Applications* Vol. 1A12 No. 3, May 1976, pp 232-254, 21 Fig., 4 Tab., 26 Ref.

ACKNOWLEDGMENT: IEEE
PURCHASE FROM: ESL

DOTL JC

15 072961
RAILROAD RELOCATION STUDY, WHEELING, WEST VIRGINIA
Changing patterns of railroad use and location of railroad users have resulted in problems with the location of the Chessie System main line in Wheeling. Removal of an unsightly viaduct over a major city street and from the street itself after the line has returned to grade have been sought for years. Railroad efficiency would not be benefitted from any relocation and Chessie insisted some other agency would have to bear the cost. As part of an FRA-sponsored study of urban rail problems, consultants were retained to study these problems in three cities, including Wheeling. The Federal Highway Act of 1973 also provided funds for the Wheeling study. The result is a series of recommendations which must be weighed by the community.
The project was carried out under a research contract funded by The Federal Railroad Administration.

Stanford Research Institute, Gruen Associates, Incorporated Dec. 1973, 118 pp, Figs., Tabs., 2 App.

PURCHASE FROM: Stanford Research Institute 333 Ravenswood Avenue, Menlo Park, California, 94025 Repr. PC
DOTL HE1613.W54S82

15 090559
GUIDEBOOK FOR PLANNING TO ALLEVIATE URBAN RAILROAD PROBLEMS
This report is the third of four volumes reporting the results of a project to analyze the nationwide magnitude of the urban railroad relocation and to prepare methodology for future relocation studies. Volume 1 is an executive summary; Volume 2 is a community guide for preliminary assessment of the potential for planning to alleviate urban railroad conflicts; and Volume 4 presents a nationwide estimate of the nature and magnitude of urban railroad relocation. The purposes of Volume 3 are to suggest an appropriate approach to planning for community policy makers, to outline analytical processes to be used by technical specialists, and to provide supporting data.
Prepared in cooperation with Federal Highway Administration, Washington, D.C., TOPS On-Line Service, Inc., San Francisco, Calif., Gruen Associates , Los Angeles, Calif., and Kaiser Engineers, Okland, Calif.

Moon, AE Carter, J Frank, J Danzig, JC Whipple, B
Stanford Research Institute, Federal Railroad Administration, Federal Highway Administration, TOP-On-Line Service, Incorporated, Gruen Associates, Incorporated Final Rpt. Aug. 1974, 327 pp

Contract DOT-FR-20037

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-240676/7ST, DOTL NTIS

15 093634
A COMPREHENSIVE POLICY TO AMELIORATE ADVERSE IMPACTS OF TRANSPORTATION FACILITIES
Transportation facilities impose numerous adverse economic, social and environmental impacts on surrounding communities. These adverse impacts significantly detract from the overall positive effects of such facilities. A number of initiatives have been developed which help ameliorate adverse transportation impacts at the source, and through facility location and design. There are, however, additional outside the right-of-way measures which might be taken to reduce adverse impacts. In this report, the available alternatives for outside the right-of-way action are reviewed, and a package of viable program techniques including noise regulation, grants in aid, and untied compensation is proposed. Draft legislation is outlined which makes provision for: (1) Acquisition of land or development rights in land outside the right-of-way, (2) construction of berms and sound-absorbing barriers, (3) sound-proofing of private and public structures, (4) short-term loans to municipalities and small businesses financially impacted, and (5) cash compensation to homeowners suffering property value losses.
See also PB-247 824.

Blackburn, AJ Oster, S Oksman, C
Urban Systems Research & Engineering, Incorporated, Office of Environment, Safety and Consumer Affairs Final Rpt. DOT/OS-40058-5, May 1975, 138 pp

Contract DOT-OS-40058

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247823/8ST, DOTL NTIS

15 129821
LIGHT RAIL TRANSIT SOCIAL COSTS AND BENEFITS
This paper identifies the social aspects of light rail transit and categorizes them according to the viewpoints of the rider, those on the wayside, the community, and the contributor of capital funds. The physical characteristics and service qualities of light rail transit accumulate to benefits that are judged to outweight the social costs. Highlighted is the light rail transit attribute of serving a greater number of persons' travel needs through extensive distance covered for a given investment, frequent stations, easy access, and short door-to-door travel time. The ability of light rail transit to condense the amount of time between ground breaking and operation of service is stressed. This is credited to simpler construction enabled by need for narrower rights-of-way, use of sharper curves and steeper gradients, and tolerance of grade crossings. The ability of light rail transit to evolve at a later date, through additional investment, into conventional rapid transit is acknowledged. The paper draws conclusions from a 1960 study in Frankfurt, Germany, that served as the springboard for the now extensive development of light rail transit networks throughout Europe. Instances of specific social aspects are cited.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Thompson, GJ *Transportation Research Board Special Reports* No. 161, 1975, pp 147-158, 2 Tab., 82 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

15 131429
SIXTH SYMPOSIUM ON THE FUTURE OF CONURBATION TRANSPORT VI. TRANSPORTATION IMPLICATIONS OF THE NEW URBAN FORMS WHICH MAY EMERGE TOWARDS THE END OF CENTURY
The inter-dependance of transport and urban form has now been recognised, and transport may well hold the key to the future of cities. Within existing urban areas one looks to better transport management integrated into whatever new developments the city can afford. Examples from the universities are indicative of the kinds of urban form that may contribute to this integration, with particular thought given to circulation and the possibility of connections between buildings. The author envisages a number of possible modes of life outside existing urban areas, such as a high density layout in country club style, a more modest suburban dispersion, and communal life in self-sufficient communities. Experimental developments of this type must be evaluated, and uncertainty in forecasting their transportation implications reduced if possible. The government should give a lead in the area of greatest uncertainty, that of resources. Energy shortages are seen as likely to affect building forms as much as transport modes, and the survivability of settlement patterns may depend on low energy consumption rates. Already experimental houses are being designed to re-cycle domestic waste, and forms of self-sufficient agricultural communities exist in America. Survival through the energy crisis might depend on this built form with walking and the horse as the means of transport. For covering abstract of the conference see IRRD abstract no. 216149. /TRRL/

Cassidy, M (Greater London Council)
Manchester University, England Conf Paper Oct. 1972, pp 93-110

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216156)
PURCHASE FROM: Manchester University, England Department of Extra-Mural Studies, Holly Royde College, Manchester M60 1QD, England Repr. PC

15 132892
ECONOMIC CRITERIA FOR THE MAINTENANCE, MODIFICATION OR CREATION OF PUBLIC URBAN AND SUBURBAN TRANSPORT SERVICES
Following an earlier paper given at the fourth ECMT symposium in The Hague, the case is discussed for public transport subsidies for counteracting

external social costs such as urban congestion and for aiding low income groups. An exercise completed by London Transport is discussed which reviewed the social returns from providing yearly subsidies up to 130 million Pounds yearly representing some 20-100% of LT revenue. A number of recommendations are made;-urban transport subsidies should only be considered in a broad context which also includes private transport; subsidies to transport operators should be part of a general urban transport policy; and the question of transport subsidies should be examined in a wider context than the transport sector alone. It is concluded that failure to consider other ways of allocating transport subsidies is likely to risk distorting the economic and social optimum in terms of community welfare. /TRRL/

European Conference of Ministers of Transport R&D Rpt. 1975, 76 pp

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215531)
PURCHASE FROM: Organization for Economic Cooperation and Devel Suite 1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006

15 133568
ECONOMIC MEASUREMENT OF BENEFITS OF TRANSPORTATION
Presents an economic measure of the benefits of transportation. This measure allows proposed changes in an urban system in either transport or land use to be evaluated for urban planning purposes in terms of cost and accessibility. The benefit to cost ratio for the change may be expressed conveniently in terms of the ratio of costs and accessibilities of the two systems considered.

Brotchie, JF *ASCE Journal of Transportation Engineering* Vol. 102 No. TE1, Feb. 1976, pp 17-26, Refs.

ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

15 134299
THE UNDISCIPLINED CITY IN A RESOURCE SHORT WORLD
The U.S. city is claimed to be suffereing from a serious breakdown of discipline. While population and economic trends do offer grounds for hope, greater discipline will be needed to cope with the world's rising population and dwindling resources. Scarcity will make the politics of planning easier while the placement and compatibility of both public and private development will be determined increasingly by energy and resource costs. More economical means of transporting people will be perfected. There will be more questioning of the waste and personal extravagance which characterizes present society. While the standard of living will likely go down, greater cooperation and self sacrifice may actually improve the quality of life.

Culver, LW *Futurist* Vol. 9 No. 4, Aug. 1975, pp 205-209

PURCHASE FROM: World Future Society P.O. Box 30369, Bethesda Station, Washington, D.C., 20014

15 138081
THE IMPACTS ON COMMUNITIES OF ABANDONMENT OF RAILROAD SERVICE
The problem of identifying community impacts is predominantly an economic one. The discontinuance of rail service deprives a community of an economic asset-an asset that is complementary to the existing stock of labor, land, capital facilities and equipment. It is tracing and measuring the consequence of this change in production possibilities that comprises the essential problem to which the study is addressed. Includes bibliographical references.

Buchanan, S
Public Interest Economics Center Final Rpt. R009.2, 1975, 43 pp

Contract USRA-C-50010

ACKNOWLEDGMENT: DOT
PURCHASE FROM: United States Railway Association 2100 2nd Street, SW, Washington, D.C., 20024
DOTL HE2757.B83

15 138337
THE EFFECT OF A SUBWAY ON THE SPATIAL DISTRIBUTION OF POPULATION
This research determined the effect of the original subway line on the spatial distribution of population in Metropolitan Toronto. The comparison made is between a mass transit system and a road (rather then expressway) system. By using 1951, before the subway opened, and the same type of population figures in 1956 and 1961, after the operations began, it was found that the construction of the subway altered the spatial form of the area. The line was initially built through a low-density area which was primarily commercial. It was found that redevelopment of urban land is a protracted process and effects of transit service are slow in manifesting themselves.

Davies, GW (University of Western Ontario, Canada) *Journal of Transport Economics and Policy* Vol. 10 No. 2, May 1976, pp 126-136, 1 Fig., 3 Tab., 17 Ref.

PURCHASE FROM: London School of Economics and Political Science Houghton Street, Aldwych, London WC2A 2AE, England
DOTL JC

16 052719
NEW FORMS OF ENERGY CONVERSION
This report considers four new methods of energy conversion, namely: a) Fuel cells; b) Thermoelectric generators; c) Thermionic generation; d) Magnetoplasmadynamic generation. After a brief survey of the principles and of the present state of development their suitability to railway application is examined. Of the four methods only fuel cells and thermoelectric generators appear to have any future for railways. At the present time development of fuel cells is not sufficiently advanced for widespread practical application, but it is hoped that in 5-10 years the techniques will have developed sufficiently to make them of use. Thermoelectric generators are already available for power outputs up to 100 watts and although the price is at present high with further development and quantity production there is every hope that the first cost will in due course be halved. It is unlikely however that these generators will ever by economic for power outputs greater than 1 kW.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A89/RP 1/E, Oct. 1964, 26 pp, 15 Fig., 1 Tab., 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC
DOTL RP

16 052775
PROBLEMS CONCERNING THE QUALITY OF LUBRICANTS BEARING LUBRICANTS
After having carried out numerous tests both in the NS-laboratory in Utrecht and in those of the DB at Gottingen, the E 18a Committee has arrived at the following conclusionsì all the oils used by the Administrations for the lubrication of axleboxes supply satisfactory results, even at the limit conditions of speed, ambient temperature and load, mixtures of oils of different qualities, both new and aged, do not give rise to any anomaly in behaviour, and as regards the problem of hot boxes, the influence of the original quality factor of the oils is greatly reduced. Under these conditions, the E 18 a Committee does not consider it appropriate to supply the Administrations with recommendations for a possible modification of the specifications or criterions for the purchase of oils for bearings.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E18a/RP 1/E, July 1959, 56 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

16 052776
OILS FOR INTERNAL COMBUSTION ENGINES
After having established the close correlation between the behaviour in service of oils and of motors, and the results given by certain tests on the bench, the Committee was in a position to recommend the following procedureì a) concerning the homologation and the control of oils at the moment of acceptance-to insist upon the supplier's guarantee, to adopt a policy of purchasing oil in large quantities, to recommend tests with the oils on the Petter AV 1 motor, to examine the behaviour of the oils and motors in service. b) concerning the periodical testing of the oils in service, b-1) in the motive power or maintenance depot: inspection of the oil filters, b-2) in laboratories: determination of viscosity, fuel oil dilution, water content, insoluble matter, and the residual value of the "dopes". The tests, test methods to be employed, as well as the renewal criteria, were also determined.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. E18c/RP 1/E, Mar. 1958, 27 pp, 6 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

16 052777
GREASES FOR ROLLER BEARINGS. ADDITIONAL TESTS ON LITHIUM BASED GREASES AND TESTS ON SODIUM AND CALCIUM-BASED GREASES
Within the scope of its programme of work, and taking into account the information obtained from the series of tests dealt with in detail in Interim Report No. 1, the Committee has continued its investigations, particularly with a view to the lubrication of roller bearing axle-boxes. Tests have been made on: lithium-based greases, by means of testing machines whereby shocks representative of those produced by rail joints are transferred to the axle-boxes under test (see Appendices 7a and 19), sodium-based and calcium-based greases, by means of the various testing machines already used, with and without the application of shocks. These greases were placed at the disposal of ORE by the Administrations currently using them at the time of the tests. The results of the tests dealt with in this report show that the shock load tests make a useful additional contribution to the more reliable assessment of the ability of a grease to retain its properties effectively in service. However, running tests of rather long duration must, for their part, confirm the lubricating qualities of the grease. The comprehensive results of the tests carried out now allow the overall picture to be obtained as a guide for fixing the test methods to enable the characteristics properties of greases for roller bearing axle-boxes to be defined, even if, bearing in mind the limited number of tests and samples, formal conclusions cannot be deduced from these.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E18e/RP 2/E, June 1963, 50 pp, 16 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

16 052778
GREASES FOR ROLLER BEARING. TEMPERATURE MEASUREMENT IN ROLLER BEARINGS UNDER SERVICE CONDITIONS
When specifying a grease for roller bearings it is necessary to know over what temperature range the grease is required to operate. The temperature of the bearing can be affected by the following six factorsì 1. The speed of the vehicle, 2. The type of grease used, 3. The design of the bearing and axlebox, 4. The load on the axlebox, 5. The ambient temperature, 6. The degree of filling. In this report which describes practical trials the Committee has no influence on the filling ratio. Generally filling ratios of 50-60% are recommended by the bearing manufacturers and therefore this matter is not dealt with further in this report. The object of the present report is firstly to evaluate the effect of each of the remaining five factors on the temperature of the bearing; secondly to describe how temperature measurements may be carried out on axle bearings in service and to make a recommendation of how temperatures should be measured in axleboxes during trail runs. To achieve these objects the Committee carried out a test run with a loaded fish van in the hottest part of Europe in the middle of summer. Moreover many Administrations gave details of tests that they had carried out on various types of rolling stock. These results are analysed.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm Rpt. E18d/RP 3/E, Oct. 1964, 46 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

16 052779
GREASES FOR BRAKE COMPONENTS. LUBRICATION OF BRAKE CYLINDERS
Several Administrations have reported that the brake equipment fitted to their rolling stock does not function correctly under certain conditions due to incorrect lubrication. In view of the complexity of the problem, the Committee proposed to deal first with the question of lubrication of brake cylinders. In order to find out what lubricants were used for brake cylinders by the European Administrations, a Questionnaire was sent out by ORE and this report presents a summary of their replies. It will be seen that various

Administrations experience difficulty at low temperatures and the Committee has therefore decided to investigate this particular aspect first.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E18a/RP 1/E, Mar. 1966, 39 pp, 6 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

16 052780
GREASES FOR BRAKE COMPONENTS. TESTS WITH BRAKE CYLINDER LUBRICANTS AT THE VIENNA ARSENAL TESTING STATION
Several Administrations have reported that the brake equipment fitted to their rolling stock does not function correctly under certain conditions, due to incorrect lubrication. Without considering the effect of moisture, Committee E 18e was asked to study the question, and decided firstly to deal with brake cylinder lubrication. A working programme was approved at the same time and this envisaged two stages of work-1st stage-Tests at the Vienna Arsenal Vehicle Testing Station, using a variety of greases on a number of cylinders. 2nd stagei Line tests using the grease which had given the best performance in stage 1, in the coldest part of Europe. This report contains the results of the 1st stage of the programme of work and describes tests carried out using a number of greases with six brake cylinders at low and ambient temperatures. It also explains why the Committee does not intend to pursue the 2nd stage of the programme of work. By interchanging the greases in the six cylinders chosen, it has been shown that failure of the brake cylinders at low temperatures is not due to any special grease composition (as far as those greases tested are concerned). The general conception of the brake cylinder unit seems to play a more predominant role-primarily the quality of the rubber cups and secondly, the form of the cups and the roughness of the inner surface of the cylinder. As a result of the committee's work, a possible specification for a brake cylinder lubricant has been drawn up and is given in Appendix 1. Its purposes is as a guide for the Administrations in choosing a suitable lubricant.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. E18e/RP 2/E, Nov. 1967, 20 pp, 9 Fig., 6 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

16 052781
GREASES FOR ROLLER BEARINGS. TEST METHODS FOR THE ASSESSMENT OF GREASES FOR ROLLER BEARING AXLE BOXES
This report which is the final report describes the procedure recommended by the Committee for dealing with the problem of selecting greases for roller bearings. It also contains recommendations for ensuring that after approval characteristics. Partial oxidation can occur when the external surfaces of wheels or rails are deformed because the materials come into contact with the surrounding atmosphere. Oxidised metallic particles are then worn away. Wear is often effected by the characteristics of the process itself or by layers of martensite which are produced by shoe brakes.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Final Rpt. E18d/RF/E, Oct. 1964, 12 pp, 2 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

16 072184
THE ENERGY CONSUMPTION OF MEANS OF TRANSPORT. A COMPARATIVE SURVEY
This report offers information on the energy consumed by various means of transport currently used for transporting people and goods. It briefly considers the energy consumption of some new and future transport systems. As regards passenger transport, a distinction is made between urban and inter-city transport. Where passenger transport in urban areas is concerned, a comparison is made between walking, using a bicycle, moped, car or bus and travel by rail. Where goods transport is concerned, no distinction is made between urban and inter-city transport. The comparison here referes to carriage by waterway, pipeline, rail, road, and air. With regard to road transport, consideration will be given to the effect of weight, speed and load factor. Little information is as yet available on the energy consumption of new means of transport. As regards new means of urban transport, the forecasts of energy consumption are relatively optimistic, especially if they are compared with the energy consumption of current urban systems. A comparative table shows the various characteristics of current and future energy sources. The calorific value of the various fuels and the specific density and total efficiency as a function of the type of motor are given.

Tuininga, EJ
Institute for Road Vehicles TNO 1974, 121 pp, Refs.

ACKNOWLEDGMENT: TSC
PURCHASE FROM: Institute for Road Vehicles TNO The Hague, Netherlands Repr. PC

DOTL HD9540.5.T85

16 093593
A STUDY OF FUEL ECONOMY AND EMISSION REDUCTION METHODS FOR MARINE AND LOCOMOTIVE DIESEL ENGINES
This interim report presents the results of the first phase of a two-part program to investigate methods of improving fuel consumption and reducing exhaust emissions for in-service diesel engines used as prime movers in locomotives and several classes of Coast Guard vessels. The engines are large, medium-speed units with individual cylinder displacements in excess of 150 cubic inches and power ratings from 2000 to 4000 brake horsepower. The study that is the subject of this report uses information that was obtained from the technical literature and from interviews of engine manufacturers, railroads, and engineering staffs of Coast Guard vessels. Several methods were investigated for their potential to reduce fuel consumption and emissions, within the constraint of maintaining adequate locomotive and vessel operating flexibility and engine life. These methods included the retrofit of engines with existing state-of-the-art components (e.g., injectors, governor, turbocharger) of improved design, the adjustment of injection timing, and changes in engine operating modes (speed-power points). The effects of engine wear and maintenance on fuel consumption and emissions were investigated, as were the effects of ambient air properties (temperature, pressure, humidity).
Also pub. as Coast Guard Report no. CG-D-124-75.

Storment, JO Wood, CD Mathis, RJ
Southwest Research Institute, Transportation Systems Center, United States Coast Guard, Office of Systems Development and Technology Intrm Rpt. DOT-TSC-USCG-75-2, Sept. 1975, 118 pp

Contract DOT-TSC-920

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-246725/6ST, DOTL NTIS

16 093682
COMPARISON OF ENERGY CONSUMPTION BETWEEN WEST GERMANY AND THE UNITED STATES
The report examines and explains the differences in per capita energy consumption between the United States and West Germany, and quantifies the factors involved. West Germany uses only half as much energy per capita as the United States. Energy use per capita for transportation is only one-fourth of that of the United States, for residential space heating (climate corrected) only one-half, for other residential uses only one-fourth, and for industrial uses 58 percent. The United States uses at least 40 percent more energy for industry in relation to output as West Germany. The total energy use in the United States in relation to national income is about 50 percent greater than in West Germany. This large disparity in energy use between the two countries suggests that continued economic growth and improvement in the standard of living in the United States should be possible without a proportionate increase in energy consumption.

Goen, RL White, RK
Stanford Research Institute, Federal Highway Administration Final Rpt. SRI-EGU-3519, FEA/D-75/590, June 1975, 112 pp

Contract DI-14-01-0001-1885
ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-245652/3ST

16 093945
ANALYSIS OF BART'S ENERGY CONSUMPTION FOR INTERIM SYSTEM OPERATIONS
The Bay Area Rapid Transit (BART) System is the first areawide rail rapid transit system to be built in the United States in 50 years. This system includes 71 miles of track, 34 stations, and such technological advancements as a regenerative braking system plus light, all aluminum cars designed for high acceleration and maximum speeds of 80 miles per hour. This study investigates the historical energy consumption of the BART System, estimates BART's energy consumption for ultimate design service levels (approximately twice the present level), and compares BART's energy consumption to that of other rail rapid transit systems and alternate modes.
Prepared by Peat, Marwick, Mitchell and Co., Burlingame, Calif.

Cohn, SG Ellis, RH
Metropolitan Transportation Commission, Department of Transportation, Urban Mass Transportation Administration, Peat, Marwick, Mitchell and Company, (UMTA-CA-09-0025) WP-14-3-75, June 1975, 30 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248118/2ST, DOTL NTIS

16 094192
ENERGY RESOURCES FOR THE YEAR 2000 AND BEYOND, WITH SCENARIOS FOR THE YEAR 2000 AND THE YEAR 2100
The following topics are discussed: Current and projected World use of energy resources; Energy sources and environmental effects; Two scenarios for the year 2000 and the year 2100; New techniques for energy generation and transmission; The transportation sector.
Presented at Conference on Towards a Plan of Action for Mankind, Needs and Resources, Paris, 9-13 Sep 74.

Zraket, CA
Mitre Corporation MTP-401-Rev-2, Mar. 1975, 55 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247413/8ST, DOTL NTIS

16 094697
ENERGY CONSERVATION POTENTIAL OF URBAN MASS TRANSIT
The report examines the period 1950-1973 with respect to urban travel and its energy use, discusses the relative energy intensiveness of different automobile and transit services, evaluates several recent experiments with improved transit service, and estimates possible future energy impacts of expanded and improved transit.

Stuntz, MSJ Hirst, E
Federal Energy Administration FEA/D-75/621, Conservation Paper-3, Dec. 1975, 33 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249336/9ST, DOTL NTIS

16 129657
ENERGY RESEARCH PART C. TRANSPORT AND COMMUNICATIONS [Energiforskning. Transporter och Samfaerdsel]
A description is given of the development of public and freight transportation in Sweden and prognoses for the future are presented. The current distribution of the transportation work over different modes of transport in Sweden is presented. A survey is made of the different energy sources available now and prognoses for the future are presented. A comparison is made between different modes of transport concerning energy effectiveness. A survey is made of the current R&D in the energy field. Suggestions for future research in Sweden are presented and guidelines for this research for the next ten years. /TRRL/ [Swedish]

Royal Swedish Ministry of Industry R&D Rept. SOU 1974:75, 1974, 77 pp, 17 Fig., 1 Tab., 20 Ref.

ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, Transport and Road Research Laboratory (IRRD 215385)
PURCHASE FROM: Royal Swedish Ministry of Industry Fack, Stockholm 2, Sweden Repr. PC

16 129972
THE POTENTIAL OF FUEL SAVINGS THROUGH THE INCREASED USE OF U.S. RAIL PIGGYBACK
The feasibility of diverting intercity movements from road transport to rail piggyback in order to conserve fuel is investigated. The study indicates that such a shift is not feasible; piggyback has less growth potential than is generally believed; energy savings would only amount to about 1/10% of total U.S. energy consumption; and there are practical problems with respect to space and equipment requirements.

Morash, EA (Maryland University, College Park); Hille, SJ (Alabama University, Huntsville) *Logistics and Transportation Review* Vol. 10 No. 3, 1974, pp 267-275, 5 Tab., 7 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215751)
PURCHASE FROM: British Columbia University, Canada Faculty of Commerce, Vancouver 8, British Columbia, Canada Repr. PC

16 129975
ENERGY-CONSUMPTION OF DIFFERENT TRANSPORT SYSTEMS [ENERGIEVERBRUIK VAN VERSCHILLENDE TRANSPORTSYSTEMEN]
The transport sector depends on fifty-nine percent of oil products for fuel. Until recently the consumption of fuel was a relatively unimportant factor of cost in the exploitation of transport vehicles. Currently, however, interest in the energy components of transport systems is markedly increasing. With the help of a literature survey a comparison is made of the fuel consumption of different transport systems, for instance lorry, bus, metro, railway, rapid transit system, aerotrain, hovertrain and future transport modes. /TRRL/ [Dutch]

Tuininga, EJ (Afdeling Industrieel Contact); Sloten, P Rijkeboer, RC (Institute for Road Vehicles, TNO, Netherlands) *TNO-Project* Vol. 3 No. 7/8, July 1975, pp 291-300, 12 Fig., 7 Tab., 39 Ref.

ACKNOWLEDGMENT: Institute for Road Safety Research, Transport and Road Research Laboratory (IRRD 215311)
PURCHASE FROM: Redaktie TNO-Project 148 Juliana van Stolberglaan, 'S-Gravenhage, Netherlands Repr. PC

16 130905
DIRECT UTILIZATION OF CRUDE OIL AS A FUEL FOR HIGH-SPEED DIESEL ENGINES
Crude oils with wide range of properties were investigated for direct use as fuel in U.S. Army high-speed four-cycle diesel engines. Crude oil properties were divided unto two groups; 1) those properties which would be of importance for short-term operational effects, and 2) those properties whose effects would manifest during longer-term operation. Effects of crude oil use on engine subsytem hardware such as fuel filters and fuel injection pumps were investigated. Performance and combustion data were determined using pre-cup and direct injection configurations of the single cylinder CLR diesel engine operating on various crude oils. Performance data, wear and deposition effects of crude oil use were obtained using the TACOM single cylinder diesel engine. Results of this investigation showed that a wide range of crude oils with proper selection and pretreatment are feasible emergency energy sources for U.S. Army four-cycle high-speed diesel engines.
Presented at a meeting held Sept. 8-11, 1975.

Owens, EC (Southwest Research Institute); Frame, EA Bryzik, W
Society of Automotive Engineers Preprint #750762, 1975, 10 pp, 21 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

16 131029
TRANSPORTATION ENERGY CONSIDERATIONS
Maximum transportation energy conservation potentials and means for avoiding extreme adverse impacts have been identified. Financing, particu-

larly from fuel taxes, is of particular concern as a low-cost means for encouraging maximum fuel conservation with minimum increase in total travel costs. Over half of all petroleum is used for transportation and 40% for highway transportation. A projected 70% improvement in miles per gallon, trip consolidation, shifts to walk and bicycle, and shifts to transit, in that order, could cut highway fuel use in half, absorb more than a doubling of fuel price with no cost increase to the operator, and accommodate forecast increases in travel by 1985. A review of petroleum use, travel forecast, travel characteristics, vehicle miles per gallon, conservation methods, roadway improvements, highway financing, and vehicle operating costs shows how this is possible.

French, A (Federal Highway Administration) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE1, Proc. Paper 11919, Feb. 1976, pp 27-45, 11 Fig., 2 Tab., 18 Ref.

ACKNOWLEDGMENT: ASCE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 131035
ENERGY AND TRANSPORTAION IN CANADA AND THE UNITED STATES
The transportation consumption of petroleum fuels in Canada and U.S. is analyzed and the fuel savings which could be realized through the use of more economical cars and through partial shift of automobile, air and truck traffic to rail and urban transit, are evaluated. They amount to 32% of energy and oil used in transportation. Through partial electrification of intercity rail, and urban auto, transit and truck traffic, the oil consumption could be reduced by a further 25%. The total saving of 57% in transportation corresponds to one-fifth of the total consumption of oil in Canada. The extra demand for electrical energy required for electric traction is evaluated; for electrification to be completed over a period of 20 years, the annual rate of growth of electrical energy production would have to increase by 1% p.a. (from 7% p.a. to 8% p.a.) In view of the increasing scarcity of oil, the railway share of traffic should be augmented, and modernization of North American Rail is necessary to achieve this desirable change. Rail modernization is contingent on the density of traffic. The traffic density distribution on Canadian and U.S. railroads compares favorably with that on other electrified systems and thus electrification of main lines in N. America appears practical. The required extra electrical generating capacity is a small fraction of the demand by other users. The rationalization of intercity passenger traffic in N. America is contingent on improvement of the quality of railway services. The deficiencies of the latter in Canada and U.S. are evaluated and the relationship between service quality and passenger traffic share is demonstrated. The major deficiencies of the current regulation of railways in Canada are identified. It is suggested that replacement of the present legislation is a necessary first step toward modernization of railway transportation in Canada.

Lukasiewicz, J (Carleton University) *High Speed Ground Transportation Journal* Vol. 9 No. 3, Sept. 1975, pp 151-174, 8 Fig., 8 Tab., Refs.

ACKNOWLEDGMENT: High Speed Ground Transportation Journal
PURCHASE FROM: ESL

DOTL JC

16 131044
RAILROADS AND THE ENVIRONMENT-ESTIMATION OF FUEL CONSUMPTION IN RAIL TRANSPORTATION. VOLUME 1, ANALYTICAL MODEL
This report describes an analytical approach to estimation of fuel consumption in rail trnasportation, and provides sample computer calculations suggesting the sensitivity of fuel usage to various parameters. The model used is based upon careful delineation of the relevant physical mechanisms of energy dissipation under steady-state conditions rolling and aerodynamic resistance (using the Davis equations), braking, idling, and locomative power generation and conversion losses. Both simple and more complex formulations are applied as appropriate. Several Classes of service are considered: branch line freight, intercity freight, conventional and high-speed passenger, and commuter. Numerous graphs illustrate typical results for specific fuel consumption as a function of speed, grade, power/weight, load factor, weight per seat, etc.

Hopkins, JB
Transportation Systems Center, (DOT-TSC-FRA-75-16.I) Final Rpt. FRA-OR&D-75-74.I, Oct. 1975, 90 pp, Figs., Tabs., 22 Ref., Apps.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

16 131232
ENERGY STATISTICS
The supplemental report, Energy Statistics is a compendium of selected time-series data describing the transportation, production, processing, and consumption of energy. The statistics have been assembled from a wide variety of sources, such as the U.S. Department of the Interior, the Interstate Commerce Commission, and the American Petroleum Institute. The report is divided into three main sections. The first, entitled "Energy Transport", contains such items as the revenues and expenses of oil pipeline companies, number and capacities of U.S. tank ships, and the total crude oil transported in the U.S. by method of transportation. The second section, entitled "Reserves, Production, and Refining", reveals the growth over time of the U.S. oil and natural gas reserves, refinery capacity, and yields. Trends in the demand for fuel and power are displayed in the third section, entitled "Energy Consumption". Throughout this part, the transportation sector is emphasized.

Transportation Systems Center 1975

ACKNOWLEDGMENT: TSC
PURCHASE FROM: Government Printing Office Superintendent of Do, cuments, Repr. PC

050-000-00-1024

16 131262
ENERGY CONSUMPTION OF RAIL, ROAD AND AIR TRANSPORT
A study which the author carried out for the UIC. A series of detailed calculations are made concerning specific energy consumption in cubic centimeters per passenger/km or ton km for various types of passenger and freight transport with different load coefficients. Various categories of train are examined as well as DC 9 and Boeing 727 aircraft over distances of 500 km, and 25-tonne diesel lorries.

Baumgartner, JP *Rail International* Vol. 7 No. 1, Jan. 1976, pp 22-29, 4 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 131325
FUEL EFFICIENCY IMPROVEMENT IN RAIL FREIGHT TRANSPORTATION
Railroad diesel fuel conservation is becoming increasingly cost-effective. The price of diesel fuel has increased almost two and one-half times since the October 1973 Embargo. The estimated value of diesel fuel, if in short supply, is over 1 dollar a gallon. A comparison of the fuel performance of 10 selected railroads, before and after the Embargo, showed improvement in net-ton-miles hauled per gallon of diesel fuel. However, some roads used fuel less efficiently from an operating standpoint, as measured in gross-ton-miles per gallon. The most promising immediate avenue for conserving diesel fuel is designing train operating policies specifically to conserve fuel while continuing to provide desired schedule performance. Reducing horsepower-per-ton assignment to trains is a preferable strategy to that of reducing maximum allowable train operating speeds. The key to successful implementation is the appropriate short term regulation of the locomotive fleet. The basic diesel locomotive now used was designed during an era of plentiful fuel supply at a relatively low price. Many features can be improved to provide greater fuel efficiency. Corporate strategies need re-examination in the light of the high cost and uncertain supply of diesel fuel. The control of fuel must be improved and continencies for a fuel shortage should be planned.
Sponsored by the U.S. Department of transportation Federal Railroad Administration.

Cetinich, JN
Emerson Consultants, Incorporated, (DOT-TSC-FRA-75-26) Final Rpt. FRA-OR&D-76-136, Dec. 1975, 92 pp, 6 Fig., 5 Tab., 2 App.

Contract DOT-TSC-1105

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-250673/AS, DOTL NTIS

16 131428
SIXTH SYMPOSIUM ON THE FUTURE OF CONURBATION TRANSPORT II. ENERGY RESOURCES AND TRANSPORT PLANNING
Although known oil reserves are increasing as new discoveries are made, in relation to the rate of production there is a steady decrease in the security of supply for petroleum. On the best estimate of total global resources, petroleum production will reach a peak in 1985-1995, and unless the current growth in demand slackens, this will rapidly exceed supply. Since petroleum use is extremely inelastic, there will be a rapid increase in price with the consequent drain on the trade balance and problems of equitable allocation of resources. These rising prices and diminishing fuel availability will put severe constraints on vehicle ownership and use which are not at present allowed for in transportation forecasts. Current road-building schemes, often not expected to come into fruition until 1980-2000, are pernicious in that they will generate additional demand at a time when a grave fuel situation is already worsening. It is unlikely that alternative fuel sources will be developed sufficiently by this time for mass production and use. Future transport planning should aim to minimise inefficient vehicle movements and energy use, through, for example, encouragement of walking and cycling. /TRRL/

Foley, G (Architectural Association)
Manchester University, England Conf Paper Oct. 1972, pp 11-22, 2 Fig., 3 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216151)
PURCHASE FROM: Manchester University, England Department of Extra-Mural Studies, Holly Royde College, Manchster M60 1QD, England Repr. PC

16 131625
SUCCESSFUL USE OF UNCONVENTIONAL DIESEL FUELS FROM ATHABASCA TAR SANDS IN RR DIESEL LOCOMOTIVE ENGINES IN CANADA
Experiments were carried out a number of years ago by the two major Canadian railroads (Canadian National and CP Rail) and the National Research Council of Canada in a stationary locomotive diesel engine, laboratory bench tests, and later locomotive field runs to evaluate synthetic crudes as fuels for locomotive diesel engines. These crudes were derived from the Athabasca Tar Sands and supplied by Great Canadian Oil Sands, Ltd. This research received its impetus from the potential price advantage of synthetic crude over conventional RR diesel fuel. The tests were generally successful even though the synthetic crudes had high cloud points and very low flash points. Subsequently, an aromatic distillate (gas oil sidestream) with more desirable flash and cloud point characteristics obtained from the Tar Sands plant was made available in limited quantities by Great Canadian Oil Sands, Ltd. This fuel was tried and is being used successfully in spite of its low cetane number. A marked advantage for Canadian winters is the very low cloud point, below-40 C (-40 F), coupled with a normal diesel fuel viscosity.
Presented at the Diesel and Gas Engine Power Conference and Exhibit, Chicago, Illinois, April 4-8, 1976.

Stringer, PL Acosta, J Jackson, DR Bethune, AE Shepp, LP
American Society of Mechanical Engineers 76-DGP-6, Dec. 1975, 13 pp, 6 Fig., 6 Tab., 1 App.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

16 132927
COMBUSTION INSTITUTE, WESTERN STATES SECTION, FALL MEETING 1975: CHEMICAL KINETICS; COMBUSTION PROBLEMS OF PROCESSING AND UTILIZING ALTERNATIVE FUELS
Some thirty papers presented cover results of various research laboratories and individuals on combustion characteristics of various fuels and additives. The emphasis is placed upon the potential of using alternate fuels instead of conventional fuels.
Proceeding for meeting, Stanford Research Inst., Palo Alto, Calif., Oct 20-21, 1975.

Combustion Institute Proceeding 1975, Refs.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Combustion Institute Western States Section, Pittsburgh, Pennsylvania, 15219

16 133441
ENERGY STATISTICS: A SUPPLEMENT TO THE SUMMARY OF NATIONAL TRANSPORTATION STATISTICS
This report is a compendium of selected time-series data describing the transportation, production, processing, and consumption of energy. It discusses such items as the revenues and expenses of oil pipeline companies, number and capacities of U.S. tank ships, the total crude oil transported in the U.S. by method of transportation; growth over time of the U.S. oil and natural gas reserves, refinery capacity and yields; and trends in the demand for fuel and power.
See also PB-238 767.

Gay, WF
Transportation Systems Center Final Rpt. DOT-TSI-OST-75-33, Aug. 1975, 155 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-252612/7ST, DOTL NTIS

16 134054
COMPARATIVE ENERGY COSTS OF URBAN TRANSPORTATION SYSTEMS
Several urban transporation systems are compared on the basis of the energy resources consumed in the manufacture of their vehicle and guideway systems and in their operation. Four systems, the auto, bus, rapid rail and personal rapid transit, are extensively analysed, while the energy characteristics of dial-a-ride systems and the motorcycle are estimated. Analyses of bicycling and walking are also included for a comparison of motorized modes with human propulsion systems. For each system the energy required to manufacture a vehicle, the energy required to manufacture the guideway, and energy of operation are estimated. The manufacture contributions are amortized over component lifetimes and added to the energy of operation to give an estimate of total energy consumed per vehicle-mile by A system. To provide a measure of the potential energy efficiency of the systems, the average energy consumed per available seat-mile is calculated to compare the systems when they are operating at capacity. An example containing assumed average occupancy levels gives a more realistic comparison on the basis of energy consumed per passenger-mile. (A) /TRRL/

Fels, MF (Princeton University) *Transportation Research* Vol. 9 No. 5, Oct. 1975, pp 297-308, 1 Fig., 12 Tab., 34 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217347)
PURCHASE FROM: ESL
DOTL JC

16 134304
AN ENERGY SCENARIO FOR CANADA-1986
The author reviews Canada's energy resources: conventional oil, Alberta oil sands, coal, natural gas, uranium, and electrical energy (hydro-electricity and nuclear power). Tables show energy demands for the year 1986 according to the type of energy and per sector of the economy. Modal breakdowns for the transport sector are also given. An appendix lists possible non-conventional sources of energy, e.g., geothermal power (hot dry rock), solar energy, hydrogen fuel, wind energy, plantation and refuse, magnet hydrodynamics, tidal power, nuclear power, synthetic petroleum, coal gasification, synthetic natural gas (sng), and non-conventional oil extracted from oil sands. /TRRL/

Katsoulis, M
Bell Canada Business Paper 33, Dec. 1974, 16 pp, 7 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218292)

PURCHASE FROM: Bell Canada Business Planning Group 620 Belmont Street, Montreal, Quebec, Canada

7602187

16 134568
THE OBJECTIVES OF ECONOMISING ENERGY RESOURCES
[Zadaci ekonomii energoresursov]
From an examination of the consumption of energy from electricity, gas-oil and coal in railway transport, the article shows the main ways of saving energy resources in train and traction operations. [Russian]

Tupicyn, OI *Zeleznodoroznyj Transport* No. 1, 1976, pp 51-57

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Zeleznodoroznyj Transport Moscow, USSR

16 134581
COMPRESSOR OIL FOR THE BAIKAL-AMOUR MAIN LINE
[Kompressornoe maslo dlja Bajkalo-Amurskoj magistrali]
The article gives the test results with a new winter compressor oil which has the sort of properties that mean locomotive compressors can work reliably under the harsh weather conditions of the Baikal-Amour Line and other railways in areas in the North and Siberia. [Russian]

Caregradskij, VA Arunin, AA *Vestnik Vniizt* No. 1, 1976, pp 27-31, 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

16 135184
CONSIDERATION OF POSSIBLE IMPROVEMENTS IN THE CONVERSION AND USE OF ENERGY
Net usable energy needs in their various forms are defined. Wastage in energy usage is analyzed and basic possibilities of energy conservation in different end processes are discussed. The non-avoidable losses associated with the various systems of energy conversion and transportation are reviewed. In addition, the possibilities for technical improvements in these processes are assessed, together with their economic aspects and anticipated environment impacts.
Presented at the 9th World Energy Conference Trans, Paper and Discussion, Detroit, Michigan, September 23-27, 1974.

National Commission of the World Energy Conf Volume 7, 1975, pp 324-341

ACKNOWLEDGMENT: EI
PURCHASE FROM: National Commission of the World Energy Conf New York, New York

16 135192
ENERGY CONSERVATION
This paper is an attempt to quantify the potential energy savings from a comprehensive national program of energy conservation. Included are measures to reduce oil consumption in transportation, freight movement, resource recovery, appliances and home standards, industry and electric utilities and the computed figures of potential energy savings for each of the strategies proposed. The end result is a reduction in energy consumption in the period 1980 to 1985 of approximately 6 million barrels a day--the same amount as our current imports. This paper demonstrates that by using available resources more efficiently, the U.S. standard of living need not be sacrified, although a change in the indices of that standard may be indicated.

Rickles, RN *Environmental Systems Journal* Vol. 5 No. 2, 1975, pp 83-94

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 135193
TRANSPORTATION OF ENERGY
The intent is to define the world situation today in energy transportation, to set forth trends, and to identify problems and issues of major concern and to formulate a standard against which to measure the topical pertinence of final papers. The global interregional and intraregional flows of primary fuel and electricity for consumption by distant fixed and mobile users is discussed. Data are presented in tabular form.
Presented at the 9th World Energy Conference, Trans, Paper and Discussion, Detroit, Michigan, September 23-27, 1974.

Robb, JE (Bechtel Corporation)
National Commission of the World Energy Conf 1975, pp 340-370

ACKNOWLEDGMENT: EI
PURCHASE FROM: National Commission of the World Energy Conf New York, New York

16 136403
RESULTS FROM THE USE OF M-14VTS OIL IN LOCOMOTIVE DIESELS
Results of an experimental test program are presented which show that M-14VTs lubricating oil has a considerable reserve in dispersancy and neutralizing properties, thus ensuring that diesels of this type (performance level) will remain in good condition, and making it possible to increase the length of the operating runs of the locomotives between oil changes. Use of the M-14VTs oil completely eliminates piston burnout in 11D45 and 14D40 diesels and makes it unnecessary to replace the heads every 100-130,000 km. Their service life can be extended to 600-750,000 km.

Zelenetskaya, IS Chekhovskaya, OF Didyuk, EE *Chemistry and Technology of Fuels and Oils* Vol. 11 No. 7-8, July 1975, 3 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

16 136452
1974 ROCKY MOUNTAIN ENERGY FLOW PATTERNS
Highly visual and self-explanatory 1974 energy flow diagrams are presented for each of the eight Rocky Mountain States and for the Region as a whole. Each diagram is essentially an accounting of the energy produced and how it is consumed or lost. The diagrams are meant to serve as a convenient and useful reference (or starting point) for consideration of energy-related questions.

Kidman, RB
Los Alamos Scientific Laboratory Sept. 1975, 14 pp

Contract W-7405-ENG-36

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

LA-6107-MS, DOTL NTIS

16 136577
POLICIES TO REDUCE TRANSPORTATION FUEL USE
This paper reviews historical trends in passenger traffic and energy use since 1950. Overall, transportation fuel use grew from 8.9 QBtu in 1950 to 18.3 QBtu in 1974 with an average annual growth rate of 3.0%. Energy use grew more rapidly than did traffic during this period because of shifts from energy-efficient to energy-intensive modes and increases in energy-intensiveness for most modes (due both to declining load factors and reduced vehicle fuel economy). A number of alternatives exist for reducing transportation fuel use. This paper discusses the energy savings possible due to expanded and improved urban mass-transit services, increases in new car fuel economy, increases in the price of gasoline, and increases in commute-auto occupancy (carpooling). Expanded mass transit is likely to save only small quantities of energy during the next five to ten years, primarily because of the very low fraction of urban passenger travel now carried by transit. Legislating increases in new-car fuel economy and/or higher gasoline prices can save substantial quantities of fuel both in the short and long run. Policies to induce higher auto occupancy during peak periods are unlikely to save much energy both because of their political infeasibility and individual reluctance to change habits.

Hirst, E
Oak Ridge National Laboratory No Date, 24 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

CONF-751120-1, DOTL NTIS

16 136578
ENERGY SUPPLY AND DEMAND IN THE NORTHEAST UNITED STATES: 1972
A comprehensive description of the energy supply and demand pattern in the Northeastern U.S. in 1972 is presented. The region covers New England (Region I), New York (Region II), Pennsylvania, New Jersey, Delaware, Maryland, and District of Columbia (Region III). The Reference Energy Systems (RES) defined in this report describe major components in the energy system, specifying resource consumptions, fuel transportation, conversion processes, and end use for each region. Section II discusses the RES methodology and the results derived. Sections III and IV describe the primary sources of information and methods used to estimate various end uses of energy in the residential, commercial, industrial, and transportation sectors. These end use demands specified by sector and fuel type are necessary input data to construct the Reference Energy Systems. Section VII analyzes the fuel consumption and energy generated by the electric utility sector in the region. Section VIII provides data on the regional energy supply systems. Included in Appendix A is a set of Fuel Mix Tables that are designed for future energy demand projections. Appendix B contains the regional socio-economic data used in the study. Appendix C displays the conversion factors and energy equivalents of various fuel types.

Lee, J
Brookhaven National Laboratory Sept. 1975, 86 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
BNL-20427, DOTL NTIS

16 136580
PENNSYLVANIA ENERGY SYSTEM
A detailed analysis is presented of energy supplies and demand in Pennsylvania for the base year 1972. Supplies of coal, oil, natural gas, nuclear, and hydroelectric energy sources are identified and traced through the fuel cycle from extraction or import receipt through refining, transport, conversion, and end use, including exportation. Energy-consumption patterns are presented for five Pennsylvania demand sectors including electric utilities, industry, commerce, residences, and transportation systems. Efficiencies are presented for major energy conversion processes in the state, and energy use by each sector is disaggregated to estimate ultimate end-use according to specific groups or functions. The report also discusses the limitations of existing data sources as they affect the quality and level of available detail of energy flow estimates for various parts of the fuel cycle. Results of the present study can provide a useful tool for energy-related policy analysis in Pennsylvania, particularly when coupled with an auxiliary data base describing key technological, social, economic, and environmental factors associated with unit energy flows in any part of the system. While such an auxiliary data base does not presently exist for Pennsylvania, systems such as the comprehensive file developed nationally by Brookhaven National Laboratory can serve as a ueful starting point for assessing energy policy impacts and alternatives for Pennsylvania.

Rubin, ES Edelston, BS Gunwaldsen, DS Notary, KE
Carnegie-Mellon University June 1975, 122 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
BNL-20323, DOTL NTIS

16 136581
METHODOLOGY OF TECHNOLOGY ANALYSIS WITH APPLICATION TO ENERGY ASSESSMENT
In view of the significant social and economic consequences of technical change, it is important for the engineering community to provide sound technical inputs to the formulation of national policies. A methodology designed specifically for this purpose for application to large-scale technical systems is described and illustrated by application to the U.S. energy system. This methodology, Technology Analysis, uses three basic building blocks: a structural description of the system, an optimization technique for system synthesis and design, and a model of the economy within which technical detail and social structure may be expressed. The approach is general and is adaptable to other important technology policy areas including materials, agriculture, and transportation.

Hoffman, KC
Brookhaven National Laboratory CONF-751106-12, 1975, 26 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
BNL-20083, DOTL NTIS

16 136603
INTERCITY PASSENGER TRANSPORTATION: MODE/ENERGY CONSERVATION. VOLUME II: ANALYSIS
Contents: Intercity passenger data; Development of intercity passenger demand models; Energy conservation policies and their impacts; Evaluation of alternative energy conservation policies; Analyses of regression results; Travel and energy data for conservation policies; Regression analyses using air/auto costs. Portions of this document are not fully legible.
See also Volume 1, PB-250 883.

Roche, G Lago, AM
RMC Research Corporation, Council on Environmental Quality, Federal Energy Administration Final Rpt. RMC-UR-286-Vol-2, EQ-5174130282, Dec. 1975, 325 pp

Contract EQ4AC028

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250884/4ST, DOTL NTIS

16 136614
ENERGY, THE ECONOMY AND MASS TRANSIT
The report examines: (1) the probable effects of changes in energy supplies and prices on transit patronage and the transit industry; (2) the potential role of public mass transit programs in stimulating a depressed economy; and (3) the effect on the economy and on urban transit if transit funds were sharply reduced. The study also evaluates alternative transportation policies for responding to various economic and energy conditions and examines within this framework the effect of transit incentives and automobile disincentives on transit patronage and automobile use. This assessment was performed in response to a request from the Committee on Appropriations, U.S. Senate.
Prepared in cooperation with Skidmore, Owings and Merrill, Washington, D.C., and System Design Concepts, Inc., Washington, D.C.

Office of Technology Assessment, Skidmore, Owings and Merrill, System Design Concepts, Incorporated OTA-T-15, Dec. 1975, 155 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250624/4ST, DOTL NTIS

16 136617
UNITED STATES ENERGY THROUGH THE YEAR 2000
A total energy forecast is given. The energy demands of the electrical, synthetic gas, synthetic liquids, household and commercial, industrial, and transportation sectors are discussed and projected to the year 2000. Energy resources in the forms of coal, liquid hydrocarbons, and gaseous fuels are estimated, and current and future probable production and supply are discussed.

Dupree, WGJ Corsentino, JS
Bureau of Mines Spec Publ BuMines-SP-8-75, Dec. 1975, 74 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250600/4ST, DOTL NTIS

16 136635
ENERGY DEVELOPMENT: THE ENVIRONMENTAL TRADEOFFS. VOLUME 2: RELATIVE ENVIRONMENTAL ASSESSMENT OF METHODS TO INCREASE ENERGY PRODUCTION, CRUDE OIL, PIPELINE QUALITY GAS, AND ELECTRICITY FROM WESTERN COAL
This report concerns the development and application of a methodology for evaluating relative environmental impacts of alternative ways of producing energy. Topic areas cover the use of western coal for electricity generation, options for increasing U.S. oil production, and options for increasing pipeline quality gas supplies.
Energy and Environment Series. Paper copy also available in set of 4 reports as PB-249 999-SET, PC$18.00.

Levine, MD Steele, RV

Stanford Research Institute, Environmental Protection Agency, (SRI-3563) Oct. 1975, 132 pp

Contract EPA-68-01-2469

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250001/5ST, DOTL NTIS

16 136636
ENERGY DEVELOPMENT: THE ENVIRONMENTAL TRADEOFFS. VOLUME 1: SUMMARY OF VOLUMES 2-4

This volume provides a brief summary of volumes 2 through 4 of the series. The background papers include: technical overview; social impacts of energy development in a rural area: a case example of western coal development; water availability and consumption for energy; water pollution potential of energy conversion processes; and air pollution impacts of energy processes.

Energy and Environment Series. Paper copy also available in set of 4 reports as PB-249 999-SET, PC$18.00.

Stanford Research Institute, Environmental Protection Agency, (SRI-3563) 18, Nov. 1975, 29 pp

Contract EOA-68-01-2469

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-250000/7ST, DOTL NTIS

16 136707
ENERGY SUPPLY PLANNING MODEL, SYSTEM TAPE

The specific modeling work reported here was stimulated by the need to explore the feasibility of proposed U.S. energy policies in terms of the requirements for specific societal resources associated with the construction and operation of energy supply and energy transportation facilities needed to implement these energy supply policies. The Energy Supply Planning Model is designed to convert future (1975 to 1995) energy mixes to resource requirements schedules. With this planning tool, the feasibility of various proposed mixes can be assessed in terms of the time, capital, manpower, materials, and construction schedules required for the specified energy supply system. The tape, created by dumping the entire contents of a 2314 disk pack using IEHDASDR, may require special arrangements between NTIS and the user in order for the user to receive the contents in a useable condition. The source recommends use of 2314 disk packs to use the programs and data.

See also PB-245 381. Magnetic Tape available in 9 track, 1600 bpi, odd parity, EBCDIC, ONLY. Price includes documentation, PB-245 382 and PB-245 383.

Carasso, M Gallagher, JM Barany, R
Bechtel Corporation NSF-1-900-II-3, NSF/DF-75/003, Aug. 1975

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-248066/3ST, DOTL NTIS

16 138327
SOLAR ENERGY POWERS VITAL RAILWAY EQUIPMENT

CP Rail, in an effort to find efficient and economical means of providing power for railway operations, has installed two solar power test units in Quebec; the units are the source of energy to recharge batteries powering track circuits and highway crossing warning signals. Each unit consists of two solar arrays mounted on posts near the track. The solar array is made up of a series of cells which act as semiconductor devices to convert the sun's rays into electricity.

Canadian Transportation and Distribution Managemnt Vol. 79 No. 5, May 1976, pp 59, 1 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Canadian Transportation and Distribution Managemnt 1450 Don Mills Road, Don Mills, Ontario M3B 2X7, Canada

DOTL JC

17 052708

DATA TRANSMISSION BY MEANS OF RAILWAY TELEPHONE CIRCUITS AT SPEEDS EXCEEDING 600 BAUDS. FINAL RECOMMENDATIONS CONCERNING THE CHARACTERISTICS OF RAILWAY CIRCUITS FORMING PART OF A DATA TRANSMISSION SYSTEM AND DESCRIPTION OF THE BASIC CONDITIONS FOR THE CONSTRUCTION OF SUCH A SYSTEM

This final report forms a very comprehensive document on the general problems of data transmission and the basic characteristics required of data transmission networks and their principal component parts. The interference chiefly encountered on railway systems and the means adopted for its abatement were the subjects of two previous reports, RP 7 and RP 8. This contains an analysis of the data flow, its priorities and the structure of the system. Certain basic conceptions of the transmission technology are stated again and the various possibilities of designing a transmission system for medium speed are considered. The report contains recommendations concerning circuits, selection of transmission speed, method of modulation, modems, safety procedures and also concerning methods of measurement and maintenance. All problems have been considered from the standpoint of transmission. Recommendations are given in the form of tables to the greatest extent possible. For economic reasons, the recommendations of the CCITT concerning modulation rates and circuits have been adopted as far as possible. These recommendations have, however, been supplemented by data gained from experience. These were gathered by the Committee from previous investigations of railway circuits or, as regards data transmission equipment, from tests conducted in well-defined conditions at the "Installation for testing data transmission equipment", at the Federal Research and Test Institute in Vienna Arsenal. This installation is available to the administrations to enable them to test whether the equipment they intend to use meets the requirements expected to arise from the type of operation for which it is to be provided.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways A76/RP 9/E, Oct. 1970, 229 pp, Figs., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

17 052735

ORE COLLOQUIA REPORT ON THE SECOND COLLOQUIUM "TECHNICAL COMPUTER PROGRAMS" (BR RESEARCH DEPARTMENT DERBY, 16TH MAY 1972)

The proceedings of a colloquium at British Railways, Derby, May 16-18, 1972, describes Technical Computer Programs from Member Administrations. These include Mechanisation of Design Studies on Building Structures (SNCF); Electronic Processing of Structural Calculations (DB); Optimisation of Bridge Decks Formed of Prefabricated Prestressed Concrete Beams and Preflexed Steel Beams (SNCF); Automated Design of Supporting Structures for Railway Bridges in Prefabricated Parts (DR); Prestressed Statistically Undeterminate Girders or Slabs (NS); Newpac--Linear Elastic Structural Analysis Using Finite Elements (BR); Structural Analysis of Vehicles and Bridges (BR); Theoretical Stress Analysis of Wheel Sets (BR); Dynamic Stresses in Bridges)CSD); Mathematic Optimisation of Track Realignments (BR); Geodesy Program System (CFF); Databank--A Locomotive, Train and Route Data Information System and Its Applications (BR); Computer Analysis of Geometry of Track (SNCF); Optimisation of the Problems Connected with the Geometry of the Rail-Wheel Contact System (SNCF); Forces in the Track Due to Dipped Joints and Wheel-Flats (BR); Mathematical Models for Studying Dynamic Response of Rolling Stock to Excitations set up by Discontinuities in the Track (SNCF); Transverse Stability of a Group of Very High Speed Vehicles Taking into Account Nature of the Connecting Elements (SNCF).

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ40/RP 4/E, Oct. 1972, 145 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

17 052863

CONTROL AND OPTIMISATION TECHNIQUES FOR TRAFFIC CONTROL SYSTEMS. (FIRST INTERNATIONAL COMPUTER PROGRAMME COLLOQUIUM IN DERBY FROM 16TH TO 18TH SEPTEMBER 1969)

The theme selected for the colloquium was "Control and optimisation techniques for traffic control systems". The report contains 16 papers read to the colloquium. The papers themselves were not translated but included in the language in which they had been written. A brief summary of each paper, in English, French and German respectively, was included in the report. The papers are: 1. Possibilities of calculating train movements with the aid of data processors (in German): 2. Electronic data processing in the railway survey department and in planning the sequence of operations for works projects (in German; 3. Electronic calculation of maximum permissible speeds (in French); 4. The computer in London Transport engineering, A review of recent applications (in English); 5. Capacity of lines equipped with the automatic block system and operated with conflicts between a group of trains (in French); 6. Preparation of optimum engine workings with the aid of digital computers (in German); 7. Calculation of train timetables with the aid of computers (in Italian); 8. Assessing the capacity of a railway line by simulating traffic (in Dutch); 9. Study of awaiting times and capacity of a real time system by means of simulating (in Spanish); 10. Simulation of a railway line (in Spanish); 11. Study of an analogue simulation for railway traffic (in Spanish); 12. Programme for the simulation of a railway terminal station (in Spanish); 13. Preparation and transmission of data (in French); 14. Inversion of large matrices using a special method of partitioning (in Dutch); 15. Determination of the optimum service life of vehicles and the subsequent processing of the data obtained (in German); 16. Software for the simulation and control of traffic on British Railways (in English).

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 40/RP 2/E, Sept. 1970, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

17 052866

ORE COLLOQUIUM. REPORT ON THE FIFTH ORE COLLEQUIUM "TECHNICAL COMPUTER PROGRAMS" VIENNA, 3RD TO 5TH JUNE, 1975

The computer programs presented are: Programs for the data transmission network of the FS: Automation of marshalling yards: Improvement of signalling system layout with a view to increasing the line capacity; The potential of transponders and radiating cable data communication systems for train control; Programming microprocessors for safety applications; Computer controlled teleprinter and data transmission network of OBB; Safety considerations in the application of computers for remote signal box control; DB network planning of a hierarchic real-time data processing system for an integrated transport control system; Computer program for evaluating field strength distribution measurements of radio waves alongside railway lines; Production of signalling control tables by computer; Experience of the SNCB with respect to data transmission for the centralised management of goods traffic; Machine computer produced terminal reference-marking and plotting of equipment diagrams for a signalling installation; Computer programs for data transmission modem testing; Real-time computer system for the automatic control of the gravity- shunting operations at the Basle-Muttenz II marshalling yard; General purpose data transmission network for NSB; Calculation of the impedance and attenuation of telephone cables.

Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways AZ 40/RP 7/E, Sept. 1975

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

17 093480

SYSTEM CONCEPT STUDY FOR A CARGO DATA INTERCHANGE SYSTEM (CARDIS)

The report presents the analysis of functional and operational requirements of CARDIS. From these requirements, system sizing estimates are derived.

Three potential CARDIS concepts are introduced for consideration in subsequent analysis. Their characteristics are described and interface considerations with users and foreign systems developed. Functional flows of typical CARDIS transactions are presented with flow charts. The CARDIS alternatives are compared and a plan presented for CARDIS development.

D'Alessandro, F Wall, M
Computer Sciences Corporation, Transportation Systems Center Final Rpt. DOT-TSC-OST-75-20, Apr. 1975, 98 pp

Contract DOT-TSC-851

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS NTIS Price, /MF$2.25
PB-245865/1ST, DOTL NTIS

17 093920
RUCUS (RUN CUTTING AND SCHEDULING) IMPLEMENTATION MANUAL
The Run Cutting and Scheduling (RUCUS) package is a set of computer programs designed to assist transit properties in developing headway sheets, scheduling vehicles, and making driver work assignments. RUCUS has been extensively field-tested and is currently supporting the scheduling activities at a number of properties. The package, which is now available to the transit industry (through the Transportations Systems Center in Cambridge, Massachusetts) includes detailed program documentation, descriptions of the required input data, output reports and messages, and the program source code. This handbook provides guidance in implementing the RUCUS systems at the user's property, outlining such steps as obtaining and organizing the necessary resources, constructing the initial data base, and using the RUCUS programs. This handbook is to be used as an adjunct to existing documentation which defines in detail the execution of the system programs.

Nussbaum, E Rebibo, KK Wilhelm, E
Mitre Corporation, Urban Mass Transportation Administration MTR-6949, UMTA-VA-06-0004-75-4, July 1975, 198 pp

Contract DOT-UT-10005

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247754/5ST, DOTL NTIS

17 094210
NETWORK TRANSFORMATIONS AND SOME APPLICATIONS
The growing number of large scale applications of network models and the availability of very fast solution codes make it attractive to formulate problems as networks whenever such models are adequate for the purpose. In this thesis, conceptualization of, and notation used to express these models is based on the interpretation of physical flows of commodity through a network structure of nodes and arcs. As an aid to modelling, and to allow codes of varying specificity to be used, nine well-known Transformations are catalogued here for easy reference. Two recent results for special cases of the multicommodity flow problem are re-derived and in the case of (1) below, is significantly extended: (1) The case with all capacitated arcs in the network structure incident with one common node. (2) The case of transportation structure with two sinks (or two sources). Using the network approach, these are shown to have equivalent network formulations. Lastly, a Transformation which uncapacitates a network is implemented in various ways into a contemporary solution code named GNET. (Author)

Cheong, YP
Naval Postgraduate School MS Thesis Dec. 1975, 82 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
AD-A019287/2ST, DOTL NTIS

17 094794
NATIONAL FORUM (6TH) ON ELECTRONIC SYSTEMS SERVE TRANSPORTATION HELD AT WASHINGTON, D.C. ON DECEMBER 3-4, 1974
Contents: Computers serve transportation; Data communications serve transportation; Modernizing data interchange systems; Railroad data systems; Motor carrier use of electronic systems; Steel customer communications system; IATA cargo automation research project; Computer science and technology in business; Packet switching concept; New technologies for transportation; Transportation information systems in Canada; Transportation data interchange systems; Tariffs-innovation and progress; Coding for data exchange and tariffs.

Transportation Data Coordinating Committee 1974, 170 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249510/9ST, DOTL NTIS

17 128884
DATA ANALYSIS OF THE FRENCH NATIONAL RAILROADS [L'analyse des donnees a la S.N.C.F.]
The authors describe the techniques for analyzing the information required and the way in which they evolve; they explain the basic notions and then refer to the different techniques employed (factor analysis, hierarchical analysis), various typological methods (dynamic clusters), then discriminating analysis, canonical analysis, segmentation, preference analysis. All the programs adopted by the French National Railroads are exploited by the Computer Center. [French]

Baudoin, JM (French National Railways); Bertrand, A *Revue Generale des Chemins de Fer* Vol. 94 June 1975, pp 356-365, 8 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

17 129788
DETERMINATION OF STOPS AT THE CROSSING OF TRAIN ROUTES [Ermitteln der Behinderungen an Fahrstrassen Kreuzungen]
With the help of the queuing theory, the author presents approximate methods for determing the number and duration of stops at the crossings of train routes. The procedures are not essentially more complicated then Potthoff's queuing theory but, in several cases, they give better results. [German]

Stoyan, D *DET Eisenbahntechnik* Vol. 23 No. 9, Sept. 1975, pp 404-406, 1 Tab., 6 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany Repr. PC

17 129854
A NATIONAL FREIGHT CAR INFORMATION SYSTEM
While the Association of American Railroads has been developing a national freight car information system, proposals have been made for government assistance in its design and implementation through a government corporation which might also own and control freight cars. This articles examines two questions: Why has a national freight car information system not been introduced by the railroads at a faster pace? Are incentives for development of such a system less strong under existing conditions than they might be with a major government role in the development? The author lists seven institutional impediments to industry implementation, then warns that increased government involvement is not without its perils. The problem is summarized as not one of technology but of institutions and institutional rules and procedures; attempts at technological solutions to car utilization may be disappointing.

Windus, ML (National Science Foundation) *Traffic Quarterly* Jan. 1976, pp 23-40

PURCHASE FROM: Eno Foundation for Transportation, Incorporated P.O. Box 55, Saugatuck Station, Westport, Connecticut, 06880 Repr. PC
DOTL JC

17 129862
DEVELOPMENT OF PROGRAM SYSTEM FOR TRAIN PERFORMANCE COMPUTATION
The Japanese National Railways has developed a program of train performance calculations which are effectively utilized. The system can compute standard running times, temperature rise for traction motors, power consumption, RMS current and similar factors. The program is applied not only to operations of the ordinary lines but also to the automatic-train-control operations of the Shinkansen routes.

Inada, N Koga, S Tanifuji, K *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 119-122, 7 Fig.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

DOTL JC

17 129969
SIMULATION OF URBAN RAILWAY TRANSPORT WITH COLOR GRAPHIC DISPLAY IN CONVERSATIONAL MODE
[Utilisation d'une console de visualisation quadrichrone en mode conversationnel pour l'etude de la regulation d'un reseau ferre urbain]
General evolution of urban rapid transit is leading to a reduced headway between trains in order to increase the transport capacity during peak hours. Any traffic disturbance becomes rapidly more and more important and it is difficult to maintain the theoretical maximum capacity. A conversational mode system, consisting of a 4 color graphic display connected with a computer enables consultant engineers to simulate traffic. The display gives A space-time, or speed-space diagram and the operator can modify it, using light pen, function keys and keyboard. Introduction of a disturbance in traffic flow may result in different kinds of diagram, according to the selected corrective strategy. Automatic regulation may be tested on this system, and later applied on real-time system. [French]

Quonten, R *Traffic Control and Transportation Systems* Conf Paper 1974, pp 519-527, 2 Fig.

ACKNOWLEDGMENT: Institute for Road Safety Research, Transport and Road Research Laboratory (IRRD 215934)
PURCHASE FROM: North-Holland Publishing Company 335 Jan van Galenstraat, Amsterdam, Netherlands Repr. PC

17 130816
TECHNICAL INSTALLATIONS FOR ELECTRONIC DATA PROCESSING IN CONNECTION WITH THE SYSTEM OF INTEGRATED TRANSPORT MANAGEMENT [Datentechnische Einrichtungen fuer das Integrierte Transportsteuer-System-ITS-]
Through electronic data processing, it is possible to arrive at the mechanisation and rationalisation of DB transport operations. Current work concerns the achievement of a first phase of modernisation aimed at an integrated transport control and management system (ITS). The article gives a brief outline of the hierarchical system and its constituent parts, which cover data input, output transmission and processing. Regional computers are coupled to the central computer. [German]

Huth, A *Signal und Draht* Vol. 67 No. 9-10, Sept. 1975, pp 182-188, 1 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

17 130897
RAILWAY CYBERNETICS
An attempt is made to "set the scene" in the context of the control aspects of an existing form of guided transport, examining both the philosophy and the technical developments that will justify the offering of an evolved railroad system as a "new" form of guided land transport. The control aspects are presented by looking at the results of 200 years of evolution in revenue earning railroads. The possibilities for further refinement in an evolutionary manner are discussed.
Prepared for meeting London, England, August 28-30, 1974.

Belbstein, EE (British Railway Board); Parkman, WT
Institution of Electrical Engineers Conf. Pub. N117, 1974, pp 1-11

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

17 131763
MATERIAL INVENTORY MANAGEMENT PROGRAM
Computer program for management of material inventory which comprises the basic elements of cataloging order, forecasting and reviewing all items under control. Some of the principles in IBM's IMPACT (Inventory Management Program and Control Technique) have been adopted. The procedure involves (a) calculation of re-order point accomplished by application of a statistical technique using mean absolute deviation, (b) forecast demand by means of exponential smoothing, and (c) derivation of economic order quantity by relating the value of issues, the cost of procurement and carrying of inventory.
Direct requests to G.H. Cockburn, Manager of Stores, C.P. Rail.

Canadian Pacific No Date

ACKNOWLEDGMENT: Canadian Pacific
PURCHASE FROM: Canadian Pacific Windsor Station, Montreal, Quebec H3C 3E4, Canada

17 131764
SYSTEM FOR PLANNING EVALUATION AND CONTROL--SPEC
This is a set of computer programs associated with a network type project control system (SPEC). Used for time and cost calculations and report preparations for planning and control of project work. Accepts activity on node input. User oriented flexible input and output options. Time calculations and provision for cash flow calculations. Supported by a comprehensive project planning and control system.
Direct requests to R.B. Gillis, Corporate Development, C.P. Rail.

Canadian Pacific No Date

ACKNOWLEDGMENT: Canadian Pacific
PURCHASE FROM: Canadian Pacific Windsor Station, Montreal, Quebec H3C 3E4, Canada

17 131769
POWER PLAY
Computer program which calculates most economical means of allocating a large fleet of locomotives of different kinds over a wide range of train service defined by route and by performance standard. The program assigns each type of locomotive to each train service but does not deal with the day-to-day location of each individual unit. This model uses the input from the FRATE movement cost program. It has been running successfully since May 1973, but means are being developed currently to improve the data input arrangement which is somewhat time consuming.
Direct requests to R. Shea, Director of Technical and Operations Research, CP Rail. Publications: Better Equipment-Greater Profit, presented at the Fourth International Symposium on Railroad Cybernetics, Washington, D.C., P.J. Detmold and R. Klein, April 1974.

Canadian Pacific No Date

ACKNOWLEDGMENT: Canadian Pacific
PURCHASE FROM: Canadian Pacific Windsor Station, Montreal, Quebec H3C 3E4, Canada

17 131772
COMPUTER AIDED ROADWAY EQUIPMENT SYSTEM (CARES)
The objective of the computer program is to provide a cost base and inventory of roadway equipment together with production information on two types of equipment. Input is provided by four sources. Field mechanics and operators report on individual documents each machine repaired and operated, various time factors, cause and type of repair codes, and selected material used. Operators also report production on Tampers and Liners. Source documents with vendor repair invoices coded with the cause and type of repair are provided by the engineering department. Basic inventory information as to cost, machine type, location, special equipment, etc. is also supplied and updated by the engineering department. Management information is provided by inventory production, expense, and equipment reports with information accumulated monthly, last 12 months, and for the life on each machine. The system aids in the decision process of replacing and scheduling equipment.
Direct requests to R.C. Grunwald, Manager, Data Center Operations and Services, MoPac Railroad.

Missouri Pacific Railroad No Date

ACKNOWLEDGMENT: Missouri Pacific Railroad
PURCHASE FROM: Missouri Pacific Railroad Missouri Pacific Building, 210 North 13th Street, St Louis, Missouri, 63103

17 131773
LOCOMOTIVE COMPONENT PERFORMANCE SYSTEM
The objectives of this computer program are to centralize locomotive component data for greater accessibility, increase warranty redemption, retain history of component failures, and provide information for periodic replacement or maintenance of particular components. Each mechanical repair point reports the removals and installation of selected locomotive components. The selection of these components was made based on value and amount of service required. Each time a component is installed, data about its repair vendor, mileage, warranty, and possibly last service date are reported. When the component is removed the reason for removal and disposition are given. This information is provided by the mechanical forces. Mileage figures for each component are supplied by a separate statistical system which accumulates mileage on locomotives. Management information is provided by reports about component history, component servicing, warranties, and locomotive assignments. Special reports are generated as needed with use of a user-oriented retrieval system.
Direct requests to R.C. Grunwald, Managers, Data Center Operations and Services, MoPac Railroad.

Missouri Pacific Railroad No Date

ACKNOWLEDGMENT: Missouri Pacific Railroad
PURCHASE FROM: Missouri Pacific Railroad Missouri Pacific Building, 210 North 13th Street, St Louis, Missouri, 63103

17 131775
AUTOBILL
Autobill, a computer program, is a subsystem of Missouri Pacific's Transportation Control System designed to automate the production of waybills/freight bills. The system utilizes a cathode ray tube as an input device which allows the preparation process to be semi-conversational until the bill is completely error free. The system also capitalizes on the fact that much of the information about a shipment is repetitive each time a shipper releases a car. This repetitive information, such as the shippers name, location, commodity shipped, applicable rates, consignee, destination data is permanently maintained in a central computer data base available instantly for preparing waybills for each succeeding shipment. Once a bill has been entered it will be maintained along with all other bills entered at a station until it is complete from an operational and revenue standpoint. The actual printing of bills (from and to any point on the railroad) is accomplished on a demand basis and the type of print reflects its level of completeness. For example, a weight-and-charges-to-follow waybill will be printed if the operation (movement) data is complete, but not the revenue data.
Direct requests to either Warren A. Dohack, Systems Consultant, or Ronald A. Wehmeyer, Project Manager, MoPac Railroad.

Missouri Pacific Railroad No Date

ACKNOWLEDGMENT: Missouri Pacific Railroad
PURCHASE FROM: Missouri Pacific Railroad Missouri Pacific Building, 210 North 13th Street, St Louis, Missouri, 63103

17 131777
MATERIAL INVENTORY MODEL
The Material Inventory Model is a computer program designed to model the operation of N&W's Material Inventory Control System. Taking past usage and other factors for each item in inventory as input, the program projects the usage, ordering, and inventory values into the future. The ordering algorithm is described in IBM's publication "IMPACT-Inventory Management Program and Control Techniques" (E20-8105). The program is used to evaluate the effects on service level and inventory caused by changes in order control factors. The program is designed to interface to NW's Inventory Control System and it is not a general-purpose model.
Direct requests to W.C. Doughty, Computer Services Department, N&W Railway.

Norfolk and Western Railway No Date

ACKNOWLEDGMENT: Norfolk and Western Railway
PURCHASE FROM: Norfolk and Western Railway 8 North Jefferson Street, Roanoke, Virginia, 24011

17 131874
TERMINAL SERVICE EVALUATION
Computer program produces daily report of elapsed time and per diem charges by pairs of activities (e.g., arrival to industry placement), including up to 48 stations or terminals. At each location, activity pairs are grouped by cars outbound, cars inbound, cars switching (e.g., set to release industries). Activity pairs are summarized daily giving totals and averages for current day, past seven days, and month to date. Activities of trailers and containers are identically reported in four sections and summarized daily. Terminal Performance Analysis report generated tri-monthly presents graphs, plotting daily average elapsed hours within activity pairs and a corresponding 7-day moving average. Alphabetic grades A through F are shown for performance each day according to (1) Level of Service, (2) Service consistency, and (3) Alphabetic average of items 1 and 2. Activity pairs and stations to be included in TPA can be added or changed prior to the beginning of the month for which analysis is desired.
Direct requests to G.R. Clinkenbeard, Director Transportation Services and Planning, St. Louis-San Francisco Railway. Publication in Railway Age, July 31, 1972.

St Louis - San Francisco Railway Company No Date

ACKNOWLEDGMENT: St Louis - San Francisco Railway Company
PURCHASE FROM: St Louis - San Francisco Railway Company 3253 East Trafficway, Springfield, Missouri, 65802

17 131877
TRAIN MEET CALCULATOR
This computer program is a model to assist in planning for an optimum passing track arrangement and to study the various effects on the overall operation of train schedules, delays, priorities, work enroute, tonnages and lengths. The model simulates a dispatcher's logic and can be run with fixed (scheduled) input or by using historical data, or any combination thereof. The model can handle up to 36 passing tracks (and/or stretches of double track) and 20 trains, and run 98 days. Significant changes are not detected beyond 28-35 days. Extra trains can be generated. Trains can enter or exit at any point. Delays by type can be isolated to study their effects. Maximum use has been made of randomization of events. Output consists of statistical data and an optional simulated CTC graph.
Direct requests to L.A. Thomas, Director Operations Planning, St. Louis-San Francisco Railway.

St Louis - San Francisco Railway Company No Date

ACKNOWLEDGMENT: St Louis - San Francisco Railway Company
PURCHASE FROM: St Louis - San Francisco Railway Company 3253 East Trafficway, Springfield, Missouri, 65802

17 131878
FLOW RULES FOR EMPTY EQUIPMENT
Computer program used in the distribution of all general purpose freight cars on Southern. It is designed to minimize empty car days and empty car miles in transit. All XML type box car equipment is included in the system. Matrix distribution is used to distribute to many areas from large surplus supply points. Origin-Destination studies were used to determine the origin and termination of traffic by car type, and to determine surplus and deficit points to determine inbound or outbound flow of empty equipment. This data is then used as input to a Linear Programming Model that selects least cost alternatives for the distribution of empty equipment. The information is available through the Empty Car Inquiry System that is used to distribute empty equipment.
Direct requests to J.R. Martin, AVP, Transportation Planning, Southern Railway Company.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131881
DIESEL DISTRIBUTIONAL MODEL
The computer program can be used to plan diesel locomotive usage by developing optimal cycles for classes of power. The out-of-kilter and other network flow algorithms are used in developing the solution. In addition to the power cycles, the model produces a daily power assignment list and a

bar graph of inventories by hour of day at each terminal. The user may specify connection times by schedule, terminal or total system.

Direct requests to R.L. Sauder, Director, Operations Research, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131882
SIMTRAN
Computer program, a successor of the SIMNET-1 and SIMNET-II Network Models, has major emphasis placed on customer utilization. Major input data files (train service, blocking policies, terminal and track descriptions, traffic parameters) are automatically maintained by customer project identification. Output reports are produced on an exception basis, as requested. Satellite jobs automatically create traffic and train service data for the "standard" Southern Network from existing computer files. Logic of the main simulation module has been expanded to include locomotive distribution as an integral part of the simulation. The system is designed to accommodate up to 125 terminals (nodes) and up to sixteen traffic destinations at a terminal. Disc is used to keep track of individual car records.

Direct requests to R.L. Sauder, Director, Operations Research, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131884
CABOOSE DISTRIBUTION MODEL
This computer program is an extension of the Diesel Distribution Model (SOU-9) but incorporates additional logic to handle the problem of different connection times at terminals where direction of inbound and outbound trains is a factor. Since the problem of variable classes associated with different types of locomotives is not present with cabooses, the model can be used to analyze total system caboose requirements.

Direct requests to R.L. Sauder, Dirctor, Operations Research, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131885
COMPUTERIZED CLASSIFICATION TABLES
Table is used to automatically furnish classification codes of traffic moving via Sheffield Yard or Savannah Yard, for use by the Yards' mini-computers in automatic classification of cars. The classification codes are obtained by processing car data for cars contained in trains destined to Sheffield or Savannah. This data is processed against the classification table at the Atlanta Computer Complex and transmitted to the Sheffield and Savannah computers upon request. The system was designed to use the central computer complex to develop the codes because all data required for the development was available at that location. It also permits easy expansion of the system to include other yards. The system has been expanded to place classification codes on traffic moving via Brosnan Yard in Macon, GA. The codes are placed upon the Advance Consist for trains arriving at Brosnan Yard rather than being sent to a mini-computer as is done at Savannah and Sheffield Yards.

Direct requests to J.R. Martin, AVP, Transportation Planning. Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131886
TIME PERFORMANCE ANALYZER
Generalized computer information retrieval system designed to operate on car movement history. Combinations of selection parameters allow a requestor to isolate any subset of traffic for analysis. Output is elapsed time measurement detail and summary, statistically displayed as frequency distribution. TPA supplies the frame of reference for joint railroad data exchange for measurement of interline traffic. It is also the basis for generation of origin/destination matrices, audit trail, and mileage/time analysis of equipment utilization.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131887
OVER-THE-ROAD SIMULATION MODEL
The MoPac O-T-R computer program has been modified to include variable turnout and train separation time so that dark, ABS, or CTC territory can be studied. Also the meet resolution logic has been modified to allow the delayed train to hold the main track, while the oposing train is rerouted through the siding when this solution will minimize total delay. A calcomp plot routine has also been added as an alternative to the MoPac high-speed printer plot. Refer to the Missouri Pacific Railroad's description of its over-the-road model for more detail on the program. The Southern has used the model successfully to evaluate siding and/or Double Track changes in dark, ABS and CTC territories, to evaluate proposed line relocations and potential CTC projects. The model has also been used to project line capacity.

Direct requests to R.L. Sauder, Director, Operations Research, Southern Railway. See also RRIS 131774 this publication.

Southern Railway System, Missouri Pacific Railroad No Date

ACKNOWLEDGMENT: Southern Railway System, Missouri Pacific Railroad
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131888
EMPTY CAR INQUIRY
Computer program used in the Distribution of Empty Equipment on Southern Railway providing the following information about equipment: (1) A description of car including per diem, nominal capacity, last commodity (if available), assignments and other information. (2) A description of how car can be loaded in compliance with existing rules and directives. (3) Instruction on where car can be sent on line to be loaded if not needed. (4) Instructions on how to return car to owner if not needed for loading on Southern. The information is used by field forces to distribute empty equipment. This inquiry also verifies interchanges and indicates those cars that are being improperly delivered to Southern. This information is available on an inquiry basis at over 70 locations on the railroad.

Direct requests to J.R. Martin, AVP, Transportation Planning, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131889
ORIGIN DESTINATION PERFORMANCE
Computer program measures movement of cars from first to last reporting location by location pairs. Report contains car volume, Standard Time, Percent Within Standard Plus Twenty-Four Hours, Average Transit Time, Time Required for 90% of cars to make trip and Percent Within 48-Hour Window. Total Trip Time Distribution in 12-Hour Intervals is also displayed. The system develops weekly and monthly reports for use in monitoring service. It has the ability to produce additional detail, such as the above information for Origin, Destination or Intermediate Terminals and Transit Times. Weekly reports produced for smaller number of point pairs than monthly version.

Direct requests to J.R. Martin, AVP, Transportation Planning, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131890
TRAIN CONNECTION REPORT
Computer program measures movement of cars through a terminal against the movement that should have been made. System takes the car arrival on a train, coupled with destination and deliver-to road, to calculate the move that should be made from the terminal. Has capability to measure all blocks on departing trains, specific blocks or a grouped subset of the total. The system uses a combination of Move Codes (SOU-4) Train Service and Train Service Exception to calculate the proper outbound moves.

Direct requests to J.R. Martin, AVP, Transportation Planning, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

17 131893
CORPORATE MANPOWER PLANNING MODEL
This computer program is used in forecasting personnel costs for departments, subdivisions of departments, divisions, and the total system for up to five years. It calculates wage escalation factors, salary data, and benefit data.

Direct requests to P.A. Dieffenbach, Director Corporate Planning, Southern Railway, Publications: Corporate Planning Goes on the Southern", Progressive Railroading, May 1974. "The Role of Data Systems in Corporate Planning, Association of American Railroads Data Systems Division, Papers and Committee Reports Presented at the 1975 Annual Meeting.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 920 15th Street, NW, Washington, D.C., 20005

17 131895
LOCOMOTIVE COMPONENT FAILURE ANALYSIS
Computer program allowed failure histories of several locomotive components to be statistically analyzed in order to determine failure rate, the expected life and the frequency of various types of failures. Equipment and warranty evaluation, wiser vendor selection and information for revision of preventive maintenance schedules are among the benefits to be derived. This type of analysis has been applied to traction motor and power assemblies. The routines are generalized so that any equipment subject to failure can be studied.

Direct requests to R.B. Carlson, Analytic Services, Southern Pacific Transportation Company.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

17 131898
DATA ANALYSIS PACKAGE
This computer program is a set of general purpose statistical routines to be used for time series analysis and projections of future values of the series. The package is centered around the Census II routine developed by the U.S. Department of Commerce for isolating the trend, seasonal, cyclical and irregular components of a time series. To this routine has been added multiple linear regression, polynomial regression, lead-lag and smoothing routines. Uses have included analysis of marketing and car distribution historical data. Projects time series rather than only seasonals as is case with Census II. Can be run in batch mode, remote batch or time-sharing.

Direct requests to R.B. Carlson, Analytic Services, Southern Pacific Transportation Company.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

17 131901
CAR DISTRIBUTION GAME
Computer program has the railroad divided into car distribution areas where each area generates daily unloads, interchange receipts and car orders according to a base data file. Two competing players distribute the cars unloaded and received in interchange so as to minimize empty car- miles, empty car-days and unfilled car-order-days. Daily situation reports show location and status of cars, resulting from each player's distribution orders.

Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

17 131909
CAR PERFORMANCE ANALYSIS
Computer program captures, stores and displays freight car operational statistics in time-sharing mode for use by the Car Service Bureau for forecasting car loads, unloads and intercharge-receipt-empties. Interactive forecasting program is designed for use by personnel without data processing familiarity.

Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

17 131914
SPCAR-MONTHLY FORECAST OF CAR SUPPLY
SPCAR, a computer program, makes a monthly supply-demand comparison between available cars online and estimated demand over a designated period of time to detect possible shortages (or overages) in each of the car types considered. A percentage of foreign cars online is considered part of the available supply of cars. Car availability is based on monthly averages.

Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

17 131917
NETPAC/1-CRITICAL PATH PROJECT PLANNING AND CONTROL
NETPAC/1 is a user-oriented project planning and control system of computer programs, combining Network processing and Report processing capabilities. Included are Project Criticality, Task Criticality, Responsibility Sort, Gantt charts, and Key Event Reports. Report options are requested on a single procedural statement. Updating is done on a "management by exception" basis.

Direct requests to C. Bach, R & D Dept., Canadian National. Publications: "Critical Path", a CN Manual of CPM Planning and Reporting, R & D Dept., CNR 1967 and "NETPAC/1 Coding Guide", CNR and Queen's U, Aug. 1969.

Canadian National Railways, Queen's University, Canada June 1969

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

17 131918
SIDING-TO-SIDING SIMULATION
The objective of the computer programs is to represent the movement of a loaded car from the shipper's siding to the consignee's siding, in order to measure the expected variablity and the factors affecting the variability of siding to siding service time. A Monte Carlo model of a siding-to-siding trip

is broken down into a number of steps between yards, with the variability being introduced entirely by the variations in train service, and by variations in train connections. Probability distributions for state-to-state changes are input to the model.

Direct requests to E Buchholz, R & D Dept., Canadian National. Publications: "Computer Simulation Developments in CN" by P.B. Wilson and D.C. Lach, Proceedings of Second Intl. Symp on the Use of Cybernetics on the Railways, Oct. 1967.

Canadian National Railways June 1969

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

17 131920
TRAIN PERFORMANCE CALCULATOR (TPC)
Punch cards are prepared containing track characteristics (elevations, curves, speed restrictions and stops) and train specifications (length, weight, tractive effort, resistances, etc.) These cards form the input to the computer program which performs a step by step solution of the equations governing the train's progress along the track, showing distance, time, speed, fuel consumption, etc. The train is assumed to be driven at full power unless either travelling at the speed limit or braking to reduce speed. In other words, the TPC gives the minimum running time. Up to 30 trains may be run simultaneously over the track on each run. A variety of output reports, including a graphical output, can be obtained. The program, and its predecessor, have been in use on a number of railroads since 1960. The coefficients of the car resistance, tractive effort and fuel consumption curves are specified as input, and different sets of coefficients can apply to different speed ranges.

Direct requests to J.F.R. Gussow, Transportation Dept., Canadian National. Publications: Charles Sankey: "Train Performance Calculator for the IBM 7070, CNR report, Sept. 1963.

Canadian National Railways June 1969

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

17 133575
A SIMULATION MODEL OF FREIGHT TRANSPORT SYSTEM
A computer simulation model has been developed to evaluate transportation strategies over an arbitrary network. This model consists of the Basic Network and the Macro Yard. Macro Yard is modeled to predict yard performance; details of this model and its simulation program (SIMSCRIPT) are described first. To validate this model, simulation freight movement over the Tokaido Line was performed. It consists of 8 yards with 12,000 cars being handled in the model. Further application of this model to study the dynamic stability of the network is discussed and simulated results are explained.

Sato, A Nozue, N Ito, Y Goto, K *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 173-176, 11 Fig., 2 Ref.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

17 133576
AN ALGORITHM FOR CAR ASSIGNMENT
Assignment of cars for various train services on the New Tokaido line is performed by the COMTRAC computer system, a network previously used for control of actual train operations. When the line was extended to Hakata in 1975, COMTRAC functions were expanded to include car assignment and car inspection scheduling. The assignment algorithm must be consistent with efficient use of cars, allowing for accidents, train delays and road failures. The algorithm is explained and results of simulation experiments of car assignment are described.

Yamamoto, I Yabe, U *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 169-172, 12 Fig.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

17 136820
GENERAL PROGRAMMING SPECIFICATION FOR A PROTOTYPE ELECTRONIC DATA INTERCHANGE SYSTEM
The report presents a programming specification for electronic data interchange of transportation information between shippers, carriers, forwarders, and banks which may be used for estimating, design, and development purposes. This specification was prepared in conjunction with working groups composed of participants from the transportation industry.

See also PB-252 937.

Carley, J Notto, R Bass, E Kreithen, A Guilbert, E
Transportation Data Coordinating Committee, Department of Transportation Final Rpt. Apr. 1976, 100 pp

Contract DOT-OS-50017

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-252936/0ST, DOTL NTIS

17 136822
REFERENCE MANUAL AND GENERAL COMMUNICATIONS SPECIFICATION FOR A PROTOTYPE ELECTRONIC DATA INTERCHANGE SYSTEM
Implementation of an electronic data interchange system between shippers, carriers, forwarders, banks, and other transportation related organizations will involve executive level decisions, management level participation, and technical level involvement. This Reference Manual and General Communications Specification is designed to meet the needs of these different groups for an overview of the requirements for electronic data interchange, a summary of the communications technology and services, and a set of definitions and descriptions for the technical terms which are involved in communications. Finally, it provides an initial set of specifications for the communications subsystem for the prototype electronic data interchange system design. The initial specifications are designed to afford a level of industry-wide compatibility which is achievable with modest effort in the short term, but which will not inhibit future growth.

See also PB-252 937.

Carley, J Notto, R Bass, E Kreithen, A Guilbert, E
Transportation Data Coordinating Committee, Department of Transportation Final Rpt. Apr. 1976, 169 pp

Contract DOT-OS-50017

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-252938/6ST, DOTL NTIS

17 138090
STRUCTURAL COMPUTER PROGRAMS-SURVEYS, ASSESSMENTS AND AVAILABILITY
"Structural Computer Programs-Surveys, Assessments, and Availability," contains critical reviews of structural mechanics computer programs in civil engineering, mechanical engineering, nuclear engineering, applied mechanics, marine engineering, and aerospace engineering. Forty leading authorities have prepared these substantive reviews that include a survey of available programs, summary of program capabilities, assessments by users, and details of availability. The book provides a source for engineers to learn what computer programs are available and to assist in identifying the proper programs for a particular job. It alerts users to the hazards that may be encountered in using these programs.

ASME Journal of Mechanical Engineering June 1976

ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering
PURCHASE FROM: Virginia University Press P.O. Box 3608, University Station, Charlottesville, Virginia, 22903

17 138318
COMPUTERIZED M/W PROGRAMMING
Recent technological advances have rendered the minicomputer a most flexible aid to business. The authors detail the characteristics of minicomputers which lend themselves to varied applications, particularly in the railroad industry where they are adaptable to monitoring and controlling maintenance of way programs. Specific areas where the minicomputer can be useful

are in the preparation of track charts, bridge inventories, inspection and analysis, and in preventive maintenance programs for both track and bridges.

Eimer, N Teichman, RA (Penn Central Transportation Company) *Progressive Railroading* Vol. 19 No. 3, Mar. 1976, pp 63-66, 2 Fig., 1 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606

DOTL JC

17 138319
TTX'S CONTROL CENTER COORDINATES CAR MAINTENANCE

Trailer Train uses a computerized system-TRIPS (for Total Resources Information and Planning System)-along with a small staff to keep tabs on a fleet of 75,000 flatcars and autoracks. Data are instantly available on the status of each repair shop showing cars en route, on hand for repair and released; interchange data on all cars enroute; shop history of all cars repaired; and most significantly, mileage data on all cars from last repair program. The latter permits forecasting of those cars which will be maintenance candidates in future.

Progressive Railroading Vol. 19 No. 3, Mar. 1976, pp 56-60, 1 Fig., 4 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606

DOTL JC

17 138336
THE ENGINE SCHEDULING PROBLEM IN A RAILWAY NETWORK

The paper explores a mathematical approach to scheduling of several types of motive power for a variety of train services. The study was undertaken specifically for Canadian National. Each train has motive power requirements that are determined by the weight and length of the train and the route it travels. The operating constraint is to provide a train with sufficient units to meet its power requirements. The mathematical formulation of selecting the mix of types that gives the lowest capital investment and operating costs is based on the mathematical decomposition method of Benders. Results are satisfactory for medium size problems and unsatisfactory for large problems. The relevance of the model and its usefulness in practice are discussed.

Florian, M Bushell, G Ferland, J Guerin, G Nastansky, L *Infor* Vol. 14 No. 2, June 1976, pp 121-139, Figs., 9 Ref.

PURCHASE FROM: Toronto University Press Toronto, Canada

DOTL RP

18 094299
ECONOMICS OF COAL TRANSLOADERS
This report analyzes the hypothetical case of the shipment of 3.5 million tons of coal annually from Harlan County, Kentucky, to a utility in Harllee, Georgia. In this case, the transloader would result in an annual savings of $6,522,000 ($1.84 per ton). The report concludes that benefits of a transloader include new viability for small mine operators and increased coal production, and that while a transloader may be owned by a utility, steel company, railroad, or a large coal company, it seems ideal for a cooperative of small mine operators. This study is divided into four basic parts: A summary and conclusion; description, capital costs, operating costs, analysis of financial feasibility, and possible modification to the general coal transloader; potential benefits of cooperatively-owned coal transloading facilities, including savings resulting from lower rail rates; and ownership aspects of coal transloaders.

Teknekron, Incorporated, Federal Energy Administration Final Rpt. FEA/G-75/575, Sept. 1975, 33 pp

Contract FEA-P-05-75-7312-0

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246764/5ST, DOTL NTIS

18 129478
INVESTMENT EVALUATION MODEL FOR MULTIMODAL TRANSPORT CORRIDORS
A method of economic evaluation of centrally focused multimodal urban transport corridors is presented that is based on certain production theory principles. Production functions are developed in terms of average door-to-door travel velocity in a corridor as a function of commuter-rail and expressway-facility inputs. Cost data are used to establish the optimum combinations of transport mode inputs for various travel speeds. The information used to develop the relationships was obtained in the Toronto region. The use of the techniques described in the paper allows the technical and economic characteristics of the modes to be examined in a quasi-continuous way, which allows a broad range of potential modal combinations to be evaluated. This is in contrast to the normal economic evaluation approach, which chooses from among a set of mutually exclusive, mode-specific alternatives that may not include the optimal alternative. The framework allows the examination of a range of policy variables such as parking charge changes in the central business district and the effect of dial-a-bus as a residential feeder mode.

Freeman, J (Ontario Ministry of Transportation & Communic, Can); Hutchinson, BG (Waterloo University, Canada) *Transportation Research Record* No. 550, 1975, pp 26-34, 10 Fig., 4 Tab., 5 Ref.

PURCHASE FROM: TRB Publications Off Orig. PC
DOTL JC

18 129480
CLARIFYING THE AMBIGUITIES OF INTERNAL RATE OF RETURN METHOD VERSUS NET PRESENT VALUE METHOD FOR ANALYZING MUTUALLY EXCLUSIVE ALTERNATIVES
Many engineering economists have attempted to demonstrate that proper use of either the net present value method or the internal rate of return method to analyze mutually exclusive alternatives will result in identical and correct economic decisions. Unfortunatley, however, the internal rate of return method, even when properly applied, often will result in either ambiguous or incorrect economic decisions. The purpose of this paper is to illustrate more completely and definitively the ambiguities that can occur and to show that the 2 methods cannot be reconciled without additional calculations, which, by definition, go beyond the internal rate of return method as strictly and properly applied.

Wohl, M (Carnegie-Mellon University) *Transportation Research Record* No. 550, 1975, pp 48-59, 6 Fig., 6 Ref.

PURCHASE FROM: TRB Publications Off Orig. PC
DOTL JC

18 129801
ON THE USE OF THE "BURDEN STUDY" TO CALCULATE "SAVINGS" OF NEW RAIL REVENUE POLICIES
Four of the means for increasing net revenues of railroads in the 17-state Northeast and Midwest "crisis" region have been suggested as (1) regaining lost traffic, (2) increasing market penetration, (3) increasing rates on existing traffic, and (4) eliminating noncompensatory traffic. These items rely heavily on use of the so-called Burden Study (An Estimation of the Distribution of the Rail Revenue Contribution by Commodity Groups and Type of Rail Car 1969--RRIS 18 047568) in determination of the resulting net revenues. This paper identifies a particular problem of the Burden Study--called the Aggregation Problem--which casts some doubts on the validity of the study's use, at least as it is currently applied.

Allen, WB *ICC Practitioners' Journal* Vol. 43 No. 2, Jan. 1976, pp 224-239

PURCHASE FROM: Association Interstate Commerce Comm Practitioner 1112 ICC Building, Washington, D'C', 20423 Orig. PC
DOTL JC

18 129841
NEW NORMS IN RESPECT OF AMORTIZATION ACCOUNTS RELATING TO RAILWAY FIXED ASSETS [Novye normy amortizacionnyh otcislenij osnovnyh sredsty zeleznyh dorog]
This article describes a theoretical and methodical conception for fixing the norms covering the amortization accounts relating to railway fixed assests. It also reveals the importance of amortization accounts corresponding to major rolling stock repairs. [Russian]

Izosimov, AV *Vestnik Vniizt* Vol. 34 No. 6, 1975, pp 1-6, 2 Tab., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Vestnik Vniizt Moscow, USSR

18 129846
THE COMMITTEE ON CAR CHARGES. PASSENGER CAR CHARGES DOWN, TRUCK CHARGES UP [Bilavgiftutvalget personbilavgiftene ned lastebilavgiftene opp]
The principle of cost responsibility is discussed (marginal costs, capacity costs, road wear costs). Proposals for new charges in 1975. [Norwegian]

Ostmoe, K *Samferdsel* Vol. 7 No. 3, 1975, pp 4-7

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Samferdsel Oslo, Norway Repr. PC

18 130804
CALCULATIONS BASED ON AVERAGE USEFUL LIFE [Das Rechnen mit gemittelten Nutzungszeiten]
To determine the capital cost of articles made up of parts with different average useful lives, it is usual to use averages. The author shows that calculating averages in this way lead to systematic error which makes results wrong. He explains the error and proposes a new method. Using an example with figures, he also shows the practical application of the method suggested and at the same time, the disparity between the results of the two methods. [German]

Effmert, W *Eisenbahntechnische Rundschau* Vol. 24 No. 10, Oct. 1975, pp 385-388, 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC
DOTL JC

18 130912
PERFORMANCE OF RAILROAD SYSTEMS AND USE OF ROLLING STOCK AND LABOR [Prestazioni dei sistemi ferroviari ed impiego di materiale rimorchiato e manodopera]
On the basis of the operating statistics of the principal railway systems relations are established between the performances of these systems, expressed in terms of freight and passenger carried, and the corresponding need of rolling stock and labor. Brought into light are the operational aspects common to the European and American railway systems with regard to freight stock; with regard to the productivity of the personnel, there is, instead, observed a big difference which is placed in relation to the

percentage of passenger traffic with respect to the total. The determined relationships are intended to be used in the studies on the feasibility of new systems or those to be modified. [Italian]

Corazza, G *Ingegneria Ferroviaria* Vol. 30 No. 7-8, July 1975, pp 17-25

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

18 130999
REGIONAL MACROECONOMIC MODEL
This paper is a description and explanation of the model described in "Transport Research Program: An Analysis of Investment Alternatives in the Colombian Transport System, Harvard University, Cambridge, Massachusetts, 1968, Chapter 3". This macroeconomic model was developed to simulate the regional consumption and production patterns of a country, and to evaluate the effects and interactions on the economy from alternative transport policies and development plans.

Holland, EP Isaac, I
International Bank for Reconstruction & Developmnt Paper No. 60, June 1970, 25 pp, 2 Fig., 4 App.

ACKNOWLEDGMENT: International Bank for Reconstruction & Developmnt
PURCHASE FROM: International Bank for Reconstruction & Developmnt 1818 H Street, NW, Washington, D.C., 20016 Repr. PC

Catalog No. 176, DOTL RP

18 131000
TRANSPORT NETWORK MODEL
This paper is based on Chapter four of the Harvard University Transport Research Program report "An Analysis of the Investment Alternatives in the Colombian Transport System, 1968". The transportation model is designed to simulate the traffic flows in a country, taking the transportation system and shipping requirements as inputs. The output of the model is the system network link utilization with its associated costs and performance measures.

Miller, LH
International Bank for Reconstruction & Developmnt Paper No. 61, Feb. 1970, 65 pp, Figs., 4 App.

ACKNOWLEDGMENT: International Bank for Reconstruction & Developmnt
PURCHASE FROM: International Bank for Reconstruction & Developmnt 1818 H Street, NW, Washington, D.C., 20016 Repr. PC

Catalog No. 185, DOTL RP

18 131001
RAILROAD COST PERFORMANCE MODEL
This paper is based on Appendix four of the Harvard University Transport Research Program Reporti "An Analysis of Investment Alternatives in the Colombian Transport System, 1968". The Railroad cost performance model is used to develop the operational costs and performance measures for a single track rail link. The objective of the model is to transform the operational demands, physical characteristics of different road-links and the rail equipment into operational costs and the performance measures for a link. The model is deterministic in that average values are used rather than random values for the model variables.

Miller, LH
International Bank for Reconstruction & Developmnt Paper No. 63, Feb. 1970, 49 pp, 2 Fig., 5 App.

ACKNOWLEDGMENT: International Bank for Reconstruction & Developmnt
PURCHASE FROM: International Bank for Reconstruction & Developmnt 1818 H Street, NW, Washington, D.C., 20016 Repr. PC

DOTL JC

18 131002
TRANSFER COST PERFORMANCE MODEL
This paper is based on Appendix five of the Harvard University Research Program report "An Analysis of Investment Alternatives in the Colombian Transport System, 1968". This transfer model is designed to simulate intermodal transfer operations. The approach employed is to divide the transfer operation into subparts through mathematical relationships reflecting the costs and service under conditions.

Harral, CG
International Bank for Reconstruction & Developmnt Paper No. 64, Feb. 1970, 23 pp, 5 Fig., 3 Tab., 3 App.

ACKNOWLEDGMENT: International Bank for Reconstruction & Developmnt
PURCHASE FROM: International Bank for Reconstruction & Developmnt 1818 H Street, NW, Washington, D.C., 20016 Repr. PC

Catalog No. 184, DOTL RP

18 131003
THE ECONOMICS OF RAIL LINE CLOSURE
The paper discusses how to determine which sections of a rail system to close and when. These decisions are analyzed for both the economic (net social benefits) and financial (railway company's gains) objectives, when either exogenous traffic projections or traffic demand curves are available. This issue of government subsidization of rail service is also discussed. Examples and procedures for computing costs and optimum timing are included among the annexes. The approach of the paper is essentially theoretical. Further work is envisaged on actual case studies to develop pragmatic solutions for the line closure problem.

Sau, RK
International Bank for Reconstruction & Developmnt Paper No. 76, May 1970, 50 pp, 12 Fig., 8 Tab., 7 App.

ACKNOWLEDGMENT: International Bank for Reconstruction & Developmnt
PURCHASE FROM: International Bank for Reconstruction & Developmnt 1818 H Street, NW, Washington, D.C., 20016 Repr. PC

Catalog No. 178, DOTL RP

18 131004
REAPPRAISAL PROJECT IN THAILAND: AN APPLICATION OF THE HARVARD TRANSPORT MODELS
This study has two distinct but related purposes. The first is project reappraisal. To assess the economic benefits and costs of the rehabilitation program of the State Railway of Thailand financed with World Bank Loan 280-TH of 1961 after its implementation, compare them with the benefits and costs estimated at the time of the appraisal, and identify the factors responsible for the differences. The second is model evaluation. To test and improve the Transport Simulation Model developed by a study team at Harvard University and assess its usefulness as a tool for investment analysis. The study concluded that the railway rehabilitation program was well conceived and moderately successful, having an ex-post return of 13 percent but implementation was considerably delayed. It also concluded that our adapted version of the Rail Simulation Model (part of the Transport Model) should prove readily applicable to rail investment analysis in other developing countries. However, much more research is needed to make transport network models useful for the study of intermodal competition.

Israel, A
International Bank for Reconstruction & Developmnt Paper No. 132, July 1972, 170 pp, 4 Fig., 30 Tab., 5 App.

ACKNOWLEDGMENT: International Bank for Reconstruction & Developmnt
PURCHASE FROM: International Bank for Reconstruction & Developmnt 1818 H Street, NW, Washington, D.C., 20016 Repr. PC

DOTL RP

18 131311
THE COST OF NEW HIGH-SPEED LINES [Les couts en pour-cent des lignes a grade vitesse]
The article consists mainly of a set of tables showing figures for the study of a high-speed intercity link. This link is planned for towns 100, 300 or 500 km apart, on a standard gauge track, with a maximum speed of 300 km/h, a normal running speed of 250 km/h, and traffic of 10,000, 30,000 or 50,000 passengers a day. Other tables show the investment required and operating costs. [French]

Baumgartner, JP *Swiss Annals on Transport Economy* Vol. 30 No. 2, June 1975, pp 127-154, 8 Fig., 7 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Swiss Annals on Transport Economy Zurich, Switzerland Repr. PC

18 131621
FREIGHT CAR TRUCK OPTIMIZATION: TRUCK ECONOMIC DATA COLLECTION AND ANALYSIS
A first interim report covering the development of the TDOP economic methodology was published by the Federal Railroad Administration in April 1975. It contains the truck investment economic evaluation procedures intended for the use of the railroad industry and their suppliers. The primary objective of the Truck Economic Data Collection and Analysis Program is to test the procedures for establishing the significant actual operating costs of existing Type I general purpose trucks. This second interim report covers the progress of the program. A generalized truck cost information system was designed for the collection and integration of truck economic data. The collection of test data for off-line truck maintenance costs was completed. Test data collection was initiated for on-line truck maintenance and other associated costs and operating conditions. Preparatory work was begun to develop the appropriate data analysis guidelines. A preliminary analysis of some of the test data clearly revealed the truck's reported off-line wear and failure cost performance. Railroad companies and their suppliers are encouraged to consider adopting the tested procedures of the TDOP economic methodology. A progressive implementation of this methodology will provide them with the timely opportunity to develop a truck economic evaluation capability of their own.
Sponsored by the Federal Railroad Administration.

April, D
Southern Pacific Transportation Company, Federal Railroad Administration, (TDOP 75-2) Tech Rpt. FRA-OR&D 75-58A, Mar. 1976, 86 pp

Contract DOT-FR-40023

ACKNOWLEDGMENT: FRA, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-251400/AS, DOTL NTIS

18 131762
CAPITAL EXPENDITURE EVALUATION
Computer program for calculation of a range of possible rates of return on an investment proposal. Used as an aid to making investment decisions. Calculates a number of measures of value of an investment stream. Produces a projected balance sheet for the life of a project showing both, cash flow and net profit. Incorporates options on tax accounting and depreciation and on methods of financing.
Direct requests to J. Laufgas, Department of Research, CP Rail.

Canadian Pacific No Date

ACKNOWLEDGMENT: Canadian Pacific
PURCHASE FROM: Canadian Pacific Windsor Station, Montreal, Quebec H3C 3E4, Canada

18 131767
FRATE RAIL COST OPERATING MODEL
Computer program which calculates the cost of freight train movement in a very broad range of physical (e.g., route terrain, etc.), technical, and financial circumstances. Over 70 parameters are considered. The program may be used to evaluate the cost effect of locomotives of various specification, cars of various design, train performance standards, train size, changes in factor prices, etc. This model can be used in conjunction with the Minimum Distribution Cost Model or as input to Motive Power Purchasing Policy or Allocation models of more sophisticated kinds.
Direct requests to R. Shea, Director of Technical and Operations Research, CP Rail. Publicationsì Better Equipment-Greater Profit, presented at the Fourth International Symposium on Railroad Cybernetics, Washington, D.C., by P.J. Detmold and R. Klein, April 1974. Various articles published in Transportation Research Forum Annual Proceedings by P.J. Detmold and R.A. Shea.

Canadian Pacific No Date

ACKNOWLEDGMENT: Canadian Pacific
PURCHASE FROM: Canadian Pacific Windsor Station, Montreal, Quebec H3C 3E4, Canada

18 131768
MINIMUM DISTRIBUTION COST MODEL
Computer program which calculates total distribution cost for a load of any kind of a single origin/destination link involving one or more modes of transport. It can be used to evaluate a transport service as seen from the shipper's viewpoint and compare the economic advantage to him of alternative modes of transport. The model is designed to be used in various packages with operating cost models. It is then possible to choose the means of transport which is most profitable from the operator's viewpoint, offering the greatest gap between the value to the shipper and the cost of providing the service to the trransporter. This facility is useful both in considering multi-modal packages and also in evaluating the economics of train performance standards, service frequency, design of cars. etc.
Direct requests to R. Shea, Director of Technical and Operations Research, CP Rail. Publications: Various articles published in Transportation Research Forum Annual Proceedings 1972--P.J. Detmold (Denver) and R.A. Shea (Halifax).

Canadian Pacific No Date

ACKNOWLEDGMENT: Canadian Pacific
PURCHASE FROM: Canadian Pacific Windsor Station, Montreal, Quebec H3C 3E4, Canada

18 131883
FINANCIAL STATEMENTS GENERATOR
This program produces an Income Statement, Balance Sheet, Cash Flow Statement, and various financial and operating ratios for five one-year periods with the first year shown by quarters. It is operable in a time-sharing environment only. Deterministic in nature, the program requires substantial initial data from the user, after which be may make data changes by means of a simple conversation mode. Technical highlights are the internal handling of long-term and short-term debt, financial charges, capital investments, depreciation (ICC and IRS) and state and federal taxes.
Direct requests to R.L. Sauder, Director, Operations Research, Southern Railway. Publications: "Corporate Planning goes on the Southern", Progressive Railroading, May 1974. "The Role of Data Systems in Corporate Planning", AAR Data Systems Division, Papers and Committee Reports Presented at the 1975 Annual Meeting.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

18 131902
PRESENT VALUE RISK ANALYSIS
This time-sharing computer routine calculates the probability that the rate of return for an investment proposal is less than a given interest rate. Input parameters include the interest rate, investment life, and average cash flow and the associated standard deviation for each year. The methodology was taken from "The Derivation of Probabilities Information for the Evaluation of Risky Investments" by Frederick S. Hillier.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131904
VARIABLE COST WORKSHEET
This time-sharing computer program determines the cost of moving a car between two stations. It computes the Line Haul Cost; the Car Mile Cost; the Switching Minutes at the origin and destination of the move, the Enroute Switching Time, and the switching time in the passing yards; the switching charges at interchanges; the loss and damage of a given commodity; the rental costs on rented equipment; and the total cost/carload of a given commodity moved over different routes. An empty-return move can also be accommodated.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131906
TRUCKING REVENUE AND EXPENSE MODEL
Computer program is a fifteen-year forecast in time-sharing which produces reports of constant dollar revenues (uninflated), current dollar revenues, current dollar expenses and current dollar expense/revenue ratios.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131907
ASSET DEPRECIATION RANGE
Computer program makes a calculation of accelerated depreciation for corporate tax return under the Class Life Asset Guideline Depreciation Range System (ADR) of Internal Revenue Service. Interactive time-sharing computer program provides detailed depreciation reports on new property acquisitions and extraordinary retirements as well as summary report. Program will store depreciation data for as long as needed. Besides tax report, program can also be used for tax audit, and to provide depreciation input for company budgeting and other forecasting activities. Program is designed to be run by company department having responsiblity for income tax preparation. No familiarity with data processing is necessary.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131908
MONTHLY BUDGETING SYSTEM
Computer program consist of monthly and annual income statements for each subsidiary and the consolidated company. Inputs are annual and monthly data for one calendar year for each subsidiary plus inter-company adjustments, tax data, and stock data required for the consolidated company calculations. The major calculations done by the model include book and tax depreciation, and federal income taxes. The consolidated federal income tax is apportioned to all subsidiaries, depending upon each subsidiary's separate- return tax and its income before federal income taxes.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131910
GENERAL RATE INCREASE YIELD PROGRAM (REVENUE NEEDS)
This time-sharing computer program enables Traffic Department users to assess the effect of proposed rate changes on company revenues by rate bureau jurisdiction and commodity group. A second-generation system has been prepared for use by interested western railroads and the WRTA. This version allows rate increases (and hold-downs) to be selective by tariff group, STCC group, Intra-West, regional pair or combinations thereof. The effect of the increase at the selected level is immediately output to the user on the terminal.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131911
CORPORATE PLANNING SYSTEM
This system of computer programs is composed of a subsidiary model and a consolidation model, both of which generate financial statements for a 16 year planning horizon. The output reports are: (1) Net Income Statement, (2) Cash Flow Statement, (3) Balance Sheet, (4) Financial Ratios, and (5) Federal Income Taxes. Both models include calculations for debt interest & repayment, depreciation, minority interest, and Federal income taxes including carry-overs and refunds. The system allows 24 subsidiaries to be defined, where 21 are available for consolidation. The models are linked in that the consolidation model extracts the majority of data needed directly off the subsidiary files.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131913
SECURITY MANAGEMENT SYSTEM
Comprehensive time-sharing system of computer programs provides several capabilities in the areas of security management and control. These include computation of price and yield of 24 different kinds of securities and a security trade analysis function whereby the net dollar effect resulting from security swaps is computed. System creates and maintains a master file containing a security portfolio which can produce daily cash proceeds reports and monthly income reports.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131915
CARFOR-DISTRICT REVENUE ESTIMATING SYSTEM
This interactive system allows Traffic Department users to access forecasts of tonnage and revenue per car by month for 79 commodity groups. Data is kept for both base and forecast years to provide comparison reports by district, territory, or system.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

18 131921
MOTIVE POWER MODEL
The computer model can be used to determine, for a set of trains and operating assumptions, the motive power fleet (by unit type) that satisfies train service requirements at minimum ownership and operating cost. Power is assigned to trains and distributed throughout a time-space network of train service in an optimal manner. Reports and statistics give the resultant fleet size by unit type, utilization measures, average miles/unit/time period, total costs, etc. The model has been used to evaluate the economics of buying large numbers of 3000 h.p. 4-axle diesels. The model analyzed the relative costs of different ways of integrating such diesels into the total fleet. The assignment- distribution problem is formulated as a mixed-integer programming problem. IBM's MPSX linear programming package inbedded within the framework of an integer search algorithm is used to produce solutions to the problem.
Direct requests to P.N. Belshaw, R & D Dept., Canadian National.

Canadian National Railways Jan. 1973

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

18 132890
ECONOMICS AND TRANSPORT POLICY
This book is divided into 5 parts. In part 1, the nature of economic issues in the transport sector are discussed together with the effect of changes in transport demand and technology on the economic structure of the country. Part 2 is concerned with the heterogeneous nature of the demand for transport services, and with the different ways in which these demands can be met. It discussed the attempt at coordinating all activities in the sector. Part 3 outlines the problems associated with the provision of transport infrastructure. Mention is made of methods of determining optimum prices for the use of an existing network and of the use of cost-benefit analysis for evaluating additions to the network in both urban and interurban transport. Part 4 deals with the various modes of transport; railways, road haulage, road passenger transport and air transport are discussed in turn. In part 5, a comparison is made between the United Kingdom and European economic community transport policy. /TRRL/

Gwilliam, KM Mackie, PJ (Leeds University, England)
Allen (George) and Unwin Limited 1975, 390 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215445)
PURCHASE FROM: Allen (George) and Unwin Limited Museum Street 40, London WC1, England

18 132973
ECONOMIC FACTORS INFLUENCING THE DECISION TO USE JUMBO RAIL CARS
For over 40 years engineers have concluded that very heavy axle loading lends to a disportionate degree of track wear. Economists see the important question being why management continues to purchase and use jumbo cars in the face of very pervasive evidence provided by engineers. Management lives in a world of demand functions, cost functions, accounting principles and regulation. Decision making in this maze of variables, constraints and uncertainties must be made on the basis of the best information at its disposal and given the nature of railroading. ICC costing and regulatory restraints have encouraged large cars. Economics of scale seem to justify large cars. Long term economic costs, including those associated with track deterioration, may paradoxically be the wrong basis for rate making. Inability to compete in the short run may make the long run irrelevant. Short run profit maximization may be maximum use of assets.
Proceedings of the 12th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958, Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Selzer, LJ
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 130-132

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

18 132983
HOW NORFOLK AND WESTERN FIGURES ITS RETURN ON EQUIPMENT INVESTMENT
This article describes six possible approaches to calculating the return on investment on freight cars. The determinants are assumptions about online and offline utilization and the inclusion or exclusion of earnings from offline railroads. One of the six analyses is recommended as the best single answer to a very complex question.

Railway Age Vol. 177 No. 4, Feb. 1976, pp 22-24

PURCHASE FROM: XUM
DOTL JC

18 134314
RAILWAYS-A SUITABLE CASE FOR CONVERSION?
A brief summary is given of a study carried out to investigate the costs and benefits of converting six eastern region British rail lines (3 rural, 2 urban and 1 mainline) to roads. The authors, E. Smith and professor P. Hall, envisage a new road between Liverpool street and Brentwood, built to motorway standards, to cater for the traffic from the main railway line. Express buses, one every 10 seconds at 80 kph, would run to a bus station at Liverpool street; the use of this road by private vehicles, if permitted, would be limited. The return on investment for the six schemes ranged from 30 per cent on one rural line to infinity (because no net investment was needed) where a substantial amount of the line was through London. Savings in running costs and benefits to private vehicles from the six lines would total some 30 million Bristish Pounds yearly. An even greater 'saving' is attributed to the benefit to private vehicles which would ensure from the building of six new roads. /TRRL/

Surveyor - Public Authority Technology Vol. 147 No. 4365, Feb. 1976, 7 pp, 1 Fig., 1 Tab., 1 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218216)
PURCHASE FROM: IPC Science and Technology Press Limited IPC House, 32 High Street, Guildford, Surrey, England

18 134555
AN ATTEMPT TO EVALUATE THE MOST FAVOURABLE INTERNAL ECONOMIC ASPECTS OF A RAILWAY [Ensayo para evaluar aspectos de la conveniencia economica interna de un ferrocarril]
In a loss-making railway system which must, nevertheless, maintain services in operation for social reasons, the various sectors do not contribute to the poor results in the same way. The method devised by the author aims to weigh, strictly in operational terms, the economic effects of the individual elements of this rail system, equating avoidable expenses with revenue procured by the corresponding sector. When such revenue does not cover avoidable expenses, the company must identify the cause of the loss and make decisions accordingly. This paper was awarded a prize by Congress. [Spanish]

Diaz, EC
Pan-American Railway Congress 1975, 10 pp, 1 Tab., 2 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France

18 136257
RATE BUREAUS AND THE RAILROAD REVITALIZATION AND REFORM ACT OF 1976-TRUMAN REVISITED
Railroads grew up with collective ratemaking, practices using them before the passage of the Federal antitrust laws in 1890 and continuously thereafter. Court challenges never changed the practices basically; the Railroad Revitalization and Regulatory Reform Act of 1976 for the first time alters the regulatory approach to reduce the scope of detailed regulatory intervention and increase the scope of flexible carrier pricing decisions. The Section 5a changes mean that many railroad rates must come to be made by competitive procedures under pain of antitrust liabilities with joint-line rates a particular problem. The pressure to curtail collective pricing and service decisions will continue and more far reaching changes in pricing practices are in prospect.

Pearce, CJ Clearwaters, KI *ICC Practitioners' Journal* Vol. 43 No. 4, May 1976, pp 482-501

PURCHASE FROM: Association of Interstate Commerce Comm Pract 1112 ICC Building, Washington, D.C., 20423
DOTL JC

18 136258
A NEW REGULATORY ACCOUNTING SYSTEM FOR RAILROADS
After 70 years with little change in ICC-prescribed accounting procedures for railroads, the deficiencies first apparent to accountants, cost analysts and economists and then to regulators are being redressed. If ICC accounting is to be used as an effective tool in the current economic environment, revision has become necessary. The Railroad Revitalization and Regulatory Reform Act of 1976 also requires that ICC adopt new accounting requirements. Under existing accounting, most number operating revenues and expenses are not classified by function, nor are they classified by natural expenses. The fundamental change is to convert the property-oriented costing system into an input-output oriented costing system with two dimensions of natural cost elements (salaries, wages, materials, fuel, etc.) and service outputs (maintenance, line-haul, switching, etc.).

Young, R *ICC Practitioners' Journal* Vol. 43 No. 4, May 1976, pp 457-469

PURCHASE FROM: Association of Interstate Commerce Comm Pract 1112 ICC Building, Washington, D.C., 20423

DOTL JC

18 136259

HISTORICAL PERSPECTIVES ON THE FREIGHT CAR SUPPLY PROBLEM: THE ROLE OF DEMURRAGE

Car supply problems contribute in a major way to general railroad performance difficulties and the largest possible freight car fleet will not be adequate to serve shippers if it is not used efficiently. One method for expanding the effective size of the fleet is to reduce the time users detain cars; in theory demurrage changes, the fee charged users for holding cars beyond the allotted free time, should provide the incentive for shorter detention. The evolution of demurrage is traced. The author urges a rigorous examination of demurrage and observes that thus far car users have not attempted to contribute to a solution which will inherently benefit their transportation problems.

Calabro, PJ Speh, TW *ICC Practitioners' Journal* Vol. 43 No. 4, May 1976, p 470

PURCHASE FROM: Association of Interstate Commerce Comm Pract 1112 ICC Building, Washington, D.C., 20423

DOTL JC

18 138326

AAR LOOKS AT TRUCK-RAIL COMPETITION

The Association of American Railroads Staff Studies Group asserts that, contrary to the current view of truck-rail competition having stabilized with motor carrier costs somewhat higher than rail costs for long-distance carloads, evidence shows that differences in these costs have narrowed. Truck costs, not regulation, are regarded as the real arbiter of rail rates. A truck costs model was developed to derive total annual costs of truck movements for various commodities. The increasing efficiency of owner-operations, long neglected by railroads as a competitive factor, threatens to capture "rail-owned" traffic, according to study findings.

Progressive Railroading Vol. 19 No. 4, Apr. 1976, pp 45-46, 1 Tab.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606

DOTL JC

20 090870
ENVIRONMENTAL, ECONOMIC, AND SOCIAL IMPACTS OF MINING COPPER-NICKEL IN NORTHEASTERN MINNESOTA
The Duluth Gabbro Complex in northeastern Minnesota possibly contains a significant domestic copper resource and the Nation's largest nickel resource. Exploration has discovered large low-grade copper-nickel (Cu-Ni) deposits between Hoyt Lakes and the Boundary Waters Canoe Area. The mining and processing of Cu-Ni will have environmental, economic, and social impacts. The purpose of the study is to relate major environmental, economic, and social considerations to various aspects of Cu-Ni extraction. An open pit and two underground (block caving and open stoping with backfilling) models were developed to generate information on the impact of Cu-Ni extraction. Important considerations having environmental, economic, and social impacts during various aspects of Cu-Ni extraction are identified and defined. These aspects are exploration, development, mining, beneficiating, smelting, industrial, energy, climatic, resource, water, air emission, waste disposal, employee, tax and royalty, transportation, and community considerations.

Hays, RM
Minnesota University, Minneapolis, Bureau of Labor Statistics Report Aug. 1975, 149 pp

Contract S0133089

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-240466/3ST

20 093828
DEMAND FOR COAL FOR ELECTRICITY GENERATION 1975-1984
This report compiles data submitted by the Regional Electric Councils and relates to the status of their respective Bulk Power Supply Programs to the Federal Power Commission. These data include projections of annual net generation requirements and scheduled generating capacity additions by primary fuel type through 1984 as well as detailed information on individual existing generating units including megawatt capacities and both primary and alternative fuel types.
Prepared by ICF, Inc., Washington, D.C.

Federal Energy Administration, ICF Incorporated Final Rpt. FEA/G-75/487, Aug. 1975, 40 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245216/7ST

20 094171
COAL AND PUBLIC POLICIES
This is a compilation of papers presented on The Symposium on Coal and Public Policies, cosponsored by The University of Tennessee and the Oak Ridge National Laboratory and held on UT's Knoxville campus in October 1971. The collection of papers is designed to contribute to an understanding of the major mineral resource of the Appalachian region: coal-its markets, technology, and the private and social costs associated with its extraction and use.
Presented at the Symposium on Coal and Public Policies Held at the University of Tennessee, Knoxville, Tennessee on October 13-15, 1971.

Schmidt-Bleek, F Carlsmith, RS
Tennessee University, Knoxville, National Science Foundation, Oak Ridge National Laboratory NSF/RA/N-72/087, Feb. 1972, 173 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248117/4ST, DOTL NTIS

20 094174
LOW SULPHUR COAL: A REVISION OF RESERVE AND SUPPLY ESTIMATES. APPENDIX C
Conventionally, the definition of low sulfur coal, on which traditional reserve and supply estimates are based, depends only on the weight of sulfur in a ton of coal. The Btu content of the coal is not considered. Coal purchases and SO2 regulations are based on Btu content. A recalculation of reserve estimates of low sulfur coal on a utility average Btu basis reduces traditional U.S. estimates by over 75 percent and Western estimates by almost 85 percent. When calculated on a Btu basis, maximizing low sulfur coal production results in a supply shortage by 1985. The policy implications for an increased dependence on domestic coal include increased cleaning of high sulfur coal and export limitations on low sulfur coal in the short-term. In the mid-term, large capital expenditures in R and D and processes which reduce or eliminate the sulfur content are required. These include stack gas scrubbing, gasification and liquefication. For the consumer, some of these costs can be offset by the elimination of the transportation charge differential between local high sulfur coal and coal from Wyoming, Colorado and Montana.
Supersedes PB-235 464. See also PB-248 063. Report on The Coal Future: Economic and Technological Analysis of Initiatives and Innovations to Secure Fuel Supply Independence.

Rieber, M Soo, SL Stukel, J
Illinois University, Urbana, National Science Foundation Final Rpt. CAC-163-App-C, NSF/RA/N-75/037C, May 1974, 58 pp

Grant NSF-GI-35821

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248062/2ST, DOTL NTIS

20 094178
MINNESOTA'S ENERGY SITUATION TO 1985
This report presents estimates of the conventional energy supplies which can be counted on with reasonable certainty to be available to Minnesota over the next 10 years. Projected energy demands based on recent trends are shown to significantly exceed these supplies.

Minnesota Energy Abency MEA-MES 85-7508, Aug. 1975, 16 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248053/1ST, DOTL NTIS

20 094186
THE COAL FUTURE: ECONOMIC AND TECHNOLOGICAL ANALYSIS OF INITIATIVES AND INNOVATIONS TO SECURE FUEL SUPPLY INDEPENDENCE
Nuclear power costs are reevaluated to determine the ceiling price for coal. Low sulfur coal reserves are reestimated on a consumer rather than on an as mined basis. Coal reserve/resource estimating procedures are analyzed for their policy content. Comparative cost estimates are developed for unit trains, slurry pipelines and high pressure pneumatic pipelines. Low Btu coal gasification and stack gas scrubbing are compared for SO2 removal. An analysis of medium Btu coal gasification to increase coal markets is made.
See also PB-247 679.

Rieber, M Soo, SL Stuckel, J
Illinois University, Urbana, National Science Foundation Final Rpt. UIUC-CAC-DN-75-163, NSF/RA/N-75/037, May 1975, 227 pp

Grant NSF-GI-35821

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. CP, Microfiche
PB-247678/6ST, DOTL NTIS

20 094195
SHORT-TERM COAL FORECAST, 1975-1980
This report provides estimates of bituminous coal and lignite production, consumption and end-of-year stocks for 1975 through 1980. The report discusses the approach and data base used to develop the projections of 1975-1980 production, consumption and stock levels; estimates the price impacts of these projections; and discusses the uncertainties and sensitivities inherent in the projections. Appendices contain regional breakdowns of the 1975-1980 supply and demand projections; an analysis of why increases in coal production capacity are likely to be insufficient to meet the requirements of new coal-fired electrical generation capacity; a list of coal quality characteristics of the supply regions developed for Project Independence; and an analysis of short-term coal production responses to any change in spot market coal prices.

ICF Incorporated, Federal Energy Administration Final Rpt. FEA/G-75/494, Aug. 1975, 120 pp

Contract FEA-C-05-50099-00
ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247073/0ST, DOTL NTIS

20 129727
DOMESTIC AND INTERNATIONAL TRANSPORTATION OF U.S. FOREIGN TRADE: 1976-GENERAL CARGO COMMODITIES (PHASE II)
Objective is to obtain, (a) New data on the domestic orgins and destinations, and the characteristics of domestic transportation, for commodities being transported via international air and vessel movements in U.S. foreign trade, and (b) New data on the transshipment of this type of commodity by truck and rail between U.S. and Canada (or Mexico) for trade with other foreign countries. Data will be collected by a sample survey (50,000 observations) and merged with existing data on international trade.

Co-sponsors are St. Lawrence Seaway Development Corp., U.S. Dot; U.S. Army Corps of Engineers, Institue for water Resources, Ft. Belvoir, Virginia; Maritime Admin, Dept of Commerce.

Domestic & Intl Transportation of U.S. Foreign Trade: 1975- Gen Cargo Commod; Phase I: Prelim Studies, Spec & Plans, Bureau of the Census

PERFORMING AGENCY: Bureau of the Census, Economic Surveys Division, 63-7108
INVESTIGATOR: Wright, D (Tel 202-763-7330) Decker, Z
SPONSORING AGENCY: Office of Policy, Plans and International Affairs; Office of Transportation Syst Anal and Information, Department of Transportation
RESPONSIBLE INDIVIDUAL: Murphy, RD (Tel 202-426-2090)

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ACKNOWLEDGMENT: Office of Policy, Plans and International Affairs

20 129856
AN APPROACH TO THE FUTURE TRENDS OF THE ORIGIN-DESTINATION TABLE FOR THE RAILWAY FREIGHT TRANSPORT
An estimating method for railway freight traffic in the future under various conditions has been developed. The process is based on origin-destination tables and traffic matrix, which are now maintained on a continuing basis.

Uchida, T Harada, M *Railway Technical Research Institute* Quart Rpt. Vol. 16 No. 3, Sept. 1975, pp 126-130, 3 Fig., 1 Tab., 1 Phot.

ACKNOWLEDGMENT: Japanese National Railways
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC
DOTL JC

20 130915
PRESENT AND FUTURE POSITION OF COAL IN STEEL TECHNOLOGY
The current and projected demand for steel, iron and energy, as well as the reserves and availability of coal in the United States and Canada are reviewed. The future position of coal in North America is investigated, this geographic area being characteristic where coal can be expected to exert a significant influence on future steel technology. The developing technologies of coal gasification and liquefaction, and their impact on future steelmaking operations are also discussed.

Presented at the IISI 8th Annual Conference, Panel Discuss and Speeches, Munich, W. Germany, Oct. 13-16, 1974. See RRIS 20 130916.

Smith, EJ (National Steel Corporation); Hass, KP
International Iron and Steel Institute Proc Paper 1975, pp 51-71, 49 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: International Iron and Steel Institute Place du Champ de Mars 5, Brussels B-1050, Belgium Repr. PC

20 130916
INTERNATIONAL IRON AND STEEL INSTITUTE, 8TH ANNUAL CONFERENCE, REPORT OF PRECEEDINGS, 1974
Proceedings contain 12 papers all of which focus in one way or another on the major problem occupying the minds and efforts of steelmakers--energy. Trends in iron-and steelmaking technology are considered in the light of the supply situation of various fuels, and plans for steelmaking capacity in various developing countries are examined. Finally, the contributions that the steel industry is making toward the solution of energy problems are explored: supply of the right types and qualities of steel urgently needed for the development of new energy sources--offshore oil and gas exploration, and transportation of fuel and raw materials by pipeline and ship.

Published in 2 Volumes. See also RRIS 20 130915. Presented at the IISI 8th Annual Conference, Panel Discussions and Speeches, Munich, W. Germany, October 13-16, 1974.

International Iron and Steel Institute Proceeding 1975, 380 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: International Iron and Steel Institute Place du Champ de Mars 5, Brussels B-1050, Belgium Repr. PC

20 130917
USE OF ENERGY IN THE STEEL INDUSTRY DURING THE PAST TWO DECADES
Trends in energy consumption by the world's steel industry are examined with special emphasis on the Japanese industry, and technical steps that could be effective in saving energy are presented. One example is the reduction of blast furnace fuel rate. Since energy used in iron and steel manufacture mostly comes from coking coal, recommendations are given on how to increase the efficiency of this coal, as well as on the viability of developing noncoking coals.

Presented at the IISI 8th Annual Conference, Panel Discuss and Speeches, Munich, W. Germany, Oct. 13-16, 1974. See RRIS 20 130916.

Toyoda, S (Nippon Steel Corporation)
International Iron and Steel Institute Proc Paper 1975, pp 30-44

ACKNOWLEDGMENT: EI
PURCHASE FROM: International Iron and Steel Institute Place du Champ de Mars 5, Brussels B-1050, Belgium Repr. PC

20 131140
INLAND WATERWAY TRANSPORTATION
This issue contains papers that examine inland waterways and the significant role of inland waterways in the domestic transportation system, a new area for the Transportation Research Board.

Presented are 8 reports prepared for the 54th Annual Meeting of the Transportation Research Board.

Transportation Research Record No. 545, 1975, 36 pp, 2 Fig., 7 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL JC

20 131323
STEEL'S NOT-SO-SOLID EXPANSION PLANS
Despite the demand downturn from the steelmaking boom of 1973 and 1974, steel companies have been talking about the need for 30 millions tons a year of additional steel- producing capacity by 1980. That would be about 20% higher than 1973's capacity level of 155 million tons. Financing such expansion could be a problem, but if higher prices can be imposed, profits would improve and new capacity would be authorized. In the near future steelmaking capacity is going to grow at a rate that exceeds predictions of demand. If there were to be cancellations of longer-term projects, domestic shortages could spark imports. It is noted that some of the industry's investment practices are helping to keep steel underpriced and certain of the expansion plans, at present prices for products, must be thought of as inefficient use of capital.

Loomis, CJ *Fortune* Vol. 93 No. 1, Jan. 1976, 8 pp

PURCHASE FROM: Time Incorporated 540 North Michigan Avenue, Chicago, Illinois, Repr. PC
DOTL JC

20 131647
RECYCLING AND ENERGY USE IN THE PRODUCTION OF METALS
Loss of yield with resulting recycling of scrap within a metal producing-system causes an increased use of energy per unit of final product. Recycling

of materials from outside the production system results in decreased use of energy. The effects of internal and external recycling of scrap materials on the energy requirements for producing a metal has been modeled. The model provides a ready means for evaluating the effects of factors such as changing processing methods, importation of metals, improved recovery of metals from waste, etc., on the energy requirements of a metal-producing industry. Some results of the use of the model for the steel industry are presented and discussed.

Intl Symp on Metal-Slag-Gas Reactions and Processes, Proceedings, Electrochemical Soc, Spring Meeting, Toronto, Canada, May 11-16, 1975.

Elliot, JF (Massachusetts Institute of Technology)
Electrochemical Society Proc Paper 1975, pp 932-949, 6 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Electrochemical Society Electrothermal and Metallurgy and Corrosion Division, Princeton, New Jersey

20 132957
COMMODITY FLOW ANALYSIS. CARLOAD ALL-RAIL TRAFFIC BETWEEN CANADA AND THE UNITED STATES, 1968-1973

Reference paper No. 3 details in five major commodity groups the carload all-rail traffic of Canadian National Railways and C. P. Rail, originating in Canada, destined to the United States and originating in the United States destined to Canada for the six years, 1968-1973. This statistical report of international traffic is grouped into five sections, totalling 208 tables and contains: cars, tons, revenues, ton-miles, car-miles, and origin-destination matrix tables (Provinces to State groups and State groups to Provinces).

Price is $4.75 in Canada; other countries $5.70.

Canadian Transport Commission Ref Paper No. 3, 1975, 12 pp, 208 Tab.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Information Canada Ottawa, Canada
TT 31-6/1973, DOTL RP

20 132977
COMPETITION BETWEEN RAILROADS AND TRUCKS

This article analyzes the competitive performance of railroad and highway operations based on market share data and cost information. Total freight-haul tonnages, as well as those for specific commodities are investigated to ascertain modal share in relation to both length of haul and shipment size. The goal is to quantify some of the trends hidden in the mass of available data. Correlations for individual commodities generally agree with the analysis for total traffic. Significant variations for individual commodities indicate rail rates sometimes do not relate directly enough to the cost advantage of railroad carriage or that shippers of certain commodities deliberately choose premium forms of transportation when more economical methods are available. There are opportunities for aggressive railroad marketing.

Rakowski, JP (Minnesota University, Minneapolis) *Traffic Quarterly* Vol. 30 No. 2, Apr. 1976, pp 285-301, 6 Fig., 2 Tab.

PURCHASE FROM: ESL Repr. PC, Microfilm

20 132985
THE STATE OF THE U.S. COAL INDUSTRY. A FINANCIAL ANALYSIS OF SELECTED COAL-PRODUCING COMPANIES WITH OBSERVATIONS ON INDUSTRY STRUCTURE

This Bureau of Mines paper discusses the corporate structure dynamics, methods of financing, and financial assessment approaches that should be utilized to evaluate the economic health of the coal industry. It suggests rates of return and other measures of corporate economies necessary to attract capital required to finance emerging coal demand, plus impact of coal sales to total revenues. The study illuminates the activities of 30 selected coal-producing companies, including their subsidiaries or affiliates, that were responsible for approximately 60 percent of the total U.S. production in 1974. The selected firms are not all primary coal producers; many of the larger producers are classified by the financial institutions as petroleum, metal, and steel producers, public utilities, or chemical industries. The bituminous coal industry is highly competitive as to price, service, and quality of product and is subject to competition from other noncoal energy sources. The top 15 bituminous coal- producing companies mined about 46.6 percent of the Nation's total production in 1974, and the balance of approximately 3,885 companies were responsible for the rest of the production. Thus, the U.S. bituminous coal industry is not an oligopoly. Today, about 65 percent of the Nation's total coal production is consumed by electric power utilities and 26 percent by steel, space heating, and other industries; the balance of 9 percent is exported.

Tomimatsu, TT Johnson, RE
Bureau of Mines 1976, 32 pp, 6 Fig.

ACKNOWLEDGMENT: Bureau of Mines
PURCHASE FROM: Bureau of Mines Publications Distribution Branch 4800 Forbes Avenue, Pittsburgh, Pennsylvania, 15213 Repr. PC

20 132987
INVESTMENT BEHAVIOR IN THE IRON AND STEEL INDUSTRY OF THE UNITED STATES. PHASE 1: FORECASTS FOR 1975-1980

The comparison of the model forecasts with industry requirements leads to the judgment of this report that there will be a capital shortage in the iron and steel industry in the future. The total capital shortage could range from $5.87 to $10.23 billion, with the gap becoming more pronounced in 1978-80, depending upon the assumptions built into the forecasts. Although the future capital requirements given by the iron and steel industry may be somewhat overstated, even an error of 50 percent would still imply a significant likelihood of a shortage except under the most favorable conditions. The effect of any capital shortage will make itself felt eventually in insufficient production and/or increasing prices.

Available for reference material only during working hours at the Bureau of Mines Library in Pittsburgh, Pa., and the Central Library, U.S. Dept of the Interior, Washington, D.C.

Newmann, GR Crandell, RM
Pennsylvania State University, University Park Dec. 1975, 121 pp, 21 Fig.

Grant J0255006

ACKNOWLEDGMENT: Bureau of Mines
PURCHASE FROM: Department of the Interior Central Library, Washington, D.C.

20 134315
A CURRENT VIEW OF A PORTION OF THE EASTERN U.S. TRANSPORT MARKET

Rail carriers in the eastern United States are in a state of or near to bankruptcy. This paper explores the total flows of manufacturing traffic (standard transportation commodity codes 20 to 39) which traditionally moves by rail by constructing regional origin-destination matrices from the 1963 and 1967 censuses of transportation. Matrices are constructed for total goods movement and for rail movement. They are then analysed to see what profile they present for each year, and are compared to see what has occurred over this time. These results are summarised to show their significance for the eastern rail problem. It is found that traffic in goods traditionally carried by rail is increasing, but it is moving by other modes. It is suggested that aggressive management is needed for rail services. /TRRL/

Allen, WB (Pennsylvania University, Philadelphia) *Journal of Transport Economics and Policy* Vol. 9 No. 1, Jan. 1975, pp 50-61, 7 Tab., 5 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218189)
PURCHASE FROM: London School of Economics and Political Science Houghton Street, Aldwych, London WC2A 2AE, England
DOTL JC

20 135174
U.S. COAL PRODUCTION MAY NOT REACH GOALS SET FOR 1985

The sources of constraints on the plan to double United States coal production by 1985 are discussed. There are two different types of constraints now limiting coal production-constraints on the demand for coal, such as Federal air quality standards that prohibit the burning of much of the nation's coal without steps to reduce air pollutants, and supply constraints, such as bottlenecks in equipment deliveries and the decision enjoining western mining. Utilities are extremely reluctant to burn coal with cleanup devices because of the expense of the equipment (some utility executives contend the cost of the equipment is more than one-fourth the cost of constructing a typical coal fired plant), alleged reliability problems and the drawn-out rate proceedings the utilities must go through before they can recoup their investments in the cleanup devices, a capital item. Industry leaders entered 1975 bullish on western coal which they count on for almost three-fifths of the added capacity they expect to put in place between now and 1985. But on June 16 a U.S. Court of Appeals for the District of Columbia enjoined the Federal government for moving ahead with coal development in the Northern Great Plains area, a rich coal basin that contains 48 percent of the nation's coal reserves.

Phillips, JG *Professional Engineer* Vol. 45 No. 11, Nov. 1975, pp 25-28

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

20 135175
CAPITAL FOR COAL MINE DEVELOPMENT
An analysis of coal's capital needs and sources is presented. A detailed review of the estimated expenditures for mine-development discloses considerable variation in average unit costs, usually expressed in dollars per annual ton of output. Thus it is scarcely suprising to note that the range of such recent estimates of the capital needed for new coal development, for the eleven-year period 1975-1985, is from about $11 billion to around $25 billion, expressed either in 1974 or 1975 dollars. The author's principal conclusion is that new coal development is much likely to be curbed by legal regulatory and environmental constraints than by inflationary increments or any possible shortage of capital resources.

Wilson, WW *Coal Mining and Processing* Vol. 13 No. 1, Jan. 1976, 5 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

20 135176
PROSPECTS FOR COAL AS A DIRECT FUEL AND ITS POTENTIAL THROUGH APPLICATION OF LIQUEFACTION AND GASIFICATION TECHNOLOGY
Examination of the resource base for coal indicates that there will be no problem (other than man-made) in availability for legitimate domestic energy requirements within the next 20 years. As the more convenient forms of fossil energy (oil and gas) decline in domestic availability we will turn to coal out of necessity; provided that total energy growth remains below 3 percent, the coal industry will be able to fill the gap, though with great difficulty. Coal production will increase from 1975's likely production of 625 million tons to 1,025 million tons by 1985 and 1.7 billion tons by 1995. During the middle years of the 20-year forecast period, coal conversion plants, heavily subsidized either overtly or covertly, will be built to verify technology now available and to act as insurance against unforeseen failures of oil and gas supply.

Bowden, JR (Conoco Coal Development Company) *Journal of Petroleum Technology* Vol. 28 Jan. 1976, pp 11-15

ACKNOWLEDGMENT: EI
PURCHASE FROM: Society of Petroleum Engineers 6200 North Central Expressway, Dallas, Texas, 75206

20 135177
COAL PRODUCTION AND CONSUMPTION IN 1985
The Bureau of Mines estimates that demand for coal in 1985 should be about 1 billion tons, including exports. Whether consumption will reach that level depends on several constraining factors, the most important of which is air pollution regulations. The answer to whether the U.S. can produce a billion tons of coal in 1985 is a qualified "yes"-qualified because of the many constraints affecting current and future production. Based on information developed by the Interagency Coal Task Force and others working on Project Independence, the Administration established a goal of 1.2 billion tons of coal for 1985. At that level, oil imports, depending on prices, would be kept at or below current levels. The coal task force determined that 1.2 billion tons of coal could be produced in 1985 if a national commitment to coal were made immediately and if constraints to coal production could be relaxed or removed.

Falkie, TV (Bureau of Mines) *Coal Mining and Processing* Vol. 13 No. 1, Jan. 1976, 2 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

20 135199
ENERGY USE PATTERNS IN THE METALLURGICAL INDUSTRIES
This paper summarizes available information on current energy consumption in various sectors of the metallurgical industries. A knowledge of current energy use patterns and projected trends, is particularly important to the metallurgical industries because (1) their requirements represent a large proportion of the total industrial load and (2) the social and economic consequences of curtailments arising from prolonged energy shortages could be devastating. Production of primary metals together with metals fabricated constitute about 22.1% of the industrial direct use of fossil fuels and about 6.5% of the total U.S. use.

Presented at the Symposium on Efficient Use of Fuels in the Metall Ind, Paper, Illinois Inst Technol Res, Chicago, Illinois, December 9-13, 1974.

Rosenberg, RB Larson, DH Waterman, WW Ekman, F
Institute of Gas Technology 1975, pp 17-49, 8 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Institute of Gas Technology Information Services, 3424 South State Street, Chicago, Illinois, 60616

20 135200
EFFICIENT USE OF FUELS IN THE METALLURGICAL INDUSTRIES, SYMPOSIUM PAPER, 1974
Forty-six papers presented at this symposium deal with new processes and techniques for conservation and wise use of energy in the metallurgical industries. Particular subjects covered include: energy resources and rates of consumption; energy use in ore beneficiation and agglomeration; new steel making processes with emphasis on energy conservation; new processes for smelting copper that reduce fuel consumption; hydrometallurgical techniques for copper production; reduced energy consumption in foundries; energy conservation in the production of aluminum, molybdenum, and uranium; heat wells for thermal energy storage; and industrial process fuels of the future.

Presented at the Symposium on Efficient Use of Fuels in the Metall Ind, Paper, Illinois Inst Technol Res, Chicago, Illinois, December 9-13, 1974.

Institute of Gas Technology 1975, 786 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: Institute of Gas Technology Information Services, 3424 South State Street, Chicago, Illinois, 60616

20 135201
WASTE PAPER AS A PULP SUBSTITUTE IN NEWSPRINT
Possible economic advantages for newsprint mills by the use of waste paper are discussed. The disadvantages, such as wide price fluctuation, contaminants and variation in quality are pointed out. Conditions can exist where the use of waste paper could prove to be profitable, as a substitute for unbleached sulfite, or a pulp substitute when the productivity of the paper machines outruns that of the pulp mill. To be economically feasible, low-cost grades of waste paper in abundant supply must be used. New methods of processing to remove contaminants are suggested. The plant must be large enough to be profitable. Flow charts of three waste paper recycling systems are included.

Canadian Pulp and Paper Assoc, Tech Sect Proc for the year 1974, concluding with 61st Annual Meeting, Montreal, Quebec, Canada, January 27-31, 1975.

Doane, FP, Jr
Canadian Pulp and Paper Association 1975, pp T73-T76, 6 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Canadian Pulp and Paper Association Technical Section, Montreal, Quebec, Canada

20 136394
COAL MINE DEVELOPMENT SURVEY SHOWS 492.6 MILLION TONS OF NEW CAPACITY BY 1985
This survey offers a new analysis of bituminous coal's current expansion plans. Presently in development or on the drawing boards are 492.6 million tons of new coal-mining capacity additions. Plans disclosed by 123 firms

covering the years 1975 through 1985 show there are 241 mines which will, when all are in full production, have a combined capacity for 535.9 million tons. New coal mine development and expansion are presented in tables giving a breakdown by state, mining method, number of mines as well as by years.

Nielsen, GF (McGraw-Hill, Incorporated) *Coal Age* Vol. 81 No. 2, Feb. 1976, 12 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

20 136395
SURFACE COAL MINING-1975
During 1935 the U.S. Geological Survey published new coal reserve figures for the United States. The Survey increased its estimate of United States' coal reserves by 23 percent to 4 trillion tons, or about one-half of the world total. The report estimates that, under present technology, about 434 billion tons of coal in this country are recoverable. It also states that one-third of this total is amenable to recovery by surface methods, i.e., can only be mined by surface methods.

Murray, RE (North American Coal Corporation) *Mining Congress Journal* Vol. 62 No. 2, Feb. 1976, pp 80-83

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

20 136396
PRESENT AND FUTURE POSITION OF COAL IN STEEL TECHNOLOGY
Reliance on coal as the dominant energy source for the steel industry should continue until the end of the century, particularly for coal-rich countries. Despite continued reductions in blast-furnace coke rates through such current techniques as auxiliary fuel injection and improved burdens, projected increases in steel demand will increase the requirement for metallurgical coal. Coal preheating will broaden the base of coals used in conventional cokemaking. Formed coke, which should be commercialized by 1980, can extend significantly the reserves of coal applicable to steelmaking processes. Rapid growth in direct reduction can be anticipated, especially for countries with adequate resources of liquid and gaseous fuels and/or limited reserves of coking coal. For countries that are rich in coal but not in gas and oil, the development of coal gasification and liquefaction could accelerate direct reduction.

Smith, FJ Hass, KP *Ironmaking and Steelmaking* Vol. 3 No. 1, 1976, pp 10-20, 49 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL

20 136426
THE INFLUENCE OF THE IMAGE OF SUPPLIERS ON BUYER BEHAVIOUR IN THE FREIGHT TRANSPORT MARKET
The freight transport market in the UK has been increasing at a rate of between 1 and 2% p.a. Since the mid 1960s as measured by total ton-miles and it is worth some 1500 million lbs. annually. That freight business of British Rail accounts for approximately 20% of the total market size is of particular importance to the financial viability of the railways as a whole, owing to the fact that freight traditionally has generated about 40% of the revenue of British rail and difficulty has been experienced in operating it at a sufficiently profitable level to provide for essential re-investment in the business. This lack of profitability caused consideration to be given to the possibility of withdrawing altogether from the market for freight traffic in less than train-loads but this was rejected on the grounds that freight traffic shares assets such as track, signalling, locomotives and manpower with other rail services. A withdrawal from the smaller "wagon load" traffic would reduce traffic by nearly 50% and lead to an under-utilisation of assets thus weakening overall rail profitability. (a) /TRRL/

Cunningham, MT Kettlewood, K *International Journal of Physical Distribution* Vol. 5 No. 5, 1975, pp 238-251, 4 Fig., 4 Tab., 11 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218737)
PURCHASE FROM: Physical Distribution Management Limited 200 Keighley Road, Bradford, Yorkshire, England

7603031

20 136495
MACHINE-READABLE MAPPING FROM NATIONAL NETWORK SIMULATION (NNS) ZONES TO BUREAU OF ECONOMIC ANALYSIS (BEA) AREAS
This report describes the allocation of freight flow data from the National Network Simulation (NNS) zone system to the Bureau of Economic Analysis (BEA) area system. The NNS zone system was developed for use in the analysis of national modal freight flows. The BEA area system was primarily developed for the allocation of national economic data to regions of the United States. Assuming flows of commodities are known among the NNS zones, the NNS zone to BEA area mapping enables the determination of flows among the BEA areas. The report presents zone to area mapping which utilizes 1970 economic data as the basis when an NNS zone overlaps more than one BEA area. It also presents computer programs that could be used to generate a mapping using economic data from some other year.

Lozier, DW Stiehler, JR
National Bureau of Standards, Bureau of Economic Analysis, (NBS-2050141) Final Rpt. NBSIR-75-918, Sept. 1975, 78 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-251412/3ST, DOTL NTIS

20 136572
PROGRAM DEBUGGING AND TESTING A LINEAR PROGRAMMING ANALYSIS OF U.S. PRODUCTION, EMPLOYMENT, AND ENERGY USE
Preliminary work on a linear programming analysis of U.S. production, employment, and energy use is under way at LBL. A series of computer programs reads interindustry transactions data, employment data, and energy flow data in an input-output (I/O) format; performs necessary aggregations and calculates direct I/O coefficients; and provides appropriate input data to the linear programming package GUMPS. Several basic computer programs are now debugged and tested, and the flow of data from input tapes to final printed results is accomplished with a minimum of time-consuming hand operations. The format of the data cards and the structure of the component programs are flexible to permit easy later modification. For preliminary debugging and testing of the programs, 1963 national transactions data, employment data, and energy flow were used. The data aggregated into 12 broad sectors: agriculture, forestry, and fisheries; coal mining; crude petroleum and natural gas; other mining; construction; petroleum refining and related products; primary metals manufacturing; other manufacturing; electric utilities; gas utilities; transportation, communication, other utilities; and trade, finance, services, government.

Merrill, D Lofting, E Quong, C
California University, Berkeley Feb. 1974, 12 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

UCID-3731, DOTL NTIS

20 138079
WAYBILL ANALYSIS CARLOAD ALL-RAIL TRAFFIC-1974
This Waybill Analysis publication is the twenty-fifth consecutive annual report since 1950. The publication provides data on the railway freight movements within Canada and a summary of rail traffic by type of rate. It indicates the pattern of commodity rail shipment and the relative distribution of the various categories of freight rates applicable. The source of this data is a one percent continuous sample of railway waybills which are classified into six major commodity sections containing over 300 commodity subsections. The freight traffic is further defined by origin and destination for three major geographic regions in Canada (Maritime, Eastern and Western).

Canadian Transport Commission 1974

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Publishing Centre Supply and Services, Ottawa, Ontario, Canada

TT3 1-1/1974

20 138080
HISTORICAL FUELS AND ENERGY CONSUMPTION DATA, 1960-72, UNITED STATES BY STATES AND CENSUS DESTRICTS WEST OF THE MISSISSIPPI
Salient historical data on consumption of fuels and energy have been summarized by State and census district for the years 1960 through 1972. This Information Circular covers States west of the Mississippi, and Information Circular 8704 covers States east of the Mississippi. These data replace previouly published compilations of energy consumption statistics by States and districts. Future annual studies are planned using the same Btu conversion factors applied in these two Information Circulars.

Crump, LH
Bureau of Mines 1976, 425 pp

ACKNOWLEDGMENT: Bureau of Mines
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402
I28.27: 8705

20 138084
COAL TRANSPORTATION PRACTICES AND EQUIPMENT REQUIREMENTS
A study was conducted to determine the amount of transportation equipment required to move 1.2 billion tons of coal in 1985. The Federal Bureau of Mines has investigated a majority of the various practices associated with coal transportation and has gathered information on the regional origin-destination patterns, methods of movement, equipment stocks, rate structures, and operational capacities of the most important modes of coal haulage currently in use. Models employing this information were developed to establish the origin-destination pattern for 1985 coal shipments, estimate practical tonnage capacities for selected coal hauling rivers, develop modal shares for both unconstrained (by river capacity) and constrained cases, and present a range of coal transportation equipment requirements for given sets of constraints. Projected transportation shares for rail ranged from 63.7 to 72.3 percent, and for river, from 8.8 to 16.4 percent. Other coal transportation modes (truck, conveyor, Great Lakes, and tidewater) are expected to retain their historic shares of coal traffic. Equipment estimates were made for 1985 rail and water transportation based on 1973 average and best practice. Average practice estimates ranged from 675,000 to 710,000 hopper cars (100-ton) and 3,100 to 5,940 barges (1,400-ton equivalent). Best practice estimates ranged from 126,000 to 142,000 hopper cars and 1,750 to 3,450 barges. Full implementation of 1973 best practice by 1985 is unlikely.

Larwood, GM Benson, DC
Bureau of Mines 1976, 90 pp, 11 Fig.

ACKNOWLEDGMENT: Bureau of Mines
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402
I28.27:8706

20 138295
EFFECTS OF COAL DEVELOPMENT IN THE NORTHERN GREAT PLAINS: REVIEW OF MAJOR ISSUES AND CONSEQUENCES AT DIFFERENT RATES OF DEVELOPMENT
This report describes cooperative studies of several major impacts of increased production of coal from deposits in the Northern Great Plains region at different theoretical rates of development during the next 25-year period. The purpose of the report is to provide information that will be useful in developing a perspective of the issues and consequences of expanded development of coal in the region. The reported studies are expected to be helpful in the decisionmaking processes of individuals; Federal, State, and local governments; industry; and other public and private groups. The reported studies and investigations were made by seven work groups, whose specific subject areas were: Regional Geology; Mineral Resources; Water; Atmospheric Aspects; Surface Resources; Social, Economic, and Cultural Aspects; and National Energy Considerations. Maps are attached.

Northern Great Plains Resource Program 1975, 165 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: Northern Great Plains Resource Program Denver, Colorado

21 053153
CONTINUOUS MEASUREMENT AND CONTROL OF THE SPEED OF WAGONS SHUNTED OVER HUMPS. THE POTENTIAL CAPACITY OF VARIOUS TYPES OF AUTOMATIC HUMPING SYSTEMS. (PART 1)
Hump Marshalling Yards vary so widely in size and technique that it is impossible to gain any valid comparison of the capacity unless common parameters are applied. In this report, such values have been used to assess the capacities of 3 automatic systems, namely: (a) the system developed by the DB using primary and sorting siding retarder and booster units; (b) the system theoretically studied by the DR using 3 retarder stages; (c) the Dowty system developed by BR.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways D74/RP 3/E, June 1967, 35 pp, 18 Fig., 5 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

21 080032
UNITRAIN OPERATING METHODS AND COSTS
As far as can be determined, this is the first authoritative treatise on unitrains and techniques for estimating their transport economics. At this point, some explanation would seem in order regarding the circumstances that have led a marine department to publish a paper on railroad economics. Interest in the subject is legitimate, and arises from a growing awareness that a merchant ship is but one link in the transport system. Before designing an optimum ship, it must be understood how to optimize the complete system. In short, marine, rail, highway and air transport analysts are things of the past. Today's needs are for origin-to-destination transport analysts who can deal in all modes. Three important aspects of unitrain operations are covered in this report. First the various types of railroad operations are defined to enable the reader to comprehend the significance of a unitrain operation. Second, a method of calculating unitrain costs is described. Finally various theories behind the pricing of unitrain operations are discussed.

Sward, JD
Michigan University, Ann Arbor No. 145, July 1973, 163 pp, 40 Ref.

ACKNOWLEDGMENT: Michigan University, Ann Arbor
PURCHASE FROM: Michigan University, Ann Arbor Department of Naval Architecture and Marine Engineering, Ann Arbor, Michigan, 48104 Repr. PC

21 093563
OPERATION OF HIGH SPEED PASSENGER TRAINS IN RAIL FREIGHT CORRIDORS
A preliminary examination of the problems associated with mixed-traffic operations-conventional freight and high speed passenger trains-is presented. Approaches based upon a modest upgrading of existing signal systems are described. Potential costs to the operating railroads, impact on railroad efficiency, and safety of passengers and train crews are considered. Special attention is given to analysis of stopping distance for various conditions and rolling stock. Basic conclusions are that speeds above 125 MPH are likely to require substantial signal system modification and that freight service capacity will be severely degraded by large numbers of HSPT's; further analysis is required to determine well-founded control-system guidelines.

Abbott, RK
Transportation Systems Center, Federal Railroad Administration Final Rpt. DOT-TSC-FHA-75-14, FRA/ORD-76-07, Sept. 1975, 82 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247055/7ST, DOTL/NTIS

21 094864
UNIT TRAIN TRANSPORTATION OF COAL. APPENDIX E
This report reviews operating and economic limits of the unit train. It provides a base for comparison with slurry and pneumatic pipelines.
See also PB-248 063. Report on The Coal Future: Economic and Technological Analysis of Initiatives and Innovations to Secure Fuel Supply Independence.

Ferguson, JA Rieber, M Soo, SL Stukel, J Simon, J
Illinois University, Urbana, National Science Foundation MA Thesis CAC-163-APP-E, NSF/RA/N-75-037E, May 1975, 69 pp

Grant NSF-GI-35821

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-248846/8St, DOTL NTIS

21 098627
REPORT ON RAIL AND MARINE INTERFACE IN THE SAN FRANCISCO BAY AREA
This report examines in detail the factors influencing the transfer of intermodal equipment between rail terminals and U. S. flag carrier marine terminals in the San Francisco Bay Area. The objective is to provide an informational survey and analysis of the nature, procedures and problems of container interchange.

Maritime Administration Sept. 1974, 25 pp

ACKNOWLEDGMENT: Maritime Administration
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC
GPO NC39.202:R13/4

21 126961
A FEASIBILITY STUDY OF RAIL PIGGYBACK SERVICE BETWEEN DALLAS-FORT WORTH AND SAN ANTONIO
The feasibility of utilizing rail piggyback for merchandise Freight moving between the Texas cities of Dallas-Fort Worth and San Antonio is examined. In this nearly 300 mile long intercity corridor,intensive motor carrier service, moving primarily via Interstate Highway 35, dominates the freight market. The rail network is extensive but the quality of merchandise service is poor and piggyback is only minimally utilized. A concept called "mini-piggy"--short, fast, unitize existing line-haul equipment, including 2 diesel locomotive and no more than 20 85-foot flatcars, over the shortest possible routing (that of the current Missouri-Kansas-Texas Railroad, after roadbed and track renovation), with new but simple terminals located as near as possible to probable users in both SMSA'S. Revisions in existing operating and terminal practices would allow overnight truck-competitive service, using standard piggyback plans and standard rate structure. Mini-piggy is offered as an intermodal option that uses motor carriers and railroads in the particular roles for which they are best suited--piggyback for the intercity line-haul move and trucks for intraurban door-to-door moves.

Kasparik, EN
Texas University, Austin, (RR 32) Draft Rpt. Apr. 1975, 88 pp, 6 Fig., 11 Tab., 48 Ref.

Contract DOT-OS-30093

ACKNOWLEDGMENT: Texas University, Austin
PURCHASE FROM: NTIS Repr. PC $, ofiche $2.
DOTL RP

21 129785
CONTRIBUTION TO THE SOLUTION FOR PLACING WAGONS AND GROUPS OF WAGONS IN THE SORTING SIDINGS OF MARSHALLING YARD INSTALLATIONS [Ein beitrag zum Problem der Weiterfoerderung von Einzelwagen und Wagengruppen in Richtunggleisen automatisierter Rangierbahnhoee]
The system studied is as follows: the sorting siding after the rail brake is divided into 2 sections: a wagon spacing section on which 2 handling trucks alternately ensure the positioning of the wagons; a pre-support section on which the wagons come to a halt in random fashion. When a certain number has been reached, a second handling truck moves them intermittently to their final contact position. The study calculates the length of these sections, and the movement speeds to be observed to bring the wagons into contact without excessive impacts. [German]

Goebertshahn, R
Sci Comm for Way & Works & Operat Tech, 5th Sess 1974, 18 pp, 3 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France Repr. PC

21 129799
BLOCKING AND TRAIN OPERATIONS PLANNING
This report summarizes the functional details of various computer-aided methodologies developed to conduct detailed analyses of blocking and train operations, schemes and yard operations for the Northeastern and Midwestern states. The methodologies and the programs described in this report can be used for analyzing rail operations in any railroad network.

Siddiqee, W D'Esopo, AD Tuan, PL
Stanford Research Institute Final Rpt. USRA-R-106.1, Oct. 1975, 94 pp

Contract USRA-C-50042

ACKNOWLEDGMENT: United States Railway Association, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248355, DOTL NTIS

21 129844
THE DEVELOPMENT OF CONTAINER TRANSPORTS IN SWEDEN [Utvecklingen av containertransporter i Sverige]
Since the 1960's the author has participated in the organization of the SJ container handling. In this article he gives an outline of the development and the present situation. [Swedish]

Carlsson, B *Nord-emballage* Vol. 41 No. 9, 1975, pp 30-34, 9 Fig., 9 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Nord-emballage Stockholm, Sweden Repr. PC

21 129847
CONRAIL BI-MODAL AND INTERMODAL OPERATIONS. A STUDY AND PLAN
This study updates a previous study (February 1975) by utilizing 1974 data instead of 1973 data and by revising future forecasts to take into account the recent recession and a reduced rate of growth of the gross national product. The study confirms the basic marketing, operating and organizational recommendations contained in the previous study. Perhaps the greatest import of this study is the development for the first time in the railroad industry, of computerized profit and loss statements for intermodal operations by traffic lane and terminal. These statements were developed to serve as a basic tool in the management of Conrail intermodal operations at a level of profitability that would justify investment in, and expansion of, needed intermodal facilities and equipment. Updates PB-239038.

Reebie (Robert) and Associates, Incorporated USRA/R-014.1, Aug. 1975

Contract USRA-C-50034

ACKNOWLEDGMENT: United States Railway Association
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248475, DOTL NTIS

21 130790
EXPERIENCE WITH A LONG DISTANCE UNIT COAL TRAIN
This paper is intended to provide an insight into the operation and maintenance experiences encountered during 7 1/2 years of operation of a unit coal train, that makes a 2164-mile round trip over a territory of varied operating and climatic conditions every 96 hr.
Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Atlanta, Georgia, July 14-18, 1975.

Angold, JA (ENSCO, Incorporated)
American Society of Mechanical Engineers 75-ICT-4, July 1975, 7 pp, 1 Tab.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC
DOTL RP

21 130794
UNIT TRAINS-A TOOL FOR IMPROVED SERVICE AND PROFIT
A general overview of unit train operation will be given, including a review of benefits to railroad, shipper, and receiver. The transport of coal is considered in detail, but other commodities suited to unit train movement are suggested as well. The conclusion is that unit train operation can reduce costs and improve service for high volume movements of bulk commodities.
Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Atlanta, Georgia, July 14-18, 1975.

Martin, JR (Southern Railway System)
American Society of Mechanical Engineers 75-ICT-1, July 1975, 4 pp

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC
DOTL RP

21 130802
ANNOUNCING NETWORK AND TECHNICAL INSTALLATIONS FOR COMPUTER-CONTROLLED OPERATION OF THE MASCHEN MARSHALLING YARD [Vormeldenetz und technische Einrichtungen fuer die rechnergesteuerte Betriebsfuehrung im Rangierbahnof Maschen]
Stations responsible for announcing trains advise the marshalling yard of the departure time and composition of convoys, the destination of wagons and information on any special forwarding arrangements. Through the train announcing system, it is possible to prepare the track occupation schedules, the shunting and splitting-up programme and other operational documents. The yard installations include a traffic control computer and a coordination computer linked to entry and exit devices. The data transmission installations are connected to the coordination computer through concentrators. Full details of the installations and working procedures are given by the author. [German]

Gellekum, L *Signal und Draht* Vol. 67 No. 9-10, Sept. 1975, pp 155-161, 5 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

21 130890
MOVING WESTERN CANADIAN COKING COAL
Problems arise from many variable factors encountered in moving coal from the province of Alberta through terminals to shipboard in Vancouver. These variables encompass such matters as effect of car design, other problems faced by the railroads, difficulties at the mine loading point, and pass-on problems inherited by the terminal in dealing with the variable nature of the product caused by climatic changes from the interior to the west coast of Canada. Differences in product moisture content and related matters are also discussed, as are the effect of snow and ice.
Intl Symp on Transp and Handl of Miner, 2nd, Proc, Pap and Discuss, Rotterdam, Netherlands, October 1-5, 1973.

Hubber-Richard, RA (Neptune Terminals Limited)
Miller Freeman Publications, Incorporated Proc Paper Chapter 2, 1974, pp 58-77

ACKNOWLEDGMENT: EI
PURCHASE FROM: Miller Freeman Publications, Incorporated San Francisco, California, Repr. PC

21 131019
DESIGN AND EXECUTION OF AN AUTOMATIC CONTROL SYSTEM FOR MARSHALLING YARDS
The high concentration of wagons to be handled in large marshalling yards makes it possible to: (1) solve optimisation problems effectively (choice of order of reception and splitting up of trains, optimisation of splitting-up programmes especially for parallel splitting of trains, optimisation of train forwarding planning); (2) foresee possible difficulties in working; (3) prepare the working documents for transmissions between department heads; (4) draw up the train formation lists; and (5) automate yard booking. The article gives the results of research, experience and prospects for application of a system of automatic management of freight yards. It deals with problems which can be resolved in the yard by means of small third-generator electronic calculators, and defines the anticipated development of an automatic management system for very large yards and railway centres. [Russian]
This availability is for only the English translation of this article.

Kulaev, KV Petrova, AP *Zeleznodoroznyj Transport* Vol. 57 No. 8, 1975, pp 17-24, 2 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402

Y3.J66; 13/66560

21 131096
REPORT ON RAIL AND MARINE INTERFACE AT THE PORT OF JACKSONVILLE
The Jacksonville study, as did its predecessors, focuses mainly on the intermodal operations of U. S.-flag steamship operators. All port rail and marine terminal facilities which handle intermodal equipment are discussed however, whether utilized by either U. S. or foreign flag ocean carriers.

Maritime Administration Aug. 1975, 19 pp

ACKNOWLEDGMENT: Maritime Administration
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

21 131227
THE REAL POTENTIAL OF CONTAINERIZATION
The firm establishment of containerization is seen as adding to highway traffic, rather than diminishing it. While motor carriers have generally been opposed to containers for domestic intermodal freight movements, it is to the advantage of rail and highway modes to adopt standard containers. In addition to social and economic factors favoring a compatible system of intermodal transportation, such a step may soon be a matter of survival for both the rail and highway modes.

Serenbetz, WL (Interpool Limited)
Society of Automotive Engineers #760297, 1976, 4 pp

ACKNOWLEDGMENT: SAE
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

21 131229
CONTROL STRATEGIES FOR NON-SCHEDULED TRAFFIC IN A TIMETABLED SYSTEM
This paper has outlined a possible approach to strategic area control of untimetabled vehicles and a method of simulating its effects upon traffic flow in a timetabled railroad system. It is concluded that in order to provide a reasonable quality service, using demand scheduled traffic for wagon-load freight, the level of activity will be such that traditional movement control will not be adequate. Under these new operating conditions a semi-automated approach to decision making will be required. Economic constraints will impose an upper bound on the strategic complexity which may be adopted. Further investigation is being undertaken to evaluate the performance-cost characteristic of these types of control.
Presented at a meeting in London, Aug. 28-30, 1974.

Mellitt, B (Birmingham University); Ward, DP
Institution of Electrical Engineers Conf Publ. No. 117, 1974, pp 170-176, 3 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

21 131236
INDIA PLANS UNIT TRAINS TO MOVE FREIGHT IN THE 1980'S
With freight expected to more than double by 1988-89, Indian Railways is preparing to move the bulk of this traffic in 4500-tonne air-braked unit trains running on 14 high-capacity routes. This requires an integrated programme embracing major improvements in motive power, wagons, signalling and infrastructure. The Research Designs Standards Organisation is investigating all these areas as a multi-discipline project.

Bhalla, P *Railway Gazette International* Vol. 132 No. 2, Feb. 1976, pp 49-52, 3 Fig., 2 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 131238
UNIT TRAIN ECONOMICS ON THE LONG COAL HAULS
Ten years hence the coal burnt in US power stations will be around 70% above the 1974 figure of 390 million short-tons. Most low-sulphur coal will be mined in the west, and will have to be moved further than the 500 mil limit for economic transmission of electric power to reach generating stations located close to the load. However, coal slurry pipelines may capture a large amount of this traffic unless strenuous efforts are made to improve the economics of unit train operation.

Ross, BA *Railway Gazette International* Vol. 132 No. 2, Feb. 1976, pp 52-55, 3 Fig., 3 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 131239
ONE THIRD OF JNR TONNAGE NOW RUNNING IN UNIT TRAINS
Elimination of marshalling enroute, and close cooperation between JNR and users at terminals, ensure that unit trains greatly shorten wagon-load delivery times. Loading and unloading equipment is jointly financed by JNR and the user, while latest freight depots have separate facilities for rapid handling of single commodity trains. Although they account for only 10% of tonne-km, JNR's unit trains are carrying 31% of total freight.

Mauro, K *Railway Gazette International* Vol. 132 No. 2, Feb. 1976, pp 56-57, 2 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 131305
THE FREQUENCY OF STOPS PURELY DUE TO TRAINS PASSING EACH OTHER, AS A CRITERION OF THE OPERATING QUALITY ON SINGLE-TRACK SECTIONS [Die Haeufigkeit reiner Kreuzungshalte als Massstab der Betriebsqualitaet auf eingleisigen Strecken]
If the determination of line capacity on single-track sections is based only on the criterion of the minimum mean headway of trains, and the necessary average tolerances in time, the resulting figures are high. However, as the number of trains meeting increases as the square of the number of trains, the number of stops at passing points would become so large that the operating quality would suffer. For this reason, the writer proposes the introduction of another criterion fixing a lower limit for intervals due to stops. The author applies this quality criterion to the calculation of the necessary time tolerances. [German]

Schwanhausser, W *Eisenbahntechnische Rundschau* Vol. 24 No. 5, May 1975, pp 187-190, 2 Fig., 7 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

21 131314
ENGINEERING METHODS AND ECONOMIC CONSIDERATIONS INVOLVED IN IMPROVING THE QUALITY OF TRANSPORTATION SERVICE
The principal elements in freight service quality are identified as reliability in scheduled arrival time, elapsed time and equipment availability; as schedule compatibility with customer's requirements; and in freedom from loss and damage. Acceptable levels of quality will differ with customers and commodities. The FRA-sponsored study by the Massachusetts Institute of Technology of a specific Southern Railway region are discussed. In addition to this fully documented study, investigations carried on by Canadian Pacific, Denver & Rio Grande Western, Illinois Central Gulf, Rock Island and Santa Fe are mentioned. The cost effectiveness of quality improvement programs is not widely documented, but the MIT/Southern study is an exception.

AREA Bulletin Vol. 77 Bulletin 656, Jan. 1976, pp 284-99, 1 Fig., 1 Tab.

ACKNOWLEDGMENT: AREA Bulletin

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 131324
TRAINS FOR TOMORROW
The evolution of British Rail's Freightliner concept is traced from the rationalization study of 1961 to the current operation which the author describes as the only means for a railway in an industrialized country to continue to participate satisfactorily in the movement of freight traffic which by its nature, points of origin and termination is a "natural" for efficient highway services. The idea is combining rail and highway movement of general merchandise in such a way as to maximize the benefits of fast through-train movement, containerization, selected terminal concentration and modern collection and distribution systems by highway.

Margetts, FC *Trains* Vol. 36 No. 6, Apr. 1976, pp 40-47, 7 Phot.

PURCHASE FROM: Kalmbach Books 1027 North Seventh Street, Milwaukee, Wisconsin, 53233 Repr. PC

DOTL JC

21 131651
THE OPTIMUM SPEED OF A COAL UNIT TRAIN
The average speed at which a unit coal train operates is of economic interest to many--shipper, railroad and equipment owner. The average speed is normally set by exogenous forces exerted on the railroad such as competitive modes or shipper demands. Speed may also be set by internal forces such as short-term profit expedience and, quite often, from poor accounting which does not allow cost to accurately match revenues. This report establishes the principle that there is an optimum speed for unit trains and that speed can be calculated.

Steffes, DW
Planning and Forecasting Consultants Feb. 1976, 12 pp, 3 Fig., 6 Tab.

ACKNOWLEDGMENT: Planning and Forecasting Consultants
PURCHASE FROM: Planning and Forecasting Consultants 863 Frostwood, Houston, Texas, 77024

DOTL RP

21 131760
TERMINAL MODEL II RECEIVING YARD POSTPROCESSOR
This computer program is a general simulation model which is used as a postprocessor to Terminal Model II. The purpose of this model is to provide a detailed simulation of receiving yard activity. The model considers each train arriving on the yard and attempts to place the train on the shortest available track which will hold the entire train. If the train cannot be yarded on a single track, the model will double the train into available tracks. If there is no room in the yard to accept the train, it will be held out until a track becomes available. Tracks are made available by the humping of trains out of the receiving yard. There are two sets of inputs to the Receiving Yard Postprocessor. The first is a set of cards which describe the track configuration. The second is an output tape from the Terminal Model II simulation which has the arrival and humping times and consists for trains entering the yard.
Direct requests to J.J. Whalen, RM 207, Director Technical Support, Chessie System. Publicationsì Terminal Model II Receiving Yard Postprocessor, C&O/B&O, September 1970.

Chessie System Sept. 1970

ACKNOWLEDGMENT: Chessie System
PURCHASE FROM: Chessie System 2 North Charles Street, Baltimore, Maryland, 21201

21 131761
TERMINAL MODEL II DEPARTURE YARD POSTPROCESSOR
This computer program is a general simulation model which is used as a postprocessor to Terminal Model II. The purpose of this model is to provide a detailed simulation of departure yard and assembly lead activity. The model considers each outbound train which must be assembled in the departure yard and attempts to build the train on the shortest departure yard track which will hold the entire, final train length. If train length, direction and departure times permit, the model will allow two trains to be built on a single track. The model also considers the track paths that must be used in moving cars from the classification yard to the departure yard and simulates the conflicts which occur between simultaneous assembly jobs. There are two sets of inputs to the Departure Yard Postprocessor. The first is a set of cards which describe the track configuration. The second is an output tape from the Terminal Model II simulation, which has assembly and departure times for the trains leaving the yard.
Direct requests to J.J. Whalen, Rm 207, Director Technical Support, Chessie System.

Chessie System No Date

ACKNOWLEDGMENT: Chessie System
PURCHASE FROM: Chessie System 2 North Charles Street, Baltimore, Maryland, 21201

21 131765
SINGLE TRACK LINE OPERATING MODEL
Computer program which calculates average transit time characteristics as a function of train density for a particular section of rail line-single track with sidings. These characteristics are used to established a cost forecast for a particular operation on a specified railroad plant. An economic program evaluates various modified operations on a number of modified plants to determine the most economical single track railroad expansion strategy. Given an operating philosophy on a single track railroad for a certain forecast period, the program determines the cash flow for that operation including the ownership cost of increasing congestion delays. This procedure is repeated for a number of changes to the railroad plant and/or operation philosophy and an economic program evaluates the results to establish the most economical railroad expansion strategy.
Direct requests to R. Shea, Director of Technical and Operations Research, CP Rail.

Canadian Pacific No Date

ACKNOWLEDGMENT: Canadian Pacific
PURCHASE FROM: Canadian Pacific Windsor Station, Montreal, Quebec H3C 3E4, Canada

21 131770
NETWORK SIMULATION MODEL
The model simulates traffic flow over an entire railway system. It provides the ability to predict the effect of proposed changes in train or yard operations upon the entire operating network. Interaction among classification yards is inherent in the model, with each yard and train, as well as associated activities, being defined in any desired level of detail. Output reports provide origin-destination service time estimates, yard resource utilization and delay by traffic destination, and individual train summary statistics.
Direct requests to L.D. King, Systems Manager, Louisville and Nashville Railroad.

Louisville and Nashville Railroad No Date

ACKNOWLEDGMENT: Louisville and Nashville Railroad
PURCHASE FROM: Louisville and Nashville Railroad 908 West Broadway, Louisville, Kentucky, 40201

21 131892
PRIDE TRANSLOADER SIMULATION MODEL
This computer program simulates unit coal train movement between the Pride Coal Transloader and various points on the Southern Railway System. Its purpose is to develop reasonable train schedules over the lines on which these unit trains will be traveling.
Direct requests to R.L. Sauder, Director, Operations Research, Southern Railway.

Southern Railway System No Date

ACKNOWLEDGMENT: Southern Railway System
PURCHASE FROM: Southern Railway System 99 Spring Street, SW, Atlanta, Georgia, 30303

21 131896
NETWORK SIMULATION MODEL
A computer model simulated the track and yard network between Roseville and El Paso in order to assist the Operating Department in evaluation of operating procedures. The principal policies evaluated were alternate train

schedules and blocking strategies, existence and placement of yards and facilities, lengths of trains, and traffic flows. The data required to run the model is composed of train, yard structure and traffic information. The model is generalized so that other networks (including the whole system) can be analyzed.

Direct requests to R.B. Carlson, Analytic Services, Southern Pacific Transportation Company.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

21 131897
OPERATIONS PLANNING MODEL
Computer program uses data describing horsepower per ton versus running time and versus operating cost for the relevant districts which are developed from a Train Performance simulation program. Mathematical optimization is then used to determine the lowest cost power allocation by districts to meet train schedules and power balancing constraints. Trains are then run over the route to determine meet delays which affect the schedule constraints and require re-optimization until solution stabilizes or five iterations are made. Is used to analyze and evaluate long-range operating investment strategies. The model accepts up to 200 trains, 140 "arcs" in which run time curves can differ, 80 power districts and 20 sidings per arc.

Direct requests to R.B. Carlson, Analytic Services, Southern Pacific Transportation. Publications: "Development and Use of Computer Models for Analysis of Long Range Planning Model", Third Annual Technical Management Science/Operations Research Conference, Proceedings, April 9-11, 1969. Annual Technical Management Science/Operations Research Conference, Proceedings, April 9-11, 1969.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

21 131900
COMMUTER CREW ASSIGNMENT
Computer program calculates all feasible one-crew assignments for a given set of train schedules subject to labor and governmental restrictions. A direct search approach is then utilized to establish the assignment schedule which: 1) satisfies the given train schedule, and 2) minimizes crew costs (i.e. direct wages, overtime, deadheading, and overhead additives). The optimal assignment schedule and its associated cost is then generated as the final output of the model. Initially used to minimize crew costs for the assigned commuter runs. Suggested changes in the scheduling of commuter trains can also be evaluated in terms of its effect on crew costs through the application of this technique.

Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

21 131912
DISCUS-DISPATCHING OF CREWS UNDER SIMULATION
DISCUS is a computer program that simulates the dispatching of pool freight crews to a given line-up of trains. Agreement provisions for interdivisional runs are programmed into Discus and many of their parameters such as inactive time at home terminal can be changed.

Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

21 131916
CN NETWORK MODEL
Computer program accepts cars, available at nodes either individually or in groups, or on trains, which are moved to destination through a network of nodes and links on trains running according to specified rules regarding the traffic handled by each train, subject to constraints of resources available at nodes, yard classification policies, rules regarding train connections, and delays due to train meets and overtakes. Results are measured in terms of the standard of service obtained from the system (car origin-destination performance) and the utilization and delays associated with nodes, links and trains. The basic objective of the model is to improve CN's ability to predict the effects of simultaneous change in the market (volume, flow and mix of traffic), service targets, operating plans and physical resources. Running time on a 370-165 for a network of 130 nodes, 275 trains per day, and 5000 cars becoming available per day is approximately 1 minute per simulated day. Post-Analysis programs require 30-60 minutes depending on the amount of output desired.

Direct requests to M. Aboubakr, Operational Research Branch, Canadian National. Publications: R.D. Jones, D.C. Lach, J.W. Metsos: "The CN Network Model," paper presented at the 2nd Conference on Applications of Simulation, New York, Dec. 1968 and P.B. Wilson, C.J. Hudson: "Development, Validation and Application of the CN Network Model," paper presented at the 3rd International Symposium on Railway Cybernetics, Tokyo, Apr. 1970.

Canadian National Railways June 1969

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

21 131919
SIMTRAC
SIMTRAC is a simgle track dispatching computer simulation designed to study the effects on over-the-road performance of changes to train operating policies and track and signal configurations. The program will handle stretches of CTC- signalled line of 1000 or more miles for a period of up to 10 days. The simulation (written in SIMSCRIPT) is non-stochastic, that is, it contains no random elements. Two SIMSCRIPT non-simulation programs read the data, which have been punched from special coding forms, manipulate it, and prepare an exogeneous events tape for the simulation. Train running times are based on TPC (Train Performance Calculator) times. From the TPC output, running time coefficients are derived by the TPC Chart Program to form part of the input. Outputs include delay summaries by train, class of train and direction as well as by track location, as well as a graphical output similar to that produced by a CTC machine.

Direct requests to L. Dube, Operational Research Analyst, Canadian National.

Canadian National Railways June 1969

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

21 131923
TRAIN SCHEDULE AND NETWORK SIMULATOR
This computer model simulates train operations on lines and in yards. It can model trains on any type of line: single track, double track and track networks. It will process trains through small yards for those yard activities that affect trains only-not those that affect individual cars. On line, it applies predetermined average delays to trains at meets and overtakes wherever they occur along the track. In yards, each train goes through a series of activities such as waiting for a receiving track or an inspection crew or undergoing inspection or crew change. Results from this model can help examine alternative train operating plans or alternative line and yard facilities. It requires a small amount of easy-to-code input data: For example, simulating 50 originating trains over 1,000 miles of track requires about 200 data cards. The output comes out in the form of tables and graphs. Tables contain train statistics and facilities utilization. The graphical output is a time versus distance plot of train trips. There is a discrete line-printer and a continuous line (Versatec) version of this plot. Note: This model does not plan for the location of meets and passes. It uses average delays which may be derived from operating experience or analytical methods based on probability theory.

Direct requests to L. Dube, Operational Research, Canadian National.

Canadian National Railways No Date

ACKNOWLEDGMENT: Canadian National Railways

PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

21 131924
MULTIPLE TRACK TERMINAL SIMULATION MODEL
This computer model simulates train movements on any number of tracks linked by switches and controlled by signals. The simulation logic is based on some operating characteristics, such as interaction between the train movement and the switch status, length of switch/track occupancy time determined by transit time and traffic conditions, variable impact of delayed train arrival on train departure in the station etc. This model has been extensively used for evaluating new station track design and track capacity expansion studies. It produces two types of output: the train delay reports and the switch/track utilization reports. The required input data includes the train schedule and the train routes description.

Direct requests to H.S. Chen, Operational Research Canadian National. Publications: "A Computer Model for Simulation of High Density Train Movements on Multiple Track Terminal Controlled by Complex Signal System", by H.S. Chen, R. Belanger, and F. Bartunck, 1974, Research Rpt., CNR.

Canadian National Railways No Date

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetieve, West, Montreal, Quebec H3C 3N4, Canada

21 131925
WORKLOAD INFORMATION SYSTEM FOR PLANNING (WISP)
The computer program creates small individual user-oriented information files which can be used for such purposes as planning the make-up and frequency of trains, determining the amount of capacity expansion required at overcrowded yards, deciding what traffic could be eliminated from congested line segments and determing the effect heavier cars are having on the life of bridges and rail. The main operations of WISP are the merging of data for each move from one past year and two forecast years into one large file, the addition of the train type and standard route to the description of each move and the grouping of commodity types, car types and station numbers to the level of detail required by the user.

Direct requests to Mr. S.G. Brown, Operational Research Branch, Canadian National.

Canadian National Railways No Date

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

21 132934
UNIT TRAIN COAL HAULAGE-CAN IT MEET THE CHALLENGES AHEAD
Analysis of transportation problems is presented.

Presented at the 71st Regul. Meet. of the Rocky Mt. Coal Mining Inst., Steamboat Springs, Colo., June 29-July 2, 1975.

Graves, TB, Jr (Union Pacific Railroad)
Rocky Mountain Coal Mining Institute Proc Paper 1975, pp 37-40

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

21 133582
TIMETABLE PREPARATION SYSTEM WITH MAN-MACHINE INTERACTION
Rail traffic planning has been a time-consuming manual operation. The increased density of traffic and increased variety of transportation demands have made such planning prohibitively costly. A computer-aided timetable preparation system has been developed by JNR which reduces the time and cost. The system is used by the train operating department and can be used as a practical planning aid.

Iida, Y Ohkawa, M *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 145-149, 7 Fig., 1 Tab., 2 Ref.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

21 134305
DISTRIBUTION BY SCIDS
Features of the small containers intermodal distribution system (scids) operated by Freightliners Ltd are described. A 15ft long container size has been found adaptable to the needs of most customers though one case is cited whereby one company has developed a mini-container system, the basis of which is a specially strengthened 20ft ISO container pallet, fitted with legs which can be lowered so that the pallet forms a free-standing loading/unloading platform. The pallet base incorporates four additional intermediate pairs of twist locks to secure 3 mini-containers 6ft 7in long by 8ft wide. For the train journey the 20 ft pallet is treated as a single unit, but for local distribution at its destination each mini-container is mounted on its own adapted delivery-vehicle chassis. /TRRL/

Long, C *Modern Railways* Vol. 33 No. 329, pp 59-60, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218203)
PURCHASE FROM: XUM
DOTL JC

21 134556
SECOND-GENERATION FREIGHTLINER PROPOSED TO CAPTURE MEDIUM-HAUL MERCHANDISE
A network of fast container trains linking 300 terminals through sorting centres based on automated warehouse principles has been proposed by BR's Research and Development Division. Essential to the concept is a fast, cheap method of transferring containers on and off trains, and overnight transits between all but the more remote parts of the country.

Railway Gazette International Vol. 132 No. 2, Feb. 1976, 71 pp, 1 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

21 134564
ON THE CAPACITY OF RAILWAY LINES [Zur Leistungsfaehigkeit von Eisenbahnstrecken]
The author discusses factors to be considered to improve capacity on main railway lines. The proportion of goods to passenger trains is of major importance; headway between two consecutive trains or the block interval play a secondary role. [German]

Brux, G Feige, G *Eisenbahningenieur* Vol. 27 No. 1, Jan. 1976, pp 17-18, 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

21 134582
THE OPERATION OF LONG TRAINS FOR ORE AND COAL USING RADIO-CONTROLLED MID-TRAIN LOCOMOTIVES
In this paper, the author gives brief details of how the remote control equipment operates and shows the best place for the locomotive in each case. He also discusses the correct train shunting methods in critical situations by means of a few examples of accidents. This paper was given an award by the Congress.

Parker, CW
Pan-American Railway Congress Nov. 1975, 41 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France

21 134599
RAIL FREIGHT TRANSHIPMENT TECHNIQUES: FEASIBILITY AND ECONOMICAL LIMITS: I
34% of the D.B. freight fleet are goods wagons of special types the design of which is featured by the kind of transhipment technique. The cost of provision is between 20 and 120% higher than that of comparable stock of normal type. In this article are demonstrated the technological feasibilities of the transhipment in wagon load and combined traffic under the viewpoint of their economical limits. It is also depicted how the transhipment cost can

be considerably reduced in the sundries traffic by conversion of the system, i.e., by applying the well-known transhipment techniques of the combined traffic. [German]

Eisenbahningenieur Vol. 26 No. 11, Nov. 1975, pp 382-386

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

21 135202
A RAILWAY CORRIDOR ACROSS THE TEHUANTEPEC ISTHMUS, MEXICO [Corredor ferroviario en el istmo de Tehuantepec, Mexico]
The Tehuantepec Isthmus in the South-East of the Mexican Republic is about 200 km wide in its narrowest part, and offers very favourable prospects for the construction of a railway line to carry freight quickly and easily between the Pacific Coast and the shores of the Gulf of Mexico. This paper explains the advantages of a system known as a "Landlift", which would combine transport by ship with railway transit across the isthmus. [Spanish]

Pan-American Railway Congress CPF-79-E-60, Nov. 1975, 24 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France

21 135215
COAL TRANSSHIPMENT-A NEW ERA. CLEAN COAL TO HELP SOLVE ENERGY CRISES
The Superior Coal Terminal at Superior, Wisc., is designed to transfer western coal bound for Detroit Edison generating stations from 110-car Burlington Northern unit trains to bulk carriers of up to 60,000-ton capacity for movement down the Great Lakes. The intermodal transhipment terminal design and construction are described.
Spring 1976 issue. Published in "NOTES".

Parsons, Brinckerhoff, Quade and Douglas, Inc Apr. 1976, pp 6-9, Phots.

PURCHASE FROM: Parsons, Brinckerhoff, Quade and Douglas, Inc One Penn Plaza, 250 West 34th Street, New York, New York, 10001

21 136267
SWITCH BACK HUMP. A NEW MARSHALLING TOOL
Omnibus freight trains require marshalling of wagons in specific geographical sequence in order to reduce the number of manoeuvres necessary for routing them to their destination. The author proposes a system whereby four or five tracks at one end of the main sorting yard are connected to a subsidiary hump through a ladder track. Wagons are pushed over the hump and when they come to a stop they roll backwards to switches where they are directed to any of a number of tracks. The article explains how it is possible to form trains to be set in 3 different directions with each direction involving a maximum of 15 stations.

Rao, S *Rail International* Vol. 7 No. 4, Apr. 1976, pp 219-222

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

21 136269
SIMULATION OF OPERATION IN THE RECEPTION SIDINGS OF MARSHALLING YARDS
The problem is one of a two-stage queuing system, at reception sidings and for the humping process. It is handled by computer simulation, with random train arrivals, following an "Erlang K" distribution. The computer program comprises some 900 FORTRAN instructions, and the time required for 30,000 trains is one minute on an IBM 370/165 computer. The results are shown in 7 graphs, which give correlation coefficients between the operating characteristics, such as the operating process and the number of reception sidings, processing time, minimum occupation time, and number of trains per day.

Klug, KR *Rail International* Vol. 7 No. 4, Apr. 1976, pp 223-231, 3 Tab., 9 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

21 136279
THE AMERICAN PLAN FOR IMPROVING FOOD DISTRIBUTION BY THE USE OF SUPER-CONTAINERS, FOR TRANSPORT TO NEW YORK, EUROPE AND ASIA
A brief description of recent research and tests to determine how fresh agricultural products stand up to container transport inside the United States, and outside, towards European and Asian markets. A diagram shows the main characteristics of a container arranged for intermodal transport of packed fruit and vegetables.
Also published in French and German.

Rath, E *Containers* No. 49, Dec. 1975, pp 33-42, 1 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Containers Actualites 129 Rue du Faubourg Poissenniere, 75009 Paris, France

21 136398
PROGRESS WITH COAL SLURRY PIPELINES (COMPARISON WITH UNIT TRAINS)
Economic and environmental advantages of coal slurry pipelines over coal transportation by railroad are pointed out by quoting the examples of existing pipelines and calculations of several projected lines. It is argued that coal pipelines are an economical and environmentally beneficial method of expanding the nation's energy transportation system, particularly to handle the sharply escalating production of western coal. A map of existing and projected coal slurry pipelines is provided. The costs of shipping 25 million t of coal per year from the Powder River Basin of Wyoming to Arkansas by a pipeline and by rail are calculated as a theoretical example, showing the advantages of a coal slurry pipeline.
8th Annual Front of Power Technology Conf, Proceedings, Oklahoma State University, Stillwater, October 1-2, 1975.

Wasp, EJ
Oklahoma State University Paper 1, 1975, 24 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: Oklahoma State University Engineering Extension, Stillwater, Oklahoma, 74074

21 136420
INTERMODALISM--EVOLUTION OR REVOLUTION?
This paper is intended to provide an insight into some of the technical problems that appear to be impeding the development of railroad freight intermodalism as an efficient and viable transport system. Three points of view are presented: the "systems approach", the operational approach, and the economic approach.
This paper is unpublished. Copy at the RRIS Repository Department of Transportation Library, Washington, D.C.

Bang, AJ (Federal Railroad Administration); Paladino, JG (Chessie System); Darling, JA (Atchison, Jopeka and Santa Fe Railway)
Intersociety Conference on Transportation, 3rd July 1975, 34 pp

ACKNOWLEDGMENT: FRA
DOTL RP

21 136421
THE RENFE CONTAINER SERVICE [El servicio de contenederores renfe]
A detailed analysis is presented of the transport sector in Spain and of its influence on the national economy. Problems of coordination between different transport modes, taxation system, apportioning of infrastructure costs, the relation between transport forms and the state from the financial point of view, etc. are examined. The TECO plan is outlined; its aim is to increase container freight transport, and several combinations of road-rail systems are outlined. Their advantages would be a regular, rapid, safe freight transport system independent of weather conditions. /TRRL/ [Spanish]

Boletin de Informacion del Ministerio de Obras Pub Vol. 16 No. 189, Sept. 1973, pp 35-40, 4 Phot.

ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain (LTMS06025E), Central Laboratory of Bridges & Highways, France, Transport and Road Research Laboratory (IRRD 102488)
PURCHASE FROM: Boletin de Informacion del Ministerio de Obras Pub Madrid, Spain

21 136422
ARCTIC OIL AND GAS BY RAIL

The purpose of this study, as defined in the contract between the Transportation Development Agency and the study group "is to establish the engineering feasibility, costs, and time required to construct an Arctic railway as a possible means of transporting oil and liquefied natural gas (lng) from the Arctic to a point beyond the southern limit of permafrost". From that point, arbitrarily placed near the Trout River, it is assumed that the products will be moved to market via pipeline. The contract required the investigation of a series of possibilities in which not only the points of origin of the oil and gas are to be varied, but also the daily quantities of each product moved. Route requirements are described as: Mackenzie valley route-from Trout River in the Northwest Territories to a point on the Mackenzie delta, and Spur to Prudhoe bay, Alaska. The six volumes comprising this report are entitled: 1) introduction and summary 2) route selection and construction 3) railway operation and maintenance 4) petroleum products processing and handling 5) relevant considerations 6) cost data and analysis. /TRRL/

Transport Development Agency Report June 1974, Figs., Tabs., Phots., Refs.

ACKNOWLEDGMENT: Roads and Transportation Association of Canada (RTAC02050E), Transport and Road Research Laboratory (IRRD 218582)
PURCHASE FROM: Transport Development Agency Ministry of Transport, Canada, 1000 Sherbrooke Street, West, Montreal, Quebec H3A 2R3, Canada

21 138086
AN IMPROVED TRUCK/RAIL OPERATION: EVALUATION OF A SELECTED CORRIDOR

Presuming an improved truck/rail transportation service would offer significant opportunities for the future, this study had as its objective the consideration of potential impacts upon trucking companies, shippers, Teamsters and the highways. The analysis was directed to a single corridor-Los Angeles to Portland with Sacramento as an intermediate point. Drawing upon traffic statistics for conventional rail service, all forms of trucking, existing piggyback and intra-coastal water movement, it was possible to identify nearly 500 forty foot container equivalents (FCE) of available merchandise type freight moving between the study cities on a typical day in 1971. Comparing unit costs and service characteristics for each of the modes with shipper indications of modal preference under various rate/transit time arrangements, it was estimated that approximately 230 forty foot containers could be potentially diverted to an improved intermodal operation. Of the potentially divertible traffic, however, only 160 FCE's or one 45 car train in both directions could be scheduled and meet the operational, economic and service constraints. What emerged from the first stage of the analysis was not free from ambiguities. While an improved intermodal service is conceivable, both economically and operationally, it is questionable whether the actual initiation of such a service, which would necessitate overcoming several barriers, would be worth the benefits it might generate.

Prepared for the Federal Highway Administration, US DOT.

Ainsworth, DP Keale, MJ Liba, CJ Levinson, HM
Reebie (Robert) and Associates, Incorporated Final Rpt. Dec. 1975, 245 pp, 6 App.

Contract DOT-FH-8158

ACKNOWLEDGMENT: Federal Highway Administration
PURCHASE FROM: NTIS

DOTL NTIS

21 138332
CAPACITY PROBLEMS AT THE SORTING SIDINGS OF A MARSHALLING YARD

For calculation of the length of the sorting sidings in a marshalling yard, the necessary correlations are developed. Among them are the effects of stochasticity, or the mode in which cars are collected and the number of cars involved. Capacity is ultimately governed by the additional time which trains must spend in the classification tracks after the sorting is completed. Three closely associated problems are discussed: Capacity of tracks, capacity of the entire yard and determination of the times at which trains are assembled in the department yard.

This paper is a follow up of "An analysis of the wagon collection process in a marshalling yard," RRIS 21 072957 in Bulletin 7501.

Brandalik, F Kluvanek, P *Rail International* No. 5, May 1976, pp 264-283, 8 Fig., 8 Tab.

PURCHASE FROM: ESL

DOTL JC

22 052743
SHEETS FOR THE PROTECTION OF LOADS. REPORT OF INQUIRY AND PROGRAMME OF WORK
This report first examined the manner in which the protective sheets used by the Administrations of 17 different countries are constructed and maintained. It would seem that these sheets all belong to the conventional type (flax, hemp or cotton for the basic fabric with linseed oil media, waxes or soaps for the dressings). The report states that the improvement of sheets of the conventional type is an idea which unfortunately must be dispensed with. It envisages the manufacture of sheets of the future in the form of fabrics prepared from artificial or synthetic fibres treated with plastomers or elastomers.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways Intrm. Rpt E58/RP 2/E, July 1961, 7 pp, 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

22 052744
SHEETS FOR THE PROTECTION OF LOADS. DEFINITION OF COATED FABRICS FOR THE MANUFACTURE OF SHEETS
This report gives an account of the preliminary studies which it has made concerning the synthetic fibre fabrics, the coating materials based on elastomers or plastomers and also the corresponding coated fabrics.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E58/RP 3/E, Oct. 1962, 14 pp, Figs., 5 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

22 052745
SHEETS FOR THE PROTECTION OF LOADS. EXPEDIENCY OF SERVICE TESTS AND POSSIBILITIES FOR ORGANISING SAME WITHIN THE SCOPE OF ORE
After briefly recalling the salient points of its activities up-to-date and also the conclusions to be drawn from these, the Committee, in the present report, deals with the last point on its programme of work namely, the question of conducting service tests. Prior to the creation of the Committee, two Administrations, the FS and the NS, had taken the initiative to carry out tests of this type. The Committee takes cognizance of these tests, examines how they compare with respect to those envisaged at the outset of the studies and established that, as far as ORE is concerned, only the technical aspect should be retained. The Committee then examines whether a general validity can be accorded to the monetary balances which will ultimately lead to the decision concerning the interest presented by the polyamide/polychloroprene sheets and/or the polyamide/P.V.C. sheets. The answer is negative as there is no one sufficiently widely used classical sheet on the Administrations which can be taken as a reference basis.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E58/RP 5/E, June 1964, 19 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

22 053154
SHEETS FOR THE PROTECTION OF LOADS. ASSEMBLY AND REPAIR OF COATED FABRICS
The Committee has continued its work on sheets for the protection of loads. It has studied: the assembly of coated fabrics; means of securing; possible methods of repair. The results obtained have prompted the Committee: 1. to reject chlorosulphonated polyethylene-based coatings which can be neither welded nor stuck. 2. to advocate the high-frequency welding process for the assembly and repair of fabrics coated with a plasticised P.V.C. based product. 3. to recommend the hot or cold sticking process for fabrics coated with polychloroprene-based products, provided that the adhesives are chosen beforehand. 4. to consider the P.V.C. coated fabrics and the polychloroprene coated fabrics as equivalent on the basis of laboratory tests, since neither shows any marked superiority over the other as regards general properties or assembly and repair.
Restrictions on the use of this document are contained in the explanatory material.

International Union of Railways E58/RP 4/E, June 1963, 11 pp, 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC

DOTL RP

22 091026
CARGO HANDLING TRAILER
The patent concerns a cargo handling trailer having a plurality of rail assemblies containing adjustably mounted chock assemblies slideably mounted. Each rail assembly is constructed so as to removeably mount thereon a rail extension. Large amounts of cargo may be transported by the trailer by proper placement of the chock assemblies. The rail extensions are utilized to rapidly and simply unload the transported cargo at the desired destination.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Alfriend, TBJ Klopp, JH
Department of the Air Force, (PAT-APPL-349-902) 5 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC

AD/D-000345/9ST, DOTL

22 093686
STANDARDIZATION OF TRANSPORTATION COSTS FOR FUTURES TRADING OF COAL ON A COMMODITIES EXCHANGE
This study is part of a series of analyses in which each of the elements required for futures trading in coal is being examined. This study addresses the Deliverability of coal and how transportation affects and is affected by the existence of a futures market. The report discusses the following aspects of coal transportation: transportation costs and a matrix for rail transportation; delivery in futures markets; and base points in futures markets. The section of criteria for base point selection includes application of the theoretical criteria to a coal futures market; base delivery point in the futures market; cost evaluation; why deliveries take place or do not take place in the futures market; and the relationship of spot market to futures market.

Marcom, Incorporated, Federal Energy Administration FEA/G-75/583, June 1975, 18 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-245398/3ST, DOTL NTIS

22 093687
THE FEASIBILITY OF COAL MINE COOPERATIVES: A PRELIMINARY REPORT AND ANALYSIS
The report is a preliminary analysis on the feasibility of marketing/transportation cooperatives composed of small producing coal mines; that is, mines producing between 100,000-500,000 tons of coal per year. The report is composed of 9 sections: Sections I, II, III cover Project Parameters, Summary and Review and Legal Aspects of Coal Cooperatives Footnotes to Section III. Section IV, Potential Cooperative Identification defines small producing coal mines as primarily located in Alabama, Kentucky, Ohio, Western Pennsylvania, Tennessee, Virginia and West Virginia. Section V, Coal Quality Control, discusses the different coal seams mined by small mines in these areas. Section VI, Coal Preparation, is an analysis of the type of machinery used in mining coal: in screening and picking, crushing, washing, drying dust removal, blending, and size and complexity of plants. Section VII, Transportation, discusses train, truck, belt conveyor and pneumatic pipelines as a means of transport from the mine to the railhead or preparation plant. Section VIII, Transportation: Unit Trains, discusses loading facilities for unit trains. Section IX discusses facilities.
Also pub. as Federal Energy Administration, Washington, D.C. Office of Coal, FEA/G-75/581.

Rieber, M Soo, SL
Illinois University, Urbana, Federal Energy Administration Apr. 1975, 122 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245326/4ST, DOTL NTIS

22 093690
ECONOMIC ENGINEERING ANALYSIS OF U.S. SURFACE COAL MINES AND EFFECTIVE LAND RECLAMATION
This report covers technology of surface coal mining in the United States, including current problems, possible solutions, and projected future developments. It presents a coordinated, systematized, technical, economic analysis of the industry, describing practices and trends and giving cost data. To evaluate the mining techniques employed, the United States was divided into four regions where similar geologic and topographic conditions warrant similar mining practices. Mining methods for each region were examined in detail from a unit operation viewpoint. Economics of alternative mining equipment choices are discussed. The report covers surface coal mining from exploration through transportation to markets.

Skelly and Loy, Bureau of Mines BuMines-OFR-74-75, Feb. 1975, 611 pp

Contract S0241049

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245315/7ST, DOTL NTIS

22 094337
LOADING AND UNLOADING FACILITIES IN COMMUNICATIONS DEPARTMENTS. VOLUME I. (RAILROAD SECTION)
The report contains illustrations of a wide variety of loading and unloading equipment used in the People's Republic of China railroad system.
Trans. from various journals. Paper copy available to U.S. Government recipients only. See also Volume 2, JPRS-L/5498-2.

Joint Publications Research Service Nov. 1975, 188 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
JPRS-L/5498-1, DOTL NTIS

22 094654
TRANSPORTATION SCHEDULING ALGORITHM
An heuristic scheduling algorithm for a transportation network directed by a single manager who has advance knowledge of shipments is described. The algorithm is easy to use and can incorporate various constraints such as maintenance, convoys, etc. "Optimum" scheduling with binary or linear programming cannot incorporate these constraints. Using Monte Carlo simulations of a system being considered for nuclear material transportation, a comparison was made between network cost using the algorithm and cost using linear programming optimization. The algorithm was found to be trivially suboptimal in all cases tested. Because it is simple, only slightly suboptimal, and capable of considering real-world constraints, the report suggests that this algorithm be used in operating transportation network systems.

Aronson, EA
Sandia Laboratories July 1975, 35 pp

Contract AT(29-1)-789

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
SAND-75-0374, DOTL NTIS

22 094655
ACCIDENT-RESISTANT CONTAINER: MATERIALS AND STRUCTURES EVALUATION
The philosophy for the accident-resistant container (ARC) design concept and the evaluation of the candidate structures and materials are described. Structures evaluated were (1) inner and outer metallic shells, (2) energy-absorption end structures, and (3) closure joints. Materials evaluated were those believed capable of providing the fire-barrier protection, energy absorption, and payload nesting. Also evaluated were the thermal properties of the structure and of the candidate materials to be used for fire barrier and nesting of the payload.

Berry, RE Hill, TK Joseph, WW Clarke, RK
Sandia Laboratories Aug. 1975, 95 pp

Contract AT(29-1)-789

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
SAND-74-0010, DOTL NTIS

22 130796
AUTOMATIC DUMPING AT TRANSSHIPMENT POINTS FOR BULK MATERIAL [Automatische Lagerbeschickung bei Umschlaganlagen fuer Massengueter]
The author defines the functions of modern bulk material shipment and makes special reference to the mixing and homogenizing of the materials handled. The feasibility of automating the dumping process is examined on the basis of various types of dumps and equipment used. Moreover, a description is also given of various dumping operations matched to the job on hand and actually put into practice. [German]

Schmitz, E *Siemens[Zeitschrift* Vol. 49 No. 2, Feb. 1975, pp 82-87

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

22 130896
SIMULATION STUDY EXAMINING THE BENEFITS OF AN URBAN CONSOLIDATED TERMINAL
This paper is concerned with the movement of commercial vehicles in central cities and examines the potential benefits of the establishment of a consolidated freight terminal in a medium sized city: Syracuse, New York. Using original data on the movement of freight shipments within the central business district of Syracuse, simulation analysis is employed to estimate the efficiency gains and cost reduction which could be anticipated by central city freight movers as a result of their use of a consolidated freight terminal. Principal among the findings reported are a possible annual savings of $1.6 million, and a 93 percent reduction in freight vehicle movement time.
Prepared for meeting, Intersoc Conf on Transp, Atlanta, Georgia, July 14-18, 1975.

McDermott, DR (Syracuse University)
American Society of Mechanical Engineers N 75-ICT-8, 1975, 9 pp, 28 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

22 131498
THE NATIONAL COUNCIL OF PHYSICAL DISTRIBUTION MANAGEMENT, THIRTEENTH ANNUAL CONFERENCE
This Proceedings includes 40 presentations involving logistics and physical distribution. Among these are: Observations on Surface Transport Deregulation by A. D. O'Heal; The Contribution of Railroad Marketing to Physical Distribution by T. B. Graves, Jr.,; and Forecasts of Freight Transport Technology to the Year 2000 by V. C. Sequin.
Proceedings of the 13th Annual Meeting, Hyatt Regency O'Hare, Chicago, Illinois, October 13-15, 1975.

National Council of Physical Distribution Mgt, Inc 1975, 662 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: National Council of Physical Distribution Mgt, Inc
PURCHASE FROM: National Council of Physical Distribution Mgt, Inc 222 West Adams Street, Room 857, Chicago, Illinois, 60606 Repr. PC
DOTL RP

22 131899
WAREHOUSE LOCATION PROGRAM
Computer program determines warehouse locations and distribution patterns which meet a company's distribution requirements at the lowest cost consistent with physical and operating constraints. Particularly designed to assist shippers in evaluating alternative distribution warehouse configurations.
Direct requests to Mr. R.B. Carlson, Analytic Services, Southern Pacific.

Southern Pacific Transportation Company No Date

ACKNOWLEDGMENT: Southern Pacific Transportation Company
PURCHASE FROM: Southern Pacific Transportation Company 1 Market Street, San Francisco, California, 94105

22 131922

LOGISTICS PLANNING MODEL

This is a multi-time period linear programming computer model which finds the optimal routings for a number of commodities over a given transportation network. The model determines the least-cost combination of movements from source locations to numerous destinations subject to restrictions on supplies, requirements, and transportation equipment and facilities.

Direct requests to Mrs. J.A. Bickerton, Operational Research Branch, Canadian National. Publications: "A Logistics Planning Model for an Arctic Pipeline", Bushell, G.E. and Kingsbury, T.E., Transportation Research Forum, Proceedings 1972, pp 61-74.

Canadian National Railways Jan. 1973

ACKNOWLEDGMENT: Canadian National Railways
PURCHASE FROM: Canadian National Railways 935 la Gauchetiere, West, Montreal, Quebec H3C 3N4, Canada

22 132936

COMPUTERIZED PREVENTIVE MAINTENANCE SYSTEM AT THE PITTSBURGH & CONNEAUT DOCK COMPANY

The operating plan provides for coal to be loaded into vessels either directly from railroad cars or from ground storage. The overall system consists of more than 11,000 ft of conveyors with 23,000 ft of belting, mostly 72 in. wide, two shiploaders, two traveling stackers, two reclaimers, an underpile reclaim pit, a three-car unloading track pit, a thaw shed accommodating eight 100-ton cars and 6000-ton silos. A fleet of eight large bulldozers compact the coal to prevent spontaneous combustion. The modern multi-million ton coal handling and storage system permits coal to be shipped to Conneaut for storage on a year-round basis. This new concept in coal handling and storage, in addition to eliminating surges, delays, and shutdowns in the coal and railroad industries, substantially improved freight car utilization by alleviating the many problems previously encountered in attempting to match vessel availability with coal train arrivals.

McGuirk, CH *Iron and Steel Engineer* Vol. 52 No. 12, Dec. 1975, pp 30-35

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

22 134312

PROPOSALS FOR A MODEL OF INTRA-STATE FREIGHT MOVEMENTS

The need for a model of intra-state freight movements is shown and suitable data sources are identified. The system to be modelled is defined as the primary and secondary production and final consumption of goods in a state. A linear programming model which minimises total transport costs is found to be suitable. A current pilot study is described. The study uses a simplified model, but the same data sources. Some difficulties in obtaining data are identified. /TRRL/

Proceedings of the 7th Conference of the Australian Road Research Board.

Conroy, MM (New South Wales University, Australia) *Australian Road Research Board Conference Proc* Vol. 7 No. 3, 1975, pp 234-243, 2 Fig., 5 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218051)
PURCHASE FROM: Australian Road Research Board 500 Burwood Road, Vermont 3133, South Victoria, Australia

22 134531

ANALYSIS OF SALES IN COMPLETE WAGON LOAD TRAFFIC FROM THE VIEWPOINT OF PRODUCTION [Umsatzanalyse im Wagenladungsverkehr der Eisenbahn aus der Sicht der Produktion]

Some of the turnover analysis methods currently used in economic circles have been adapted to railway conditions, so as to obtain additional information for product and sales management. The writer describes the methods, and the results of experimental calculations, and examines the application possibilities and utility of these methods. [German]

Krause, H *Archiv fuer Eisenbahntechnik* Vol. 30 Dec. 1975, pp 86-94, 6 Tab., 3 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany

23 072046
ECHOS OF COMMUNICATIONS [Echos des communications]
Surface transportation means and State of the art and perspectives are given. From distances of less than a mile to intercity connections, most systems presently in operation or still on the drawing board are reviewed. A bright future is forecast for transportation over distances 150 miles to more than 800 miles, using either an improved version of the present trains, or more revolutionary vehicles featuring air cushions or magnetic lifting forces. Extensive intercity connections should become operative in Europe by 1985, that will generally be compatible with existing facilities. However, financial studies show a definite advantage to revolutionary systems over traditional ones. Research on the other hand requires subsidies from the governments and an international coordination of efforts, in order to meet harmoniously the short and long term needs of the European market at a reasonable cost. Statistical data pertaining to road accidents are presented. Victims of traffic accidents are categorized according to the type of vehicle, sex, gravity of injury, driver or passenger. Brief news and publication reviews are given. [French]

Ministry of Transportation & Telecommun, Belgium Vol. 16 No. 1, 1973, 68 pp, 1 Fig., 8 Tab., 8 Phot.

ACKNOWLEDGMENT: TSC
PURCHASE FROM: Ministry of Transportation & Telecommun, Belgium Brussels, Belgium Repr. PC
DOTL

23 093348
A COMPARISON OF METHODS FOR EVALUATING URBAN TRANSPORTATION ALTERNATIVES
The objective of the report was to compare five alternative methods for evaluating urban transportation improvement options: unaided judgmental evaluation cost-benefit analysis, cost-effectiveness analysis based on a single measure of effectiveness, cost-effectiveness analysis based on multiple measures of effectiveness, and scoring function methods. Each method was assessed within the framework of eight methodological criteria relating to the three major concerns of feasibility, reviewability, and relevancy. The following conclusions are drawn: (1) the judgmental method is satisfactory in several respects, but its subjectivity, lack of specificity might create difficulties in a federal review of the local decision process; (2) of the systematic evaluation methods, cost-effectiveness analysis based on multiple measures of effectiveness poses the fewest difficulties in simultaneously serving the local and federal purposes.

Bronitsky, L Misner, J
Transportation Systems Center, Urban Mass Transportation Administration, (MA-06-0050) Final Rpt. DOT-TSC-UMTA-75-5, UMTA-MA-06-0053-74-1, Feb. 1975, 62 pp, Tabs., 10 Ref.

ACKNOWLEDGMENT: NTIS, Highway Safety Research Institute (HSRI-33327)
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245312/4ST, DOTL NTIS

23 093375
CHARACTERISTICS OF URBAN TRANSPORTATION SYSTEMS. A HANDBOOK FOR TRANSPORTATION PLANNERS
The objective of the handbook specifically for use by transportation planners in the evaluation of alternative systems, is to provide a single simplified reference source which characterizes the most important (from the standpoint of evaluation) performance characteristics of the following contemporary urban transportation systems: (1) Rail (commuter, rapid, and light); (2) local bus and bus rapid transit; (3) automobile-highway system (automobiles and other vehicles); (4) pedestrian assistance systems; and (5) activity center systems---people mover systems that have been installed at airports, zoos, amusement parks, etc. The handbook assesses the supply or performance aspect of urban transportation dealing with passenger demand implicitly. Seven supply parameters studied are: speed, capacity (service volume), operating cost (vehicle), energy consumption (vehicle or source), pollution, capital cost, and accident frequency.
Supersedes PB-233 580/AS. Prepared in cooperation with Urban Inst., Washington, D.C.

De Leuw, Cather/STV, Urban Mass Transportation Administration, Urban Institute, (UMTA-IT-06-0049) UMTA-IT-06-0049-75-1, May 1975, 193 pp

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245809/9ST, DOTL NTIS

23 093441
UMTA TRANSPORTATION PLANNING SYSTEM REFERENCE MANUAL
Developed by the Urban Mass Transportation Administration, the UMTA Transportation Planning System (UTPS) is a collection of IBM System/360-370 computer programs for use in planning multimodal urban transportation systems. The objective of UTPS is to provide transportation planners with readily available, tested, and easy to use planning tools. This document summarizes information on the function and use of the UTPS program. It discusses general program operation and contains each individual program's operating instructions. This manual also describes all UTPS datasets, and explains how UTPS is installed at a user's computing facility. Sections of the manual include system control statements, subject program control statements, program writeup organization, software system description, data file formats, cataloged procedures, and program writeups.
Supersedes PB-231 865.

Urban Mass Transportation Administration, (UMTA-IT-06-0050) UTP.40.74.1.5, UMTA-IT-06-0050-75-1, June 1975, 512 pp

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246187/9ST, DOTL NTIS

23 093471
A HISTORY OF THE KEY DECISIONS IN THE DEVELOPMENT OF BAY AREA RAPID TRANSIT
The report describes the key decisions in the planning and implementation of Bay Area Rapid Transit (BART) during the period 1947 through 1974. The decisions are evaluated in terms of the influences brought to bear upon the decision-making process to determine decision outcomes.
Prepared in cooperation with Dept. of Housing and Urban Development, Washington, D.C., and McDonald and Smart, San Francisco, Calif.

Grefe, R Smart, R
Metropolitan Transportation Commission, Department of Housing and Urban Development, McDonald and Smart Incorporated Final Rpt. FR-3-14-75, Aug. 1975, 229 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245617/6ST, DOTL NTIS

23 093483
IMMEDIATE TRAVEL IMPACTS OF TRANSBAY BART
The Bay Area Rapid Transit (BART) System started service beneath San Francisco Bay in September 1974. The report analyzes travel patterns in the transbay corridor in the period before and immediately after the start of transbay BART service. Aggregate transbay travel by automobile and transit are analyzed in terms of historical trends and seasonal and short-term variations as the basis for assessing the impacts of BART. Impacts on traffic congestion are analyzed using highway travel time survey data. The results of on-route questionnaire surveys of transbay travelers using automobile, BART, and bus in October 1974 provide descriptions of the origin-destination pattern of transbay trips, their purposes, and the profiles of travelers. Traveler choices between BART and the alternative modes are analyzed in terms of reported travel times and costs and ratings of perceived importance and satisfaction for a set of 14 travel factors (impedances) included in the survey questionnaire. Portions of this document are not fully legible.
Prepared in cooperation with Peat, Marwick, Mitchell and Co., Burlingame, Calif.

Sherret, A
Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration Tech. Memo MTC-TM-15-3-75, May 1975, 153 pp

Contract DOT-OS-301-76

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245983/2ST, DOTL NTIS

23 093912
DATA NEEDS FOR MEASURING THE IMPACTS OF NEW TRANSPORTATION SYSTEMS: THE BART EXPERIENCES
The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system, BART. The Impact Program has just completed its initial phase of planning and investigation, and is now evaluating its results, research strategy and analytical methods developed thus far.

Markowitz, J Reynolds, M
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development WP-18-1-75, Aug. 1975, 22 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB247708/1ST, DOTL NTIS

23 093913
THE BAY AREA RAPID TRANSIT SYSTEM-CURRENT STATUS AND IMPACTS
The report reviews the history of the BART system, describes the kind of service the system provides, discusses the difficulties of impact measurement, reports the early findings about BART's effects on travel, and describes how BART is seen by residents and policy-makers of the area. The Bay Area Rapid Transit system has only been in operation on all of its lines since September 1974. The inherent design of the system as a long-distance, commuter rail facility means that BART by itself could not possibly live up to some of the inflated expectations held for it, nor produce some of the dramatic impacts which had been predicted. As BART solves its operational problems, it will become a key element in the total regional transportation system of the Bay Area, and is likely to prove to have been worth its cost.

Bay, P Markowitz, J
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development WP-17-1-75, Aug. 1975, 33 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247709/9ST, DOTL NTIS

23 093923
LAND USE AND URBAN DEVELOPMENT PROJECT RESEARCH PLAN
The report defines the scope of the Land Use and Urban Development Project, identifies specific research issues, and outlines methods for performing the work. A theoretical framework encompassing the various anticipated land use impacts outlines the impact process and defines the basic concepts used in formulating the research approach. The Work Elements describing the specific work to be done are closely tied to the research issues identified in the theoretical framework. Details of data collection and analysis are contained in the Work Elements. The Research Plan outlines how the work will be performed by proposing a preliminary schedule, staffing requirements and estimates of level of effort.

Bain, H Escudero, E
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. PD-17-5-75, Sept. 1975, 63 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247767/7ST, DOTL NTIS

23 093924
PHOTO SURVEY OF DEVELOPMENT AND ACTIVITIES IN THE VICINITY OF BART STATIONS. USER'S GUIDE
A general description of BART Impact Program Photo Survey data and basic instructions for their use is given. The Photo Survey is a record of development and activities in the vicinity of BART stations at given points in time. The photos, aerial photos and supplementary assessor's land use information. The three kinds of data are cross-indexed by map overlays. More detailed technical information concerning procedures used in establishing and maintaining the Photo Survey data area presented in the Photo Survey Technical Report (Christensen, 1975).
Prepared by California University, Berkeley, Department of Architecture.

Christensen, DL
Metropolitan Transportation Commission, California University, Berkeley Final Rpt. FR-14-17-75, July 1975, 40 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247768/5ST, DOTL NTIS

23 093954
PHOTO SURVEY OF DEVELOPMENT AND ACTIVITIES IN THE VICINITY OF BART STATIONS. TECHNICAL REPORT
The Photo Survey is a record of development and activities in the vicinity of BART stations at given points in time. The record consists of three categories of data: ground level photos, aerial photos and supplementary assessor's land use information. The three kinds of data are cross-indexed by map overlays. Additional description of Photo Survey data, as well as detailed instructions for their retrieval and cross referencing may be found in the Photo Survey Users Guide (Christensen, 1975).
See also PB-247 768. Prepared in cooperation with Department of Housing and Urban Development, Washington, D.C.

Christensen, DL
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. FR-5-17-75, July 1975, 42 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248313/9ST, DOTL NTIS

23 094130
A PARAMETRIC ACCESS NETWORK MODEL
Supply models are estimated for the access portions of rail and bus trips. The models are designed to predict aggregate zonal travel times as a function of the transportation system, zone size, and volume related characteristics of a zone. Three models are estimated that deal with a rail trip. These are: access walking time, access driving time, and access riding time on a bus. The walking time to a bus stop is modeled for the bus trip. Corresponding models are developed for the within zone variance of the access times. One purpose of these models is to provide an input to existing travel demand forecasting processes by systematizing the way in which the access times are currently obtained for network coding. Another purpose of the models is to provide for the reduction of bias if disaggregate (logit) models are used in forecasting travel.

Talvitie, A Leung, T
Oklahoma University, Urban Mass Transportation Administration, (UMTA-OK-11-0016) UMTA-OK-11-0016-74-3, Oct. 1974, 70 pp

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248958/1ST, DOTL NTIS

23 094169
FULL COSTS OF URBAN TRANSPORT. PART II. MARGINAL COSTS OF FIXED-RAIL RAPID TRANSIT SERVICE IN THE SAN FRANCISCO BAY AREA
Contents: The capital costs of BART; Calculating marginal peak and base costs; Operating costs of the San Francisco Bay Area rapid transit district; Marginal costs per seat-mile in current and long-run operation; Alternative marginal-cost concepts; Comprehensive marginal costs for selected trips. Portions of this document are not fully legible.
See also PB-248 147.

Keeler, TE Merewitz, LA Fisher, P
California University, Berkeley, National Science Foundation Monograph-20, NSF/RA/S-75-069B, June 1975, 108 pp

Grant NSF-GI-37181
ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248146/3ST, DOTL NTIS

23 094170
FULL COSTS OF URBAN TRANSPORT. PART I. ECONOMIC EFFICIENCY IN BUS OPERATIONS; PRELIMINARY INTERMODAL COST COMPARISONS AND POLICY IMPLICATIONS
Contents: Derivation of unit costs; Structure for assessing the short and long run costs of bus service; Long run equilibria and system capacity; Integrated bus service and inter-modal cost comparisons. Portions of this document are not fully legible.
See also PB-248 146.

Keeler, TE Merewitz, LA Fisher, P Viton, P
California University, Berkeley, National Science Foundation Monograph-19, NSF/RA/S-75-069A, Dec. 1974, 156 pp

Grant NSF-GI-37181

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248145/5ST, DOTL NTIS

23 094663
INTEGRATED MASS TRANSPORTATION SYSTEM STUDY/DEFINITION/IMPLEMENTATION PROGRAM DEFINITION
Specific actions needed to plan and effect transportation system improvements are identified within the constraints of limited financial, energy and land use resources, and diverse community requirements. A specific program is described which would develop the necessary generalized methodology for devising improved transportation systems and evaluate them against specific criteria for intermodal and intramodal optimization. A consistent, generalized method is provided for study and evaluation of transportation system improvements. (Author)

Ransone, RK Deptula, DA Yorke, GG
Virginia University NASA-CR-145961, ESS-4764-102-75, Dec. 1975, 34 pp

Contract NGR-47-005-181

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
N76-14979/8ST, DOTL NTIS

23 126196
A METHOD FOR STANDARD DESCRIPTION OF PUBLIC TRANSPORT SYSTEMS [Metod foer Standardbeskrivning av Kollektiva Transportsystem]
The standard of a transport system, its ability to satisfy a certain travel requirement, is defined by a multitude of factors. The principal components chosen in the report are accessibility, safety and convenience. Preferences between different factors vary depending on age, etc. Transport standard is a complex concept and the quality of a system is dependent on a large number of factors. Factors can be set out systematically or analysed graphically. Different evaluation methods are used in comparing transport systems. In choosing analytical methods, a balance must be struck between accuracy and ease of handling. Attempts have been made to set transport standards into a broader framework by making the transport apparatus an integral part of society. Travel is an expression of people's need to participate in different activities; recent surveys showed that a well-functioning transport apparatus must satisfy greatly varying travel needs. A model is presented for public travel standard; in a study at Lund, the model was applied and found in good agreement with intuitive assessemnts of the public transport system. /TRRL/ [Swedish]

Friberg, G Holmberg, B
Nordic Institute for Studies in Urban & Reg Planng R&D Rept. NR2, 1974, 114 pp, Figs., 6 Tab., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-213463)
PURCHASE FROM: Nordic Institute for Studies in Urban & Reg Planng Skeppsholmen, S-111 49 Stockholm, Sweden Repr. PC

23 126197
THE INFLUENCE OF SERVICE FREQUENCY ON TRAFFIC VOLUMES IN MASS TRANSIT [Turtaethetens Inverkan paa Trafikmaengden i Kollektiv Lokaltrafik]
This paper deals with the problems of separating the influence of frequency from a great number of other parameters which also affect traffic volume. The investigation area is close to the central business district of Stockholm with an underground line which had its time table intervals changed from 10 to 15 and from 15 to 7.5 minutes. This area is compared with similar areas served by other underground lines with no change in frequency. Similarity and constancy or co-variation of most parameters whose influence cannot be correctly compensated for or avoided by the layout of this investigation is checked for all areas. After 2 years there is an increase in traffic with at least 16% during 0900-1500 hours and at least 10% during late evening traffic. /TRRL/ [Swedish]

Grindahl, T
Royal Institute of Technology, Sweden R&D Rept. No. 1, 1974, 73 pp, 7 Fig., 16 Tab., 16 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-213453)
PURCHASE FROM: Royal Institute of Technology, Sweden Fack S-10044, Stockholm 70, Sweden Repr. PC

23 128805
REPORTS ON OECD CONFERENCE ON "BETTER TOWNS WITH LESS TRAFFIC" AND FIELD VISITS TO VARIOUS WESTERN EUROPEAN CITIES-APRIL 1975
Field trip reports are presented which highlight current practice in urban transportation in Europe. The report of visits to 3 case study cities (Munich, Bern, Besancon) notes many innovative concepts, and the European emphasis on mid-range programming (6-10 years). The importance of form, size, population density, dispersal characteristics, and historical and cultural restraints in relation to transportation is emphasized. The European countries which submitted case studies at the Conference reported measures to restrict the use of the private auto, and measures to promote the use of public transit. A visit to Nottingham, Leeds and London has shown that where pedestrianization has taken place, business has improved; community groups must be included in the planning process; and good public relation schemes must be implemented. The conference also provided for exchange of information related to systematic problems that arise when a traffic restraint is undertaken. A report is made of a visit to several European cities (in England, West Germany, and Netherlands) engaged in the use of public transportation and/or traffic management to reduce the adverse impacts of automobile traffic. A report of general and specific observations, notes that European programs are geared to a total system concept, and are much less inhibited by transfers or constrained by safety hazards. Specific observations made in Munich, Bern and Besancon are discussed. A report on a visit to Sweden notes the success of traffic restraint schemes. Such restraints are part of a larger process of city planning, citizen involvement and traffic management whose goal is to gradually alter the traffic flow so as to achieve the same standards of safety and environmental quality as is achieved when planning new developments.

Transportation Research Circular No. 171, Oct. 1975, 47 pp

PURCHASE FROM: TRB Publications Off Orig. PC
DOTL RP

23 129608
LIGHT RAIL TRANSIT SYSTEMS
This compendium of information on Light Rail Transit (LRT) systems operating in 23 cities throughout Europe and North American, describes types of LRT (such as tram, semi-metro, and pre-metro), vehicle types, city characteristics, and government policies relating to such systems. The systems described were predominantly radial network configurations serving center city, and mostly confined within a 5 km radius. Increasing use was noted of tunnel sections in the center city as well as pedestrian mall service. There was also extensive modal integration. The broad range of LRT fleets consist of single, articulated and trailer units. Observations are also recorded of the vehicle ability to serve both low and high level platforms, monitoring and signal prioritization, honor-type fare collection, performance, ridership, operating costs, and subsidy sources specific to each country.

General Motors Corporation Aug. 1975, 151 pp, Figs., Tabs.

PURCHASE FROM: General Motors Corporation Twelve Mile and Mound Roads, Warren, Michigan, 48090

23 129804

LIGHT RAIL TRANSIT: A MODERN RENAISSANCE

The evolution of light rail transit from the earliest street railways is traced. Between the demise of the electric interurban and streetcar systems and the resurgence in urban rail transit, the concept of light rail was lost. The rediscovery is not now motivated by sentimentality, but on the inherent advantages of this technology. Rapidly increasing costs in heavy rail development and uncertainty about new transit technology served to spark the new interest. It offers the opportunity to initiate rail transit development at rather modest costs. The flexibility of light rail technology allows transit service, system capacity and available resources to be traded off in a variety of ways.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Mills, JR *Transportation Research Board Special Reports* No. 161, 1975, pp 3-6

PURCHASE FROM: TRB Publications Off Repr. PC

DOTL RP

23 129805

LIGHT RAIL TRANSIT: 1975 USAGE AND DEVELOPMENT

A worldwide survey of light rail transit systems and specific details of many of these operations are included. General principles of the application of light rail technology are derived from some of these applications. The author notes that the design and subsystem components for the guideway, as well as the power distribution technology exist presently. The vehicle necessary to implement this technology is currently in design or is being manufactured in Belgium, Germany, Switzerland, Canada and the U.S.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Rogers, LH (Institute of Public Administration) *Transportation Research Board Special Reports* No. 161, 1975, pp 7-13, 1 Tab., 1 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC

DOTL RP

23 129806

THE URBAN MASS TRANSPORTATION ADMINISTRATION VIEW OF LIGHT RAIL TRANSIT

This paper addresses the issues of how the Urban Mass Transportation Administration views light rail transit, what future role UMTA sees for this technology in American cities, and what considerations lead UMTA to sponsor a Light Rail Transit Conference. Although UMTA recognizes the virtues of the light rail concept, it does not see this as a panacea for urban mobility problems. It is believed that light rail may be a major solution to the search for less costly, more efficient and more environmentally attractive transportation systems that can economically serve the dispersed land use and travel patterns of metropolitan areas.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Orski, CK (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 161, 1975, pp 14-15

PURCHASE FROM: TRB Publications Off Repr. PC

DOTL RP

23 129807

LIGHT RAIL TRANSIT: AN URBAN TRANSPORTATION ALTERNATIVE

The Urban Mass Transportation Administration expects federal policy for investment in major urban transportation projects to lead to a rational allocation of limited resources. This is not a new concept and analysis on the basis of cost effectiveness by both federal and local agencies should encourage more cities to consider light rail as an alternative. Light rail on exclusive right of way can be an attractive competitor to the automobile.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Herringer, FC (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 161, 1975, pp 16-18

PURCHASE FROM: TRB Publications Off Repr. PC

DOTL RP

23 129808

PHYSICAL, OPERATIONAL, AND PERFORMANCE CHARACTERISTICS OF THE LIGHT RAIL MODE

An overview of the light rail mode is presented. General characteristics and application of the mode are described, emphasizing the versatility of its guideway, the railway track. Physical characteristics of the right-of-way and ranges of dimensions for right-of-way and vehicles are discussed. Stations are discussed briefly. Basic technical simplicity of the light rail mode is pointed out as a significant virtue. Operating characteristics (both maximum running speeds and typical average operating speeds) are indicated. Acceleration of typical vehicles is noted. Frequency of service is discussed, and ranges for various traffic control systems are given. Riding quality and visual impact are pointed at as being favorable. Capacity of light rail lines is given as a few thousand to 12,000 passengers/h. In special cases, a high of 18,000 passengers/h can be achieved by using multiple-unit trains of 3 or more cars. Choices a designer has to attain maximum capacity are stated. Capital costs of contemporary new light rail systems are given as ranges of costs for various configurations. It is concluded that light rail transit is a medium-cost mode providing a medium level of capacity at medium speeds that can find application in many corridors or areas in medium and larger sized urban areas. It is pointed out that light rail is an existing mode with proved capabilities that needs little or no new research and development.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Vigrass, JW (Port Authority Transit Corporation) *Transportation Research Board Special Reports* No. 161, 1975, pp 19-25, 5 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC

DOTL RP

23 129809

ROUTE LAYOUT PHILOSOPHY AND SERVICE COORDINATION PARTICULARLY FOR LIGHT RAIL TRANSIT

Peak-period and all-day service in public transportation are discussed with emphasis on light rail transit. Peak- period service treats each line as a separate entity operating from residential neighborhoods directly to the central business district. This type of service is typified by the American metro-mode motor-bus concept. Each route in an all-day service interacts with every other route enabling regionwide mobility. This integrated approach is found throughout Europe and is also well developed in a few U.S. and Canadian cities. Traditional network arrangements, such as radial and grid setups, and more recent concepts, such as the timed transfer focal point, are considered. Detailed aspects of service integration including schedules, passenger facilities, information, and fares are reviewed. That a widespread disinclination in North America to implement integrated systems exists because of limited funds and management disinterest is noted. The organizational structure successfully adopted in Europe to bring about service integration is described.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Sullivan, BE (British Columbia Department of Municipal Affairs) *Transportation Research Board Special Reports* No. 161, 1975, pp 26-36, 1 Fig.,

1 Tab., 20 Ref.
PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129810
LIGHT RAIL AND RAPID TRANSIT
Light rail transit can be considered as an advanced form of the conventional streetcar. Its tracks lie primarily on separated rights-of-way. In areas where there is heavy congestion, they are often in tunnels. Like rapid transit, which is independent from surface traffic on its entire length, light rail transit with modern vehicles can undertake the role of the primary transit carrier in medium and large urban areas, supplemented by and coordinated with a secondary feeder system. The most common application of light rail is in medium-sized cities. Rapid transit serves large cities. With respect to its service quality, capacity, productivity, and efficiency, rapid transit is superior to light rail transit in various degrees. However, a particularly important advantage of light rail transit is that its network can be constructed with lower investment costs and in a shorter period of time than can a rapid transit network. Moreover, individual sections can be used immediately after completion. When light rail transit has under ground sections in central urban areas, it can be a transitional system to later rapid transit as long as adequate alignment standards are applied in construction. The requirement for an integration of transportation and urban design is particularly important for light rail and rapid transit. Their radial lines from the central cities should form the axes of residential corridors. Thus they perform 2 rolesì To the corridor residents and commuters from the region, through park-and ride, they represent an attractive alternative to the private automobile; at the same time, they reduce traffic loads on urban arterials and streets.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Lehner, F *Transportation Research Board Special Reports* No. 161, 1975, pp 37-49, 5 Tab., 5 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129811
COMPARISON OF BUSWAY AND LIGHT RAIL MODES
Much has been offered to convince decision makers that busways are the least costly of fixed-guideway services in medium-density urban corridors. Until recently, these claims could be questioned but not refuted because a thorough analysis of comparable busway and light rail transit (LRT) systems did not exist. However, such a work was completed in late 1974. The Rochester, New York, Charlotte-Henrietta corridor studies are a detailed busway-versus-LRT mode comparison for a specific corridor. The studies show that, although LRT and busway investment costs are similar for equal facilities, LRT exhibits substantial operating costs, operation, and service advantages.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Morris, WH, Jr (Rochester-Genesee Regional Transportation Auth) *Transportation Research Board Special Reports* No. 161, 1975, pp 50-61, 3 Fig., 4 Tab., 5 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129812
PLACE OF LIGHT RAIL TRANSIT IN THE FAMILY OF TRANSIT MODES
The paper attempts to clarify concepts and terminology of urban transit systems. Modes are defined by type of right-of-way, system technology, and type of service and operation. Right-of-way is shown to be the most important single feature determining mode performance and cost. Advantages of partial or full separation of transit from surface traffic are defined. The basic features of system technology are analyzed. Guided systems are compared with driver-steered systems; rail systems are compared with rubber-tire guided systems; and manually driven systems are compared with automated systems. With respect to operations, it is pointed out that commuter transit should be a supplement to, not a substitute for, regular transit. An analysis of optimal vehicle size shows that, for guided systems that are in use or may be operational in the near future, minimum vehicle capacity should be 40 to 50 spaces. Based on this analysis of mode components, it appears that potential light rail applications are in medium-sized cities as carriers serving major routes and in large cities as a supplement to rapid transit. In large cities with low densities, light rail transit or light rapid transit (fully grade-separated light rail transit) also has potential for application. Small cities and special services may sometimes also use this mode. The following rights-of-way are best suited for light railì street and highway medians, railroad rights-of-way, aerial structures, and, in downtown areas, short tunnel sections.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Vuchic, VR (Pennsylvania University, Philadelphia) *Transportation Research Board Special Reports* No. 161, 1975, pp 62-76, 6 Fig., 1 Tab., 11 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129817
OPERATING A LIGHT RAIL SYSTEM
The most important parts of a transit operation-movement and control of vehicles-are discussed. Scheduling and control of trains in a hypothetical system are described. Examples of movement and control in light rail systems in Boston, Newark, Shaker Heights, and Cleveland are given.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Korach, RS (Port Authority Transit Corporation) *Transportation Research Board Special Reports* No. 161, 1975, pp 111-114

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129818
LIGHT RAIL TRANSIT CONSTRUCTION COSTS
Light rail transit has attractive service characteristics that can be secured in most cities for modest investments. The relatively low construction costs of light rail transit are due primarily to avoiding large civil works by relying instead on reserved rights-of-way at grade. Many options are available for alignments at grade, and costs for way reservation can vary widely. This paper describes the construction costs for modern light rail transit; it takes into consideration way reservation and the more predictable costs for stations, street crossings, track, cars, electrification, signals, communications, and other requirements. The costs presented are estimates, based on the experience of the author in recent evaluations of light rail transit for several U.S. cities. Few new light rail facilities have been built in the United States in recent years; therefore, little opportunity exists for relating estimates of this type to actual construction. Figures discussed here range from high to low where convenient, and single estimates presented are conservative representations of the largest values likely to be experienced in most cities.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Beetle, GR (Klauder (Louis T) and Associates) *Transportation Research Board Special Reports* No. 161, 1975, pp 115-121

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129819
OPERATING AND MAINTENANCE COSTS OF LIGHT RAIL TRANSIT
This paper explains the costs of operating light rail lines, and it explains how light rail can be more economical than other modes under certain conditions. Using 3 recent studies of proposed light rail lines as examples, the paper shows that new lines can be economically constructed and operated with a potential ridership of as little as 20,000 daily passengers. The self-service fare systems used on European light rail lines is explained, and an opinion is given recommending that such a system could be implemented on new light rail lines built in the United States. Relatively fixed maintenance costs, high passenger-to- operator ratios, and multiple-unit capabilities make traffic increases on light rail lines much more economical to accommodate than on bus lines. The paper details how light rail lines have high passenger carrying capabilities (as much as 20,000 passengers/h) yet need relatively low passenger loads (only 20,000 passengers/day) to economically justify implementation and still have sufficient revenue to cover all operating costs. Also discussed are the ease of implementation, the versatility of the mode, and passenger acceptance and preference.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

DeGraw, R (Southeastern Pennsylvania Transportation Authority) *Transportation Research Board Special Reports* No. 161, 1975, pp 122-125, 4 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129820
ATTRACTING LIGHT RAIL TRANSIT RIDERSHIP
This paper addresses the complex planning considerations for attracting ridership to transit systems, particularly light rail transit systems. Taking the viewpoint of a potential rider, the authors present some observations that lay the foundation for understanding ridership response. Users are not interested in technology per se but in the level of service the system provides. Level of service is a complex combination of many system attributes such as travel time, cost, comfort, and convenience. Different user groups (market segments) make different trade-offs among these attributes. They assign different relative weights or importance to each attribute. To attract maximum ridership, the system should be tailored to the particular needs and constraints of the market segments it is serving. No single system is superior for all market segments. The paper discusses the various level-of-service attributes and their relative importance to different market segments based on empirical evidence and attitude surveys. Although one cannot generalize because different market segments assign different relative weights to level-of-service attributes, the following rank ordering of attributes from most influential to least influential is most typically the case: out-of-vehicle travel time, in-vehicle travel time, cost, comfort, and safety. For work trips travel time reliability should be added as either the first or second most important attribute. The characteristic convenience is dismissed from this list as being too broad to be specifically and universally defined. The paper goes on to introduce disaggregate, behavioral, travel-demand models as an emerging analytical technique that the transit planner can use to more precisely address the problem of the ridership response of different market segments to different level-of-service packages. Examples of these models are then used to demonstrate how different prototypical households would respond to various technologies under various representative operating policies. Some conclusions are drawn on the situations in which light rail transit would appear to be the most attractive form of public transportation from the rider's point of view, and some suggestions are made on how to improve attraction of light rail transit ridership.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Jessiman, WA (Cambridge Systematics, Incorporated); Kocur, GA *Transportation Research Board Special Reports* No. 161, 1975, pp 126-146, 5 Fig., 5 Tab., 16 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129822
LIGHT RAIL TRANSIT SYSTEM EVALUATION
Evaluation of a light rail transit system involves many considerations that are specific to sites or systems and cannot be treated in a general study. However, it is possible to establish a value for reductions in running time relative to reductions in direct operating cost, savings in passenger time, and increases in net system revenue. These values, which depend on passenger volume, can be related to capital cost improvements. These include eliminating on-street running, eliminating grade crossings, instituting high-platform loading, and varying fare-collection systems. Brief commands are included on other factors of system evaluation including reliability, safety, and provision for future growth. The paper concludes that, although certain intensive improvements are likely to be justifiable, these must depend on a more detailed system-specific evaluation. In general it suggests that the planning and design of light rail transit should keep the system as simple as possible and, on the surface, avoid automatic application of rapid transit or railroad standards-and costs.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Parkinson, TE *Transportation Research Board Special Reports* No. 161, 1975, pp 159-166, 4 Tab.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129823
PUBLIC CONSIDERATIONS OF THE ECONOMICS AND MARKETING OF LIGHT RAIL TRANSIT
The term light rail transit is defined for its use in this paper. This paper is concerned with that type of rail transit that permits electric operation of rail vehicles, singly or in trains, and is capable of subway, elevated, at-grade, and in-street operation on any given route. Economics and marketing are related in the same manner that revenue and expense are related. Adaptation of the service to maximize public response cost will confer public benefits to both the user and the taxpayer when more costly alternatives are relieved or avoided. The unique aspects of light rail transit in developing and conferring benefits are reviewed and analyzed. Light rail transit is often less costly and more convenient than full-scale rapid transit; it is often more efficient, attractive, and economical than conventional bus transit within its proper area of operation.
This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.

Tennyson, EL (Pennsylvania Department of Transportation) *Transportation Research Board Special Reports* No. 161, 1975, pp 167-172, 2 Ref.

PURCHASE FROM: TRB Publications Off Repr. PC
DOTL RP

23 129853
A REVIEW OF SHORT HAUL PASSENGER TRANSPORTATION
This report presents analyses, findings, conclusions and recommendations of the Committee on Transportation's review of short haul passenger transportation, primarily intercity. There is particular focus on the potential of ground transportation systems and the role they might play in satisfying the nation's needs in the next 20 to 25 years for passenger transportation between points 50 to 500 miles apart. While these distances may vary from corridor to corridor, this general range is the one of primary concern. Considered are present and projected short haul technologies of all modes, the potential future markets and the applicability of the technologies to anticipated transportation needs. The findings are intended to help define priorities and weigh alternatives in federally- sponsored programs relating to higher speed intercity transportation.
This is a report of work supported by Task Order No. 4, between the Department of Transportation and the National Academy of Sciences.

National Academy of Sciences-Natl Research Council 1975, 147 pp, Figs., Tabs., 29 Ref.

Contract DOT-OS-40022

PURCHASE FROM: National Academy of Sciences-Natl Research Council 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr. PC
DOTL RP

23 129973
PROGRESS IN PLANNING URBAN PASSENGER TRANSIT IN AUSTRALASIA AND JAPAN
The authors present a state of the art report of research being carried out a Australasia and Japan in mid 1974 into innovation in public transport systems and coordination of urban public transport planning. The huge differences in scale, resource availability and tradition that separate Australasia and Japan were found to be reflected mainly in the progress made towards the development of public transit systems, rather than in the overall aims of the policies being adopted to combat urban transport problems. /TRRL/

Woodling, G Marshall, R (Transport Planning Limited) *Traffic Engineering and Control* Vol. 16 No. 4, Apr. 1975, pp 178-180, 4 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215210)
PURCHASE FROM: Printerhall Limited 29 Newman Street, London W1P 3PE, England Repr. PC

23 130789
RAIL FERRY BY AUTO-TRAIN CORPORATION, TODAY AND TOMORROW
This paper provides a brief description of the actual "Auto-Train" service with an emphasis on equipment and terminal operations. Expansionary plans for the future are also mentioned.
Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Atlanta, Georgia, July 14-18, 1975.

Garfield, EK (Auto-Train Corporation)
American Society of Mechanical Engineers 75-ICT-9, July 1975, 4 pp, 1 Fig.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC
DOTL RP

23 130900
JAPAN'S BULLET EXPRESS TRAIN, SHINKANSEN, AND ITS 10 YEAR HISTORY
The number of Tokaido Bullet Express (Shinkansen) users has reached 800,000,000, since the service was inaugurated in October 1964. From a railway transportation operational viewpoint, it is significant that, in spite of the fact that total running length of the Bullet Express line is 515 km, or only 1/40 of the 20,000 km total length of Japanese National Railways lines, yet its passenger recepts are 1/4 of the total passenger receipts of all the Japanese National Railways lines. The reasons for the Bullet Express success in operation are its enviable intercity traffic facilities, such as high-speed, large capacity, comfort and safety. These features are well matched to the traffic demands in Japan. Effective Bullet Express utilization has been directly proven by the fact that each Bullet Express train comprises 16 cars and that trains make more than 100 round trips every day. This successful Bullet Express operation presents an excellent example of a net type of railway train which seems best suited to future railway transportation requirements.

Matuskuma, M (Tokyo Shibaura Electric Company) *Toshiba Review* No. 98, July 1975, pp 12-17

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

23 130925
CORRELATIONS BETWEEN SHORT-HAUL AIR TRANSPORT AND HIGH-SPEED RAILROAD SYSTEM IN JAPAN
Shinkansen, a high-speed rail line between Tokyo and Osaka, is regarded as a success from the viewpoints of both its earnings performance and national as well as public interests. It has however, caused dislocations in air transportation. Air carriers who were operating flights over sectors of not longer than 300 miles were forced to suspend service, and even those who were operating service over sectors of 300 miles or longer experienced more or less a decline in the number of passengers. On the other hand, it was proved that air service over routes of at least 300 miles long could coexist with Shinkansen, maintaining constantly a market share of 10% without suffering fatal damage.
Presented at the Intl Air Transportation Conference, San Francisco, Mar 24-26, 1975 sponsored by the ASCE Air Transportation Division.

Itow, R (Japan Air Lines)
American Society of Civil Engineers Proc Paper 1975, pp 73-89

ACKNOWLEDGMENT: EI
PURCHASE FROM: ASCE Repr. PC

23 130987
URBAN EXPRESS BUS AND RAILROAD PERFORMANCE
The relative performance of traditional local transport modes with a proposed investment in a commuter railroad or in express bus operations was appraised by a computer simulation which determined travel time, waiting time, walking time and monetary costs involved for each mode for complete trips from a suburban area to the central business district four miles away. In this rather narrow situation the commuter railroad is completely dominated in cost and time performance by express bus systems. If the distance between the suburban and downtown areas were increased, relative performance by buses would decline. The author suggests the express bus must be considered as a rail alternative and in any commuter system an integrated downtown distribution with several stops can greatly enhance system performance.

Dewees, DN (Toronto University, Canada) *Journal of Transport Economics and Policy* Vol. 10 No. 1, Jan. 1976, pp 16-25, 1 Fig., 4 Tab., 6 Ref.

ACKNOWLEDGMENT: Journal of Transport Economics and Policy
PURCHASE FROM: London School of Economics and Political Science Houghton Street, Aldwych, London WC2A 2AE, England Repr. PC
DOTL JC

23 131026
PROCESSING VARIABLE FORMS FOR TRAVEL ESTIMATION
As applied to intercity travel demand estimation, the conventional gravity model consists of some pairing-like variables which attempt to express certain interactions affecting the travel potential between two cities. This paper explores alternative functional forms of the pairing-like variables, in order to produce a more effective travel demand forecast relationship. The study suggests the use of three statistical procedures for formulating the demand model, based on functional forms of variables that most significantly express the travel demand relationship. The best functional form of the pairing-like variable is defined as the one which will yield a statistically sound model of travel estimation, as indicated by stepwise multiple regression techniques. It is anticipated that by incorporating these variables forms, the predictive power of resulting travel demand models will be substantially improved, while data requirements are minimized.

Yu, JC (Utah University); Popper, RJ (Virginia Polytechnic Institute & State University) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE1, Proc. Paper 11938, Feb. 1976, pp 91-104, 1 Fig., 6 Tab., 17 Ref.

ACKNOWLEDGMENT: ASCE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

23 131034
MULTIMODAL INTERCITY CORRIDOR STUDY: THE SACRAMENTO- STOCKTON-SAN FRANCISCO BAY AREA CORRIDOR
Intercity travel is a growing problem in California. In the face of rising energy costs, congestion and environmental impacts associated with highway-dominated regional growth, the need for a service alternative to the automobile is apparent. The Sacramento-Stockton-San Francisco Bay Area Corridor Study is searching for a viable intercity public transportation improvement program sensitive to the transportation, economic, and environmental characteristics of the study area. Conventional and advanced technologies were examined which combined modal alternatives with routes, stops, feeder-distribution service, and variable operating and pricing policies. These combinations were evaluated in respect to potential demand, capital and operating costs, level of service, revenue, and non-user impacts under a variety of fare, service, and subsidy assumptions. Improved express

bus service, closely integrated with local transit, offers immediate action opportunities. A staged program of rail-based improvements, starting with operating conventional equipment on existing tracks mixed with freight and evolving into a turbine train operation on new track, offers a middle range possibility with a higher level of service at a moderate cost. Short-haul air service with improved airport access will also have a role in the corridor. Its full potential requires a demonstration program. Extending Bay Area Rapid Transit at a high cost offers no major advantage over cheaper rail solutions. Tracked Levitated Vehicle technology is not available for decision-making; however, future options should be preserved. Major findings indicate the importance of close ties to existing local urban transit for feeder/distribution service. New demand-responsive local feeder service will have an even more dramatic effect on patronage in the long-run. The increasing attractiveness of intercity transit service is directly related to increasing gas prices and lower highway speed limits as well as moderate fares and a high frequency of transit service. Denser development patterns also improve transit viability. The energy utilization and pollution output of each alternative was compared with their automobile equivalent with results substantially favoring the transit alternatives. Noise and visual disruption to communities was also studied, as well as the ecological impacts associated with construction. Using existing transportation rights-of-way for the new alternatives has kept these impacts to a minimum.

Lockwook, SC (Voorhees (Alan M) and Associates, Incorporated); Weber, WD (California Department of Transportation) *High Speed Ground Transportation Journal* Vol. 9 No. 3, Sept. 1975, pp 115-150, 12 Fig., 7 Tab.

ACKNOWLEDGMENT: High Speed Ground Transportation Journal
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 131139
TRAVEL BEHAVIOR AND VALUES
The papers in this Record represent several important advances in the study of traveler behavior and values. Five of the papers are concerned with behavioral travel demand specifically, and one is concerned with the value of time.

Presented are 6 reports prepared for the 54th Annual Meeting of the Transportation Research Board.

Transportation Research Record No. 534, 1975, 69 pp, Figs., Tabs., Refs.

PURCHASE FROM: TRB Publications Off Repr. PC

DOTL JC

23 131223
LIGHT RAIL TRANSIT
This bibliography comprises a large number of entries relating to experience in various cities and describing new equipment, characteristics on infrastructure and operating systems, projects now being implemented etc.

International Union of Public Transport Bibliog.

ACKNOWLEDGMENT: International Union of Public Transport
PURCHASE FROM: International Union of Public Transport 19 Avenue de l'Uruguay, Brussels B-1050, Belgium Repr. PC

23 131224
PROCEEDINGS OF CONFERENCE ON IMPROVED PASSENGER TRAIN SERVICE
These Proceedings comprise a report of a conference on Improved Passenger Train Service sponsored by FRA and Carnegie-Mellon University. The objective was appraisal of current rail passenger service with a view towards improved service in the future. Part A contains papers presented at each of the five sessions-Overview, Technological and Economic Problems; Research Areas of High Potential; Proposed Passenger Train Concepts and National Passenger System Development; and Implementation and Acceptance. All sessions were built out of four basic transport aspects: Planning; Technology; Operation and Financing; Part B contains addresses by guest speakers.

Carnegie-Mellon University #7, 300 pp

ACKNOWLEDGMENT: Carnegie-Mellon University
PURCHASE FROM: Carnegie-Mellon University Transportation Research Institute, Pittsburgh, Pennsylvania, 15213 Repr. PC

23 131225
THE INTERNATIONAL UITP COMPENDIUM OF PUBLIC TRANSPORT
This UITP handbook contains extensive statistical data on the mass transport systems in over 300 cities and is intended to serve as a basic reference work for operators, engineers, town planners, political leaders, consultants, manufacturers and all others concerned with providing passenger transportation services. The two volumes incorporate three sections: Metropolitan Railways/Rapid Transit; Surface Transport, including buses, streetcars, light rail and trolley-buses; and Motorbuses.

International Union of Public Transport 722 pp

ACKNOWLEDGMENT: International Union of Public Transport
PURCHASE FROM: International Union of Public Transport 19 Avenue de l'Uruguay, Brussels B-1050, Belgium Repr. PC

23 131250
ECONOMIC CONDITIONS FOR LONG-DISTANCE HIGH-SPEED LINES [Wirtschaftliche Voraussetzungen fuer Fernschnellbahnen]
The purpose of the study is to show, by means of concrete examples, the economic conditions required for the construction and operation of long-distance high-speed lines. The concrete examples are the new Tokaido line, the Rome-Florence line, and the Paris-Lyon line. The author also examines the development of passenger traffic in the USA. The last chapter is an assessment of the prior economic conditions in Japan, Europe and the USA. [German]

Duggelin, H *Swiss Annals on Transport Economy* Vol. 30 No. 4, Dec. 1975, pp 319-335, 3 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Swiss Annals on Transport Economy Zurich, Switzerland Repr. PC

23 131257
THE NEW PARIS-SUD-EST HIGH-SPEED LINE AND FRENCH PROSPECTS IN THE SPHERE OF HIGH-SPEED RAIL TRANSPORT [La ligne nouvelle ferroviaire a grande vitesse Paris-Sud-Est et les perspectives francaises en matiere de transports ferroviaires a grande vitesse]
After explaining briefly the background to the process which led to the decision to build the new Paris-Lyons high-speed line, the author describes the main features of the project and summarises the conclusions which, in his opinion, may be drawn from the examination of certain frequently non-quantifiable effects of this project, such as energy efficiency, town and country planning in France and the environment. The author finally considers the major issues arising from higher speeds, namely:-the degree of development of international passenger traffic over the next 15 years, and-the future of rail freight traffic. [French]

Collet, C *Rail International* No. 12, Dec. 1975, pp 963-971, 3 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 131260
TRANSPORT [Les transports]
After an introduction on the evolution of transport modes in Canada and on the various forms of state subsidy, this number features four articles covering:-the use of models in urban transport planning;-competition between and complementarity of ports in Quebec Province;-the rationalisation of the student transport networks;-the new Montreal international airport at Mirabel and its economic implications.

Ingenieur, Canada No. 309, Sept. 1975, p 2-38, Figs., Tabs., Refs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

23 131261
REPORT ON THE INTRODUCTION OF A RAPID REGIONAL TRANSIT SYSTEM TO SERVE MONTREAL'S MIRABEL AIRPORT (TRRAMM) [Rapport sur l'implantation d'un systeme de TRRAMM (Transport Rapide Regional Aeroportuaire Montreal Mirabel)]
No Abstract. [French]

Ministry of Transport, Canada 1974, 106 pp, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Ministry of Transport, Canada 1000 Sherbrooke Street, West, Montreal, Quebec H3A 2R3, Canada Repr. PC

23 131271
THE RELATIONSHIP BETWEEN VEHICLE SIZE AND OPERATING COSTS IN URBAN TRANSIT NETWORKS [Der Einfluss der Fahrzeuggroesse auf die Betriebskostenstruktur im Schnellverkehr]
The authors based their study on the Berlin and Hamburg networks, but a typical 20 km standard line was chosen for the study of the relationship between vehicles and productivity. Variable information concerning traffic, comfort, timetables, vehicle size and costs were used and it was seen that the volume of traffic must be determined before deciding on the size of the vehicles to be used. Operating costs for vehicles are lowest for vehicles/trains with seating for less than 100 passengers, for example, if peak traffic involves less than 3,000 passengers per hour in each direction. Trains with seating for 100 to 200 passengers are required for traffic involving 4,000 to 7,000 passengers per hour in each direction. For all types of operating, capital costs represent between 43 and 70% of rolling stock operating costs. [German]

Pampel, F *Verkehr und Technik* Vol. 28 No. 11, Nov. 1975, 14 pp, 12 Tab., 9 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Schmidt (Erich) Verlag Herforderstrasse 10, 4800 Bielefeld, West Germany Repr. PC

23 131316
RAPID TRANSIT PLANNING: A TALE OF THREE CITIES
Three articles explore the complex nature of rapid transit planning and reflect the experiences of three municipalities in their efforts to plan rail transit systems, providing insight into the mechanisms, concepts and difficulties inherent in such undertakings. Dyer analyzes the events that have taken place in the Miami area. Looking at rapid transit planning in the context of public policy, four major issues are related to the Dade County project and recommendations are offered to sooth the planning process and make it more responsive. Alegria focuses on the physical aspects of planning and specifically on technical barriers that the designers of Mexico City's Metro had to overcome. The system is now in operation and the municipal government is looking to its expansion. Simpson of Denver's Regional Transportation District asks at what point planning should stop and commitment be made. Denver's slow progress is discussed.

Dyer, JA Alegria, A Simpson, JD *Transit Journal* pp 33-52

PURCHASE FROM: American Public Transit Association 1100 17th Street, NW, Washington, D.C., 20036 Repr. PC

23 131317
ANOTHER ALTERNATIVE: THE CASE FOR LIGHT RAIL. PART II
This article explores the cost factors and the planning and development of light rail and includes a worldwide survey of light rail technology.

Taylor, SF *Transit Journal* Vol. 1 No. 3, Aug. 1975, pp 45-63, 5 Fig., Tabs., 11 Ref.

PURCHASE FROM: American Public Transit Association 1100 17th Street, NW, Washington, D.C., 20036 Repr. PC

23 131318
PUBLIC TRANSPORTATION IN JAPAN: CONTRASTS AND CONCLUSIONS
Emphasis on the rail mode in Japan is examined. The Japanese National Railways is a dominant factor in both the intercity and commuter passenger services. Japan has subways in seven urban areas, several or which are also served by privately owned suburban railways. The author discusses ticketing, service and control, and travel habits of the Japanese. Convenience, comfort, safety and dependability of trains are seen as a reason for the popularity of public transport in Japan.

Krambles, G *Transit Journal* Vol. 1 No. 3, Aug. 1975, pp 29-38

PURCHASE FROM: American Public Transit Association 1100 17th Street, NW, Washington, D.C., 20036 Repr. PC

23 131431
SIXTH SYMPOSIUM ON THE FUTURE OF CONURBATION TRANSPORT III. FARE STRUCTURES AND MARKETING
Conurbation transport can only work as an efficient partnership between public and private systems. The purpose of marketing is to adjust the public transport service to market demands in order to encourage use in those circumstances which are most economic to the community. In this way, marketing is an instrument of traffic policy to influence modal split. But an area in which marketing fails at present is in providing clear information for the public -too often good information services are lacking which could promote public transport and maximise its efficiency and use. Fares should be set in line with the value of the service as estimated by the passengers. Experiments have shown that applying free or cheap fares does not cause massive transference from cars to public transport; it is better policy to improve the quality of the service if community subsidies are available. Market conditions advocate a graduated fares system, whereas ease of fare collection suggests flat fares: a good compromise employed in Hamburg is to use a zonal fare system. The use of season tickets of a variety of types can reduce considerably the costs and difficulties of fare collection with graduated and zonal systems. /TRRL/

Leopold, H
Manchester University, England Conf Paper Oct. 1972, pp 31-43, 5 Fig., 9 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216152)
PURCHASE FROM: Manchester University, England Department of Extra-Mural Studies, Holly Royde College, Manchester M60 1QD, Repr. PC

23 131432
SIXTH SYMPOSIUM ON THE FUTURE OF CONURBATION TRANSPORT I. THE DEVELOPMENT OF THE RAPID TRANSIT SYSTEM IN TORONTO AND ITS LAND USE IMPACT
The municipality of metropolitan Toronto was established in 1954, and now has a population of over 2 million in 240 square miles on the northern shore of lake Ontario. Public transportation is supplied by the Toronto transit commission through subways, buses, street-cars and trolley-buses, and 330 million passengers were carried in 1971. The first subway, 4 1/2 miles long, was opened in 1954 to replace A heavily-congested street-car line, and was immediately successful in providing effective and attractive transportation into the city centre, in promoting "park-and-ride" travel, and in influencing land-use and real-estate values. Since then a further 16 miles of subway have been opened, and a 5-mile extension is being built. Over the years financing of this construction has changed from entirely coming out of fares to 100 percent community finance from provincial subsidies and property taxes. Development of rapid transit has emphasized the need for co-ordinated land-use transportation planning. Rapid transit lines permit a concentration of office, commercial and high-density residential facilities adjacent to the stations with the resultant high personal convenience. There is a need for a systems approach to urban transport planning with the provision of integrated road/rail/rapid transit services through suitable interchanges and "park-and-ride" facilities. /TRRL/

Paterson, WH (Toronto Transit Commission)
Manchester University, England Conf Paper Oct. 1972, pp 1-10

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216150)
PURCHASE FROM: Manchester University, England Department of Extra-Mural Studies, Holly Royde College, Manchester M60 1QD, Repr. PC

23 131626
PERFORMANCE ASPECTS OF THE HONG KONG MASS TRANSIT RAILWAY
Kennedy & Donkin (Far East) are the Consulting Engineers responsible to Freeman Fox & Partners (Far East), the principal consultants for the project, for all Electrical and Mechanical engineering and operational aspects of the Hong Kong Mass Transit Railway. This paper examines some of the problems encountered and systems chosen in the design of the railway which will operate in sub-tropical conditions at one of the highest traffic densities. The Authors wish to point out that opinions expressed are their own and are not necessarily shared by Freeman Fox & Partners (Far East) or the Mass Transit Railway Corporation.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Kennedy, JA McClean, HG
Institute of Electrical and Electronics Engineers C76 459-3 IA, Feb. 1976, 6 pp, 6 Fig.

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

23 131628
MULTIPLE UNITS VERSUS LOCOMOTIVE-HAULED TRAINS. AN OPERATING AND ECONOMIC COMPARISON
For the purpose of this paper, the comparison will be confined to the alternatives of multiple unit versus locomotive-hauled trains operating in the Northeast Corridor of the United States only. Since this is the only electrified railway with high density operation in the United States, it is the only one for which actual operating and economic cost experience are available. It is recognized that some of the factors would be different in other physical configurations of railways. Under the circumstances, these other configurations would constitute hypothetical cases and it is beyond the scope of this paper to explore the alternatives in the absolute.
Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.

Schmidt, JJ
Institute of Electrical and Electronics Engineers C76 462-7 IA, Mar. 1976, 6 pp

ACKNOWLEDGMENT: ASME, IEEE
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL RP

23 132203
BART'S IMPACT ON THE BAY AREA IS BEING STUDIED IN DEPTH
Bay Area Rapid Transit has a new group of officers and the organization has been simplified. Equipment reliability and availability remain serious problems. While some of the equipment problems have been resolved or controlled, new ones have taken their place, preventing any real improvement in equipment availability. Traction motor flashovers and braking problems are receiving most attention. Changes in operating concepts are also to be implemented.

Railway Age Vol. 177 No. 7, Apr. 1976, p 27, 1 Phot.

PURCHASE FROM: XUM Repr. PC
DOTL JC

23 132887
THE "SNELTRAM", A REORIENTATION ON INTERURBAN TRAMS [De "Sneltram", een Herorientatie omtrent Interlokale Trams]
The "Sneltram" is no panacea for solving all traffic and transport problems, but a means of filling the gap left by the railway and the metro on the one hand and the bus on the other hand. The report sets out the many possibilities of the "Sneltram". This modern tram is a quality transport system: comfortable, regular, relatively quick, safe, aesthetically justified and causing a minimum of pollution. /TRRL/ [Dutch]

Kaper, HP
N.V. Nederlandse Spoorwegen R&D Rpt. June 1975, 68 pp, Figs., Tabs., Phots., Refs.

ACKNOWLEDGMENT: Institute for Road Safety Research (IRRD 216259)
PURCHASE FROM: N.V. Nederlandse Spoorwegen IIE Hoofdgebouw, Moreelsepark, Utrecht, Netherlands
PB8051

23 132894
A GLOBAL MODEL FOR THE EVALUATION OF EXTENSION PROJECTS FOR PUBLIC TRANSPORT IN THE PARIS REGIONAL NETWORK [Un modele global pour l'evaluation des projects d'extension des reseaux de transport public en region parisienne]
In order to dispose of tools which could cope with the evaluation of a specific project and with the comparison of several transport policies, the RATP has at its disposal a global model for traffic forecasts which is applicable to the whole Paris regional network and which operates in two stages: 1-the estimate of demand (generation and distribution) broken down into 302 independant zones for each socio-professional category comprising-the definition of basic planning data (active residents and employment by zone and by socio-professional category) using an original typological approach,-the generation of intra-zonal flows based upon average levels of service and accessibility, upon the type of zone and its area,-the distribution of inter-zonal flows using a normative model with probability justification. 2-the estimate of traffic (modal split and assignment) broken down by modal category into 600 zones and comprising:-assignment for each network of the "shortest" trips by reference to generalised cost,-modal split using assignment curves with variables based on the relative difference of generalised costs. The outputs of this model are exploited as the basis for comparative studies using the economics of multi-criteria analytical methods. These studies concern the development plan of the RATP, the preparation of the five year regional plan, and the interconnection of the RATP and SNCF rail networks. /TRRL/ [French]
Presented at a conference on Traffic Control and Transportation Systems.

Labbe, B Scherrer, C (Direction des Etudes Generales de la RATP)
North-Holland Publishing Company Conf Paper 1974, pp 677-688, 1 Fig., 8 Ref.

ACKNOWLEDGMENT: Institute of Transport (IRRD 215943), Transport and Road Research Laboratory
PURCHASE FROM: North-Holland Publishing Company 335 Jan Van Galenstraat, P.O. Box 103, Amsterdam, Netherlands

23 132925
NEW HIGH-MAST LIGHTING OF THE MAIN RAILROAD STATION IN FRANKFURT ON THE MAIN, WEST GERMANY [Die Neue Hochmastbeleuchtung des Hauptbahnfofs Frankfurt (Main)]
The insufficient lighting conditions at the Frankfurt main railroad station have been significantly improved by the installation of a high-mast lighting system using floodlights and L-p sodium vapor lamps. Helicopters were employed for the installation of the 27-m high in order not to disrupt station activities. [German]

Middendorf, E Nieden, U *Elektrische Bahnen* Vol. 46 No. 10, Oct. 1975, pp 247-250, 1 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

23 132942
TYNESIDE METRO-THIS RAPID TRANSIT HAS A GOOD CHANCE OF CATCHING UP WITH MOTORISTS
A new metropolitan transport system in Great Britain is outlined. The system's core is 34 miles of standard gage electric tramroad, most of it used by British Rail. The author looks at the Tyneside metro and its likely impact.

Merchant, M *Surveyor - Public Authority Technology* Vol. 146 No. 4356, Dec. 1975, 4 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: ESL Repr. PC, Microfilm

23 132943
COMPUTER GENERATED PASSENGER ROUTING INFORMATION
An innovative passenger routing information system for public transit lines has been developed. Named PARIS (Passenger Routing Information

System), the system provides detailed information on optimal point-to-point itineraries in a scheduled transit system quickly enough to produce cost savings as well as passenger benefits. PARIS uses transit system data including, headway sheets (times), routings, incremental distances between stops, fare zones, landmark information and transfer data. The system features an itinerary defined by the arrival time, route numbers and direction of each bus; arrival and departure times and location of each transfer point along the route, arrival time at the destination, total elapsed time, and fare. Average processing time does not exceed five seconds for a bus system of up to 15,000 stops.

Presented at the 10th IEEE Comput. Soc. Int. Conf. (COMPCON 75), San Francisco, Calif., Feb 25-27, 1975.

Gates, R (Systems Development Corporation); Crilley, M
Institute of Electrical and Electronics Engineers 1975, pp 267-269, 5 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: IEEE

Cat n 75CHO920-9C

23 132978
THE METRO IN MOSCOW
While planning started early in this century, construction started on Moscow's first subway in 1933 and the 16-km line was opened in 1935. Currently the seven lines comprise almost 150 km of routes and handle 35 percent of the 4.2 billion annual passengers in the city. Described are the operational and financial management of the Metro, station design, scheduling, automation, coordination with other modes and planning.

Grava, S *Traffic Quarterly* Vol. 30 No. 2, Apr. 1976, pp 241-267, 4 Fig., 3 Tab.

PURCHASE FROM: ESL Repr. PC, Microfilm

23 132988
IMPROVED PASSENGER TRAIN SERVICE
These proceedings comprise a report of a conference at Carnegie-Mellon University in December 1975. The object was appraisal of current rail passenger service with a view towards the prospects of improved service in the future. The 22 papers were presented in five sessions: Overview in which the need for improved service was established and the historical implications examined; technology and economic problems; research areas of high potential; proposed passenger train concepts and national passenger system developments; implementation and acceptance covering promotion of service.

Proceedings of the Carnegie-Mellon Conference on Improved Passenger Train Service, December 2-4, 1975.

Carnegie-Mellon University 1976, 358 pp, Figs.

PURCHASE FROM: Carnegie-Mellon University Schenley Park, Book Store, Pittsburgh, Pennsylvania, 15213

23 133438
HANDICAPPED AND ELDERLY VERTICAL MOVEMENT ASSESSMENT STUDY
The report discusses the selection and assessment of seven (7) types of vertical movement devices for potential use in older types of fixed rail urban mass transit facilities. The potential utilization of these devices is directed towards an increased usage of transit facilities by physically handicapped and elderly persons. The study concentrates on the technical and cost considerations in the implementation and utilization of various standard (e.g., elevators, escalators, moving walks) and non-standard (e.g., inclined stairlifts, stair climbing wheel chairs) vertical movement devices in providing access and egress for elderly and handicapped persons to three (3) configurations of rapid-rail stations typically found in the older transit systems of the United States. The general conclusion reached in the study is that each station has its own unique character and unique access/egress problems which restrict or enhance the implementation of specific types of vertical movement devices. Hence, the determination of the device option which is technically most effective for a given station, must await the results of a detailed architectural study of the individual station under consideration.

Kangas, R Mann, R Glater, D Cofield, C Bottari, J
Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-25, UMTA-MA-06-0047-75-1, Feb. 1976, 100 pp
ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS

PB-252516/3ST, DOTL NTIS

23 133572
SIMULATION FOR THE FLOW OF PASSENGERS IN RAILWAY STATION
The actual flow of passengers in a railway station is so complicated that observation and prediction of the movements are very difficult. This is a computer simulation for dynamic planning. There are actually two simulations--one for an individual passenger and the other for group dynamics.

Naka, Y Sakai, Y *Railway Technical Research Institute* Quart. Rpt Vol. 16 No. 4, Dec. 1975, pp 185-186, 5 Fig.

ACKNOWLEDGMENT: Railway Technical Research Institute
PURCHASE FROM: Ken-yusha 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan
DOTL JC

23 133626
SUBWAY TRAMS KEEP GUADALAJARA ON TOP
This article describes a construction programme in Guadalajara Mexico, designed to avoid traffic congestion as the population doubles in the next 10 years. The first 5.3 km of subway, recently completed, will eventually form part of the city's projected underground railway system. Used initially as a tram way, it will change to tracked underground, railway following extensions to north and south. Each section therefore comes into immediate use and can be integrated into the whole system as it is completed. It is claimed that using trams gives flexibility in planning and construction of the network because the pressure to complete a given line is less severe. Trams will continue to follow the same route during the change to railways but at surface level where new dual three-lane carriageway roads are being built concurrently as each section of the subway cut and cover work is completed. Brief details are given of the ground conditions, the construction of the concrete subways and of the ventilation and lighting systems. /TRRL/

Walker, M *New Civil Engineer* No. 163, 1975, pp 26-27, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216751)
PURCHASE FROM: Institution of Civil Engineers 26-34 Old Street, London EC1V 9AD, England

23 133627
THE STAGE CONSTRUCTION OF METROPOLITAN RAILWAYS: THE EXAMPLE OF FEDERAL GERMANY [La realizzione delle ferrovie metropolitane in fase sucessive: L'esempio della Germania Federale]
The term u-bahn refers to an urban transport system of the following characteristics: vehicles that run on rails; a rail network entirely reserved to the system, and which can be elevated, at ground level, or underground; the intervals between vehicles or trains must be automatically controlled; station platforms must be at the level of entry into the cars; the light rolling stock must be capable of 100km/h maximum speeds, have a capacity of 200-250 seats, and allow rapid entry and exit. The stage construction of u-bahn systems in West Germany is dictated by budget restraints, the first projects being built in areas of insufficient public transport. /TRRL/ [Italian]

Sciarone, G *Automobilismo E Automobilismo Industriale* No. 11/1, Nov. 1974, pp 65-86, 3 Fig., 7 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216698)
PURCHASE FROM: Automobile Club d'Italia Via Marsala 8, 00185 Rome, Italy

23 133628
LONDON'S RAILWAYS IN THE FUTURE
This report summarises some of the main findings of the 1974 London rail study. The changing levels of demand, organisation, staffing, and the availability of finance are discussed. Brief outlines are given of the major schemes to extend the rail network which were subject to detailed evaluation. /TRRL/

Bayliss, D *Greater London Council Intelligence Unit Quart Btn* No. 31, June 1975, pp 31-39, 5 Fig., 5 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 400182)
PURCHASE FROM: Greater London Council County Hall, London SE1 7PB, England

23 133635
THE INTERCHANGE PROBLEM IN PUBLIC TRANSPORT [Omstigningsproblematiken]
Travel in a large area such as the Stockholm region exhibits great variations. Public transport must either cover a very great number of routes, or travellers must accept interchanges between routes. Only the latter solution is practicable. The most economical system is based on feeder buses which take travellers to rail or tube stations. Evaluations suggest that the discomfort of an interchange is considered, on average, to be equivalent in sacrifice to an extra journey of 8 minutes. In the Swedish climate, provision of waiting rooms is essential. This is possible on rail and tube stations, but not at bus stops. Shelters at these and covered ways between bus stops, and between stations and stops, must be provided. Traffic safety is enhanced by the provision of bridges and underpasses, but this creates difficulties for the handicapped and for people with prams. Another way is the provision of signals or routing of passenger flows, but this may increase waiting times. Outlying areas have parking spaces adjacent to rail or tube stations. More may be needed if restrictions are introduced on cars in inner Stockholm, but this may result in fewer passengers for buses. /TRRL/ [Swedish]

Stockholms Laens Landstings Kollektivtrafikutredni No. 18, 1975, 101 pp, Figs., 4 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216969)
PURCHASE FROM: Stockholms Laens Landstings Kollektivtrafikutredni Fack, Stockholm 22, Sweden

23 134060
WILL MTR PAY FOR ITSELF?
The article discusses the new Hong Kong rapid transit network that is now under construction. The development of the plans for the system are outlined and the network is explained briefly. Comparisons with other rapid transit systems are made with regard to viability. It is suggested that the line will be profitable because of the very high residential densities and ribbon development. The simultaneous development of housing and other property along the route is aimed at further enhancing profitability. The financing of the project and the contracting arrangements are given particular attention. There is a final note concerning the increasing role of the minibus in providing for Hong Kong's travel needs. /TRRL/

Ferguson, H *New Civil Engineer* No. 168, Nov. 1975, pp 38-41, 2 Fig., 1 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217151)
PURCHASE FROM: Institution of Civil Engineers 26-34 Old Street, London EC1V 9AD, England

23 134064
RAPID TRANSIT SYSTEM FOR DELHI
This paper reports the results of a study conducted by the Central Road Research Institute (CRRI), New Delhi, on a rapid transit system for Delhi. From field studies, the nature and characteristics of intra-city and inter-city passenger trips were determined. Multiple regression analysis was carried out to establish the relationships between trip production and attraction and factors influencing travel, and using these relationships, the total "person trips" in Delhi in 1981 were determined. These trips were then distributed to determine the future travel patterns. Taking into account the future travel patterns, land use and socio-economic factors, a suitable rapid transit system has been worked out. The proposed rapid transit system consists of a circular railway with inter-connecting radial corridors. The assignment of trips showed that this system will cater for a demand of 2 million passenger trips out of the total demand of 2.76 million passenger trips by mass transportation in the year 1981. The remaining 0.76 million passenger trips will have to be met by the "bus system". In the study, rapid transit and buses have been taken as complementary and supplementary to each other. The implementation of such a system would enable A long range solution to the ever increasing transportation problems of Delhi. /Author/TRRL/

Sririvasan, NS Chandra, I Suryanarayana, Y Suri, BL Prakash, A *ROAD RESEARCH PAPER NO. 134* No. 134, Res Paper 134, Apr. 1975, 32 pp, 2 Fig., 13 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217106)
PURCHASE FROM: Central Road Research Institute, India P.O. Box CRRI, New Delhi 110020, India

7512267

23 134066
AN AGGREGATE TIME-SERIES ANALYSIS OF URBAN TRANSIT DEMAND: THE MONTREAL CASE
This paper shows how readily available monthly time-series data may be used to explain the aggregate demand for public transit in particular urban areas in terms of the prices of public and private transportation, the price of non-transportation goods, service characteristics of the competing modes, comfort levels, income and socio-economic variables, etc. Parameter values pertain to the adult market of the Montreal urban community transit commission over the period December 1956 to December 1971. Estimates are obtained by using linear regression techniques in conjunction with the Box-Jenkins procedures for the specification of the rth-order autoregressive process of the error terms. (A) /TRRL/

Gaudry, M *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 249-258, 4 Tab., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217139)
PURCHASE FROM: ESL

DOTL JC

23 134301
A SUGGESTED MODEL FOR ESTIMATING THE PRACTICAL PERFORMANCE OF TRANSIT SYSTEMS
The model suggested is developed as an exploratory tool for estimating the practical performance of transit systems of both existing and new technologies. A constant jerk-rate type of equation is shown to give excellent agreement with existing New South Wales suburban railway rolling stock. By development of the envelope, use of this equation may be extended to examine the effects of reduced station dwell, increased initial acceleration and increased maximum speed etc. It is shown that for initial accelerations above 5 km/h/s very little benefit is likely to accrue on on suburban systems, but major benefits are likely to stem from increasing station separation, skip-stop scheduling and reduced station dwell, all of which are feasible with existing technology systems. The method is shown to be particularly useful in the estimation of journey speed, journey time and station-to-station time when coding transit networks for modal-split analysis. (A). /TRRL/

Brain, R *Australian Road Research Board Conference Proc* Vol. 7 No. 2, 1975, pp 414-424, 5 Fig., 2 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218039)
PURCHASE FROM: Australian Road Research Board 500 Burwood Road, Vermont 3133, South Victoria, Australia

23 134303
ALL CHANGE AT BRADFORD INTERCHANGE
The construction of the Bradford bus/rail interchange is described. The requirement was for a complex in the city centre which would combine the new railway station with a bus terminus both using the same facilities. The plan also included a garage and workshop for local bus services, housing for British rail staff and an eight storey office building for various uses. Facilities including shops, refreshments and underfloor heating are provided for passengers awaiting buses and trains. A number of ground problems were encountered which made alterations to the original design necessary and details are given. Other delays included serious materials shortages, three-day week, and a change in client, but it is expected that the interchange will be completed by the summer of 1976. /TRRL/

Heayes, N *Contract Journal* Vol. 269 No. 5031, Feb. 1976, pp 30-31, 2 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218169)

PURCHASE FROM: IPC Building and Contract Journals, Limited 32 Southwark Bridge, London SE1, England

23 134311
TORONTO COMMUTER RAIL STUDY
This study was conducted to assess the potential of providing new commuter rail services over existing railroad right-of-way within metropolitan Toronto. This report provides information that would be acceptable as the basis for negotiations by the various government agencies and organizations, including the railways, which might be involved in the provision of new services. The report is divided into 5 main parts: commuter rail service in context, identification of potential routes, demand analysis, cost analysis and evaluation. /TRRL/

Canadian Transport Commission Rept. 37, Nov. 1972, 186 pp, 20 Fig., 20 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217419)
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa, Ontario K1A 0N9, Canada

23 134313
PLANNING AND DESIGN OF THE HONG KONG MASS TRANSIT RAILWAY
The article describes the planning and design features of the Hong Kong mass transit underground railway system from the initial mass transport study planning stages in 1965 to the invitation of tenders for construction and equipment in 1975. Brief details are included of train design and operation, layout and services, station and tunnel ventilation, harbour crossing, and construction methods. /TRRL/

Edwards, JT (Freeman, Fox and Partners) *Institution of Civil Engineers, Proceedings* Vol. 60 Feb. 1976, pp 9-26, 8 Fig., 1 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 214306)
PURCHASE FROM: ESL

DOTL JC

23 134537
AIR-SURFACE COMPETITION IN THE UNITED STATES. SOME SIGNIFICANT DATA [Concurrence "air-surface" aux Etats-Unis. Quelques donnees significatives]
The criteria for comparison are given in diagrammatic form in two tables (time-cost/consumption) three graphs, for about a dozen American domestic routes. Two hypotheses have been adopted for calculating the cost of the journey: in the first, the passenger places no value on time; in the second, time is estimated on the basis of the average hourly rate applied in the United States. [French]

Servant, A *ITA Bulletin* No. 7, Feb. 1976, pp 163-169, 2 Tab., 1 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Institut du Transport Aerien 4 rue de Solferino, Paris (7e), France

23 135204
A MODEL FOR SNCF TRAFFIC FORECASTS FOR THE PARIS SUBURBS [Un modele d'affectation pour des previsions de trafic SNCF de la banlieue parisienne]
A mathematical model for a study of commuter traffic in the Paris area is outlined here. The model is applied on a repetitive basis with fixed values, e.g. behaviour of commuters, journey time, etc., and the level of saturation, and the various routes taken are adjusted according to expressions of quantity. The model takes account of geographical zones, the present situation and possible developments; it can be used for planning purposes (investments, preparation of transport plans). [French]

Pige, JC Berducou, J *Revue Generale des Chemins de Fer* Nov. 1975, pp 639-646, 4 Fig., 3 Tab., 1 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 135207
ON THE PROFITABILITY OF URBAN AND SUBURBAN LINES [Ueber die Wirtschaftlichkeit von S-Bahn Strecken]
The increasing deficit recorded in short-distance public transport, has brought the economic aspects of these services to the fore. Criticism of investment in urban railway and underground networks, and a number of contradictions observed, suggest that a general analysis should be made of the profitability of these railway systems, and in particular, an examination of the factors liable to influence the engineer when planning, preparing and constructing such systems. Based on indices, the author explains the interdependence of factors of management economy, and gives an overall view of cost-utility studies for urban railways, together with recommendations on criteria of comparison for assessing alternative short- distance transport investment. [German]

Weigelt, H *Archiv fuer Eisenbahntechnik* Vol. 30 Dec. 1975, pp 9-21, 8 Tab., 30 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany

23 135216
SOUTH STATION REVIVAL. ANTIQUATED RAILROAS STATION TO BECOME DYNAMIC TRANSPORTATION CENTER
Boston's South Station, built at the turn of the century, is being reconstructed under auspices of the Boston Redevelopment Agency into an intermodal transportation center. The participation of engineers, planners and architects in the various phases of this is described.

Notes pp 1-5, Figs., Phots.

PURCHASE FROM: Parsons, Brinckerhoff, Quade and Douglas, Inc One Penn Plaza, 250 West 34th Street, New York, New York, 10001

23 136423
PEDESTRIAN/BICYCLE FACILITIES FOR SAN FRANCISCO BAY AREA RAPID TRANSIT OPERATIONS
In addition to the pedestrian-orientation which was planned, designed and built into the Bart-system, increasing emphasis is being placed on accommodating the cyclists. Where possible, close-in bicycle parking is under the surveillance of the information-attendant. Recommendations have been made for the relocation of racks for security reasons at certain stations. Bicycle racks are provided free of charge at 27 stations, with rental lockers at 7 of them. Recommendations are given to provide secure and effective bicycle rack parking. /TRRL/

Lavigne, HH (Tudor Engineering Company, San Diego)
International Federation of Pedestrian Association 1975, pp 232-241, 2 Fig., 2 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218620), Institute for Road Safety Research
PURCHASE FROM: International Federation of Pedestrian Association Passage 61 II

PB8895

23 136425
A COMPARISON OF TRANSPORT IN TOKYO AND NEW YORK-COLLOQUIA ON THE CITY
The article is a summary of the main conclusions of A conference held in New York in May 1975. In many respects the problems are similar but a larger proportion of people use public transport in Japan. Railway and subway transport is used in Tokyo, the motor vehicle is more popular in New York. Less urban land is used for streets in Tokyo. The emphasis of countermeasures introduced in both cities recently has shifted from providing better facilities to controlling and limiting access. Measures being implemented or considered include restrictions on parking, the introduction of bus lanes, the giving of preferential treatment to pedestrians and the introduction of tolls to congested areas. Environmental effects of road traffic are of great concern in both cities, car and truck effluents are greater in New York than in Tokyo. The fundamental difference between the two cities is that in Tokyo the government discourages further employment in the central area, in New York the government is concerned about the loss of employment in the centre and does not promote company relocation. /TRRL/

Wheel Extended Vol. 5 No. 1, 1975, pp 18-19, 2 Tab., 1 Phot.
ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD-218831)
PURCHASE FROM: Toyota Motor Sales Company, Limited #3-18, 2-chome, Kudan-Minami, Chiyoda-ku, Tokyo 102, Japan

23 136427
URBANISATION AND TRANSPORTATION IN JAPAN. A SHORT HISTORY
During the past century the growth of urban population has increased transport demands. Better developed transport modes have promoted urban growth so that urbanisation and transportation have been mutual catalysts. However the development rate of urban transport has lagged and Japanese cities face serious transport problems. The article describes separately the growth history of cities and urban transport over the last 100 years. The principal factors contributing to city growth are examined and related to corresponding developments in urban transport. With the increased volume of traffic, problems of noise, exhaust emission and vibration have become more serious. The government has been forced to introduce legislation and is conducting research into new transport systems. The author concludes that although short term measures are being taken to improve transport the only real solution is a re-structuring of cities. /TRRL/

Niitani, Y *Wheel Extended* Vol. 5 No. 1, 1975, pp 4-10, 7 Fig., 6 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218835)
PURCHASE FROM: Toyota Motor Sales Company, Limited #3-18, 2-chome, Kudan-Minami, Chiyoda-ku, Tokyo 102, Japan

23 136519
INTERCITY PASSENGER TRANSPORTATION: MODE/ENERGY CONSERVATION. VOLUME I. EXECUTIVE SUMMARY
The energy conservation potential for 1980 and 1985 of alternative intercity passenger transportation policies for the United States is summarized. A national intercity passenger transportation model was developed and used to simulate alternative energy conservation policies. The model predicts household trip rates by mode and purpose of travel for five income groups, four distance markets, and three sizes of groups.
See also Vol. 2, PB-250 884.

Roche, G Lago, AM
RMC Research Corporation, Council on Environmental Quality, Federal Energy Administration Final Rpt. FMC-UR-286-Vol-1, EQ-5174130281, Dec. 1975, 32 pp

Contract EQ4AC028

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250883/6ST, DOTL NTIS

23 136695
BALTIMORE TRANSPORTATION CENTER. CONCEPT STUDY
The report established the basic justification for preserving the Baltimore Rail Station as the nucleus in an intermodal transportation center. The proposed transportation center will provide an interface for high-speed intercity rail service, intercity and regional motorcoach service, regional commuter rail service, rapid transit service, local bus service, helicopter service, and the automobile. Two concepts of the intermodal facility are illustrated in this report for further consideration: concept one provides a total comprehensive solution to an expanded transportation center; concept two modifies the direction of concept one by providing a less expensive solution for an expanded complex.
Prepared by Cochran, Stephenson and Donkervoet, Inc., Baltimore, Md. Prepared for Regional Planning Council, Baltimore, Md.

Baltimore Planning Commission, Regional Planning Council, Cochran, Stephenson and Donkervoet, Incorporated Final Rpt. BCDP-BTC-75-101, Oct. 1975, 162 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-248626/4ST, DOTL NTIS

23 137693
MODE CHOICE CHARACTERISTICS AS DETERMINANTS OF INTERURBAN TRANSPORT DEMAND
The ability of individuals to substitute modes of transportation leads to an inability to determine the demand for travel between cities. If one were able to determine those characteristics of each mode which influence the choice decision, one would then be able to arrive at more stable demand functions for each of the travel modes. With a more stable demand for travel function policy decisions could better be made concerning the allocation of public funds, to highways, airports, or rail facilities. The question of choosing between modes and the basis of choosing between modes is closely related to the stability of the demand for travel. Baumol and Guandt, Gronau, McGillivray, and Young have all attempted to derive demand equations for travel modes. However, some of the studies attempted to measure the substitutability of the characteristics influencing the demand for travel, rather each focuses on a determination of the quantity of trips undertaken of each mode between origin I and destination j as a function of characteristics. The purpose of this paper is to provide new evidence bearing on the issue of the degree of substitutability of the various travel modes. We begin with a utility function rather than a priori specifying the demand equations. In specific we employ a multilevel separable utility function which allows the grouping of various choice characteristics of each mode into subsets or branches from which estimates of the ease of substitution among characteristics of the mode may be obtained. The characteristics which enter the branches for each mode are proxies for cost, comfort, and convenience. Since the specific function is weakly separable and nonlinear, we will obtain nonlinear demand equations for the mode characteristics. Another important advantage of using this approach is that it allows us to ascertain the preference intensity of individuals for certain mode characteristics which influence the choice of one mode over another. Moreover, the estimated budget parameters will allow us to determine the optimal combinations of characteristics to be preferred by consumers, and thus their model choice preferences. /Author/TRRL/

Kraft, J (Federal Energy Administration); Kraft, A (Nebraska University, Lincoln) *Transportation Research* Vol. 10 No. 1, Feb. 1976, pp 31-35, 2 Tab., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 219305)
PURCHASE FROM: ESL
DOTL JC

23 138088
SUBWAY CONSTRUCTION IN MAJOR RURAL CITIES
Several Japanese cities having metropolitan area populations of approximately one million are constructing or planning to construct subway systems connecting residential suburbs and central business districts. The aim is to alleviate highly concentrated rush-hour demands for commuter transport. Sapporo, Fukuoka, Sendai and Hiroshima are discussed briefly and then Sendai City is examined in detail in the light of future trends in land use, population and urbanization. In such studies, it is concluded, future use of subways must be estimated on the basis of changes in urban characteristics, suburban development and all new factors created by operation of the line. Future, rather than present, demographic trends and land use patterns must be understood.

Nishikawa, Y *Wheel Extended* Vol. 5 No. 4, pp 20-28

PURCHASE FROM: Toyota Motor Sales Company, Limited #3-18, 2-chome, Kudan-Minami, Chiyoda-ku, Tokyo 102, Japan

23 138310
MATCHING THE MODES
Ridership and service of mass transit systems can be markedly increased by efficient interfaces with other modes. Examples from Chicago, Toronto, Philadelphia, and San Francisco are given in support of this view. It is shown that interfacing must be designed to meet the special needs of each city.

Myers, ET *Modern Railroads/Rail Transport* Vol. 31 No. 3, Mar. 1976, pp 62-65, 1 Fig., 1 Tab., 3 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Cahners Publishing Company, Incorporated Watson Publications, 5 South Wabash Avenue, Chicago, Illinois, 60603
DOTL JC

23 265393
BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART III. VOLUME V. PILOT LAND USE, INFORMATION SYSTEM: WALNUT CREEK

The report attempts to demonstrate the particular qualities that computer operation can offer in building a land use information system. It presents the pilot system whose purpose is monitoring the land use and related activities around the Walnut Creek BART station. Chapters include map construction, data collection, retrieval and display, system development, and costs.

Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 3, Volume 4, PB-236 744, and BART-2, Part 3, Volume 6, PB-236 746.

Lee, DBJ
California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 61 pp

Contract DOT-OS-90023

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-236745/6ST, DOTL NTIS

24 072135
REPORT ON ITALIAN SCIENCE AND TECHNOLOGY, 1974
This is a detailed report on the activities and planning efforts in the fields of energy, health, education and transportation. The Italian State Railroad (Ferrovie dello Stato) is experiencing deficit problems. In 1973 it was about 700 billion lire. One reason for this deficit is the existence of 5,000 kilometers of secondary rail network which is a heavy burden, but for political reasons the Ferrovie has been able to remove only 300 kilometers from service during the last decade. With an employee increase from 170,000 in 1963 to 215,000 in 1973 and no increase in fares in the past 10 years, it has resulted in the lowest tariffs in Europe. The ordinary budget of the Ferrovie includes funds for only general maintenance, administrative, and personnel; any special projects for improvements to the railroad must come through funds passed by parliament. In addition, government subsidies are included in the ordinary budget. When revenues plus subsidies are insufficient to cover expenses, the deficit is financed by taking out loans guaranteed by the government or the national/international financial market. However, there has been an increase in travellers and freight of 4.5%. There are several high speed lines in Italy where trains travel up to 160 km/hr. These are Milano-Venezia, Torino-Roma, Milano-Bologna-Pari, and Roma-Napoli. The report also discusses energy planning and offers statistical data on energy consumption and prices, plans for gasoline rationing, automobile travel and urban transportation.

United States Embassy, Italy June 1974, 80 pp

ACKNOWLEDGMENT: TSC
PURCHASE FROM: United States Embassy, Italy Science and Technology Office, Rome, Italy Repr. PC
DOTL T173.4.I8U54

24 072157
FINANCIAL STATISTICS ON EUROPEAN RAILROADS [Donnees statistiques portant sur la situation financiere des chemins de fer europeens]
Part 1: Financial statistics on European Railroads for 1965-1972 give 1) transport data for passengers, merchandise, global rail transport, transport structure, internal and international rail traffic, international rail transport and for personel productivity; 2) data on the financial state of railroads; 3) government subsidies; 4) investments in railroads by GNP etc. (17 pp. of basic data in the Appendix). Part 2: Continuation of financial statistics on European Railroads for 1973-1974(1975). Part 2 was undertaken because of the great changes that have taken place in the financial conditions of railroads since 1972. It concentrates on transport developments (passengers, merchandise, total), costs and deficits of railroad systems, government subsidies to the railroads, investments in national railroads. It finds that the regression of passenger transport may have been reversed for global passenger traffic, that there is an increase in merchandise traffic, that transport costs will have increased by 300-500% in 10 years, that transport subsidies vary from 62% (Italy) to 10% (Japan), and that railroad investments have remained stationary except for increases in Luxemburg, Netherlands, Norway, Sweden and Switzerland. The report concludes that a European solution and cooperation is urgently needed for regulating the financial relations between railroads and governments, for defining public services, for stimulating business cooperation between the European railroad systems and for common European transport policies. [French]

European Conference of Ministers of Transport 1975, 57 pp, Tabs.

ACKNOWLEDGMENT: TSC
PURCHASE FROM: OECD Publications Center 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006 Repr. PC
DOTL HE300,.E86

24 072191
ITALIAN STATE RAILWAYS STATISTICAL YEARBOOK [Ferrovie Italiane dello Stato Annuario Statistico]
This booklet is essentially a statistical yearbook. Its content is exclusively made up of statistical tables not accompanied by any comment at all. A summary of the statistical documentation that may be of interest will therefore be given under the corresponding headings. a) Personal transportation; statistical tables on: general data and averages, number of regularly paying travellers, number of travellers per unit of kilometer; b) Commodities transportation; statistical tables on: general data and averages, volume of transportation in tons and in tons per kilometer, volume of transportation with respect to foreign railroad stations. c) Employment; statistical tables on the functional division of regular full time employees. d) Equipment; statistical tables on: length of the railroad system, changes of the system happened in 1971, technical features of the system. e) Railroad materials; statistical tables on classification of locomotives on the basis of their horsepower. f) Historical series of data since 1905 until 1971. [Italian]
Direct requests to the Director General of Italian State Railways.

Italian State Railways 1972, 192 pp

ACKNOWLEDGMENT: TSC
PURCHASE FROM: Italian State Railways Piazza della Croce Rossa, Rome, Italy
DOTL HE3091.A951

24 093350
NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 11S. IMPROVEMENT PLAN FOR PHYSICAL PLANTS WITH ESTIMATED COSTS. VOLUME II
The two-volume report describes the physical plant necessary to meet trip time goals and permit high speed train operations in the section of the Northeast Corridor between Washington, D. C. and New Haven, Connecticut. The cost of the physical improvements are estimated and an implementation schedule is presented in Volume I. Facilities include track, bridges, tunnels, signals, communications, electrification and other items. Volume 2 includes track charts and aerial photographs of major curve realignments and interline connections on the Northeast Corridor, and a graphical representation of simulated train performance.
See also PB-244 873.

Sutcliff, H Bailey, W Biss, DJ Irvin, LA Livingston, FM
Bechtel Corporation, Federal Railroad Administration Final Rpt. FRA-ONECD-75-11S, July 1975, 135 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245414/8ST, DOTL NTIS

24 093491
NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 4B. SYSTEM SIMULATION OF SCENARIO 14
This report covers the findings resulting from a LOGSIM simulation which identifies the required improvements and changes in facilities, and the estimated cost thereof, to handle estimated high potential demand for rail services in the NEC in 1990, and to meet the service criteria established for CorridorRail service. Included, in this analysis, is a comparison of the estimated costs for physical plant improvement and changes for Scenario 14 with those developed for Scenario 13 in the report on Task 11S, Improvement Plan for Physical Plant With Estimated Costs, August 1975.
See also PB-243 419.

Gillespie, CW Arnlund, R Olsen, KA Clausing, E
Bechtel Corporation, Federal Railroad Administration Final Rpt. FRA/ONECD-75/4B, Sept. 1975, 74 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246249/7ST, DOTL NTIS

24 093934
NORTHEAST CORRIDOR HIGH-SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 11N-DETAILED PHYSICAL PLANT IMPROVEMENTS AND ESTIMATED COSTS (NEW HAVEN, CT. TO BOSTON, MA.) VOLUME I
Using information developed in other tasks of this study, a detailed time-phased, costed improvement plan to accomplish improved high-speed rail passenger service in the Northeast Corrider (NEC) is formulated. A complete description of an upgraded NEC facility is developed on a mile-by-mile basis. Dollar costs, time savings and schedules are presented by milepost segments. Criteria are developed for time phasing track improvements, bridge and tunnel improvements, electrification, signaling

and facilities to relieve traffic congestion. Estimated cost of the facility improvements between New Haven and Boston is $680,034,000. These improvements could be implemented over a four year phased period.
See also PB-247 918.

Howell, RP Kendall, RA Ward, JO Kraffmiller, SE
De Leuw, Cather and Company, Federal Railroad Administration Final Rpt., -1 2503-15, FRA/ONECD-75/11N-Vol, Sept. 1975, 105 pp

Contract DOT-FR-40026

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247917/8ST, DOTL NTIS

24 093935
NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 7B-SHOPS AND YARD FACILITIES
The purpose of the report is to formulate functional design criteria for 'CorridorRail' revenue vehicle inspection, servicing, maintenance and repair for locomotives, cars and right-of-way maintenance equipment including signal and communication equipment. The purpose is to assure that the development of maintenance and servicing techniques for the 'CorridorRail' has the full benefit of technology developed in the past as well as that currently being developed for railroad passenger service. Efficient operation of an inter-city railroad passenger service requires the availability of a completely reliable service fleet of clean revenue cars sufficient to maintain advertised schedule service, while minimizing the total number of cars required. In order to accomplish this goal, the philosophy of planned maintenance is to perform all rebuild and heavy repair at Washington Terminal, the southern terminal point of the corridor and perform service, inspection and limited repair at Philadelphia, New York and Boston.
See also PB-242 444.

De Leuw, Cather and Company, Federal Railroad Administration Final Rpt. FRA/ONECD-75/7B, Sept. 1975, 242 pp

Contract DOT-FR-40026

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247918/6ST, DOTL NTIS

24 094032
NORTHEAST CORRIDOR HIGH-SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 11N-DETAILED PHYSICAL PLANT IMPROVEMENTS AND ESTIMATED COSTS (NEW HAVEN, CT. TO BOSTON, MA.). VOLUME II
Using information developed in other tasks of this study, a detailed time-phased, cost improvement plan to accomplish improved high-speed rail passenger service in the NEC is formulated. A complete description of an upgraded NEC facility is developed on a mile-by-mile basis. Dollar costs, time savings and schedules are presented by milepost segments. Criteria are developed for time phasing track improvements, bridge and tunnel improvements, electrification, signaling and facilities to relieve traffic congestion. Estimated cost of the facility improvements between New Haven and Boston is $680,034,000. These improvements could be implemented over a four year phased period. Portions of this document are not fully legible.
See also Volume 1, PB-247 917.

Howell, RP Kendall, RA Ward, JO Kraffmiller, SE
De Leuw, Cather/STV, Federal Railroad Administration Final Rpt. 2503-15, FRA/ONECD-75/11, Sept. 1975, 96 pp

Contract DOT-FR-40026

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248729/7ST, DOTL NTIS

24 129656
THE FUTURE OF RAILWAY TRAFFIC [De Toekomst van het Railverkeer]
Compared with the car, the bicycle and the aircraft, railway transport is very old, exactly 150 years old. The question of the future of such an old system is discussed and answered by reference to history. Railway transport has marked advantages for long-distance traffic. Over short distances these advantages diminish and consideration has to be given to spatial division, the use of space and a more active public transport policy. /TRRL/ [Dutch]

Witsen, M *TNO-Project* Vol. 3 No. 7/8, July 1975, pp 272-279, 4 Fig., 1 Tab., 5 Phot.

ACKNOWLEDGMENT: Institute for Road Safety Research, Transport and Road Research Laboratory (IRRD 215308)
PURCHASE FROM: Redaktie TNO-Project 148 Juliana van Stolberglaan, 'S-Gravenhage, Netherlands Repr. PC
PB7653

24 129790
MEETING ON RAILWAY TECHNOLOGY OF THE UNION OF GERMAN RAILWAY ENGINEERS (VDEI) IN MUNICH ON 12 JUNE 1975. FURTHER DEVELOPMENT OF THE WHEEL/RAIL TECHNIQUE [Eisenbahntechnische Tagung des VDEI in munchen am 12. Juni 1975. Weiterentwicklung der Rad/Schiene-Technik]
The Union of German Railway Engineers (VDEI) organised, in Munich, a meeting with discussion on the the theme "Further development of the wheel/rail technique". Eight specialists from industry and science, with experts from the VDEI and the DB, gave an outline of current progress, and possibilities of future development of the wheel/rail technique from the aspects of rolling stock, track and data processing. [German]

Eisenbahningenieur Vol. 26 No. 8-9, Aug. 1975, pp 281-289

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

24 129791
REHABILITATION OF RAIL NETWORKS, ANTICIPATIONS OF THE FOREIGN RAILWAYS CONCERNING THEIR HIGH SPEED TRANSPORT [Die Schiene rehabilitieren. Prognosen auslaendischer Bahnen fuer ihren Schienenschnellverkehr]
The article includes a general survey of major achievements in the sphere of high speeds, together with an analysis of the long and medium-term projects in this same field. The author, who takes full account of all the important railway throughout the world, reveals, country by country, the most striking trends. The tables group, in their columns, certain items of information that, in general, are only known in isolated terms. [German]

Schneider, J *Die Bundesbahn* Vol. 51 No. 10, Oct. 1975, pp 645-651, 4 Tab., 20 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlay Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

24 129797
THE OPERATIONAL REALITY OF INDEPENDENT RATE MAKING: SOME EMPIRICAL FINDINGS
The origins and basis for current arguments about the independent actions in conference rate making are reviewed. An attempt is made to determine the reality of automomous behavior based on its successes and on the importance of independent rate making. In the light of recent regulatory commission decisions, the propensity of bureaus to protect independent actions was examined.

Sherwood, CS *Transportation Journal* Vol. 15 No. 2, Dec. 1975, pp 5-12

PURCHASE FROM: American Society of Traffic and Transportation 547 West Jackson Boulevard, Chicago, Illinois, 60606 Orig. PC
DOTL JC

24 129800
STRUCTURAL REORGANIZATION OF THE NORTHEAST RAILROADS
The Regional Rail Reorganization Act of 1973 was enacted upon recognition by Congress that bankruptcy reorganization of the failed Eastern railroads was not practicable. One primary purpose was supply of large government funding for restoration of lines and equipment. Another purpose was restructuring of the bankrupt lines through coordination of viable segments and abandonment or short-term subsidy of net-loss lines.

This study is a critique of the coordination and abandonment proposals. The hypothesis is that the coordination proposals are wholly inadequate to create a viable Northeast rail system and that abandonments are likewise insufficient. Over investment in lines and yards fosters inefficiency in organization and operation of the Eastern carriers. The failure of the statute to meet the problem and coordination really needed to resolve it is illustrated.

Conant, M *ICC Practitioners' Journal* Vol. 43 No. 2, Jan. 1976, pp 207-223

PURCHASE FROM: Association of Interstate Commerce Comm Pract Federalsburg, Maryland, Orig. PC

DOTL JC

24 129842
THE SOVIET RAILWAYS DURING THE FIRST HALF OF 1975. TECHNICAL AND ECONOMIC SUMMARY [Zeleznodoroznyj transport v pervom polugodii 1975g. Tehniko-ekonomiceskij obzor]
A progress report on the Soviet Railways covering the first half of 1975. The article gives the most important indices concerning: freight and passenger transport, the use of rolling stock, investments, operating efficiency, work output, benefits achieved and the reduction in cost prices. The total volume of freight traffic forwarded reached a figure of 1,805 million tonnes for the half year, i.e. 104% in comparison with the corresponding period in 1974. The average gross freight train weight was 2,742 tonnes. During this same period, 1,790 million passengers were conveyed. [Russian]

Zeleznodoroznyj Transport No. 9, Sept. 1975, pp 5-7, 2 Tab.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Zeleznodoroznyj Transport Moscow, USSR Repr. PC

24 129843
UIC AND ORE--WHAT DO THEY STAND FOR? [UIC og ORE--hva star de for?]
Research and development in the field of railway technology demand such great resources that NSB must avail itself of international connections wherever possible, utilizing the results of the work carried out by the railway organizations. This article reviews the organization and aims of UIC and its associated and subsidiary organizations. discussed in detail. [Norwegian]

Prestesaeter, JE *NSB Tehnikk* Vol. 1 No. 1, 1975, pp 17-20, 2 Fig.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: NSB Teknikk Oslo, Norway Repr. PC

24 130985
THE NATIONAL RAILROAD PASSENGER CORPORATION-A MODERN HYBRID CORPORATION NEITHER PRIVATE NOR PUBLIC
The National Railroad Passenger Corporation, Amtrak, is a hybrid from either a legal or a commercial point of view. It might be described as a private corporation with quasi-public obligations or as a public corporation with quasi-private obligations. This article discusses the extent to which it is public and private and the extent to which its board of directors has different or additional responsibilities compared with corporate directors in general. Amtrak was founded to take over a moribund passenger service and it is debatable whether the concept of profit was ever fully compatible with Amtrak's obligation to service the public convenience and necessity. Congressional actions from 1970 through 1975, by acts of what might be described as selective breeding, appear to reflect the public desire to develop in Amtrak a strong, permanent and distinct species of public service corporation which may not yet have found its ultimate form.

Adams, A *Business Lawyer* Vol. 31 No. 2, Jan. 1976, pp 601-619

PURCHASE FROM: American Bar Association 1155 East 60th Street, Chicago, Illinois, 60637 Repr. PC

DOTL RP

24 130989
RATE BUREAUS AND ANTITRUST CONFLICTS IN TRANSPORTATION. PUBLIC POLICY ISSUES
Pricing in the railroad and regulated segment of the motor carrier industry is enormously complex because of the legal- economic institutional mechanisms employed. Rate bureaus play a critical role in transportation pricing, and critics of conference rate making contend these groups are anticompetitive cartels. This book examines the effects of rate bureaus on the general public and the transportation industries. It was found that for a limited, but specific, period of time they do perform a positive function. In the area of independent action, where they are most frequently criticized, bureaus can be extremely responsive to changing consumer needs. This initial examination of rate conference activity and performance should be followed, the authors claim, with extended dynamic analysis to produce conclusions about public policy in transportation.

Davis, GM Sherwood, CS
Praeger Publishers, Incorporated 1975, 116 pp

PURCHASE FROM: Praeger Publishers, Incorporated 111 Fourth Avenue, New York, New York, 10003 Repr. PC

DOTL HE195.5. U129

24 131254
IS VALUE ANALYSIS A NEW CONCEPT FOR DETERMING WHAT WE ALREADY KNOW? [Die Wertanalyse, ein neuer Begriff fuer Bekannte Dinge?]
The author explains the most important concepts involved and describes the method with examples from the railway sphere. He gives one specific example to show the limitations of value analysis. [German]

Muhleisen, K *Glasers Annalen ZEV* Vol. 99 No. 12, Dec. 1975, pp 342-347, 1 Fig., 3 Tab., 10 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

24 131320
RAILROADS SURVIVED A DISASTROUS YEAR, BUT AT WHAT COST
The results of 1975 in the railroad industry are discussed. The effects of the recession on traffic and service are examined. While fourth quarter earnings erased the nine- month deficit, earnings for the year were the worst since the Depression of the 1930s. Other areas discussed include freight rates, capital expenditures, management/labor relations; competitive transportation; transportation policy; legislation; reorganization; merger activity; rail safety and passenger service.

Railway Age Vol. 177 No. 2, Jan. 1976, 12 pp

PURCHASE FROM: XUM Repr. PC

DOTL JC

24 131497
RAILROAD DIVERSIFICATION: WHERE LIES THE PUBLIC INTEREST
The potential public benefits and costs of railroad diversification are examined in this article. The principal claimed benefit, that diversification will produce an increased flow of capital to the railroad industry, is unlikely to be realized. The principal cost, that management may use diversification as a means of transferring assets from railroading to other more profitable lines of business, is less a problem created by diversification than a reflection of the current financial state of the railroad industry. Railroad diversification should be neither banned nor tightly regulated. Either will further hamper a much needed process of adjustment that already has been too long delayed. Instead, diversification ought to be welcomed, for it will place a needed check on the ICC's ability to force railroads to operate in a noneconomic fashion.

Eads, GC (George Washington University) *Bell Journal of Economics and Management Science* Vol. 5 No. 2, Sept. 1974, pp 595-613, 26 Ref.

ACKNOWLEDGMENT: Bell Journal of Economics and Management Science
PURCHASE FROM: ESL Repr. PC, Microfilm

24 131499
NEW ORLEANS, LOUISIAN REGIONAL RAILROAD PLANNING DEMONSTRATION STUDY-PHASE 1: INVENTORY AND PROBMEM IDENTIFICATION
This report constitutes Phase I of the New Orleans, Louisiana Regional Railroad Planning Demonstration Study. The New Orleans Metropolitan Area is composed of the four parishes of Jefferson, Orleans, St. Bernard, and

St. Tammany. Phase I involves the collection of an inventory of existing railroad operations; an evaluation of the relationship of the railroads to other transportation corridors; a definition of specific areas of concern to the railroads and the community; and a recommended program for further study. A sampling of railroad freight traffic processed in the New Orleans area was taken for a 14-day period in August 1974 using train consist reports and demurrage records as source documents. The areas of major concern to the communities and the railroads were obtained and are included in the report; a recommended program for further study is developed stressing rail system efficiency and the integration of future objectives of the railroads with those of the region.

Sponsored by the Fedral Railroad Administration, Office of Federal Assistance.

Louisiana State Planning Office, (Spo-74-14) Final Rpt. 3016, Apr. 1975, 110 pp

Contract DOT-FR-4-3016

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246414/AS, DOTL NTIS

24 131648
FINANCIAL AND OPERATING STATISTICS FOR THE TWELVE MONTHS ENDED DECEMBER 31, 1974
Financial and Operating Statistics of Class I Railroads in the United States is a semiannual publication of statistical data of Class I Line-Haul railroads. Although the data are published semi-annually, the carriers are still required to report this information quarterly. The quarterly reports are on file and open for public inspection in the Interstate Commerce Commission, Bureau of Accounts, Washington, D.C. All carriers listed in the table on pages 6-11 are included in the tables summarizing information by District and United States.

See also RRIS 24 131649, publication 7602.

Interstate Commerce Commission Statement No. 100, 1974, 19 pp

ACKNOWLEDGMENT: Interstate Commerce Commission
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402

24 131649
FINANCIAL AND OPERATING STATISTICS FOR THE SIX MONTHS ENDED JUNE 30, 1974
Financial and Operating Statics of Class I Railroads in the United States is a semiannual publication of statistical data of Class I Line-Haul railroads. Although the data are published semi-annually, the carriers are still required to report this information quarterly. The quarterly reports are on file and open for public inspection in the Interstate Commerce Commission, Bureau of Accounts, Washington, D.C. All carriers listed in the table on pages 6-11 are included in the tables summarizing information by District and United States.

See also 24 131648, publication 7602.

Interstate Commerce Commission Statement No. 100, 1974, 19 pp

ACKNOWLEDGMENT: Interstate Commerce Commission
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402

24 131650
FREIGHT COMMODITY STATISTICS. CLASS 1 RAILROADS. BUREAU OF ACCOUNTS YEAR ENDED DECEMBER 31, 1974
These summaries of freight commodity statistics represent the tabulation of commodity data reported by Class I railroads under the commodity classifications adopted by the Interstate Commerce Commission in its order of September 13, 1963, as amended. The Commission's classification system provides for carrier reporting of commodity data at 2-, 3-, 4-, and 5-digit code levels. Class I railroads report to the Commission at the 3-digit level of detail, supplemented with 4-and 5-digit level detail. The data are summarized at the 2-digit level. The statistical definition of a Class I railroad is a railroad with average annual operating revenues of $5,000,000 or more. The average number of miles of road operated in freight service (single track) by the carriers represented in the tabulation is 207,628.

Interstate Commerce Commission 1974, 33 pp

ACKNOWLEDGMENT: Interstate Commerce Commission
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402
026-000-01030-6

24 132204
THE BRITISH RAIL PROBLEM. A CASE STUDY IN ECONOMIC DISASTER
Government-owned British Railways, formed in the 1940s, become a pressing national problem in the late 1950s. The so-called Beeching Plan for reshaping Britain's rail operations was put into effect in 1963 but succeeded only temporarily in controlling BR's mounting deficits. By 1967 subsidies were instituted for socially necessary but unremunerative passenger services and in the next year steps were taken to reduce capital charges. The Transport Act of 1968 has failed its objective since British Rail is again heavily in deficit. This book forecasts the traffic BR can hope to obtain and estimates what investment and level of employment are necessary for this level of traffic. Stagnation of productivity constitutes the principal explanation of BR collapse: methods including increased productivity are suggested by the authors as means of making the operations self-supporting.

Pryke, RWS Dodgson, JS
Westview Press 1975, 297 pp, Tabs.

PURCHASE FROM: Westview Press 1898 Flatiron Court, Boulder, Colorado, 80301
DOTL HE3017.P78

24 132970
ORE ORGANIZATION AND ITS STUDIES IN TRACK, SUSPENSION AND TRACK/TRAIN INTERFACE
The procedures and facilities utilized by the office for Research and Experiments of the International Union of Railways are described. The studies on conventional and on concrete slab track are described. The investigations of train/track interraction and of derailments are then discussed, as well as axle loading as a function of speed and wheel diameter. It is concluded that in Europe the ballasted conventional track is nearly optimized and much study is being made of concrete slab track. Studies of car suspension systems have only involved two-axle cars. Recommendations on improving the riding stability and quidance of locomotives have been formulated and of maximum loadings for axles and bridges are being progressed.

Proceedings of the 12 th Annual Railroad Engineering Conference held at Pueblo, Colorado, October 23-24, 1975. The complete volume is RRIS 02 132958. Pricing is for the complete volume: Repr. PC $6.75, Microfiche$2.25, NTIS PB-252968/AS.

Schrotberger, K (International Union of Railways)
Federal Railroad Administration FRA OR&D 76-243, Oct. 1975, pp 93-102, 17 Fig.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
DOTL NTIS, DOTL RP

24 132979
REPORT ON THE JOINT CONFERENCE ENO FOUNDATION BOARD OF DIRECTORS AND BOARD OF CONSULTANTS. PART 1: RESTRUCTURING THE RAILROADS IN THE UNITED STATES. PART 2: ENERGY EFFICIENCY OF VARIOUS TRANSPORTATION SYSTEMS
This is a summary of presentations of a panel and the ensuing discussion. The presentations include U.S. Railway Association's plan for restructuring railroads of the Northeast-Midwest region; evaluation of USRA Final System Plan; Amtrak's role in the restructured rail system; and major problems facing all U.S. railroads. Among the discussion topics were comparison of rail and truck profits; comparisons with highway development; branch line abandonment, competition between railroads; labor problems; and the Northeast corridor.

Traffic Quarterly Vol. 30 No. 2, Apr. 1976, pp 167-239, Figs., Tabs.

PURCHASE FROM: ESL Repr. PC, Microfilm

24 134530
DEVELOPMENT PLANNING AND THE SCIENCE OF RAILWAY OPERATION-- PRODUCTIVITY STUDIES BASED ON THE EXAMPLE OF A RAILWAY LINE [Ausbauplanung und eisenbahnbetriebswirtschaft. Leistungsuntersuchungen am Beispiel einer Strecke]
Poor operating conditions and the expected increase in traffic make new construction and extension of the railway network a necessity. The purpose of the science of railway operation is to show that the transport envisaged can be carried out in a satisfactory way from the standpoint of quality and quantity with the planned installations. The authors discuss the different alternative arrangements for a line and the junctions by which it is bounded, partly by use of electronic data processing methods. [German]

Brandt, KH *Archiv fuer Eisenbahntechnik* Vol. 30 Dec. 1975, pp 67-73, 2 Tab., 9 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany

24 134562
OPTIMUM ECONOMIC AND OPERATIONAL NETWORK FOR DB. EXPLANATIONS BY THE DB BOARD AND DECLARATION FROM THE FEDERAL TRANSPORT MINISTER AT THE PRESS CONFERENCE IN BONN ON 22 JANUARY 1976
[Betriebswirtschaftlich optimales Netz der DB. Erlaeuterungen des Vorstandes der DB and Erklaerung des Bundesverkehrsministers in der Bundespressekonferenz am 22 Januar 1976, in Bonn]
The account of the study submitted by the DB Board also includes a map of the optimum DB network from the economics angle. The network consists of a total of some 16,000 km, including the new high speed lines to be built between now and 1985. The optimum network as defined by the DB does not correspond to the future network at all. It merely serves to show economically viable lines. [German]

Die Bundesbahn Vol. 52 No. 2, Feb. 1976, pp 95-98

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany

24 134574
DEVELOPMENT OF TRAFFIC TURNOVER AND TRANSPORT CAPACITY OF THE RAILWAYS
The article analyses and explains the technico-economic efficiency of the measures taken to increase traffic turnover and transport capacity on Soviet railways during the ninth five-year plan (1970-1975). It also mentions: the construction of new lines and doubling existing ones, the extension of stations, equipping track sections with automatic block and dispatching installations, and the introduction of advanced types of traction. [Russian]

Perminov, AS *Zeleznodoroznyj Transport* No. 1, 1976, pp 14-21

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Zeleznodoroznyj Transport Moscow, USSR

24 136387
FINAL SYSTEM PLAN FOR RESTRUCTURING RAILROADS IN THE NORTHEAST AND MIDWEST REGION
The Final System Plan, developed by the U.S. Railway Association meets the obligation of the Regional Rail Reorganization Act of 1973. The Plan is described in two volumes with Volume I containing Part I: Introduction and Summary; Regional Rail System; Passenger Service; Financial Analysis; Capital Structure; Valuation; Manpower Requirements and Policies; Marketing; and Part II: Designations. Volume II contains Part III: Light Density Lines and Community Impact.
Supplementary Note: See also Official Errata Supplement to Volume 1-2, December 1, 1975, RRIS #24 136388, Bulletin 7602. Two volume set $12.30 available from GPO.

United States Railway Association Vol. 1&2 July 1975, 920 pp

ACKNOWLEDGMENT: United States Railway Association
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402
052-003-00098-9

24 136388
FINAL SYSTEM PLAN FOR RESTRUCTURING RAILROADS IN THE NORTHEAST AND MIDWEST REGION. ERRATA SUPPLEMENT TO VOL 1-2
Final system plan for restructuring railroads in Northeast and Midwest region pursuant to Regional Rail Reorganization Act of 1973, official Errata supplement to Vol. 1-2, December 1, 1975.
Supplementary Note: See also Final System Plan, July 1975, RRIS #24 136387, Bulletin 7602.

United States Railway Association Dec. 1975, 58 pp

ACKNOWLEDGMENT: United States Railway Association
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC
S/N052-003-00116-1

24 137696
EFFECT OF PRODUCTIVITY AND TECHNOLOGICAL PROGRESS ON TRANSPORT WORKERS
The report involves the analysis of the use of manpower resources in transport. Three introductory reports cover the conventional sectors of inland transport-road, rail and inland waterway. The review of road transport includes definitions of productivity and gives figures on productivity development. Consideration is then given to the industry's labor force and new developments in road haulage. The technological programme for inland water transport is described and mention made of the situation in Germany. The effects on crews are considered and trends and policy requirements outlined. The review of rail transport covers aspects including shunting, freight terminals, parcels, passenger stations and repair of rolling stock. A summary is given of the discussion which followed, the main topics of which are recruitment and stability of employment, the maintenance of job flexibility and the measures required. /TRRL/
Report of the Twenty-Sixth Round Table on Transportation.

European Conference of Ministers of Transport No. 26, 1975, 104 pp, 4 Fig., 25 Tab.

PURCHASE FROM: OECD Publications Center 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006

24 138338
OPERATING AND FINANCIAL IMPLICATIONS OF GOVERNMENT TAKEOVER OF THE U.S. RAILROAD INDUSTRY'S FIXED PLANT
This report, prepared for the special Subcommittee on Federalized Rights-of-Way of the Legal Affairs Committee of the Association of American Railroads concludes that government takeover of the railroad industry's fixed plant would ultimately lead to total nationalization of the industry. The operating characteristics of the rail mode require integrated control of fixed plant and train operations, it is claimed. Takeover would impair rail efficiency, result in wasteful spending for rehabilitation, reduce the inherent economic advantage of rail transport and alter the competitive status of the various modes. The appendix traces origins and development of rail transportation in the U.S. and other major industrial nations.

Richardson Associates May 1975, 32 pp

PURCHASE FROM: Union Pacific Railroad 1416 Dodge Street, Omaha, Nebraska 68179
DOTL RP

25 071934
RAIL SERVICE IN THE MIDWEST AND NORTHEAST REGION
The Regional Rail Reorganization Act of 1973 (P.L. 93-236), enacted January 2, 1974, directed the Secretary of Transportation to submit a comprehensive report containing his conclusions and recommendations with respect to the geographic zones in the midwest and northeast region within and between which rail service should be provided. This report is submitted in accordance with that provision.

Department of Transportation Vol. 1 Feb. 1974, 86 pp, Figs., Tabs.

PURCHASE FROM: DOT Repr. PC

25 072107
ANNUAL REPORT 1973 OF THE GERMAN FEDERAL GOVERNMENT [Jahresbericht der Bundesregierung]
The 1973 Annual Report of the German Federal Government comprises the annual reports of all ministries, the foreign office and the chancellor's office. The report of the Ministry of Transport covers pp. 395-447. It gives an overview of transportation policies and covers in detail: railways (Deutsche Bundesbahn and private enterprizes); road traffic; inland-waterways traffic; ocean traffic; air traffic; road construction; construction of inland- waterways; other transportation, like pipe-lines for oil and goods; the German Weather Service (DWD); and the German Hydrographic Institute (DHI). Charts, maps, figures, tables and photographs illustrate the statements of the report. [German]

German Federal Government 1973, 715 pp, Figs.

ACKNOWLEDGMENT: TSC
PURCHASE FROM: German Federal Government Press and Information Office, Bonn, West Germany
DOTL J351.G38

25 072164
MODERN TRANSPORT: THREE CANTOR LECTURES
This issue contains three articles on the subject of transportation. The first entitled, An Integrated Transport System, attempts to see where the line should be drawn and what scope there is for integrating the components which together make up Britain's transport system. The author suggests that the scope for integration lies primarily in those areas where there is severely wasted competition between the available systems leading to either a surplus, of transport capacity or to deprivation of means of transport. The prime examples may be listed as follows: (1) urban areas where the car competes with public transport services, which leads to an excess of car traffic; (2) direct competition between road and rail for long-distance passenger transport; (3) direct competition between road and rail for both long and short-haul freight transport. This is an extremely difficult field. No one doubts the value of rail haulage for the long distance transport of bulk commodities such as coal, iron ore, cement and petroleum products; (4) direct competition between cars and buses in rural areas. The author concludes that it is futile to talk of integration unless all the authorities concerned can develop a common outlook and agree on the objectives, including the professional staffs behaving in the same manner.

Royal Society of Arts, Proceedings Vol. 122 No. 521, Feb. 1974, pp 107-178

ACKNOWLEDGMENT: TSC
PURCHASE FROM: Royal Society of Arts London, England Repr. PC
DOTL HE243.M64

25 091416
THE VOICE OF THE TRANSPORTATION CONSUMER. A REPORT TO THE SECRETARY OF TRANSPORTATION ON NATIONWIDE CONSUMER PUBLIC HEARINGS CONDUCTED BY THE OFFICE OF CONSUMER AFFAIRS, 1971-1974. EXECUTIVE SUMMARY
The Executive Summary includes the background and objectives of the 54 nationwide transportation consumer public hearings held 1971-1974, an overview of the findings, and a summary of transportation concerns identified at the hearings. Subject areas include: Balanced transportation; transportation planning; transportation funding; citizen participation in transportation planning; elderly and handicapped; energy; environment; rural transportation; technology; automobile; aviation; bicycles; bus; highways; motorcycles; pedestrians; rail; rapid transit; trucks; water transoprtation.
Paper copy also available in set of 2 reports as PB-241 778-SET, PC$19.00.

Department of Transportation Final Rpt. DOT/TES/OCA-75/1, Apr. 1975, 116p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-241764/0ST, DOTL NTIS

25 093609
REPORT ON THE RAILROAD TECHNOLOGY PROGRAM (8TH), FEDERAL RAILROAD ADMINISTRATION 1974
The Secretary of Transportation is required to report at least annually to the President and the Congress on the activities carried out under the High Speed Ground Transportation (HSGT) Act of 1965 as amended and extended. This Eighth Report covers not only HSGT-fund research, development and demonstrations programs administered by the Office of Research, Development and Demonstration (ORD&D) of the Federal Railroad Administration (FRA) in accordance with section 10(a) of the Act, but also encompasses related work performed under appropriations for advancing railroad technology and safety.
See also report dated 1973, PB-233 064.

Federal Railroad Administration Annual Rpt FRA-ORD/D-76-127, 1974, 88 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247206/6ST, DOTL NTIS

25 093622
TECHNOLOGY ASSESSMENTS IN THE U.S. DEPARTMENT OF TRANSPORTATION, 1975
Major ongoing or completed technology assessments are covered in the summary, which is divided into seven areas: (1) General or multimodal assessments; (2) Highway system assessments; (3) Air system assessments; (4) Rail system assessments; (5) Urban assessments; (6) Energy assessments, and (7) Environmental assessments.

Office of Systems Development and Technology Final Rpt. DOT-TSC-76-39, Nov. 1975, 61 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247697/6ST, DOTL NTIS

25 094018
SUPPORT OF STATE AND LOCAL POLICY DEVELOPMENT IN GENERAL-PURPOSE GOVERNMENTS. THREE WORKING PAPERS
In the context of their functional programs, mission agencies often conduct and administer efforts which could help state and local general purpose governments improve their policy formulation. As part of their participation in OMB's Study Committee on Policy Management Assistance, the DOT members of the group examined this premise, using ongoing DOT programs as a case study. This analysis, documented in three working papers provided to the committee, indicated that functional technology transfer, technical assistance, and training programs can make substantial contributions to state and local policy makers. Key in supporting the state and local policy process is identifying this mission as supportive of, or inherent in, functional mandates. Especially major opportunities are available by identifying policy makers as a client group for interpreted technical information and taking advantage of ongoing internal training efforts using Title III of the Intergovernmental Personnel Act. Mechanisms for input into federal program development by state and local officials are also required.

Linhares, AB Paulhus, NG Shapek, R
Department of Transportation Final Rpt. DOT-TST-76-35, 1975, 68 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS NTIS Price, /MF$2.25
PB-248619/9ST

25 094125
SELLING RAPID TRANSIT TO THE VOTERS, THE LOS ANGELES EXPERIENCE
In 1968, an attempt was made to sell a sales tax and bond issue proposal to the voters of Los Angeles, California, for an 89 mile rapid transit system

(Proposition A). The attempt failed to reach the required voter approval of 60% and even failed to achieve a simple majority. This report is an examination of that effort to learn what can be gained from the experience. The report includes a brief history of the various groups that preceded the final citizens group which undertook the promotion on behalf of the proposition. The report focuses on efforts to publicize the issue including actual sales techniques, the raising of funds, the separate roles of the transit district and citizen group, the opposition encountered, efforts to counteract specific opposition, and some retrospective insights as to why the issue ultimately lost at the ballot.

Erikson, G
California University, Los Angeles, Urban Mass Transportation Administration, (UMTA-CA-11-0009) UMTA-CA-11-0009-75-2, Aug. 1974, 36 pp

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248785/8ST, DOTL NTIS

25 094411
TECHNOLOGY SHARING: A GUIDE TO ASSISTANCE IN OBTAINING AND USING RESEARCH, DEVELOPMENT AND DEMONSTRATION OUTPUTS
The report includes information on the Department's policy and general approach to technology sharing, an overview of the sharing/assistance mechanisms, the specific mechanisms and activities of the various operating administrations and the Office of the Secretary, and interagency programs aimed at improving federal coordination. Programs are broken out in four general categories: field support and direct assistance, information services, training programs, and RD&D programs. Appendices are included which provide information on grant and financial assistance which is available, intergovernmental personnel and training, excerpts from the Secretary's policy statement, and a summary chart of the programs contained in the report. Throughout the report, specific contacts are provided as sources of further information.

Department of Transportation Final Rpt. DOT-TST-76-51, Jan. 1976, 80 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249101/7ST, DOTL NTIS

25 094606
URBAN RAIL SUPPORTING TECHNOLOGY PROGRAM FISCAL YEAR 1975. YEAR END SUMMARY
The Urban Rail Supporting Technology Program is described for the 1975 fiscal year period. Important areas include program management, technical support and applications engineering, facilities development, test and evaluation, and technology development. New projects were started in all important areas. Specific technical discussion includes: Technical Support and Applications Engineering, the Crashworthiness of Vehicles, Advanced Concept Train, and Rail Transit System Costs; Facilities Development, Permanent Track Power, Catenary, Wheel truing Machine, and Track Scale; Test and Evaluation, State-of-the-Art Car testing and Revenue Service Demonstration, the testing of existing Revenue Service Vehicles, testing on the UMTA RTTT (Energy Storage Car Gas-Turbine/Electric cars, Standard Light Rail Vehicle, Track Geometry Measurement System, and General Vehicle Test System); Technology Development, Noise Abatement, and Tunneling.
See also report dated Mar 75, PB-241 239.

Madigan, RJ
Transportation Systems Center, Urban Mass Transportation Administration Final Rpt., 7 DOT-TSC-UMTA-75-28, UMTA-MA-06-0025-75-1, Dec. 1975, 85 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250447/0ST, DOTL NTIS

25 094636
DEVELOPMENT OF METHODOLOGY FOR THE ASSESSMENT OF BART'S IMPACTS UPON ECONOMICS AND FINANCE RESEARCH PLAN
This is a research plan for the Economics and Finance Project, one of the six major components of the BART Impact Program, a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system. The Economics and Finance Project will determine the impacts of the construction of BART, the transportation service it provides, and the bond issues and taxes that finance it, on the regional economy and on specific economic sectors. It will also assess impacts on employment, productivity, business activity, the cost of public borrowing, public willingness to incur debt for other purposes, and the distribution of tax burdens among socioeconomic sectors of the population. In the Research Plan, one or more work elements are defined for each of the enumerated factors. The discussion of each element includes a description of a model of the determinants of the impact, expectations as to measurability of the impacts, a consideration of alternative study methodologies, and a recommendation of a preferred methodology.
Prepared by Urban Inst., Washington, D.C. Planning document.

Bergsman, J Muller, T McGillivray, R Garn, HA
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, Urban Institute PD-22-7-76, Mar. 1975, 45 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250719/2ST, DOTL NTIS

25 094809
FEDERAL OUTLAYS IN SUMMARY. REPORT OF THE FEDERAL GOVERNMENTS IMPACT BY STATE, COUNTY AND LARGE CITY, FISCAL YEAR 1975
The reports show all domestic outlays of federal funds (other than those for which publication would constitute a hazard to national security) under each program or appropriation, by county and large city where the outlay was made. These outlays are also summarized at the national and state levels by agency, program, and function. Order individual reports by PB-number listed below:
See also reports for Fiscal Year 1974, PB-238 200. Also available from NTIS as set of 53 reports PC$258.00/MF$119.25, PB-249 200-SET.

Community Services Administration FIXS-75-53, Dec. 1975, 307 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249253/6ST, DOTL NTIS

25 127486
TRANSPORTATION PROGRAMMING PROCESS
The steering committee summary, the summary of the workshops, and the formal papers presented at the conference on programming are presented here. The papers were as follows: Programming in Perspective; Federal Role in Programming; State Role in Programming; Local Role in Programming; Resource and Financial Management-Some Persistent and Perplexing Programming; Pricing and Investment in Transportation Facilities; Program Development; Decision Making; and Evaluation. The key issues which emerged both in the workshops and in the formal presentations are: Programming should be based on goals and objectives and not on fund structures; governmental roles in programming should be clearly delineated; programming should continue to emphasize the trend toward decentralization of decision making to the lowest feasible level of government; fiscal philosophy for transportation programs is moving away from modal trust funding and categorical grants; Diverseness and disparateness are characteristics of the present time; and there should be a continum in the planning, programming and project-selection processes. Workshop findings relating to resource and financial management (sources of funds, financial planning, and revenue allocation), program management (relation of planning and programming, defining the criteria for program development and priority rating, and program identification and project development), decision making (government's role) and evaluation (defining and measuring success, review of program implementation) are presented.
Proceedings of a conference held March 23-26, 1975 at Orlando, Florida.

See individual sections, HRIS #127487-#127495.
Transportation Research Board Special Reports No. 157, 1975, 75 pp

PURCHASE FROM: TRB Publications Off Orig. PC

DOTL RP

25 129269
CURRENT PROBLEMS IN SHORT-DISTANCE TRAFFIC [Aktulle Fragen der Nahverkehrspolitik]
Short-distance transport modes have a limited ability to adapt to market fulctuations, there are fewer possibilities for increasing capacity and they must cooperate with other transport modes. One of the aims of the German Federal Republic's Ministry of Transport is to find new sources for financing projects by levying special taxes on regional or inter-community groups. To reach these aims, the financial capacity of transport bodies should be combined, public transport should be given full support and priority and towns with a population of more than 1,000,000 should be encouraged to build underground transport systems. [German]

Ingelbrecht, P *Verkehr und Technik* Vol. 28 No. 5, 1975, pp 167-170

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Schmidt (Erich) Verlag Herforder Strasse 10, 4800 Bielefeld, West Germany Repr. PC

25 129803
RAILROAD REHABILITATION PROGRAM. A PROGRAM TO UPGRADE SELECTED BRANCH LINES IN IOWA
This report describes how Iowa participates with railroads and shippers in upgrading track and roadbeds, through direct financial assistance. Major topics include a discussion of the selection, negotiation, implementation, follow-up and payback procedures; the factors related to transferring the program from Iowa to another state; the authorizing legislation with back-ground information; and comments about future directions for the program. The Iowa Railway Assistance Act establishes a fund to be expanded by the Iowa Department of Transportation for upgrading the branch lines, serving not as a substitute for abandonment but as a realistic approach for saving viable branch lines.
Direct requests to Dick Howard, Innovations Transfer Project.

Council on State Governments 22 pp

ACKNOWLEDGMENT: Council of State Governments
PURCHASE FROM: Council on State Governments P.O. Box 11910, Iron Works Pike, Lexington, Kentucky, 40511 Orig. PC

25 129851
A METHODOLOGY FOR EVALUATING THE IMPACT OF RAILROAD ABANDONMENT ON RURAL HIGHWAYS
This report develops a methodology for the impact of railroad abandonment on existing highways and bridges and application of the procedure to two case studies in Indiana. The indicated effects are in increased deterioration of some pavements and hence a required additional amount of resurfacing material and in increased emphasis on replacement of inadequate bridges and traffic congestion in some areas. A dollar effect of the additional resurfacing is calculated for the two case studies and emphasizes increased financial needs which railroad abandonment will have on rural highways in Indiana.

Purnell, LO
Purdue and Indiana State Highway Commission, JHRP, (JHRP-76-4) Final Rpt. C-36-54NN, Jan. 1976, 217 pp, 33 Fig., 25 Tab., 5 App.

ACKNOWLEDGMENT: Purdue and Indiana State Highway Commission, JHRP
PURCHASE FROM: Purdue University West Lafayette, Indiana, 47906 Repr. PC

DOTL RP

25 130986
A REVIEW OF NATIONAL RAILROAD ISSUES
This review is based on the Final System plan establishing Consolidated Rail Corporation (Conrail) out of the financially distressed railroads of the Northeast. National railroad issues considered by Congressional committees in preparing and implementing legislation for Conrail are examined with the view of maximizing the utility of the System Plan. The legislative package addressing the industry problems identified in this study would include a selective program of federal assistance for rehabilitiation of the railroad fixed plant, legislation of permit restructuring of the industry and to permit the federal government to react rationally to industry-initiated proposals, rate reform which will allow some ratemaking flexibility while minimizing disruptive effects within and outside the industry, and dealing with problems of branch line losses and discriminatory taxation.
Prepared at the request of the United States Committee on Commerce.

United States Congress OTA-T-14, Dec. 1975, 70 pp, 4 App.

ACKNOWLEDGMENT: United States Congress
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

25 131006
TRANSPORTATION PRODUCTIVITY. MEASUREMENT AND POLICY APPLICATIONS
This study examines productivity measures as a tool for policy makers since they plan an expanding role in transportation regulatory questions. Areas of possible application include rate adjustments, wage adjustments, identification of inefficiencies and mergers and acquisitions. This study is restricted to issues relevant for policy analysis. Measurement of labor input, capital input and intermediate inputs, as well as output, necessitates considerable reliance on theory. However, the focus is on how to measure productivity for policy applications, not how to refine productivity theory. The study is restricted to three major modes--rail, air and motor freight trucking. Previous transportation productivity studies are reviewed. Policy implications for each type of measure are identified and their applicability to each of the modes is discussed.

Scheppach, RC, Jr Woehlcke, LC (Faucett (Jack) Associates)
Heath Lexington Books 1975, 125 pp, Tabs.

PURCHASE FROM: Heath (DC) and Company Department RS, 125 Spring Street, Lexington, Massachusetts, 02173 Repr. PC

DOTL HE151.S35

25 131031
MATERIALS CONCERNING THE EFFECTS OF GOVERNMENT REGULATION ON RAILROADS AND AN ECONOMIC PROFILE OF RAILROADS IN THE UNITED STATES
This staff study consists of six major parts: Cost of Regulation and Regulatory Time Lag; Cost of Subsidy program for light Density Lines; Discriminatory State Taxation; Employment Levels and Employee Protection in the Railroad Industry; Estimates of Transportation Expenditures; and Key Economic Facts of Rail Transportation. Extensive statistical data is presented in each of these areas to support points made by the study. The bibliography consists of a complete listing, 145 citations, by the Library of Congress Congressional Research Service.

United States House of Representatives No. 17, Dec. 1975, 95 pp, Figs., Tabs.

ACKNOWLEDGMENT: United States Congress
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

DOTL JC

25 131041
RAILROAD REVITALIZATION ACT WILL ADD NEW CONCEPTS TO RATEMAKING PROCESS
The Railroad Revitalization and Reform Acts designed to function on two levels, providing for revitalizing failing railroads through federal aid and revitalizing all railroads through regulatory reforms calculated to enhance the industry's competitive strength. Throughout the law are dozens of rate-oriented provisions that will force some type of response from railroads, shippers and even other modes of transportation. This will mean that rail and shipper rate specialists must cope with new rate-making terms such as market dominance, going concern value, predatory pricing and the Conte Amendment. While there is a degree of deregulation, the Interstate Commerce Commission is still deeply involved in the required processes.

Champman, RS *Traffic World* Vol. 165 No. 6, Feb. 1976, 3 pp

PURCHASE FROM: Traffic Service Corporation 815 Washington Building, Washington, D.C., 20005 Repr. PC

DOTL JC

25 131286

DB 1975 THE GREATEST ECONOMIES AND THE GREATEST DEFICIT [DB 1975: Groesste Einsparung-groesstes Defizit]

Because of the ever increasing difference between the share the DB would like of the Federal budget and the amounts it is granted, action needs to be taken to slow down and even reverse this trend. A network totaling some 15,000 km of line would be the optimum size from the economic angle and this may be achieved by 1985. Such a network would also be the optimum solution for the national economy. [German]

Vaerst, W *Die Bundesbahn* Vol. 51 No. 12, Dec. 1975, pp 755-759

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

25 131430

SIXTH SYMPOSIUM ON THE FUTURE OF CONURBATION TRAFFIC V: RESEARCH EXPENDITURE AND TECHNICAL PROGRESS IN URBAN TRANSPORT

This paper examines the pattern of research and development conducted in and for surface transport in Great Britain. There are significant variations in the research inputs of different modes of transport, most noticeably, little research and development in public road service vehicles and a heavy concentration in the private motor car industry. In research on railways, the urban element of rail travel is seen to have been rather neglected, despite the existence of urgent problems. It is suggested that radical solutions are necessary. Research and development expenditure should be related to the likely number of beneficiaries (as reflected in the current travel pattern) and the technological opportunities of the relevant mode there should be major encouragement of research and development for public transport despite declining revenues and severe operating problems. In this way, marked technical improvements may be achieved instead of trying to sustain, by subsidised fares alone, systems which are technologically inferior and which are likely to suffer a loss of traffic and revenue although their costs will remain substantially unchanged. The motor companies should also be given greater encouragement to seek more basic advances in transportation than marginal improvements to private motor cars. /TRRL/

Stubbs, PC Tyson, WJ
Manchester University, England Conf Paper Oct. 1972, pp 74-92, 3 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216155)
PURCHASE FROM: Manchester University, England Department of Extra-Mural Studies, Holly Royde College, Manchester M60 1QD, England Repr. PC

25 131505

PORT DEVELOPMENT IN THE UNITED STATES

The problems and issues of national concern facing ports are examined in terms of the implications of technological change and public policies affecting port planning, development, and operation. Major areas of concern are classified in four categories: a) decision-making on federal, regional, state, and local levels; b) measures of national, regional, and local requirements; c) institutional constraints; and d) shoreline usage. The ability of ports adapting to containerization, the need to balance economic and environmental concerns, and the sale of labor and management in port operations are discussed. The report concludes with a recommendation and guidelines for a federal aid to ports program, as well as recommendations relating to port finance, development and planning, rates and regulations, and environmental concerns.

Prepared by the Panel on Future Port Requirements of the United States.

Maritime Transportation Research Board Jan. 1976, 246 pp

ACKNOWLEDGMENT: Maritime Transportation Research Board
PURCHASE FROM: Maritime Transportation Research Board 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr. PC

DOTL RP

25 131755

RAILROAD RESEARCH: THE CHANGING EMPHASIS

When founded, the Federal Railroad Administration had the safety regulation functions of the ICC and the high-speed ground research mission of the Department of Commerce. New legislation in the past five years has given FRA a much broader research role. The general decision was made to concentrate efforts on near-or intermediate-term problems, rather than long-term advanced systems. Today there are four areas of emphasis: Rail safety, freight systems, passenger systems and "soft" research--as opposed to the hardware orientation of the preceding three missions. FRA has defined R&D goals and strategies to assure that all future R&D activities fit into an overall scheme.

Parsons, RE (Federal Railroad Administration) *ASME Journal of Mechanical Engineering* Vol. 98 No. 4, Apr. 1976, pp 29-33, 4 Fig.

PURCHASE FROM: ESL

DOTL JC

25 131756

MASS TRANSPORTATION NEEDS AND FINANCING IN THE UNITED STATES

The U.S. Department of Transportation (1974) recently completed a comprehensive study of mass transportation needs and methods for financing these needs. Using information from the 1974 National Transportation Study, the study determined the level of capital and operating funds that would be required to implement the 1972-90 long-range plans and 1972-80 short-range programs of the states and urbanized areas. It then analyzed various funding mechanisms at state and local levels for financing their portions of these plans and programs. It was found that urban areas, in general, not only plan to stabilize transit fares in the face of rising costs, but also intend to put $23.6 billion into capital investments through 1980 and an additional $34.6 billion through 1990. Of the total $58.2 billion in capital expenditures by 1990, 63% would be expended by the nine largest urganized areas; 27.8% by the New York area alone. Rail transit and commuter railroad costs would account for 90% of the nine largest urbanized areas. States and localities would be able to carry the financial burden of mass transportation improvements, even if the proposed 1980 programs were implemented in their entirety, given current levels of federal assistance. However, three would have to be a substantial financial commitment from the states and localities and some hard decisions made by them about public expenditure priorities, fare policies, and taxation levels, and policies to discourage automobile usage. This underscores the need for careful review of their overall plans and programs by state and local officials before making financial commitments.

Weiner, E (Department of Transportation) *Transportation (Netherlands)* Vol. 5 No. 1, Mar. 1976, pp 93-110, 7 Fig., 3 Tab.

ACKNOWLEDGMENT: Transportation (Netherlands)
PURCHASE FROM: ESL

25 132885

PUBLIC EXPENDITURE AND URBAN AND INTER-URBAN TRANSPORT

The author summarizes three recently published papers which add support to the opinion that the solution to urban traffic congestion lies in improving public transport rather than in building more roads. The first paper also calls for the coordination of public expenditure on the different modes of interurban transport, including rail and water, as well as roads. The papers are: 1. "Public Expenditure on Transport", the first report of the Expenditure Committee, Environment Sub-committee, of the House of Commons for session 1974; 2. A summary report on the Stevenage Superbus Experiment; 3. A discussion paper by Tyson, WJ on the "Economic Implications for Transport Planning of the New Grant System and Transport Policies and Programmes". /TRRL/

Jenkins, GC *Housing and Planning Review* Vol. 31 Jan. 1975, p 15

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215978)
PURCHASE FROM: National Housing and Town Planning Council 34 Junction Road, London N19, England

7510180

25 133632
TRANSPORTATION GEOGRAPHY: COMMENTS AND READINGS
This textbook is a compilation of articles and papers by various authors and is presented under seven headings as follows: part (1) transportation geography: an overview; part (2) network analysis (graph theoretic concepts, connectivity of the interstate highway system, linkage importance in a regional highway network, population and accessibility: an analysis of Turkish railroads); part (3) flow analysis (concepts and methods in commodity flow analysis, the application of linear programming to geographic problems, aggregation and gravity models: some empirical evidence, least cost flows in a capacitated network: a Brazilian example); part (4) modal systems (the geography of railroad piggyback operations, ships and shipping: the geographical consequences of technological progress, elements in inter-port competition in the United States, development of air transport); part (5) interdependencies-systems and circulation (government influence on transport decision-making in Thailand, air travel: towards a behavioral geography of discretionary travel, the geography of communications, flows of information and the location of economic activities, spatial reorganization: a model and concept); part (6) specific problem areas (transport expansion in underdeveloped countries: a comparative analysis, transportation planning in developing countries, evaluating construction prorities of farm-to-market roads in developing countries: a case study, depressed regions and transportation investment, transport inputs at urban residential sites, automobile commuting in large suburbs: a comparative analysis of private car use in the daily journey to work, land use travel movement relationships, micromovement and the urban dweller); part (7) development of transportation geography. /TRRL/

Eliot, AR (Simon Fraser University, Canada)
McGraw-Hill, Incorporated 1974, 528 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 216682)
PURCHASE FROM: McGraw-Hill, Incorporated London, England

25 134297
HOW RAPID TRANSIT GOT LOST IN THE CLOUDS
In the mid-1960's the U.S. government supported a resurgence of public transportation, but simultaneously denigrated the existing practitioners. Now the 10-year-old dream shared among federal government, academics, politicians and some aerospace companies has turned into a financial, technical and political nightmare which has also set back mass transit in many cities by a decade. The American government and aerospace industry have pursued the wrong products, and in consequence harmed established manufacturers, given confidence to the anti-rapid-transit lobby and disillusioned transit's well wishers. The lesson is that money can only be made on standard performance products with cost escalation clauses.

Bond, W *New Scientist* Apr. 1976, pp 175-177

PURCHASE FROM: IPC Magazines Limited 66-69 Great Queen Street, London WC2E 4DD, England
DOTL JC

25 134306
NATIONAL AND EUROPEAN TRANSPORT POLICY
This article discusses the four main transport modes within which it is considered a national and European transport policy needs to be developed. Loads carried by sea and air are felt to form a small part of the total, leaving the main area of competition between road and rail. Environmental problems with all modes are considered important, and the need to provide adequate motorway links between the major channel ports and the rest of the motorway network with these problems in mind is stressed. It is felt that a national transport policy, within the framework of a realistic pricing policy, must aim at achieving a balance of direct economic and indirect environmental advantage. Reference is made to the heavy commercial vehicles (controls and regulations) act, 1973, and its influence on transport policy. /TRRL/

Chartered Mechanical Engineer Vol. 103 No. 1/2, pp 5-6

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218198)
PURCHASE FROM: Institution of Mechanical Engineers 1 Birdcage Walk, Westminster, London SW1H 9JJ, England

25 134309
TRANSPORT COSTS AND REVENUES IN CANADA
The object of the paper is to analyse public investment in the different modes of transport in Canada, investment which has shown an annual deficit of $1.5 billion in recent years. An investigation is made into the profitability of road, rail, marine and air transport, including facilities such as airports, roads and harbours. Taking 1968 as the base year is found that of total costs of $18.3 billion, road accounted for $14 billion. This deficit was much larger than that of any other mode but only 3.7 per cent of its costs compared with rail 25.5% and air 9.3%. The degree of cost recovery was a result of transport policies based on social objectives such as regional development and national unity as well as efficiency. /TRRL/

Haritos, Z (Canadian Transport Commission) *Journal of Transport Economics and Policy* Vol. 9 No. 1, Jan. 1975, pp 16-33, 5 Fig., 6 Tab., 7 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218186)
PURCHASE FROM: London School of Economics and Political Science Houghton Street, Aldwych, London WC2A 2AE, England
DOTL JC

25 134310
TRANSPORTATION IMPLICATIONS OF CANADA'S TRADE WITH JAPAN
This paper recalls the changes in the National Transportation Act of 1967, which must be superseded by legislation regulating the key items of the transport rate structure. These changes should not place regional interest above Canada's international trading objectives. Over the next two decades, the federal and other levels of government must be involved in investment decisions about the nature and capacity of Canada's logistical network. This probably means a reordering of priorities and a reassessment of technological developments such as STOL, turbotrains, and other experimental forms of transport. More emphasis on technology related to the efficient movement of bulk commodities should have first place. It is evident, according to the author, that the system of Canadian transportation and its related facilities are severely over-administered. /TRRL/

Hay, KAJ (Canada-Japan Trade Council)
Economix International Mar. 1975, 101 pp, 1 Fig., 32 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 217409), Roads and Transportation Association of Canada
PURCHASE FROM: Economix International P.O. Box 4205, Station E, Ottawa, Ontario, Canada

25 134541
THE RAILWAY: A MODERN MODE OF TRANSPORT [Le chemin de fer: un moyen de transport moderne]
The statements are the work of experts and deal with vital questions for the various transport modes, economic aspects and transport costs against the background of national policy, rational use of available manpower and materials and the railway's prospects on the Swiss transport market. [French]
Series of general statements on the present position of the railway in Switzerland.

Bulletin Technique de la Suisse Romande Feb. 1976, pp 369-402, Tabs., Phots., Refs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

25 134572
DEVELOPMENT OF A METHOD OF DYNAMIC INVESTMENT PLANNING-PILOT STUDY [Entwicklung eines Verfahrens zur dynamischen Investitions-planung-Pilotstudie]
A synopsis of a 291-page study ordered by the German Federal Transport Minister. By means of a pilot study, an effort is made to take into account the very long processes involved in transport infrastructure investment planning and implementation, and the interdependence of projects as regards cost-benefit calculations. For this, it becomes necessary to group together the multiple periods of time and correlations between projects, so as to simulate the operational aspect of data input and calculation. The method is explained with two examples of communication routes planning.

The mathematical processes used in particular are quadratic whole-number programming and the "Branch and Bound" method. [German]

Internationales Verkehrswesen Vol. 27 No. 6, Nov. 1975, pp 253-255

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

25 134573
IMPROVING THE PRODUCTIVITY OF INVESTMENTS [Provysenie effektivnosti kapital'nyh vlozenij]
The article: gives data on the productivity of investments in Soviet rail transport, and examines the problem of subsequently raising this productivity during the tenth five-year plan (1975-1980). [Russian]

Barkov, NN *Zeleznodoroznyj Transport* No. 1, 1976, pp 73-79

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Zeleznodoroznyj Transport Moscow, USSR

25 134575
INTEGRATED LONG-RANGE FORECAST OF FREIGHT AND PASSENGER TRANSPORT DEMAND IN THE GERMAN FEDERAL REPUBLIC. PROJECTION OF FREIGHT AND PASSENGER TRAFFIC AND TRAFFIC FLOW [Integrierte Langfristprognose fuer die Verkehrsnachfrage im Gueter-und Personenverkehr in der Bundesrepublik Deutschland. Projektion des Gueter-und Personenverkehrs sowie Verkehrsstroeme]
A synopsis of the 293-page study ordered by the German Federal Transport Minister. [German]

Internationales Verkehrswesen Vol. 27 No. 6, Nov. 1975, pp 255-259

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany

25 134595
PROBLEMS OF TRANSPORTATION IN JAPAN
This issue contains articles which were published between 1969 and 1973 in the journal "Transportation and Economy". They are classified under 5 main chapter headings. A number of articles are viewed in the present context of transport policy trends and railway technological developments.

Institute of Transportation Economics No. 1, July 1975, 85 pp, 12 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Institute of Transportation Economics Tokyo, Japan

25 134603
A FORMULA FOR SUB-ALLOCATING OPERATING ASSISTANCE FUNDS
The $3.9 billion transit assistance program instituted after 1974 legislation requires that USDOT funds be apportioned by state and local officials for both operating and capital projects in urbanized areas. Urban funding is on the basis of population and population density without guidelines on distribution of the funds among operating entities. The publice transportation operating entities serving Philadelphia, Pa. and Southern New Jersey and the interstate area at Trenton, N.J., were appraised by the Delaware Valley Regional Planning Commission and a general formula was constructed based on demand, supply and efficiency. A continuing effort to promote efficiency in public transit operations is essential. The formula and fund distribution to the entities are described. The methodology relies on data commonly compiled by operating agencies.

Pierce, IN Schwarzwalder, J Brizell, EG, III Sergi, J *Urban Land Institute* Vol. 2 No. 1, Feb. 1976, pp 31-42, 2 Fig.

PURCHASE FROM: American Public Transit Association 1100 17th Street, NW, Washington, D.C., 20036

25 135205
AN OVERVIEW OF TRANSPORT TECHNOLOGY ASSESSMENT
Presents a critical review of the methods currently used in transport technology assessment and suggests that the root of the problem lies in the procedures adopted for evaluation.

Ashford, NJ Clark, JM *Transportation Planning and Technology* Vol. 3 No. 1, 1975, 13 pp, 1 Fig., 31 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: ESL Repr. PC, Microfilm

25 136502
AIRLIE XII CONFERENCE HELD AT WARRENTON, VIRGINIA ON 29-31 JANUARY 1976
The Airlie conference highlights the financial requirements of the operating and capital programs of Metro. The following points were emphasized at the conference. Public transportation, while essential to our economic, social, and economical well-being, is a major cost and one that must be effectively managed. Rail construction costs must be kept as far as possible within the current estimate. Bus and rail operating programs must be managed so as to take advantage of every opportunity for increasing efficiency and reducing marginal service. Adequate funds are available to meet the full rail construction costs. To the extent that the full level of costs cannot be budgeted, effective budgetary alternatives must be identified without sacrificing our end program alternatives.

Washington Metropolitan Area Transit Authority WMATA-76/1, Jan. 1976, 147 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-251299/4ST, DOTL NTIS

25 136609
TRANSPORTATION DEVELOPMENT PROGRAM FOR APPALACHIA: PROGRAM DESIGN
The report presents an analysis of transportation needs in Appalachia; issues and modal alternatives in meeting these needs; and, recommendations for future program directions. Aviation, rail, water and highway modes are addressed.

Prepared in cooperation with Appalachian Regional Commission, Washington, D.C.

Resource Planning Associates, Incorporated, Appalachian Regional Commission Final Rpt. Nov. 1974, 283 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-250734/1ST, DOTL NTIS

25 137702
THE ROLE OF BRITISH RAIL
The author describes Britian Rail as having several roles in transport including provision of the inter-city service, pte services, London and south-east services and other grant-aided services. He then concentrates on its roles in urban areas and identifies those of providing a metro-type system, single-line commuter service, fan-shaped commuting coverage and long-distance commuter service. The advantages of these systems are discussed including the sharing of tracks with inter-city and freight traffic. The joint planning of commuter services with the British rail network is described as providing opportunities for flexibility with maximisation of coverage, greater Manchester being used as an example. Discussions which followed this paper are included. For covering abstract of the symposium see IRRD no. 219539.

Keen, PA (British Railways Board); Ennor, PD
Newcastle-Upon-Tyne University, England 1974, pp 65-74, 1 Fig.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 219544)
PURCHASE FROM: Newcastle-Upon-Tyne University, England Newcastle-Upon-Tyne, Northumberland, England

25 137703
WHY WE NEED THE RAILWAYS-MORE THAN EVER BEFORE
The report outlines the environmental, social, energy and material resource arguments in favour of the retention and development of the British railway system. The growth of inland passenger and freight transport since 1950 and the effect of this change on the life of the country are outlined. The relationship between the government and British rail since nationalisation is set out. The railways Act 1975 does not make it clear whether the primary task of British rail is to maximise revenue, maximise passenger carrying and

tonnage, or maintain network and level of service regardless of either. The second half of the paper considers firstly, the objectives the railway could have from 1975 until 2000, secondly, how they might be put into practice and finally, the level of investment the public must accept if the railways are to undertake a fully effective social role. The advantages of rail transport when compared with road transport on the basis of conservation of fuel, natural resources and space, of lower pollution levels and of safety are set out. The future roles of rail passenger and freight services are reviewed. On environmental grounds, the authors recommend a change in policy,with the railways undertaking bulk movement of basic commodities, trainload movement of company traffic and wagon load working over all long distance journeys. /TRRL/

Transport 2000 1975, 12 pp, 1 Fig., 7 Tab., 1 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 218991)
PURCHASE FROM: Transport 2000 9 Catherine Place, London, England

25 137706
THE RAIL PROBLEM
Reasons for the failure of the 1968 transport act and the attempt to make BR pay its way with the assistance of a small subsidy are examined. Attention is drawn to the board's inaction, the way it ignored warnings and its failure to achieve planned reduction in costs. Estimates are made of how much revenue br can hope to earn from freight and passenger traffic in 1981. It is demonstrated that BR has scope for increasing prices. Investment and labour forces are scrutinised in order to establish the minimum level of expenditure if br is to cope with anticipated traffic. It is found that large savings in manpower are possible. A critical review of the case for rail subsidies analyses their effect on the distribution of income, the arguments for maintaining loss-making passenger services are examined and an attempt is made to quantify the costs that lorries impose on the community. It is shown how far BR could be made financially self-supporting by 1981 if it were fully efficient and a five year programme of economic and administrative reform is sketched out for tackling the rail problem. /TRRL/

Pryke, RWS Dodgeson, JS (Liverpool University, England)
Robertson (Martin) and Company Limited 1975, 249 pp, 1 Fig., Tabs., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 219208)
PURCHASE FROM: Transport and Road Research Laboratory 17 Quick Street, London, England

25 138087
NINTH REPORT ON THE RAILROAD TECHNOLOGY PROGRAM
A report on the Federal Railroad Administration's activities carried out under the High Speed Ground Transportation (HSGT) Act of 1965 as amended and extended, for the Secretary of Transportation to report annually to the President and the Congress on activities performed under the Act. This report covers the HSGT-funded research, development and demonstrations programs administered by the Office of Research and Development (OR&D) and the Transportation Test Center (TTC) of the Federal Railroad Administration (FRA) in accordance with Section 10(a) of th Act and also encompasses related work performed under appropriations for advancing railroad technology and safety including the activities of the Transportation Test Center. The report covers program activities for the period October 1, 1974, to September 30, 1975. The report is designed to serve as a source of information for those having an interest in FRA's research, development and demonstration activities. A limited number of copies are made available to Committees of Congress, other Department of Transportation (DOT) organizations, academicians, prospective contractors, industry organizations and others who have an interest in FRA's R&D results.

Federal Railroad Administration FRA-OR&D 76-245, Apr. 1976, 74 pp, 42 Fig., 1App.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS
PB-253197/AS, DOTL NTIS

25 138308
USRA GOES NATIONAL
The current belief that U.S. railroads suffer from excess capacity has resulted in numerous proposals for consolidation. The author reviews recently completed track consolidation studies prepared for the FRA and USRA; surveys successful consolidations in the past, including arrangements for shared track, paired operations and trackage rights; and outlines ConRail's activities in this area.

Shaffer, FE *Modern Railroads/Rail Transport* Vol. 31 No. 2, Feb. 1976, pp 50-53, 2 Fig., 1 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Cahners Publishing Company, Incorporated Watson Publications, 5 South Wabash Avenue, Chicago, Illinois, 60603
DOTL JC

25 138325
NEW MAN IN THE HOT SEAT--WHAT OTTO LANG INTENDS TO DO
Text of an interview with Otto Lang, Minister of Transport in Canada, in which such topics as railroad freight rates, truck-rail competition, national objectives regarding transportation, the relationship between rail rates and regional development, the future of Air Canada were discussed. The overall theme was that of government bearing the cost for the services which it wanted performed.

Seip, DW *Canadian Transportation and Distribution Managemnt* Vol. 79 No. 1&2, Jan. 1976, pp 18-24, 2 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Canadian Transportation and Distribution Managemnt 1450 Don Mills Road, Don Mills, Ontario M3B 2X7, Canada
DOTL JC

25 138339
TRANSPORT POLICY: A CONSULTATION DOCUMENT VOLUME 1 AND 2
This two-volume document is a review of the British government's transport policy. Main objectives of the policy are: Efficiency in terms of resources used; priority to social welfare aspects of transport; protection of the community from unwarranted impact on the environment; resource conservation, particularly energy; democratic decision making and freedom of choice on the part of users; assurance that change be accomplished in context of full trade union involvement; control of public expenditure particularly confinement of subsidies to areas of greatest need. This so-called Green Paper devotes major attention to subisidies for British Rail and its future role. The paper includes a section comparing the British situation to that of the railway systems of other members of the European Economic Community. It is concluded that taxation and subsidy must be considered together to achieve sensible pricing and transport policy must be coordinated at all levels.

Her Majesty's Stationery Office 1976, 228 pp, Tabs.

PURCHASE FROM: Her Majesty's Stationery Office 49 High Holborn, London WC1V 6HB, England

25 138340
TOWARD MORE BALANCED TRANSPORTATION: NEW INTERGOVERNMENTAL PROPOSALS
Every level of government in the U.S. has transportation responsibilities and this segment of transportation spending alone represents $26 billion annually in public funds. The varied responsibility at various levels and with respect to the different modes and geographic regions is the heart of the study. Overwhelmingly in recent years public transportation effort has been on highways, followed at distant second by airports and then water transportation, mass transportation and parking. Local government are engaged in all five, with most attention on mass transportation. State roles are most heavily concentrated on highways. The Federal government is now attaining a balance among highway, mass transportation, airport and water transport. Nine recommendations are made on government funding and financing of all transport modes and on emphasizing regional planning and programs.

Advisory Commission on Intergovernmental Relations Dec. 1974, 307 pp, Figs., Tabs.

ACKNOWLEDGMENT: Advisory Commission on Intergovernmental Relations
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402

DOTL RP

26 052672
INTERNATIONAL RAILWAY STATISTICS. STATISTICS OF INDIVIDUAL RAILWAYS
The Statistics now consist of twenty two Tables (twenty- three for years ending in 0 or 5) grouped into four classes. These classes are: 1) Composition and means of the railway systems, 2) Technical operating results, 3) Financial results and 4) Miscellaneous including fuel, accidents, taxes and terminal conditions.

International Union of Railways, BD 1973, 190 pp, Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France Repr. PC
DOTL RP

26 053162
TRILINGUAL GLOSSARY OF COMMONLY USED TECHNICAL TERMS AND DEFINIITONS OF TERMS CONNECTED WITH THE USE OF THYRISTORS IN RAILWAY TECHNOLOGY
No Abstract.
Restrictions on the use of this document are contained in the explanatory material. It is written in German, English and French.

International Union of Railways DT31/D/E/F, Apr. 1976, 89 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC
DOTL RP

26 090975
TECHNOLOGY UTILIZATION PROGRAM REPORT, 1974
The adaptation of various technological innovations from the NASA space program to industrial and domestic applications is summarized.
Misc-Original Contains Color Illustrations.

Carlson, O Dosa, L Leavitt, W
National Aeronautics and Space Administration NASA-SP-5120, 1975, 96 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
N75-16409/5ST, DOTL NTIS

26 093543
RAILROAD RESEARCH BULLETIN, AUTUMN 1975. VOLUME 2, NUMBER 2
The publication contains 1,106 abstracts of journal articles and research reports selected by RRIS from current railroad literature, 93 descriptions of computer programs, and 404 summaries of ongoing research activities in the railroad field. This material covers the entire range of railroading from technology to operations, management, economics and government involvement. Literature sources are worldwide. The material is arranged according to the RRIS classification scheme in two separate sections, one for journal and report abstracts and computer program descriptions, and one for ongoing project summaries. The book also contains subject term, author, and source indexes. It supplements the material contained in the five prior Railroad Research Bulletins which should be retained for a complele file of RRIS data.
See also PB-242 353. Also pub. as ISSN-0097-0042.

National Research Council, Federal Railroad Administration Bibliog. RRIS-7502, FRA/ORD-76-26, 1975, 327p

Contract DOT-OS-40022

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-246648/0ST, DOTL/NTIS

26 094198
TRAVEL HABITS AND PATTERNS. VOLUME 1. 1964-1973 (A BIBLIOGRAPHY WITH ABSTRACTS)
Travel habits and patterns in the U.S. are cited in this bibliography of Federally-funded research. The majority of the studies cover urban transportation including carpools, subways, buses, dial-a-ride, and private automobiles. Disadvantaged, disabled, student, and various age groups are discussed as are recreational data. Some aircraft and rail studies are included. (Contains 83 abstracts)
See also NTIS/PS-76/0026.

Adams, GH
National Technical Information Service Report Jan. 1976, 88 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
NTIS/PS-76/0026/7ST, DOTL NTIS

26 094495
RAILROAD RESEARCH BULLETIN, CUMULATIVE SUBJECT INDEX, 1973-1975
This Index marks completion of the developmental phase of the Railroad Research Information Service. It lists alphabetically all the subject terms which have been utilized in the indexing of journal articles, reports and computer programs for which abstracts and descriptions have been entered in the RRIS magnetic tape file and reproduced in the six issues of the Railroad Research Bulletin and RRIS Special Bibliography published between 1973 and 1975. Listed alphabetically under each subject term are the titles of the pertinent journal articles, reports and/or computer programs, followed by a guide to make it possible to locate the abstract and bibliographic data in a specific RRIS publication. The publications covered by this index are the following, all available from National Technical Information Service: RRIS Special Bibliography, March 1973, PB-220 220; Railroad Research Bulletin 7301, Autumn 1973, PB-226 784; Railroad Research Bulletin 7401, Spring 1974, PB-233 880; Railroad Research Bulletin 7402, Autumn 1974, PB-241 042; Railroad Research Bulletin 7501, Spring 1975, PB-242 353: Railroad Research Bulletin 7502, Autumn 1975, PB-246 648.
See also PB-246 648. Also pub. as ISSN-0097-0042.

National Research Council, National Academy of Sciences-Natl Research Council, Federal Railroad Administration Bibliog. RRIS-75CI, FRA/ORD/D-76-134, Jan. 1976, 684 pp

Contract DOT-OS-40022

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB-249716/2ST, DOTL NTIS

26 126118
DESIGN CONCEPTS FOR A NATIONAL NETWORK OF TRANSPORTATION RESEARCH INFORMATION SERVICES (TRISNET)
This third report of the TRIS Committee updates and extends many of the concepts and recommendations for TRISNET that have been presented in previous reports. Concepts for TRISNET development and operation are presented in terms of four network components. The abstracting and indexing service component acquires and produces references on transportation research projects, documents, data, and other forms of information. References are collected, organized and stored by a second component that provides on-line retrieval and document ordering services for users. A document delivery service component responds to requests for documents whose references appear in the TRIS-ON-LINE data base. The fourth TRISNET component is a communications and coordination center whose elements are a TRISNET Advisory Committee, a TRISNET Managers Council, and a TRISNET Secretariat. These respective elements provide advice and guidance for network operations, definition and procedures for cooperative tasks, and a focal point for communications among TRISNET elements and communications with the user community.

Transportation Research Board, Department of Transportation Final Rpt. DOT-TST-76-30, July 1975, 86 pp

Contract DOT-OS-40022/9

ACKNOWLEDGMENT: DOT, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245311/6ST, DOTL NTIS

26 131226
BIBLIOGRAPHY OF ARTICLES ON TRANSPORTATION ECONOMICS AND MANAGEMENT AND BUSINESS LOGISTICS IN BOOKS OF READINGS AND PROCEEDINGS 1960-1975
No Abstract.

Wisconsin University, Madison
ACKNOWLEDGMENT: Wisconsin University, Madison
PURCHASE FROM: Wisconsin University, Madison Center for Transportation Research, Madison, Wisconsin, 53706 Repr. PC

26 132953
TRANSPORT ECONOMICS-OUTLINE OF A BIBLIOGRAPHY
[Economie des transports. Esquisse d'une bibliographie]
No Abstract. [French]

Baumgartner, JP
International Union of Railways Aug. 1975, 60 pp, 730 Ref.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France
UIC No. 01N45

26 133433
SUMMARY OF NATIONAL TRANSPORTATION STATISTICS
The report is a compendium of selected national-level transportation statistics. Included are cost, inventory, and performance data describing the passenger and cargo operations of the following modes: air carrier, general aviation, automobile, bus, truck, local transit, rail, water, and oil pipeline. The report includes basic descriptors of U.S. transportation, such as operating revenues and expenses, number of vehicles and employees, vehicle-miles and passenger miles, etc. As its name implies, the report is a summary of a larger data base, consisting of time-series collected from a variety of government and private statistical handbooks. In this edition, the selected data cover the period 1963 through 1973.
See also report dated Jun 74, AD-A001 017.

Gay, WF
Transportation Systems Center, Office of Policy, Plans and International Affairs Final Rpt. DOT-TSC-OST-75-18, June 1975, 137p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
PB -252410.6ST, DOTL NTIS

26 134543
GENERAL DICTIONARY OF RAILWAY TERMS (THIRD EDITION)
The third edition of the General Dictionary of Railway Terms with a preface by W. Pycha, includes 12,000 terms of expressions that are not only in the railway context but also concern general techniques. This edition, like the earlier ones, has been prepared by the UIC Documentation Bureau with the help of representatives from BR, CFF, DB, DR, FS, NS, ENFE, SNCB, SNCF. The volume has two parts: the first is in tabular form giving the terms in the 6 languages of the Dictionary followed by an alphabetical list of the abbreviations or initials of international bodies and documents connected with railways, the names of which are mentioned in the tables. The second part is made up of alphabetical lists of each of the five languages other than French. The dictionary has been printed for the first time by electronic data processing, using optical ready and photocomposition techniques; it is a useful aid to all those who have to read or write texts dealing with railway technology in an unfamilar language. Not only does this dictionary facilitate the mutual exchange of information on new technical developments, but it also helps to promote better understanding between technicians responsible for solving international transport problems.
Printed in French, German, English, Italian, Spanish, Dutch.

International Union of Railways, BD 1975, 1602 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: Malsch and Vogel Gmbh Stuttgarter Strasse 57c, Karlsruhe, West Germany

26 134601
TERMINOLOGY FOR THE AUTOMATIC COUPLER SYSTEM FOR RAIL VEHICLES. WORKING DOCUMENT
No Abstract.

Organization for the Collaboration of Railways July 1975, Figs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France
DOTL RP

26 136774
INTERCITY TRAVEL DATA SEARCH
Intercity Travel Data Search is an annotated bibliography on U.S. domestic intercity passenger travel by the four major modes of air, auto, bus and rail. The bibliography is concentrated on three subject areas: (1) survey data on point-to-point intercity passenger volumes; (2) survey data on the socioeconomic, attitudinal and trip behavior characteristics of intercity travelers, and (3) demand models for predicting point-to-point intercity travel. The bibliography totals 422 items, almost all published after 1964. Approximately 100 of these are in the first two subject areas and the remaining 300 are in the third subject area. Foreign publications are included in this bibliography, which also contains author and geographic indexes of the 422 items. (Author)

Roy, M Rock, S
Northwestern University, Evanston Final Rpt. DOT-OST-TPI-76-01, July 1975, LL pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
AD-A025150/4ST, DOTL NTIS

26 138085
RAILROAD MANAGEMENT AND PLANNING. VOLUME 2, 1974-1976 (A BIBLIOGRAPHY WITH ABSTRACTS)
Studies are presented of Government and regional planning concerning costs, terminals, intermodal systems, comparisons, safety, community relations, environmental impacts, railway abandonment, and high speed systems. Other discussions include noise control, commuter services, demand characteristics, and transportation models. (This updated bibliography contains 86 abstracts, all of which are new entries to the previous edition.) See also NTIS/PS076/0169, Railroad Freight Transportation.
Supersedes NTIS/PS-75/321

National Technical Information Service Mar. 1976, 86 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS
DOTL RP

Ongoing Research Summaries

00 038648

DEVELOPMENT AND TESTING OF NEW TUNNEL SUPPORTS

The objective is to make the construction of transportation tunnels faster, safer and less costly. Improvement in the design and construction of the opening is approached in two ways: measurements are being made on tunnels in Washington, D.C. during and after construction to determine how ground movements are related to construction procedure and geology; and finite element analyses are performed that will allow the simulation of realistic ground conditions with time dependent behavior and the sequence of excavation and support. The analysis can be tested with the field measurements and used to predict behavior of tunnels with different ground conditions and excavation and support sequences. Tests are being performed and analysis techniques developed relevant to the structural behavior of cast-in-place and segmented concrete tunnel liners subjected to various simulated ground loadings. Part of the effort on cast-in-place liners concerns the structural behavior and material development for an extruded liner system. This liner would be placed directly behind the excavation and serve both primary and secondary support functions. It would use rapid-set cement concrete and fiber reinforcement.

REFERENCES:

Research to Improve Tunnel Support Systems Paul, S; Kesler, C; Gaybrd, E; Mohraz, B; Hendron, A;, University of Illinois at Urbana-Champaign, FRA-ORDD-74-51, June 1974

Concrete for Tunnel Liners; Behavior of Steel Reinforced Concrete Under Combined Loads, Herring, KS; Kesler, CE, University of Illinois at Urbana-Chamgaign, FRA-ORDD-75-7, Aug. 1974

Concrete for Tunnel Liners: Evaluation of Fiber Reinforced Quick Setting Cement Concrete, Halvorsen, GI; Kesler, CE;, University of Illinois at Urbana-Champaign, FRA-ORDD-75-3, Aug. 1974

Tunnel Design Considerations: Analysis of Medium-Support Interaction, Ghaboussi, J; Ranken, R, University of Illinois at Urbana-Champaign, FRA-ORDD-75-24, Nov. 1974

Concrete for Tunnel Liners: Behavior of Fiber Reinforced Quick Setting Cement Concrete, 75-87, Aug. 1975

Concrete for Tunnel Liners: Pumpable Fiber Reinforced Concrete, 75-88, Aug. 1975

Concrete for Tunnel Liners: Mix Design Recommendations for Prototype Extruded Liner System, 75-89, Aug. 1975

PERFORMING AGENCY: Illinois University, Urbana, Board of Trustees
INVESTIGATOR: Cording, EJ (Tel (217)333-3823) Hendron, AJ (Tel (217)333-3823) Kesler, CE (Tel (217)333-3823)
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Lucke, WN (Tel 202-4260808)

Contract DOT-FR-30022
STATUS: Active NOTICE DATE: Jan. 1976 START DATE: Jan. 1973 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $400,000

ACKNOWLEDGMENT: TRAIS (PR# 73-65), Illinois University, Urbana

00 045960

TUNNEL LINING

The contractor shall perform and report on the following: Task 1. The prior work of the Principal Investigator shall be specialized for the specific case of the tunnel lining of circular cross-section. Task 2. The prior work of the Principal Investigator shall be extended to include the case of the tunnel lining of horseshoe shaped cross section. Task 3. The system of a linkage of prefabricated structural elements forming a tunnel lining shall be studied. Task 4. An in-situ test of a tunnel structure under construction shall be conducted.

PERFORMING AGENCY: California State University, Sacramento
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-426-9638)

Contract DOT-OS-40016 (CS)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1974 COMPLETION DATE: Mar. 1977 TOTAL FUNDS: $76,698

ACKNOWLEDGMENT: TRAIS (PR# PUR-2-40569)

00 046488

NATIONAL INFORMATION SERVICE FOR EARTHQUAKE ENGINEERING

It is the purpose of this center to collect and organize all the research information currently available on earthquake engineering and related areas. This will provide the first opportunity to collect, and assess information from many different sources and at the same time be a single source for researchers in the field to obtain information from a comprehensive collection. This will be geared to meet the needs of both academic researchers and design engineers. The library will consist of reports (both published and unpublished), site visit records, data collected from various seismic regions, an abstracting service and potentially as a basis for a technical journal directed to the needs of earthquake engineers.

This grant is the fourth year support for GI-28098X. It is a companion to Grant GK-28349X to University of California at Berkeley.

PERFORMING AGENCY: California Institute of Technology, Division of Engineering and Applied Science
INVESTIGATOR: Hudson, DE
SPONSORING AGENCY: National Science Foundation, Division of Advanced Environmental Research and Technology, GI-28098X3

Grant GI-28098X
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1973 COMPLETION DATE: Mar. 1977

ACKNOWLEDGMENT: Science Information Exchange (GSE 3202 2)

00 047346

UTILIZATION OF SIMULATION MODEL FOR ANALYSIS OF TUNNEL CONSTRUCTION

This project provides for the utilization of the Tunnel Cost Model in collaboration with various sectors of the tunnel industry. Four industry sectors have been identified for this project: contractors, estimators, owners, and engineers. At least one participating firm or agency from each of these sectors is included in the project. Objectives of the program are to demonstrate and enhance the model's applicability to each of these sectors, using as case studies hard rock tunnel projects currently active and of interest to one or more of the participants. Direct industry participation in the program will continue the expertise of consulting geologists, cost estimators, project managers, and tunnel supervisors to the design of the case studies and the interpretation of results.

REFERENCES:

Tunnel Cost Estimating Under Conditions of Uncertainty Wyatt, RD, R75-13, June 1974, PB-242428/1ST

The Probalistic Estimation of Construction Performance in Hard Rock Tunnels, Minnott, CH, R74-47, Sept. 1974, PB-242427/3ST
Tunnel Cost Model: Professional Papers 1974 Moavenzadeh, F, R74-4, May 1974, PB-243253/2ST
Tunnel Cost Model: A Stochastic Simulation Model of Hard Rock Tunneling. Volume 1. Summary Report, Moavenzadeh, F, R74-22, May 1974, PB-243252/4ST

PERFORMING AGENCY: Massachusetts Institute of Technology, Department of Civil Engineering
INVESTIGATOR: Moavenzadeh, F
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, GI-34029A1

STATUS: Active NOTICE DATE: July 1976 START DATE: May 1974 TOTAL FUNDS: $235,400

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 219 2)

00 048898
MUCK UTILIZATION IN THE URBAN TRANSPORTATION TUNNELING PROCESS
The objective of this contract is to assess the problem of muck disposal as it emanates from urban transportation tunneling process. An assessment was completed based on case histories of materials handling and muck utilization, possible uses of muck, interactions with subsurface investigations and muck properties. A draft handbook of guidelines was prepared and is being implemented in order to develop a muck utilization plan for the Mass Transit Administration (MTA) of Baltimore, Md. A final technical report and guidelines will be printed at the end of the contract.

PERFORMING AGENCY: Haley & Aldrich, Incorporated
INVESTIGATOR: Liu, TK (Tel 617-4926460)
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Saulnier, G (Tel 617-4942092)

Contract DOT-TSC-836
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $186,203

ACKNOWLEDGMENT: TRAIS (PR# TM-0013), TSC

00 048930
STUDY OF FEASIBILITY OF LOCATING UTILITIES IN TRANSPORTATION TUNNELS
The objective of this project is to accomplish the following items of work: Investigate the various types of utility lines, such as main trunk, feeder, & branch lines present in urban utility networks & define the most probable sets that would be applicable for inclusion with a cut-and-cover transportation tunnel & to assess the relative technical and economic feasibility of the designs developed in Item 1. The institutional factors involved in determining the acceptance or rejection of the concept of providing for utilities in cut-and-cover transportation tunnels will be examined. A detailed analysis shall be made of the economic, technical and institutional factors involved with integrating utilities with a specific cut-and-cover tunnel.
REFERENCES:
Combined Utility/Transportation Tunnel Systems - Economic, Technical and Institutional Feasibility, Huck, PJ; Iyengar, MN; Makeig, KS; Chipps, J, Dec. 1975

PERFORMING AGENCY: IIT Research Institute
INVESTIGATOR:
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Larson, G (Tel (617)494-2300)

Contract DOT-TSC-794 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Oct. 1976 TOTAL FUNDS: $113,996

ACKNOWLEDGMENT: TRAIS, IIT Research Institute (PR# TMP-0151-ES), TSC

00 058302
IMPROVEMENT OF PROBLEM TRACK SUBSOIL BY THE LIME SLURRY PRESSURE INJECTION METHOD
The ability of the Lime Slurry Pressure Injection (LSPI) stabilization technique to improve in-place railroad subgrades shall be examined. This study shall be directed toward developing the information requisite for field utilization of the promising LSPI stabilization technique. Emphasis shall be placed on verifying the concepts and premises on which the technique has been founded including delineation of those track and soil conditions under which LSPI is most effective. The study shall incorporate an evaluation of the present and past field performance of this track design criteria. Concurrent studies with regard to economic effectiveness and environmental impact shall be conducted to help provide a better guideline for future utilization.
REFERENCES:
Proceedings of Roadbed Stabilization Lime Injection Conference, Blacklock, JR, Nov. 1975, PB-251681

PERFORMING AGENCY: Arkansas University, Little Rock, Graduate Institute of Technology
INVESTIGATOR: Blacklock, JR (Tel 501-375-7247)
SPONSORING AGENCY: Department of Transportation
RESPONSIBLE INDIVIDUAL: McCafferty, RM (Tel 202-426-4377)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Aug. 1974 COMPLETION DATE: Mar. 1977

ACKNOWLEDGMENT: FRA

00 058332
PREFABRICATED STRUCTURAL MEMBERS FOR CUT-AND-COVER TUNNELS
Accomplishments will include: 1) Innovative concepts for highway tunnels to be built in urban areas by cut-and-cover methods using prefabricated structural members. 2) Design requirements and recommendations concerning steps necessary to cope with environmental constraints for construction of cut-and-cover tunnels in urban areas using prefabricated structural members. 3) A summary of the engineering characteristics of the most promising materials, including composites, for use in prefabricated structural members and in their assembly on the construction site.

PERFORMING AGENCY: Consulting Engineers Group Incorporated
INVESTIGATOR: Martin, LD
SPONSORING AGENCY: Federal Highway Administration
RESPONSIBLE INDIVIDUAL: Sallberg

Contract DOT-FH-11-8594 (CPFF)
STATUS: Active NOTICE DATE: Mar. 1975 START DATE: Jan. 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: $91,920

ACKNOWLEDGMENT: TRAIS (41-10-0025), Federal Highway Administration (049305353)

00 058353
HYDRAULIC TRANSPORTATION AND SOLIDS SEPARATION OF EVACUATED MATERIALS IN TUNNELS
Investigation of techniques and costs of hydraulic tunneling and transport of sand rock muck and in particular St. Peter Sandstone, which underlies much of the Minneapolis area. Investigations will be made of techniques for slurry/water separation by mechanical and/or chemical means. The purpose is to greatly minimize or eliminate the need for large settling ponds and to meet environmental requirements where open loop systems are used.
REFERENCES:
Hydraulic Transportation and Solids Separation of Excavated Materials in Tunnels, Nelson, CR; Yardley, DH, Apr. 1974

PERFORMING AGENCY: Minnesota University, Department of Civil and Mineral Engineering
INVESTIGATOR: Nelson, CR Yardley, D Hopstock, D Christenser, L Stefan, H
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK

Contract DOT-OS-40087 (CS)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Mar. 1974 COMPLETION DATE: Mar. 1977 TOTAL FUNDS: $70,602

ACKNOWLEDGMENT: TRAIS (PUR-1-40075), Minnesota University, Minneapolis

00 058360
HYDRAULIC WATER JET ASSISTED TUNNEL BORING
The effectiveness of jet assisted tunneling will be assessed after laboratory testing. A boring machine will be designed and an economic evaluation made.

PERFORMING AGENCY: Colorado School of Mines
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Doyle, J

Contract DOT-OS-40102 (CS)
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1974 COMPLETION DATE: Apr. 1976 TOTAL FUNDS: $100,000

ACKNOWLEDGMENT: Office of Systems Development and Technology

00 058433
PARTICIPATION IN DOT TUNNELING RESEARCH PROGRAM
No Abstract.

PERFORMING AGENCY: Federal Highway Administration
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

ID AS-50062
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Apr. 1975

ACKNOWLEDGMENT: Office of Systems Development and Technology

00 058434
COST/BENEFIT ANALYSIS OF THE ELEMENTS OF THE DOT TUNNELING R AND D PROGRAM
No Abstract.

PERFORMING AGENCY: Federal Railroad Administration, Department of Transportation
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

ID DOT-AS-50063
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Apr. 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $35,000

ACKNOWLEDGMENT: TRAIS

00 058435
REVIEW OF THE DEPARTMENT OF TRANSPORTATION TUNNELING RESEARCH AND DEVELOPMENT PROGRAM
No Abstract.

PERFORMING AGENCY: Federal Highway Administration, Department of Transportation
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

ID AS-50060
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Apr. 1975

ACKNOWLEDGMENT: TRAIS

00 058470
ASSESSMENT OF DISRUPTIVE EFFECTS ASSOCIATED WITH URBAN TRANSPORTATION TUNNEL CONSTRUCTION
Effects of constructing both bored and cut and cover tunnels was considered. Effects from bored tunnels center on the impact of the construction of access shafts and cut and cover stations. The extent of the impact will depend on the spacing and the location of these relative to community services. Effects from cut and cover stations tend to follow a surface route within the urban area. Disruptive effects, therefore, may tend to be more concentrated in the former, but distributed in the latter. For each disruptive effect identified the currently used method(s) of measurement for determing that impact was identified. A preliminary approach to predicting and assessing the degree of each disruptive impact was developed. The study was expanded to collect real data and assess the completeness and validity of the approach developed for an ongoing rapid transit tunnel construction.
Final Report: Phase A-No. UMTA-MA-06-0025-76-5, June 1976.

PERFORMING AGENCY: ABT Associates, Incorporated
INVESTIGATOR: Wolff, P (Tel (617)492-7100)
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, UM-504
RESPONSIBLE INDIVIDUAL: Saulnier, G (Tel (617)494-2092)

Contract DOT-TSC-1018
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1975 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $110,320

ACKNOWLEDGMENT: TRAIS

00 058496
TESTS OF CONCRETE TUNNEL LINER SEGMENT EDGE SEALANT
Tasks include: 1-Evaluate the effect of compressive stress levels of 300, 600, and 1200 lb in (sq.) on the sealant to determine if satisfactory fusion can be achieved and the tensile strength and extensibility of the fusion obtained. 2-Evaluate the deformation of the sealant at the various compressive stress levels and the effect of lateral flow of the sealant on this liner. 3-Determine the hydrostatic pressure resistance of the sealant, particularly the effectiveness of the sealant fusion at the junction of four liner segments.

PERFORMING AGENCY: Bureau of Reclamation
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)
IA DOT-AS-50061
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: May 1975

ACKNOWLEDGMENT: TRAIS

00 058646
ANALYSIS OF BRIDGE COLLISION INCIDENTS
The objective is to establish trends and accident factors. Approximately 300 cases will be selected by the Coast Guard for the study.

PERFORMING AGENCY: Operations Research, Incorporated
SPONSORING AGENCY: United States Coast Guard, Department of Transportation
RESPONSIBLE INDIVIDUAL: Olson, LJ (Tel 202-4261058)

Contract DOT-CG-31,446-A/18
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: $24,940

ACKNOWLEDGMENT: TRAIS

00 058679
URBAN TRANSPORTATION TUNNELING FORECAST
A primary objective of this analysis is to investigate the future transportation requirements of U.S. urbanized areas and to determine probabilistic estimates on the levels of tunneled transportation construction that may occur in these areas during the next two decades. Although the analysis will concentrate on the new construction requirements for urban passenger transportation systems, an examination of future tunneling requirements for urban goods movement will also be conducted to place the demand for urban transportation tunneling in perspective. As a result of this analysis, improved information on future extents and associated costs of tunneling construction that may be expected to occur in the U.S. during the next two decades will be developed.

PERFORMING AGENCY: Systan, Incorporated
SPONSORING AGENCY: Transportation Systems Center, OS-552

Contract DOT-TSC-1075 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: $149,022

ACKNOWLEDGMENT: TRAIS (OS-552)

00 058689
ECONOMICS OF THE TUNNELING INDUSTRY
Objectives are: 1. Indicate the size of the industry and recent trends in aggregate supply and demand for tunneling services. 2. Identify the functions performed in the industry by following a typical project through the planning, design, contract, and construction stages. Identify the types of firms in the industry and which functions they perform. 3. Determine the size of these firms, the importance of tunneling to their overall operations, the degree of concentration in the industry and their organizational status. 4. Determine the professional positions existing in each type of firm, and the skills required. Identify the supply of such professionals and numbers. 5. Describe the current status of the markets for personnel and capital funds.

PERFORMING AGENCY: Cresheim Company
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, OS-552

Contract DOT-TSC-1091 (CPFF)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: $96,786

ACKNOWLEDGMENT: TRAIS

00 058755
STAND-UP TIME OF TUNNELS IN SQUEEZING GROUND
Objectives are to develop a fundamental understanding of the relationship between the size of an advancing tunnel face and the stand-up time in squeezing ground, as well as to develop a stand-up time predictive capability. The first phase will include: 1. Describe and identify case histories where stand-up time problems have been encountered. 2. Develop a set of properly scaled physical model materials. 3. Perform three-dimensional physical model tests. 4. Identify material properties to be used in predicting ground behavior. 5. Identify to what extent numerical methods can be used to model ground behavior.

PERFORMING AGENCY: California University, Berkeley, Department of Civil Engineering
INVESTIGATOR: Brekke, TL
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

Contract DOT-OS-50108 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: May 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: $80,451

ACKNOWLEDGMENT: TRAIS, OST

00 058758
DEVELOPMENT OF RATIONAL DESIGN METHODOLOGY FOR SOFT GROUND GROUTED TUNNELS
This research is for development and experiments to determine a rational basis for the design of grouted tunnels. Objectives are: 1. Perform field grouting trials using several different grouts, in varying soil conditions, to determine the degree to which the grout spreads, field strengths of the grouted soil, and aging effects of grouted soils. 2. Perform laboratory tests of soils grouted in the field trials to identify the soils, establish stress strain properties and strength, and determine permeabilities. 3. Develop a finite element program to analyze movements and stresses around grouted tunnels. 4. Apply the finite element analysis to a field case history.

PERFORMING AGENCY: Stanford University, Department of Civil Engineering
INVESTIGATOR: Clough, GW
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

Contract DOT-OS-50123 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $64,738

ACKNOWLEDGMENT: TRAIS, OST

00 082170
INSTRUMENTATION OF TUNNELS AND BRACED EXCAVATIONS OF THE WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
Measurements of ground movements and lining behavior have been made during construction of tunnels in rock and soil, large underground rock chambers, and braced excavations in Washington, D.C. Results are being used to monitor construction, and improve design of tunnels and braced excavations. Results have been analyzed and compared with analytical studies and other case histories.

PERFORMING AGENCY: Illinois University, Urbana, Department of Civil Engineering
INVESTIGATOR: Cording, EJ Hansmire, WH O'Rourke, TD Mahar, JW Jones, RA
SPONSORING AGENCY: Washington Metropolitan Area Transit Authority

Contract IZ6002
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: Mar. 1970 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: $500,000

ACKNOWLEDGMENT: Illinois University, Urbana, Smithsonian Science Information Exchange (BJ 51, AN 9233)

00 082313
PRETHAWING PERMAFROST AND CONSOLIDATION IN PREPARATION FOR CONSTRUCTION
The aim of this study is to develop efficient and economical methods of prethawing permafrost, and establish criteria for preconsolidation and stabilization of such soils to achieve range of bearing capacities applicable to roads, airfields, pipelines and foundations, including dams and bridges. Literature and data from related research will be reviewed and analyzed. Theoretical and laboratory studies will be conducted to optimize methods of pre-thawing, facilitate heat transfer, remove excess pore pressure and consolidate the soils. Field and laboratory studies will be conducted on stabilization, shear strength and bearing capacity of thawed soils, with and without surcharge loadings, and treatment with chemical and cement grouts.

PERFORMING AGENCY: Cold Regions Research and Engineering Laboratory, Department of the Army, AT06-04-002
INVESTIGATOR: Crory, FE
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army, DA0J8151

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1974 COMPLETION DATE: June 1978 TOTAL FUNDS: $195,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA108151)

00 082531
PILE DRIVING
Foundation piles have been driven into the ground for many years by an impact process. The impact can be produced by simply dropping a weight on top of the pile or by using more sophisticated hammers driven by steam, or by internal combustion. The characteristics of these devices vary greatly. Also, the frequency, or the number of blows delivered to the pile per minute varies. To protect the top end of the pile from excessive damage as a result of the blows delivered to it, some sort of cushion is usually provided. The characteristics of this cushion influence the speed and efficiency of the driving. The weight of the hammer and the number of blows per unit of time also influence the efficiency of the driving. It seems reasonable to expect that for a given type of pile and a given set of soil conditions, there must be some optimum combination of driver characteristics which would result in the most rapid placement of the pile. In view of the hourly cost involved in modern pile driving, "most rapid placement" is essentially synonymous with "most economical". A sophisticated computer program has been obtained for solving the wave equation by which the pile driving action is analyzed. When a suitable model of the pile-soil system has been developed, it will be used in connection with the computer program to determine the optimum combination of all the controllable factors involved, for the most economical placement of the pile. It is expected that eventually it will be possible, when the characteristics of the soil at a site where piles are to be driven are known, to predict in advance of the actual driving the equipment that will be needed for most efficient placement of the piling.

PERFORMING AGENCY: Texas University, Austin, Department of Aerospace Engineering & Mechanical Engineering
INVESTIGATOR: Ripperger, EA James, R
SPONSORING AGENCY: Texas University, Austin

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1973

ACKNOWLEDGMENT: Science Information Exchange (NTX 316)

00 100810
RESEARCH IN LONG HOLE EXPLORATORY DRILLING FOR RAPID EXCAVATION UNDERGROUND
Abstract: the goal of the proposed research is to provide the optimum drilling system or systems for exploration drilling well in advance of underground excavation projects. This system will be adaptable to different geological and hydrological conditions. The method will be adaptable to both drill and blast and mechanical boring methods of driving tunnels, with a greater emphasis on the latter method. Ideally, this drilling system will probe ahead four or five days and provide little or no interference to the excavation process. The principal objective will be to retrieve a meaningful sample, preferably an undisturbed core. An exploration drill will be designed which is capable of determining geological conditions and rock properties in advance of mechanical tunnel boring machines. A prototype drill will be fabricated and field tested. Capabilities of this drill include: operating in conjunction with mechanical tunneling machines with little or no interference; assembly, disassembly, and operation in a tunnel; ability to recover solid core samples; instrumentation to continuously monitor torque, rpm, and penetration rate; and lead the tunneling operation in hard rock by several days.

PERFORMING AGENCY: Jacobs Associates
INVESTIGATOR: Williamson, TN
SPONSORING AGENCY: Department of Defense, Advanced Research Projects Agency, DD220127 H0220020

Contract
STATUS: Active NOTICE DATE: Dec. 1975 START DATE: July 1974 TOTAL FUNDS: $68,858

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GQQ220127 3)

00 109558
ACCELERATED CURING TEST FOR LIME AND LIME-FLYASH STABILIZED SOILS
The purpose of this project is to develop an accelerated curing test procedure to determine the most advantageous lime and lime-flyash percentages and the stabilization susceptibility of troublesome soils. Guidelines concerning performance and durability aspects of these stabilized materials will be evaluated. Existing published information concerning methods for rapidly determining optimum lime and lime-flyash stabilization percentages of soils will be collected, reviewed, and analyzed. A laboratory testing program will be conducted to evaluate the effects of time, temperature, and PH on the developed strengths of various soil-lime mixtures. /SIE/

PERFORMING AGENCY: Waterways Experiment Station, Army Crops of Engineers
INVESTIGATOR: Townsend, FC Gilbert, PA
SPONSORING AGENCY: Waterways Experiment Station, Army Crops of Engineers, DA05F8182

STATUS: Active NOTICE DATE: Sept. 1975

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA 681821)

00 110036
STABILIZATION OF STEEP LAND SLOPES
Field studies are being conducted to develop practical and economical measures and methods to reduce or to stabilize potential or existing landslides in southeastern Ohio. Detailed field measurements are being made at selected sites on the Eastern Ohio Resource Development Center. Proposed solutions will be developed primarily from laboratory and analytical models. Soil, Topographic, and other features will be related to control measures. Basic information for extending recommendations to similar areas will be developed by coordinating the results with those from state project 401. /CRIS/

PERFORMING AGENCY: Ohio State University, OHO00410-S; Ohio Agricultural Research and Development Center, Department of Agricultural Engineering
INVESTIGATOR: Schwab, GO
SPONSORING AGENCY: Department of Agriculture; Ohio Agricultural Research and Development Center

STATUS: Active NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: Ohio State University, Ohio Agricultural Research and Development Center, Smithsonian Science Information Exchange (G1 106706)

00 110103
AN INVESTIGATION OF THE INTERACTION OF ROCK AND TYPES OF ROCK BOLTS FOR SELECTED LOADING CONDITIONS.
The effectiveness of conventional and grouted rock bolts in resisting lateral displacement and axial separation along fracture planes is being investigated. Blocks of rock, each containing a fracture surface and a rock bolt inclined at some angle to the fracture, are being loaded in shear while the normal force on the plane is held constant. Pull-out creep tests are also being performed on resin-grouted reinforcing bars. Concurrent with the experimental phase, a finite element analysis of a bolted mine roof is being performed so that the support mechanisms of grouted bolts can be determined so that support-design principles can be improved.

PERFORMING AGENCY: Missouri University, Rolla
INVESTIGATOR: Stears, JH
SPONSORING AGENCY: Bureau of Mines

STATUS: Active NOTICE DATE: Dec. 1975

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GUG 59 1)

00 110156
ADHESION IN ROCKS
An attempt is made to study and explain the mechanism of adhesion or cohesion at zones of weakness inside rocks. These forces operate at interfaces and indicate a relationship between fracture and the physical chemistry of surfaces. Initial efforts include an intensive review of pertinent literature including that relating to binding concrete and commercial adhesives and the study of grain boundaries in ceramics and metals which may also apply to rocks. The strength of adhesion at grain boundaries will be studied to determine if mechanical interlocking is the predominant mode of intragranular binding in igneous rocks. Variations in hardness at grain boundaries and cleavage planes will be determined and compared with similar measurements away from these areas. The relationship of grain size to the mechanical strength of a rock will be investigated by use of compression and tensile strength tests.

PERFORMING AGENCY: Bureau of Mines, Department of the Interior
INVESTIGATOR: Savanick, GA
SPONSORING AGENCY: Department of Defense, Advanced Research Projects Agency, DD220089

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1972

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GTP 31 1)

00 111514
STRENGTH OF REPAIRED REINFORCED CONCRETE STRUCTURAL MEMBERS
This research project will investigate the properties of repaired reinforced concrete structural members. A series of structural members that have been severly damaged in earlier experimental investigations will be repaired using methods and materials considered to be the best available in the current state of the art. These members will then be retested to ascertain the effectiveness of the repair in restoring the original properties. The project will be accomplished in four steps: A study of information about available materials and techniques for repair; retesting of present specimens to obtain a

comparison of load- displacement properties and degradation properties with those of the virgin specimens; testing of a new series of original, repaired and retested similar members; testing of a new column series. /SIE/

PERFORMING AGENCY: Michigan University, Ann Arbor, Department of Civil Engineering
INVESTIGATOR: Hanson, RD
SPONSORING AGENCY: National Science Foundation, Division of Engineering

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Mar. 1976 TOTAL FUNDS: $43,700

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 6251)

00 115950
A COMPREHENSIVE PROGRAM ON ROCK PROPERTIES, TUNNELING AND EXCAVATION TECHNOLOGY AND NUCLEAR BLAST EFFECTS ON EARTH MEDIA
Fifth-year funding of continuation grant GI-34608x1 The goal is to establish a data center on properties of geological substances of interest to the geosciences in a manner useful for applications and research concerned with the use of underground space. The data center will be within the Thermophysical Properties Research Center. Data tables will be compiled, using published literature and reports, on thermal, mechanical, magnetic and electrical properties of geologic materials. Periodic data tables will also be produced on unconventional methods of tunneling and underground excavation technology as well as complete information on the methods, equipment, rates and costs for excavation of tunnels and underground openings. A minimal effort will be maintained in collecting data on blast effects on soils and rocks. One product will be an annotated bibliography of publications related directly to underground excavations in soil and rock.

PERFORMING AGENCY: Purdue University, School of Civil Engineering
INVESTIGATOR: Touloukian, YS
SPONSORING AGENCY: National Science Foundation, Division of Advanced Technology Applications, GI-34608X2; Department of Transportation
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1976 COMPLETION DATE: 1978 TOTAL FUNDS: $62,800

ACKNOWLEDGMENT: National Science Foundation

00 129708
TRANSPORTATION TUNNELING PROGRAM
DOT's Transportation Tunneling Program is designed to develop and demonstrate advanced techniques for constructing transportation tunnels, reduce costs by at least 30 percent and increase construction rates by 100 to 200 percent by the 1980's, and to minimize the environmental impact of tunnels. The program continues a comprehensive, coordinated investigation of new tunneling technology carried out through several groups at DOT including TST, FRA, UMTA, and FHWA. Areas of research activity within the modal administrations include site investigation, ground movement prediction and control, cut and cover tunneling technology, novel excavation techniques (laser, water cannon), liner innovations, urban muck disposal, and the study of industry issues and problems. In addition, each mode works on special problems which are peculiar to its needs such as traffic controls, transition lighting.
No contract yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office for Systems Development and Technology
RESPONSIBLE INDIVIDUAL: McFarland, RK

STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: FRA

00 129709
GUIDELINES FOR EXISTING SUBWAY MAINTENANCE
The objective of this contract is to assess current subway system tunnel maintenance proctices and problems and to perform an initial evaluation of new equipment, materials, and techniques that can be utilized on operational systems and to help eliminate, at the design state, those situations which have contributed to subway system deterioration and maintenance problems. Two sets of guidelines, one for subway system operators and one for designers, will result from the contract.

PERFORMING AGENCY: Bechtel Corporation
INVESTIGATOR: Birkmyer, J (Tel 415-768-1009)
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Saulnier, G (Tel (617)494-2092)

Contract DOT-TSC-1078
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $174,233

ACKNOWLEDGMENT: TSC

00 129710
ECONOMIC FACTORS IN TUNNEL CONSTRUCTION
Develop a tunnel construction cost data base and cost estimating and systems analysis thodologies founded on this base.

PERFORMING AGENCY: Singstad, Keghart, November & Hurka
INVESTIGATOR: Foster, E Toporoff, I
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Sluz, A (Tel 617-494-2019)

Contract DOT-TSC-1106
STATUS: Active NOTICE DATE: July 1976 START DATE: Dec. 1975 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $130,000

ACKNOWLEDGMENT: TSC

00 129711
THE TRANSPORTATION OF TUNNEL MUCK BY PIPELINE
This contract will advance the technology of tunnel excavation by increasing the rate of muck removal from the tunnel face. Areas of emphasis include: understanding of pneumatic solids flow, evaluation of alternate types of extensible components, and reduction at size and cost of dewatering systems.

PERFORMING AGENCY: Colorado School of Mines
INVESTIGATOR: Faddick, RR (Tel 303-279-0300 X370) Martin, JW
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Bosserman, B (Tel 617-494-2432)

Contract DOT-TSC-1114
STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1975 COMPLETION DATE: Oct. 1976 TOTAL FUNDS: $37,637

ACKNOWLEDGMENT: TSC

00 129712
TESTING PROGRAM FOR THE EXPERIMENTAL VERIFICATION OF A PNEUMATIC TRANSPORT SYSTEM FOR THE RAPID EXCAVATION OF TUNNELS
This contract provides funding for a field test program of a pneumatic muck pipeline system to test the reliability, wear and maintenance requirements, capacity, noise and dust levels, energy requirements and costs, effect of moisture content, and extensibility.

PERFORMING AGENCY: Colorado School of Mines
INVESTIGATOR: Faddick, RR (Tel 303-279-0300 x370) Martin, JW
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Bosserman, B (Tel 617-494-2432)

Contract DOT-TSC-1144
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1976 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $91,065

ACKNOWLEDGMENT: TSC

00 130495
BALLAST AND FOUNDATION MATERIALS RESEARCH PROGRAM
This research study is concerned with development of a better methodology for considering ballast and foundation soils in the overall analysis and design of a railway support structure. A theoretical analysis model is being developed which is based on finite element theory and which will be able to more realistically consider the "stress-dependent" behavior of ballast and foundation materials. A number of different types of ballast and foundation materials will be subjected to various types of laboratory testing including

repeated load triaxial testing. Laboratory test results and the theoretical analysis model will be used to identify material properties that are meaningful for evaluating potential material performance and to identify appropriate testing procedures for determining these properties. Ultimately, the research program will lead to development of rank ordering of ballast, subballast and foundation materials according to their potential in-service performance.

PERFORMING AGENCY: Illinois University, Urbana, Department of Civil Engineering
INVESTIGATOR: Robnett, QL Thompson, MR Ireland, HO Hay, WW
SPONSORING AGENCY: Association of American Railroads Technical Center

STATUS: Active NOTICE DATE: June 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BG 885)

00 130952
UNDERGROUND EXCAVATION AND ROCK PROPERTIES INFORMATION
The goal is to establish a data center on properties of geological substances of interest to the geosciences in a manner useful for applications and research concerned with the use of underground space. The data center will be within the Thermophysical Properties Research Center. Data tables will be compiled, using published literature and reports, on thermal, mechanical, magnetic and electrical properties of geologic materials. Periodic data tables will also be produced on unconventional methods of tunneling and underground excavation technology as well as complete information on the methods, equipment, rates and costs for excavation of tunnels and underground openings. A minimal effort will be maintained in collecting data on blast effects on soils and rocks.
This is a continuation of Grant No. GI-34608X2.

PERFORMING AGENCY: Purdue University, School of Engineering, Department of Mechanical Engineering
INVESTIGATOR: Touloukian, YS
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, APR75-15710
STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $31,400

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 213 3)

00 130960
EFFECTS OF TIME, TEMPERATURE, AND CONCENTRATION ON THE ENGINEERING PROPERTIES OF POZZOLANIC STABILIZED SOILS
Time, temperature, and percentage of pozzolanic stabilizer, i.e., lime and/or lime-flyash, greatly affect the stabilization response of troublesome soils. The objective of this investigation is to evaluate the effects of these variables on the stabilization response of various soils. It is anticipated that this research will permit rapid strength estimates of pozzolanic stabilized soils for mix designs and construction times. Existing published information concerning the effects of time, temperature, and percent additive on the strength of soils and current mix design procedures will be collected, reviewed, and analyzed. A laboratory program will be conducted to evaluate the effects of these variables and ph on the developed strengths of various soil-lime and soil-lime-flyash mixtures.

PERFORMING AGENCY: Waterways Experiment Station, Army Crops of Engineers
INVESTIGATOR: Townsend, FC Gilbert, PA
SPONSORING AGENCY: Waterways Experiment Station, Army Crops of Engineers, DA0F8182

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA 68182 2)

00 130961
ENGINEERING CLASSIFICATION OF COHESIONLESS SOILS
To develop correlations between engineering properties and quantitative descriptions to provide meaningful classifications of cohesionless soils. The indexes and correltions would be relatable to shear strength, compressibility, and other engineering properties. The development of the system should permit a more rapid and valid evauation of the on-site selection and utilization of these materials. A literature review of previous work will be conducted to select variables thought to exert the greatest influence on the engineering properties of cohesionless soils. A laboratory testing program would be initiated to evaluate the significance of these variables on various engineering properties-i.e., shear strength, compressibilty, and copaction. Subsequently, the data would be analyzed to provide correlations which would form the nucleus of A classification system and permit rapid estimations of the anticipated engineering properties.

PERFORMING AGENCY: Waterways Experiment Station, Army Crops of Engineers
INVESTIGATOR: Townsend, FC
SPONSORING AGENCY: Waterways Experiment Station, Army Crops of Engineers, DA0G8186

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA 78186 1)

00 130962
THEORY AND PRINCIPLES OF REINFORCED EARTH
Study the theory and principles of reinforced earth relevant to military construction and develop guidelines for the construction and develop guidelines for the construction of reinforced earth structures. Materials such as metal reinforcement and dry granular soil have been used to form reinforced earth. Previous investigations will be extended to include materials such as membrane reinforcement and cohesive soil backfill. The phenomena assoicated with soil reinforcement will be studied experimentally, both in the laboratory and in the field, and analytically.
PERFORMING AGENCY: Waterways Experiment Station, Army Crops of Engineers
INVESTIGATOR: Alhussanini, MM Perry, EB
SPONSORING AGENCY: Waterways Experiment Station, Army Crops of Engineers, DA0G8187
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA 78187 1)

00 130963
SOIL STABILIZATION
There is a need to develop and evaluate a chemical soil stabilization system for use in the expedient construction of military roads, airfields, and support areas in order to increase troop mobility and effectiveness. Such a soil stabilization system will enable the future army to achieve maximum mobility for its striking force, to lessen its logistic support load, and provide a high degree of assurance of mission accomplishment in areas with marginal or poor soils. Laboratory and field investigations will be conducted to disclose potential soil stabilization materials and to determine the capabilities of developed processes to satisfy specific strength and durability requirements established for expedient military roads and airfields in support of various operational missions. Techniques will be developed and evaluated for both liquid and nonliquid soil additives.

PERFORMING AGENCY: Waterways Experiment Station, Army Crops of Engineers
INVESTIGATOR: Eaves, RC Culpepper, MM
SPONSORING AGENCY: Waterways Experiment Station, Army Crops of Engineers, DA0K5551

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA115551 1)

00 130965
RAPID ASSESSMENT OF ROCK MASS CONDITIONS
To develop a technique for the rapid assessment of the integrity of rock slopes, tunnel rock, dam abutments, and embankments. Thermal anomalies

associated with known structural defects and their significance will be evaluated with a portable infrared scanner. Techniques for the rapid evaluation of rock mass properties (deformation, strength, stress, etc.) will be investigated. Improvements of existing tools or the development of new tools will be made as required.

PERFORMING AGENCY: Waterways Experiment Station, Army Crops of Engineers
INVESTIGATOR: Huie, JS
SPONSORING AGENCY: Waterways Experiment Station, Army Crops of Engineers, DA0M8183

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA138183 1)

00 133589
SCOUR RESEARCH
There is lack of any accepted method of predicting the depth of scour around bridge piers and abutments. The amount of scour to be expected may critically affect the design of bridge structures. The aim of this project is to observe and record magnitude of those most significant factors believed to be related to scours, such as: (A) contraction in the case of general scour or abutment scour; (B) depth of flow and mean velocity of flow that characterize the flow approaching the scour location; and (C) characteristics (mean diameter) of bed material particle size in the approach; observe and record the magnitude of scour, both general and local, during significant floods at selected bridges; analyze recorded scour and scour related data. Analysis would hopefully verify or help to modify presently available analytic techniques for evaluating probable scour at bridge crossings. Most of the effort during the fiscal year was directed toward completing analytical work on past data, reviewing recent works of other researchers, and in writing the final project report. Significant conclusions from the study are: (1) general scour formulas for long contractions proposed by Griffith (1939), Straub (1940), and Laursen (1958) compare favorably with measured values on gravel and cobble bed streams; (2) bed material size and pier width appear to be the dominant parameters in describing maximum equilibrium scour depth for piers with round or pointed noses.

PERFORMING AGENCY: Geological Survey, Water Resources Division
INVESTIGATOR: Norman, VW
SPONSORING AGENCY: Geological Survey, Water Resources Division, AK 64-036

In-House
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1973

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZUA 2849 1)

00 134775
MECHANICAL TUNNEL BORING PREDICTION AND MACHINE DESIGN
Research during the first two years has shown small-scale testing of small samples to be a valid representation of full-scale rock cutting. Thus samples from along a proposed tunnel alignment can be tested at a reduced scale and the results used to predict machine boring performance and to specify machine design parameters. These studies show that cutting performance is affected by factors such as cutter edge angle, wear and cutter size. Further testing is necessary to formulate the relationships between the factors affecting cutting performance, and to correlate laboratory and field data. Extensive laboratory tests will be conducted on factors affecting cutting performance, including cutter edge angle, cutter size, depth of cut, cutter wear, and multi-kerf cutters. Also tested will be cutter pattern, spacing, thrust, torque and speed of cutting. The results of these tests will be combined with field boring data to develop the scaling relationships. In addition, a theory will be developed with the verifcation from experimental data to describe the effect and interrelationship of factors which affect cutting performance. This research will result in a practical means of predicting tunnel boring performance and will provide characteristic performance relationships valuable for machine design and field tunneling operations.

PERFORMING AGENCY: Colorado School of Mines, Department of Mining Engineering
INVESTIGATOR: Wang, F
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, APR73-07776 A03

STATUS: Active NOTICE DATE: May 1976 START DATE: Feb. 1976 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $73,300

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1467)

00 134841
RESEARCH INITIATION-ANALYSIS OF GROUND VIBRATIONS PRODUCED BY PILE DRIVING
In this research a program of field vibration measurements is to be undertaken to study the influence of pile type, hammer type and operating characteristics, driving resistance, depth of pile penetration, and pile attitude on the types and intensities of ground vibrations produced in a known soil system. Variations in vertical, transverse, and horizontal displacements and/or accelerations will be measured at several distances from the point of penetration of the piles. Pile types include reinforced concrete displacement piles and steel H-piles. Field measurement will be used to establish or verify correlations between the parameters listed vibration intensities. The field data will also be made available for use in a more comprehensive analytical and/or laboratory program aimed at the establishment of predictive relationships between dynamic soil properties and energy input from pile driving.

PERFORMING AGENCY: Georgia Institute of Technology, School of Civil Engineering
INVESTIGATOR: Hardcastle, JH
SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG75-10276

STATUS: Active NOTICE DATE: May 1976 START DATE: Mar. 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $17,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 5194)

00 134940
SUBGRADE STABILITY
The general objectives of the study are to: 1) determine required levels of subgrade stability; and 2) to develop recommendations and procedures for more adequately considering subgrade stability during the project design state, establishing improved quality control and specifications for subgrade and embankment construction, and correcting subgrade stability problems. Current activity is directed toward identifying the major factors that influence subgrade stability.

PERFORMING AGENCY: Illinois University, Urbana, Department of Civil Engineering
INVESTIGATOR: Thompson, MR (Tel (217)333-3930) Figueroa, JL Kinney, TC Traylor, ML
SPONSORING AGENCY: Illinois Department of Transportation, IHR-605

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: Apr. 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $85,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (YIL 676), Illinois University, Urbana

00 134982
ROCK QUALITY DETERMINATION FOR LARGE-SIZED STONE USED IN ENGINEERING CONSTRUCTION
Large pieces of stone (ranging from 50 pounds to 20 tons) are used for slope protection of dams, internal and external materials for breakwaters (harbor protection) slope protection for highway cuts and embankments and along drainage ways. The existing materials tests were devised for smaller pieces, i.e. concrete aggregates, highway base courses etc., and large pieces inherently contain more weakness planes than do smaller ones. For this reason and because of the current over-reliance on empirical relationships, no meaningful test procedure exists for evaluating performance of large-sized stone. Construction of earth dams, harbors, highway slopes and stream diversion structures constitute a considerable portion of the current civil works done today. Each involve the use of large stone for slope protection and collectively constitutes a field where the engineering geologist can focus

his unique knowledge of geology related to engineering on the problem of predicting rock performance. The objective of this study is to establish test procedures that will enable the materials geologist and materials engineer to predict strength and durability and hence the performance of large stones used in dams (rip-rap), breakwaters and on highway slopes.

PERFORMING AGENCY: Purdue University, Department of Geosciences
INVESTIGATOR: West, TR Salzman, U
SPONSORING AGENCY: Purdue Research Foundation, Purdue University, 6998

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: Sept. 1974 TOTAL FUNDS: $3,600

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AX 127)

00 135095
PHOTOELASTIC STUDY OF BLASTING PROCEDURES IN URBAN AREAS
The objective of the program is to improve hard rock blasting procedures to effect cost reductions in urban projects and to improve the safety of the blasting process. The general research approach involves the use of scale models to examine the phenomena of stress wave propagation, crack initiation, crack propagation and the fragmentation process. Scale models of full-planes, half-planes, half- spaces and bench faces will be examined in the laboratory where advanced optical methods are employed to make the various dynamical processes visible over the entire field of the model. Excellent progress during the first year was made in the application of dynamic photoelasticity and holographic interferometry to problems related to surface excavation and tunneling. Dynamic surface motion in rock models caused by explosives will continue to be studied utilizing holography. A detailed design will be made of three charge holders which were demonstrated to be advantageous (during the first year of study) for presplitting and smooth blasting. Dynamic photoelasticity will be employed to examine stress wave propagation and fracture extension and fragmentation in producing tunnel sections.

PERFORMING AGENCY: Maryland University, College Park, Department of Mechanical Engineering
INVESTIGATOR: Dally, JW
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, APR73-07908 A01

STATUS: Active NOTICE DATE: May 1976 START DATE: Nov. 1974 TOTAL FUNDS: $79,950

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 639 1)

00 135249
EVALUATION OF REMOTE SENSING APPLIED TO CIVIL WORKS PROJECTS
The objective is to determine the feasibility of assessing civil works sites by measuring soil moisture using remote sensing in the 0.4 to 14 microns wavelength region. The approach was to perform investigations to determine the conditions under which soil moisture can be correlated with remotely sensed reflected energy (0.4 to 2.5 microns) and emitted energy (8 to 14 microns). Apply these results to civil works sites to evaluate their usefulness to field conditions. Applications to be studied include: landslides, levees, highways, ground water localities and dams. Application studies will be cooperative efforts with USACE and California State agencies.

PERFORMING AGENCY: Ames Research Center, National Aeronautics and Space Administration
INVESTIGATOR: Chapman, DR
SPONSORING AGENCY: Ames Research Center, Aeronautics and Space Technology Office, NASA, 177-53-13 7570511

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZH 41637)

00 135284
RESEARCH STUDIES ON BEHAVIOR OF STABILIZED SOILS UNDER REPEATED LOADINGS
Objective: Investigate the influence of repetitive loading conditions on the behavior and engineering characteristics of stabilized soils pertinent to the development of design criteria and procedures for military roads and airfields. Laboratory investigations will consist of the application of repeated loads to stabilized soil specimens by compression and flexural testing. The behavior of stabilized soils under repetitive loadings will be measured in terms of strength, modulus of elasticity, and fatigue cracking, and the implications of the observed behavior on stabilized-soil design will be examined. Variables to be examined in the study includes soil type, stabilizer type and quantity, soil moisture content, and curing conditions.

PERFORMING AGENCY: California University, Berkeley, Department of Civil Engineering
INVESTIGATOR: Mitchell, JK Monismith, CL
SPONSORING AGENCY: Waterways Experiment Station, Army Crops of Engineers, DA0C5560 DA-22-079-ENG-414

Contract
STATUS: Active NOTICE DATE: Nov. 1974 START DATE: July 1974 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GQA 35560 4)

00 135290
STRESS-STRAIN BEHAVIOR OF COHESIONLESS SOIL DURING UNLOADING AND RELOADING
The objectives of this research are: (1) To study the stress-strain characteristics of cohesionless soil during unloading and reloading using conventional triaxial tests, plane strain tests, triaxial tests with independent control of all three principal stresses on cubical specimens, and simple shear tests in which the principal axes of stress can be rotated. (2) To evaluate the procedures used for characterization of soil stress-strain behavior during unloading and reloading, and alternatively to develop improved procedures for this characterization.

PERFORMING AGENCY: California University, Los Angeles, Department of Mechanics and Structures
INVESTIGATOR: Lade, PV
SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG75-05325
STATUS: Active NOTICE DATE: May 1976 START DATE: Oct. 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $27,600

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 5511)

00 135296
THERMOCORER FOR RAPID TUNNELING AND EXCAVATION
The feasibility of using a dynamic rock melting method to increase advance rates will be determined. Static melting rates are limited by the relatively thick layer of molten material between the penetrator and the rock. Theoretical calculations show that circulating the molten material has the potential of reducing the thickness of the lava layer, thus permitting much greater advance rates. The fluid dynamic performance of a dynamic melter (Thermocorer) will first be optimized by analysis and experiment. To avoid the use of refractory metals in the penetrator, the feasibility will be found by melting glass which has a lower melting temperature than rocks) dynamically and comparing the advance rates to that using static melting procedures. A preliminary cost/benefit study will be made for the Thermocorer.

PERFORMING AGENCY: Energy Research and Generation, Incorporated
INVESTIGATOR: Benson, GM
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, APR73-03322 A02

STATUS: Active NOTICE DATE: Mar. 1976 START DATE: Sept. 1975 TOTAL FUNDS: $40,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1022 2)

00 135514
RAPID ASSESSMENT OF ROCK MASS CONDITIONS
To develop a technique for the rapid assessment of the integrity of rock slopes, tunnel rock, dam abutments, and embankments. Thermal anomalies assoicated with known structural defects will be studied and their signifi-

cance with respect to the behavior of the structure determined. Anomalies investigated will include loose tunnel rock, voids behind shotcrete and/or concrete structures, and leakage through dam abutments or embankments.

PERFORMING AGENCY: Waterways Experiment Station, Army Corps of Engineers
INVESTIGATOR: Huie, JS
SPONSORING AGENCY: Waterways Experiment Station, Army Corps of Engineers, DA0M8183

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA138183)

00 135516
RAPID EXCAVATION WITH EXPLOSIVES-EXPLOSIVE EXCAVATION IN DIFFERING GEOLOGIC MEDIA AND TOPOGRAPHY
Purpose of study/investigation: To develop improved techniques of excavation with explosives for civil engineering projects that lead to cost stabilization or reduction. This program provides salary and travel funds for planning, executing and reporting field experiments at Corps project sites.

PERFORMING AGENCY: Department of the Army, Explosive Excavation Research Laboratory
INVESTIGATOR: Mills, RR
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1973

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 356)

00 135517
RAPID EXCAVATION WITH EXPLOSIVES-ENVIRONMENTAL AND SAFETY EFFECTS
Purpose of study/investigation: To develop prediction techniques for airblast and seismic motion from explosive excavation detonations. Approach or plan: Make field measurements on major explosive excavation experiments, analyze results, report results, develop generalized prediction techniques.

PERFORMING AGENCY: Department of the Army, Explosive Excavation Research Laboratory
INVESTIGATOR: Mills, RR
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1973

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 357)

00 135518
RAPID EXCAVATION WITH EXPLOSIVES; CHARGE SHAPE, EMPLACEMENT PATTERNS AND FIRING TECHNIQUES
Purpose of study/investigation: To develop controlled Project Lost Creek and the measurements made to get a large structural excavations where some cost advantage would result from the use of larger charges. scale in the R. D. Bailey pilot excavation program. Velocity measurements were marginally successful in controlled blasting techniques. zone. Changes have been made in plans for R. D. Bailey to make both vertical and horizontal velocity measurements rather than just horizontal.

PERFORMING AGENCY: Department of the Army, Explosive Excavation Research Laboratory
INVESTIGATOR: Mills, RR
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 358)

00 135550
RATIONAL DESIGN OF TUNNEL SUPPORTS
OBJECTIVE: To develop reliable design procedures and to encourage the adoption of improved construction techniques for tunnel support systems that satisfy structural and economic requirements. APPROACH: Various analytical solutions applicable to tunnels constructed by the Corps and other agencies will be documented and/or developed and checked for performance adequacy. The check will be accomplished by the review of instrumentation data from selected projects and follow-through construction and performance appraisal. Corrections will be made to the theoretical analysis for the purpose of arriving at reliable design approaches and construction procedures for tunnel support systems.

PERFORMING AGENCY: Department of the Army, Missouri River Engineering Division
INVESTIGATOR: Redlinger, JF Underwood, LB
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army, 31214

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 529 2)

00 135806
RESEARCH INITIATION-PERFORMANCE INDICATORS FOR CUTTERS ON TUNNEL BORING MACHINES
This research program will consist of the three major phases: design, experimentation, and analysis. The design of the experiments will be performed on the basis of previous experience, number of parameters, and results of a literature survey. Experiments will be conducted in rocks that are representative of those normally encountered by tunnel boring machines. The representative rocks chosen for this study are marble, limestone, granite and quartzite. Th experiments will be designed to determine the effects of variations in groove spacing, normal force, cutter speed, and rock type on the performance of the cutters. The data obtained during the course of the experiments will be refined and analyzed in order to determine a complete set of performance indicators describing the operation of the drag bits and rolling studded cutters. Attempts will be made to relate the performance indicators to the input indices in order to find those indices that can predict the cutting performance more conveniently.

PERFORMING AGENCY: Clemson University, Department of Civil Engineering
INVESTIGATOR: Rad, PF
SPONSORING AGENCY: National Science Foundation, Division of Engineering, GK-42125

STATUS: Active NOTICE DATE: June 1974 START DATE: Apr. 1974 COMPLETION DATE: Sept. 1975 TOTAL FUNDS: $17,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 4771)

00 135943
ANALYSIS OF PILES IN LAYERED SOILS SUBJECTED TO LATERAL LOADING
This research involves the use of analysis and laboratory and field experiments with the aim of developing procedures for predicting p-y curves for layered soils. The surface layer may consist of sand or clay, varying in thickness from a few feet to several feet, followed by layers of soils of other types. The analytical studies involve the assumption of a failure mechanism for the layered soils in which the full shearing resistance of the soil will be developed along the surfaces of the failure mechanism, and that the ultimate resistance against the pile can thus be computed. Existing three-dimensional finite element codes will be studied thoroughly and their capabilities utilized to the fullest extent. The laboratory studies will employ a box-like device featuring a pressurized membrane to simulate effects of overburden pressure. The field studies will employ short-term static and cyclic loading of 4 in. diameter piles in 12 ft. deep tanks of artificially layered soils. Finally, results will be tested against open literature data on full scale test results.

PERFORMING AGENCY: Texas University, Austin, Department of Civil Engineering
INVESTIGATOR: Reese, LC
SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG74-19444

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Dec. 1974 TOTAL FUNDS: $26,650

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 4992)

00 135949
COMPUTER PREDICTION OF AXIALLY LOADED PILE BEHAVIOR
Description: Research is being conducted concerning the response of axially loaded piles and a part of this program involves the computer prediction of this behavior. Computer programs employing a discrete-element mechanism to model pile behavior are being developed for the analysis of axially loaded piles. These programs will represent developmental stages using varying degrees of refinement of the analysis capabilities concerning soil support assumptions and loading conditions. Both static and dynamic loading analyses of axial pile behavior will be considered.

PERFORMING AGENCY: Texas University, Austin, Department of Civil Engineering
INVESTIGATOR: Matlock, H Meyer, PL
SPONSORING AGENCY: Texas University, Austin

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (NTX 525)

00 135960
LOCAL SCOUR IN CHANNELS
Description: In natural stream channels local scour of the bed frequently occurs at obstructions such as bridge piers and abutments and at culvert outlets. One phase of this project is concerned with the secondary flow at channel obstructions and their effect on local scour. It is believed that a more thorough understanding of the fundamentals of these secondary flows will provide a basis for devising methods to control this type of local scour. Another phase deals with scour at culvert outlets and a new principle for dissipating the energy in the flow from the culverts. A radial flow energy dissipator for culvert outlets has been developed for use with circular and box culverts located in moderately steep to steep topography. Laboratory tests indicated good performance for a variety of conditions. It is believed additional studies should be made to compare the cost of the new type structure with other methods of accomplishing satisfactory energy dissipation and that arrangements should be made to construct an installation in the field where its performance could be observed under field conditions.

PERFORMING AGENCY: Texas University, Austin, Department of Civil Engineering
INVESTIGATOR: Moore, WL
SPONSORING AGENCY: Texas University, Austin

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (WZ 2453 2)

00 135967
A STUDY OF NOVEL ROCK DISINTEGRATION TECHNIQUES
In 1968, the principal investigator published a book entitled Novel Drilling Techniques which described the work that had been done on over 30 novel rock disintegration techniques. More research has been done on these novel techniques since 1968 than prior to publication of the book, so this book is now outdated. A critical review will be made of the available information on these novel systems, both from the U.S. and foreign countries. This review will include (1) the status of the novel techniques, (2) the potential of these techniques in developing energy resources, (3) the application of these techniques to tunneling, raise boring, or excavation machines, (4) the relative status of foreign developments, and (5) the possible directions for future research. Attempts will be made to have the report resulting from this study published as a book in order to more effectively disseminate the information and to provide the widest circulation possible.

PERFORMING AGENCY: Maurer Engineering Incorporated
INVESTIGATOR: Maurer, WC
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, APR75-14405

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: $42,500

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1335)

00 136026
RUNOFF SIMULATION
Few long-term runoff records exist for small drainage basins. The need for long-term records for small basins is great. The records are used in the design of highway crossings, in urban planning, and in water-resource development. The development of computer simulation models, such as rainfall-runoff relations and multivariate generating processes, will provide means for synthesizing long-term runoff records. Some of these models will permit simulation of basin response to varying environmental conditions. The emphasis will be to study and develop, as feasibility and needs dictate, runoff simulation models to provide synthetic data for specific applications such as flood investigations, urban storm runoff, and mean monthly flows. The emphasis has been to synthesize flood peaks for rural drainage basins. Future work will encompass more complex models to synthesize urban storm runoff, daily discharge in rural basins, and combining subbasin runoff to estimate basin outflow. In areas where rainfall-runoff relations are impracticable, models such as multivariate generating processes will be developed. Operational versions of runoff simulation models will be programed for a variety of environmental conditions. Criteria for selection and delineation of input data for models will be developed. Methods of climate-record transposition will be investigated. Limitations in the application of each model will be explored. Approaches to the synthesis of large basin runoff through distributed routing of synthesized small basin records will be initiated. Multivariate generating processes will also be utilized to synthesize runoff. Synthetic flood frequency data derived by rainfall-runoff modeling and continued evaluation of information content of rainfall-runoff model output (long-term synthetic flood frequency statistics). Develop "optimum" model calibration procedures (computer programs) in relation to the worth of synthetic data.

PERFORMING AGENCY: Geological Survey, Water Resources Division
SPONSORING AGENCY: Geological Survey, Water Resources Division, NR 70-069

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1973 TOTAL FUNDS: $52,500

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZUA 2685 1)

00 136073
SCANNED ACOUSTICAL HOLOGRAPHY FOR GEOLOGIC PREDICTION
One of the costly aspects of underground excavation is the uncertainty of the ground conditions ahead of the tunnel face and how it will react when "opened". Prediction of poor rock, water, faulting, etc., is needed to prevent costly delays. Rapid tunneling techniques increase the need for accurate prediction. A multi-phased project for producing a means of "seeing" into the rock using Scanned Acoustical Holography has been initiated. The final objective of the project is to install an Acoustical Holography inspection system on a rapid tunneling machine in such a manner that "real-time" presentation of the observed geologic and rock conditions 30 to 100 feet ahead of the machine is made available to the machine operator in a simple, usable format, without delaying the tunneling operation. Phase I, the preliminary demonstration of the feasibility of using scanned acoustical holography on a rock model has produced successful results. In Phase II the project moves from a small-scale laboratory model through intermediate steps to a full-scale system and finally the use of Acoustical Holography will be demonstrated on an actual tunnel heading.

PERFORMING AGENCY: Holosonics, Incorporated
INVESTIGATOR: Price, TO
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, APR73-03200 A01

STATUS: Active NOTICE DATE: May 1976 START DATE: May 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $423,500

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1279)

00 136152
PARTIAL SUPPORT OF THE U.S. NATIONAL COMMITTEE ON TUNNELING TECHNOLOGY
The U.S. National Committee on Tunneling Technology was established in 1972, at the request of the Chairman of the Federal Council for Science and Technology, to assess the broad range of activities and related technologies pertaining to the use of subsurface space and to stimulate improvements in underground construction technology. Improvements are needed to meet increasing national demands for providing life-support functions in urban areas and recovery of resources (mining and drilling) with minimum environmental impact. The Committee is pursuing a number of programs to stimulate improvements related to creation and use of subsurface space in the following areas: (1) Education of engineers, officials, and the public, (2) Assessment of environmental and energy impact of the use of subsurface space, (3) Encouragement of improved practices for underground construction contracting, (4) Evaluation of technology and recommendations for research, (5) Evaluation of systems for collection and dissemination of geological and engineering data required for planning and completing underground construction. The Committee also participates in the activities of the International Tunneling Association (ITA) on behalf of the scientists, engineers, and technologists of the United States. The ITA was formed in 1974, and seven cooperative projects are underway on subjects including planning use of the subsurface, research needs, and standardization.

PERFORMING AGENCY: National Academy of Sciences
INVESTIGATOR: Israelsen, OA
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, APR 74-02378-A09 C310-277-009

Contract
STATUS: Active NOTICE DATE: May 1976 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $33,600

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 803 2)

00 136165
US COMMITTEE FOR ROCK MECHANICS
The aims of the project are to review new developments and trends in rock mechanics; research, implement and enhance exchange of technical information among scientists; identify and encourage research activities that will advance rock mechanics technology; and coordinate international efforts in rock mechanics research. The proposed program and activities of the Committee for Rock Mechanics are consistent with the responsibilities of U.S. Army Corps of Engineers and Office, Chief of Research and Development to keep abreast of new developments and to direct army research toward most promising areas pertinent to army requirements in rapid excavation, drilling, construction and prediction of engineering properties of rock mass. The approach will involve identification of research needs, dissemination of published information on rock mechanics through abstracting service and translations, preparation of advisory reports, coordination and participation in domestic and international professional societies, conferences and symposia, and periodic reviews and surveys of national research efforts in rock mechanics and related fields.

PERFORMING AGENCY: National Academy of Sciences, Division of Engineering
INVESTIGATOR: Handin, J
SPONSORING AGENCY: Department of the Army, OCRD Environmental Sciences Office, DA0A9654 DAHC19-71-C-0007

Contract
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974 TOTAL FUNDS: $3,000

ACKNOWLEDGMENT: Science Information Exchange (GQA 19654 4)

00 138468
ECONOMIC FACTORS IN TUNNEL CONSTRUCTION
Analysis of tunnel case histories as an aid in formulation of a tunnel cost data base, and development of systems analysis methodologies related to tunnel cost estimations.

PERFORMING AGENCY: Bechtel Corporation
INVESTIGATOR: Gin, E
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Sluz, A (Tel (617) 494-2432)

Contract DOT-TSC-1104
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1976 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: TSC

00 138477
EVALUATION OF REPAIR TECHNIQUES FOR DAMAGED STEEL BRIDGE MEMBERS
The first phase of this project will identify and categorize common types of structural damage to steel bridges and the frequencies of their occurrence; analyze the state of the art of present practice and equipment used for assessing damage and repairing highway and railroad bridges and other steel structures (including heating temperatures, jacking methods, straightening tolerance and degradation of steel's mechanical properties and service life); evaluate techniques that have been applied or may be applied for correcting structural damage; preparation of report of Phase I and outline Phase II research.
Contract not yet awarded.

SPONSORING AGENCY: American Assn of State Hwy and Transp Officials; Federal Highway Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Reilly, RJ (Tel (202) 389-6741)

NCHRP 12-17
STATUS: Proposed NOTICE DATE: July 1976 COMPLETION DATE: 1977

ACKNOWLEDGMENT: National Cooperative Highway Research Program

00 138478
SCANNED ACOUSTICAL HOLOGRAPHY FOR GEOLOGIC PREDICTION
One of the costly aspects of underground excavation is the uncertainty of the ground conditions ahead of the tunnel face and how it will react when "opened". Prediction of poor rock, water, faulting, etc., is needed to prevent costly delays. Rapid tunneling techniques increase the need for accurate prediction. A multi-phased project for producing a means of "seeing" into the rock using Scanned Acoustical Holography has been initiated. The final objective of the project is to install an Acoustical Holography inspection system on a rapid tunneling machine in such a manner that "real-time" presentation of the observed geologic and rock conditins 30 to 100 feet ahead of the machine is made available to the machine operator in a simple, usable format, without delaying the tunneling operation. Phase I, the preliminary demonstration of the feasibility of using scanned acoustical holography on a rock model has produced successful results. In Phase II the project moves from a small-scale laboratory model through intermediate steps to a full-scale system and finally the use of Acoustical Holography will be demonstrated on an actual tunnel heading.

PERFORMING AGENCY: Holosonics, Incorporated
INVESTIGATOR: Price, TO
SPONSORING AGENCY: National Science Foundation

STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: Oct. 1976 TOTAL FUNDS: $423,500

ACKNOWLEDGMENT: National Science Foundation

00 138502
IMPROVING UNDERGROUND EXCAVATION THROUGH THE APPLICATION OF HYDRAULIC WATER JET ASSISTED MECHANICAL TUNNEL BORING
A full scale hydraulic water jet assisted tunnel boring machine will be designed and field tested with the support of laboratory experiment and testing. The objective of this investigation is to verify the concept and laboratory projection of increasing the rate of underground excavation several fold through the application of high pressure hydraulic water jets to assist the conventional mechanical method of tunneling. The project consists of (1) the design and fabrication of the full scale equipment, and, the complete prototype water jet assisted tunnel boring machine, (2) field testing of the prototype system, (3) laboratory equipment and testing to guide and

assist the full scale design and field test, and (4) engineering anlaysis and economic evaluation of the hydraulic machanical method of excavation. This research will further tunneling technology through the design and testing of a full scale machine to provide engineering and cost- performance data for improving rate of excavation, the reduction of cutter and labor costs and thus, the overall tunneling cost.

PERFORMING AGENCY: Colorado School of Mines
INVESTIGATOR: Wang, F
SPONSORING AGENCY: National Science Foundation

STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1975 COMPLETION DATE: Oct. 1976 TOTAL FUNDS: $257,200

ACKNOWLEDGMENT: National Science Foundation

00 138532
TUNNELING
To use underground space as an effective means of meeting the increasing needs of urban transportation systems, this program seeks to improve the social, economic and environmental impacts of tunneling processes, reduce costs of construction, improve tunnel design and maintenance procedures, and alter materials handling and utilization procedures. In the DOT Transportation Tunneling Program, UMTA is the lead administration in the following categories: Interactions with society, maintenance modal problems and materials handling.

PERFORMING AGENCY: Transportation Systems Center, Department of Transportation; Transit Development Corporation, Incorporated
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Butler, GL

Contract UM-604
STATUS: Active NOTICE DATE: July 1976 START DATE: 1970 COMPLETION DATE: 1981 TOTAL FUNDS: $30,000,000

ACKNOWLEDGMENT: UMTA

00 139166
EMBANKMENT SUPPORT FOR A RAILROAD TEST TRACK
After participation in the design and construction of the embankment for the Kansas Test Track in 1970 and 1971, the static data yeilded by instrumentation was to be compiled, analyzed and interpreted. Interpretations of the embankment failure mechanisms have been made and instrumentation proved inadequate to accommodate the permanent settlements that occurred and to adequately measure moisture.

PERFORMING AGENCY: Shannon and Wilson, Incorporated
INVESTIGATOR: Dietrick, RJ (Tel (415) 697-7503) Salley, JR
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: McCafferty, RM (Tel (202) 426-4377)

Contract DOT-FR-54168
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: Sept. 1976

ACKNOWLEDGMENT: FRA

00 139169
ENGINEERING AND GEOPHYSICAL STUDIES OF KANSAS TEST TRACK
During the design, construction and operation of the Kansas Test Track, vibroseismic tests were performed to determine elastic properties of the subgrade. After the premature failure of KTT, the objective is to determine the failure mechanisms, appraise validity of built-in instrumentation's data and perform static and dynamic response investigations of unconventional track structures for validating analytical models of such construction. This includes nondestructive testing, other field testing and laboratory testing.
REFERENCES:
Vibroseismic Survey, Railway Test Embankment, Aikman, Kansas Curro, JR, Jr, WES Mis. Paper S-72-36

PERFORMING AGENCY: Waterways Experiment Station, Army Crops of Engineers
INVESTIGATOR: Ballard, RF (Tel (601) 636-3111)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: McCafferty, RM (Tel (202) 426-4377)

Contract DOT-AR-30025

STATUS: Active NOTICE DATE: July 1976 START DATE: Nov. 1972 COMPLETION DATE: Sept. 1977

ACKNOWLEDGMENT: FRA

01 036737
TRACK COMPONENT AND TRACK RESPONSE INVESTIGATIONS
C&O Railway Company and the B&O Railroad Company will conduct a series of track component and track response investigations.
REFERENCES:
Developmental Tests of Concrete Tie and Tie Fastening Systems, Way, GH, Jr, May 1973, PB-25218/AS
Lateral Load Test of Track at Sadot, Va. (to be published in Fall), Reiner, IA

PERFORMING AGENCY: Chessie System
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Moody, HC (Tel (202)426-4377)

Contract DOT-FR-20015 (CS)
STATUS: Completed NOTICE DATE: Aug. 1976 START DATE: Aug. 1971 TOTAL FUNDS: $90,000

ACKNOWLEDGMENT: TRAIS (PR# 71-176)

01 038973
RAILROAD TRACK STRUCTURES RESEARCH
The Federal Railroad Administration (FRA) and the Association of American Railroads (AAR), the contractor, enter into a program to perform Railroad Track Structures Research. The program is expected to encompass a number of Tasks for research into a variety of technical factors affecting railroad track and related systems and subsystems. The initial portion of the Railroad Track Structures Research Program was to consist of the Four Tasks: Mathematical Modeling, Ballast and Subgrade Material Performance Tests, testing phase, and Track Research Laboratory Facility. Work continues only on Ballast and Subgrade Material Performance Tests.
REFERENCES:
Technical Data Bases Report (Task 2) Robnett, QL, July 1975, PB-251771
Functional Requirements for a Facility for Accelerated Service Testing (Task 4), Runwani, SK, Sept. 1975
Structural Model and Materials Evaluation Procedures (Task 2), Robnett, QL, July 1976
Track Support Systems Parameter Study (task 2) Tarabji, SD; Thompson, MR, July 1976
Finite Element Analysis of a Railway Track Support System - User's Manual (Task 2), Tarabji, SD; Thompson, MR, July 1976

PERFORMING AGENCY: Association of American Railroads; Illinois University, Urbana, Department of Civil Engineering
INVESTIGATOR: Martin, GC (Tel (312) 567-3588) Thompson, MR (Tel (217) 333-3930)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: McCafferty, RM (Tel (202)426-4377)

Contract DOT-FR-30038
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: May 1973 COMPLETION DATE: Sept. 1977 TOTAL FUNDS: $672,000

ACKNOWLEDGMENT: FRA

01 038974
CONTINUOUS MEASUREMENT OF DYNAMIC COMPLIANCE CHARACTERISTICS OF RAILROAD TRACK. PHASE 3
The contract is for the design, fabrication, demonstration and furnishing of equipment for the continuous measurement of dynamic compliance characteristics of railroad track.
REFERENCES:
A Review of Measurement Techniques, Requirements and Available Data on the Dynamic Compliance of Railroad Track, Kaiser, WD, May 1975, PB-250547/AS

PERFORMING AGENCY: Battelle Memorial Institute
INVESTIGATOR: Prause, RH (Tel 614-2993151)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB

Contract DOT-FR-30051
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: May 1973 COMPLETION DATE: 1979

ACKNOWLEDGMENT: TRAIS (PR# RP-39)

01 045168
METHODOLOGIES AND PROCEDURES FOR ANALYZING ECONOMIC COST OF RAILROAD ROADWAY FOR PRICING PURPOSES
To develop and justify a set of methodologies and procedures for analyzing the economic costs of providing, maintaining and operating the railroad roadway and attendant structures under various geographic, physical, climatic, operating and traffic condititions for the purpose of developing a portion of the relevant economic costs for pricing purposes.
Procedures for Analyzing the Economic Costs of Railroad Roadway for Pricing Purposes and Vol. 2 Bibliography, RPD-11-CM-R, V1 DOT-FR-30028

PERFORMING AGENCY: Tops-On-Line Service, Incorporated
INVESTIGATOR: Williams, JH (Tel 415-9892670)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel 202-426-0771)

Contract DOT-FR-30028
STATUS: Completed NOTICE DATE: July 1976 START DATE: June 1973 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: $401,573

ACKNOWLEDGMENT: FRA

01 047342
EVALUATION OF THE TECHNOLOGICAL AND ECONOMIC EFFECTS OF VARIOUS CONTINUOUS WELDED RAIL SECTIONS AND OF SPECIAL METALLURGY RAIL
An analysis of comparative life and economics of various rail sections for continuous welded rail under modern traffic loadings is in process. The study has been expanded to include jointed rails of special metallurgies such as heat treated, flame hardened, and hi-silicon. Wear patterns from field test locations are taken, analyzed, and equivalent cost conditions determined.

PERFORMING AGENCY: Illinois University, Urbana, Department of Civil Engineering
INVESTIGATOR: Hay, WW Butler, AB Martin, GC Franke, MW Schuch, PM Reinschmidt, AJ Mikkelson, MJ Lawrence, FV
SPONSORING AGENCY: Burlington Northern, Incorporated

STATUS: Active NOTICE DATE: July 1975 START DATE: Nov. 1973 COMPLETION DATE: UNKNOWN

ACKNOWLEDGMENT: Science Information Exchange (AI 733 2)

01 058304
ANALYSIS OF THE STABILITY OF RAILROAD TRACK SUBJECTED TO STATIC AND DYNAMIC LOADS
The objective of this contract is to obtain information which will provide a rational basis for the design, construction and maintenance of railroad track of improved safety and economic efficiency by reducing the probability of catastrophic buckling. The activities of this contract will assist in determining the largest admissible geometric imperfections to prevent buckling of the track in the vertical plane and will initiate the analysis of horizontal buckling. A critical review of track stress analyses and field tests on track will provide a methodology for determining the characteristics of track performance under static and dynamic loads. In addition, a continuing review of foreign technical literature will provide for the incorporation of previous European and Soviet experience into ongoing and anticipated rail systems research activities and recommendations for inclusion of documents in the series of technical translations under preparation by FRA.

PERFORMING AGENCY: Princeton University, Department of Civil and Geological Engineering
INVESTIGATOR: Kerr, AD (Tel 609-452-5424)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Kish, A (Tel 617-4942442)

Contract DOT-TSC-900
STATUS: Completed NOTICE DATE: July 1976 START DATE: Dec. 1974 COMPLETION DATE: May 1976 TOTAL FUNDS: $82,555

ACKNOWLEDGMENT: FRA

01 058306

STATE-OF-THE-ART SURVEY: RAIL JOINING METHODS

Research and review existing, as well as potential, rail joining methods with the aim of weighing the strengths and weaknesses of each. Also areas are to be identified where further research and development efforts could lead to cost and/or performance improvements in joining rails.

Research for this project was also performed by Metals and Ceramics Information Center of the Defense Supply Agency.

PERFORMING AGENCY: Department of Defense, Defense Supply Agency
INVESTIGATOR: McNeill, JD (Tel 513-296-6310)
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation
RESPONSIBLE INDIVIDUAL: Steele, RK (Tel (617) 494-2002)

STATUS: Active NOTICE DATE: Aug. 1976 COMPLETION DATE: Nov. 1976 TOTAL FUNDS: $43,390

ACKNOWLEDGMENT: FRA

01 058307

RAIL INSPECTION SYSTEMS ANALYSIS AND TECHNOLOGY SURVEY

The objective of the program is to define quantitatively those factors which limit the present speeds of inspection systems and to determine the overall costs associated with making improvements in rail flaw inspection systems which would provide increased speeds, decreased inspection costs, increased inspection reliability, and/or increased sensitivity. To determine these factors, studies of three railroads are being made to quantify track and operating characteristics; studies are being made to determine operating speeds; studies are being made to define transducer performance/cost tradeoffs; studies are being made of data aquisition and processing systems and costs are being determined for several combinations of systems and operation conditions.

Reports are available through NTIS. Work was performed under contract to: Electromechanical Branch, DOT; Transportation Systems Center.

REFERENCES:

Rail Inspection Systems Analysis and Technology Survey. Interm Report, Meacham, HC, Dec. 1975

Rail Inspection Systems Analysis and Technology Survey. Phase I, Final Report, Kaiser, WD, 7605

PERFORMING AGENCY: Battelle Columbus Laboratories
INVESTIGATOR: Kaiser, WD (Tel (614)424-6424) Ensminger, D Meacham, HC Flora, J Byers, R Becker, L Posakony, G
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Ceccon, H (Tel (612)494-2711)

Contract DOT-TSC-979
STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $163,370

ACKNOWLEDGMENT: FRA

01 058312

DESIGN OF RAIL FLAW-DETECTION SYSTEM

Tasks include: Evaluation of state-of-the-art and potential rail inspection techniques; Detailed description of the data handling systems required for inspection systems. Determination of the effects of inspection speed and sensitivity on the operational economics. Detailed description of the support task force required for the various rail inspection systems. Determination of the type of inspection system (s) required for specific type of railroad systems. Determination of the economics involved resulting from operational factors (interruption of traffic, traffic slow down, etc.) Recommendations on specific inspection system designs.

PERFORMING AGENCY: Battelle Memorial Institute
SPONSORING AGENCY: Transportation Systems Center, RR-519

Contract DOT-TSC-979 (CPFF)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $198,404

ACKNOWLEDGMENT: TRAIS (RR-519), FRA

01 058352

NONDESTRUCTIVE MEASUREMENT OF LONGITUDINAL RAIL STRESSES

One objective is to study the effect of applied stress on the propogation of ultrasonic pulses in high carbon, railroad-quality rail steel. This will be accomplished by an analysis of appropriate wave equations with the non-linear elastic constants included puls experimental work to compare with the predicted results. The second objective will be to initiate research utilizing ultrasonic pulses that will result in techniques adoptable to the in-situ measurement of longitudinal stresses in rail via a test car moving at standard operating speeds. Measurement of these stresses will enable operating railroads to locate highly stressed areas in rail.

PERFORMING AGENCY: Oklahoma University, Aerospace, Mechanical and Nuclear Engineering Dept
INVESTIGATOR: Engle, DM
SPONSORING AGENCY: Office of Systems Development and Technology
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel 202-426-4377)

Contract DOT-OS-40091
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1974 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $113,000

ACKNOWLEDGMENT: TRAIS, FRA

01 058458

FABRICATE, TEST, EVALUATE, AND DELIVER AN ULTRASONIC WHEEL PROBE INSPECTION SYSTEM

Objectives are: 1. To provide ultrasonic wheel probes for an ultrasonic inspection system which can detect all potentially dangerous defects. Particular emphasis shall be given to the detection of vertical split heads and the inspection of welded joints in continuously welded rail. The capabilities of these components will improve the detectability of ultrasonic inspection and also provide additional defect information needed to facilitate automatic data processing. 2. To test and evaluate the ultrasonic system in the field by comparing the inspection results with that of a magnetic inspection system.

PERFORMING AGENCY: DAPCO Industries, Incorporated
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, RR-519
RESPONSIBLE INDIVIDUAL: Ceccon, H (Tel 617-494-2711)

Contract DOT-TSC-995
STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1975 COMPLETION DATE: 1976 TOTAL FUNDS: $75,552

ACKNOWLEDGMENT: TRAIS (RR-519)

01 058644

RAIL FLAW OCCURRENCE SURVEY

Objectives are: 1. Develop the data base from a review of available failure records from which statistical evaluations can be made. 2. Develop and apply statistical procedures which will determine interrelationships of rail failure and train derailment occurrence. 3. Calculate severity indices for difference types of rail defects as causes of train derailments from this analysis of the data base. 4. Ascertain, for defects of important severity, the relationships between flaw occurrence, load environment and characteristics of track locations, construction, maintenance, and inspection. 5. Propose one or more approaches for the reliability analysis of rail-in-service utilizing the information generated.

PERFORMING AGENCY: Midwest Research Institute
SPONSORING AGENCY: Transportation Systems Center, RR-519

Contract DOT-TSC-1061 (CPFF)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $54,197

ACKNOWLEDGMENT: TRAIS (RR-519), FRA

01 058671

DEVELOPMENT OF ULTRASONIC IMAGING SYSTEM FOR HIGH SPEED RAIL INSPECTION

An ultrasonic scanning system shall be built, employing dual non-directional transducers, and utilizing both direct and boundary reflected signals which will record data in a form compatible with synthetic aperture image processing. Direct display of untransformed data recordings will permit definitive assessment of the validity of the new transducer configurations in the unique geometry peculiar to rail inspection, and will provide an immediate capability for inspection of welds and other transverse plane defects. A further short-term payoff will be provided through adaptation of the data recording and display equipment to produce an improved consolidated B-scan display for conventional assemblies of directional transducers.

PERFORMING AGENCY: Electra-Physics Laboratories, Incorporated
SPONSORING AGENCY: Transportation Systems Center, RR-519

Contract DOT-TSC-1036 (CPFF)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: June 1975 COMPLETION DATE: Apr. 1976 TOTAL FUNDS: $96,577

ACKNOWLEDGMENT: TRAIS (RR-519), FRA

01 058673
SLEEVE EXPANSION OF BOLT HOLES IN RAILROAD RAIL
Objectives are: 1. To ascertain by laboratory testing that the sleeve expansion process is likely to be an effective means of reducing the bolt hole failure rate under railroad loading conditions. 2. Having accomplished this, to devise a test plan for a preliminary field evaluation defining costs and time required to implement the plan.

PERFORMING AGENCY: Boeing Company
SPONSORING AGENCY: Transportation Systems Center, RR-519

Contract DOT-TSC-1048 (CPFF)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: June 1975 COMPLETION DATE: Feb. 1977 TOTAL FUNDS: $159,010

ACKNOWLEDGMENT: TRAIS (RR-519), FRA

01 058697
ENGINEERING AND TEST SUPPORT SERVICES FOR RAILROAD INSTRUMENTATION, DATA ACQUISITION, PROCESSING AND EVALUATION
This effort will provide the required operation and development of data acquisition systems including data analysis, and system refinement for Government-supplied data collection tools such as the wayside van, the four FRA railroad track measurement cars, track survey device (TSD), instrumented truck, and associated test vehicle, the digital data collection system, ride quality measuring systems, and other government furnished equipment that may be provided.

PERFORMING AGENCY: ENSCO, Incorporated
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation

Contract FR-54174 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1975 TOTAL FUNDS: $1,607,000

ACKNOWLEDGMENT: TRAIS

01 058698
INSTRUMENTATION AND DATA PROCESSING EQUIPMENT ON RAIL VEHICLES FOR MEASURING TRACK GEOMETRY AND RAIL FLAW
Tasks include: 1. Refurbish a rail hospital car for track inspection applications. 2. Install a vehicle track geometry measurement system and install rail flaw detection instrumentation. 3. Furnish and install an on-board digital computer system for system control, data recording and data processing. 4. Develop and implement the necessary computer programs for performing on-board track geometry defect analysis and rail flaw analysis. 5. Survey the market for availability of a high railer-type motor vehicle and track geometry instrumentation for the purpose of providing unloaded measurements. 6. Carry out validation and acceptance testing of the completed track inspection vehicle. 7. Conduct a training program for operation and maintenance personnel.

PERFORMING AGENCY: ENSCO, Incorporated
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation

Contract FR-54190 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $1,300,000

ACKNOWLEDGMENT: TRAIS

01 058725
ENGINEERING ANALYSIS OF STRESSES IN RAILS
The activities will provide the description of stresses in rail required for the prediction of rail failure, based upon the best available representations of service loads and support conditions. The analyses developed in this study will be combined with the rail material failure model concurrently under investigation in the development of a rail reliability analysis. Close coordination of these efforts with ongoing TSC track research activities is a requisite for the success of this study. Under the first phase, the factors influencing rail stress will be reviewed and an analysis of the three dimensional states of stress in the rail developed. The second phase will investigate the conditions in the rail joint region and will define the mechanisms of flaw growth in the rail end region.

PERFORMING AGENCY: Battelle Memorial Institute
SPONSORING AGENCY: Transportation Systems Center, RR-519

Contract DOT-TSC-1038 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $343,345

ACKNOWLEDGMENT: TRAIS (RR-519), FRA

01 058728
ANALYSIS AND DESIGN REQUIREMENTS FOR IMPROVED CROSS TIE TRACK SYSTEM
The emphasis is on applying existing data, analyses, and instrumentation to a characterization of the response and deterioration of track structures under typical wheel/rail loads. In addition, studies of the influence of tie/fastener characteristics on track performance and the adequacy of 'synthetic' tie fastener assemblies for mainline application under typical North American loadings will be coupled with an economic study to investigate the feasibility of 'synthetic' cross ties for U.S. usage.

PERFORMING AGENCY: Battelle Memorial Institute
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, RR-519
RESPONSIBLE INDIVIDUAL: Kish, A McConnell, DP

Contract DOT-TSC-1044 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $326,661

ACKNOWLEDGMENT: TRAIS (RR-519), FRA

01 081797
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 1--TRACK STRUCTURES
Task objectives are development of recommended performance specifications and maintenance and geometric design guidelines for conventional railroad track and related track structures and components. This activity is intended to quantify the adequacy of a guideway that yields an acceptable level of ride quality and safety with minimization of first cost, maintenance costs, and secondary costs such as loss and damage, and wear and fatigue to vehicles. Task will recognize that load environment is a function of track parameters, wheel load, and level of maintenance. The Track Structures Dynamic Test Facility, developed under separate AAR/FRA contract, has the capability of determining the basic structures as affected by different subgrade materials, different types of ballast, various types of ties, spacing and rail sizes. A moving load allows for compaction of ballast subgrade material. Also sensitivity studies of track parameters, including basic alignment of the structure with such factors as minimum length of tangent between curves and deviation from theoretical line and surface, have been made using computer modeling techniques developed in Phase I.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Martin, GC (Tel 312-225-9600 Ext 877)
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency

RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

01 099366
TECHNOECONOMIC SURVEY OF METHODS FOR REFURNISHMENT OF WOOD CROSS TIES
The contractor will conduct a review of cross tie deterioration mechanisms and a survey of the number and severity of ties exhibiting such deterioration. He then will critically assess the technical and economic capability of existing polymeric or other processes of refurbishing ties either in-situ, on-site or in batch plant operation. Processing requirements will be determined and techniques for fulfilling these requirements identified. Based on this, the feasibility of such processes, both technical and economic, will be determined. Specific recommendations for research and/or development will be identified.

PERFORMING AGENCY: Stanford Research Institute
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Safety Research
RESPONSIBLE INDIVIDUAL: McConnell, DP (Tel 617-494-2461)

Contract DOT-TSC-1044
STATUS: Active NOTICE DATE: July 1976 TOTAL FUNDS: $53,000

ACKNOWLEDGMENT: FRA

01 099369
OPERATION OF TEST TRACK AND RAIL INSPECTION EQUIPMENT
Because of the interdependence between each of the newly developed components for track and rail inspection, a critical test and evaluation must be carried out on each to assess its contribution to the total system. From the results of the tests and evaluations, an assessment of the developments can provide the information needed to generate work statements for future developments. In order to facilitate an effective test and evaluation, qualified technical personnel and testing facilities are required. The facilities primarily consist of an NDT laboratory, two test tracks, and a rail inspection vehicle. The NDT laboratory contains the instrumentation needed to perform the commonly used NDT techniques. The test tracks contain machined and natural rail defects on which inspection equipment can be tested up to speeds of 40 mph. The rail inspection vehicle is a hi-rail vehicle and currently uses ultrasonics exclusively to perform the rail inspection. The hi-rail vehicle provides the mobility required for a test vehicle and has ample space to house newly developed equipment. The staff presently consists of two technicians and two engineers.

PERFORMING AGENCY: Transportation Systems Center
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Safety Research
RESPONSIBLE INDIVIDUAL: Ceccon, H (Tel 617-494-2711)

In-House
STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1974

ACKNOWLEDGMENT: FRA

01 099393
PROGRAM FOR INVESTIGATION OF RAIL FAILURES
The objective of this program is to evaluate the metallurgical and applied stress environment coincident with failures in conventional carbon steel rail and in other types. The following steps are involved: (A) Characterize in the laboratory, service-developed defects resulting in field failures in carbon steel rails with emphasis on short service life or premature failures; (B) Determine in the laboratory the chemistry, metallography and mechanical properties of carbon steel rails in service; (C) Determine in the field the state of stress in carbon steel rails in service under a wide range of conditions track and loadings; (D) Establish possible interrelationships of material properties, service stresses and service failures; (E) Promote similar laboratory and service evaluations of economically attainable variations in rail steel and treatments, consistent with progress of work performed on carbon steel rail. Specimens supplied consist of 8-foot rail sections containing a detected defect. These specimens are used to determine the spectrum of properties which possibly may be associated with each type of defect. Selected in-track sites are instrumented to determine service stresses associated with fatigue crack initiation. Relation between service-initiated failures and attendant stress is correlated. Work with steels other than the conventional carbon type is to be undertaken.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; American Iron and Steel Institute; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Martin, GC (Tel 312-225-9600)

STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: AAR

01 099394
RAIL FLAW DETECTION SYSTEMS
The detector car section of the AAR Technical Center has constantly worked on materials and systems for upgrading the privately-owned and operated rail detector cars using the residual magnetic method as developed and built by the AAR. Along with this, studies of advanced technologies of rail flaw detection, such as ultrasonics, have been conducted. An ultrasonic rail test system and recording equipment to meet FRA track inspection requirements was initially tested under one of the standard magnetic detector cars. The ultrasonic system significantly increased flaw detection due to its greater sensitivity in the web area. This was followed by construction of a new detector car equipped exclusively with ultrasonics which will be used in refining techniques using this rail flaw detection system.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Martin, GC (Tel 312-225-9600)

STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: AAR

01 099395
IMPROVED TRACK STRUCTURES RESEARCH PROGRAM
The objectives of this program are to reduce the frequency of track-caused derailments, to provide more durable track systems and components, and to reduce lading damage attributable to rough track. In the course of refining the FRA track safety standards, a rail flaw detection system has been acquired and evaluation of areas of possible improvement has begun. In refining the performance of track systems, the Kansas Test Track has been opened to traffic (see RRIS 01 013867); design has started on constructing a Facility for Accelerated Service Testing (FAST) at the Transportation Test Center at Pueblo, Colo.; development is proceeding on three test tracks at Pueblo.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Peterson, LA (Tel 202-426-2965)

STATUS: Active NOTICE DATE: Aug. 1975

ACKNOWLEDGMENT: FRA

01 099396
ACCOUSTICAL EMISSION MONITORING OF FIELD AND PLANT WELDS
Accoustical emissions in the ultrasonic range can be monitored with appropriate equipment to determine the soundness of field and plant welds made in steel rails. The investigation has shown that good and bad welds can be detected by the procedure. Additional development is directed to the refinements necessary for a production installation.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Martin, GC (Tel 312-225-9600)

STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: AAR

01 099415
THE PROTECTION OF TRACK SWITCHES FROM SNOW AND ICE FAILURE
Investigate methods of track switch protection from failure due to snow or ice. Thermal, non-thermal and passive methods have been and are being evaluated. A pulse jet combustion heater for forced convection heating in remote areas has been developed. A cyclone combustion heater has been developed for areas with adequate power supplies. A non-thermal switch protection system based on a horizontal air curtain has been evaluated on a limited scale for three winters. More extensive evaluation is planned. Two switches have been designed and fabricated. One employs vertical lift point members while the second uses a horizontal traverse double rail head profile section. Both switches need only overcome shear loads and do not have compression loading of snow or ice. One switch has had limited field trials while the second is due for field installation in mid-1975.

PERFORMING AGENCY: National Research Council of Canada, Division of Mechanical Engineering
INVESTIGATOR: Ringer, TR (Tel 613-993-2439)
SPONSORING AGENCY: National Research Council of Canada, Associate Committee on Railway Problems

STATUS: Active NOTICE DATE: Aug. 1975

ACKNOWLEDGMENT: National Research Council of Canada

01 109019
DEFORMATIONS UNDER RAIL TRACK STRUCTURE AND SUPPORT
The overall objective is the improvement of railway track support through better selection and use of ballast material and the sizing and spacing of rail ties. The objective implies the need to increase the resistance of the track structure to the development of irregularities due to repeated loading from traffic and due to the effects of weather. The program is primarily concerned with methods of selection and specification of ballast materials and optimization of the design of the ballasted track structure.
REFERENCES:
A Study of Stresses & Deformations under dynamic and Static Load Systems in Track Structure and Support, Raymond, GP, Canadian Institute of Guided Ground Transport, Report No. 75-10, Sept. 1975

PERFORMING AGENCY: Queen's University, Canada
INVESTIGATOR: Raymond, GP
SPONSORING AGENCY: Canadian Institute of Guided Ground Transport

STATUS: Active NOTICE DATE: July 1976 START DATE: May 1971 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: CIGGT

01 131759
FUNDAMENTAL PROBLEMS OF RAILROAD TRACK MECHANICS
Four fundamental research problems in railroad track mechanics will be investigated. One project will consist of a basic study of foundation models which are needed for the inclusion in more sophisticated railroad track analyses with a view of establishing the suitability of these models for track analyses. The second project will deal with the determination of bending stresses in the rails caused by static and dynamic loads, assuming that the base responds like a Pastermak model. The obtained results will be compared with the available results for the Winkler model and relevant test data, in order to establish the accuracy of the more general formulation. The third project will study the effect of the various assumptions made in the published analyses, on the determined buckling temperatures, such as: the effect of different temperature increases in each rail, the effect of various assumptions for the lateral ballast resistance, and the effect of dropping the usual assumption that in the adjoining regions the track rests on a "rigid" base. The fourth project will study the effect of nonlinear base characteristics on the dynamic response of the track. Of particular interest is the effect of pre-loading of the track by a distributed load, since often dynamic measuring cars are located in the middle of a moving train and the clarification of this effect is necessary for the proper interpretation of the recorded results.

PERFORMING AGENCY: Princeton University, Department of Aeronautics and Astronautics
INVESTIGATOR: Kerr, AD
SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG74-19030
STATUS: Active NOTICE DATE: Apr. 1975 START DATE: Feb. 1975 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: $30,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 5107)

01 133601
APPLICATION OF AEROSPACE TECHNOLOGY TO THE MATHEMATICAL AND STATISTICAL CHARACTERIZATION OF RAILBED AND HIGHWAY GEOMETRICS
No Abstract.

PERFORMING AGENCY: Auburn University, Department of Civil Engineering
INVESTIGATOR: Bell, LC
SPONSORING AGENCY: National Aeronautics and Space Administration, University Affairs Office, NCA 8-109 644-02-02

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: Dec. 1975 TOTAL FUNDS: $25,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GH 15449)

01 138467
MECHANICS OF BALLAST COMPACTION
Formulation of ballast compaction guidelines based on a review of the theory on the compaction of ballast sized, non-cohesive materials, laboratory and field measurements. Measures of the degree of ballast compaction are being developed.

PERFORMING AGENCY: State University of New York, Buffalo
INVESTIGATOR: Selig, ET (Tel (716) 831-3113)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Sluz, A (Tel (617) 494-2432)

Contract DOT-TSC-1115
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1976 COMPLETION DATE: Jan. 1978 TOTAL FUNDS: $216,000

ACKNOWLEDGMENT: TSC

01 138533
TRACK RESEARCH
Costs of construction and maintenance of track and supporting structures comprise a major portion of most rail transit or other fixed guideway systems. This program aims to reduce such costs while minimizing adverse environmental impact and insuring safety. Federal guidelines for transit track construction and maintenance are to be developed. After current construction and maintenance costs are appraised, potential R&D areas for reducing these costs will be identified and investigated.
Contract not yet awarded.

SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Butler, GL

STATUS: Proposed NOTICE DATE: July 1976 START DATE: Mar. 1977 COMPLETION DATE: Mar. 1980 TOTAL FUNDS: $5,000,000

ACKNOWLEDGMENT: UMTA

01 138535
TRACK GEOMETRY MEASUREMENT
This project is to produce a real-time track geometry measurement system which includes on-line data processing capability and may be used at revenue speeds without requirement for a special vehicle.

PERFORMING AGENCY: Transportation Systems Center, Department of Transportation
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Spencer, PE (Tel (202) 426-0090)

Contract UM-504
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1974 COMPLETION DATE: Sept. 1977 TOTAL FUNDS: $1,600,000

ACKNOWLEDGMENT: UMTA

01 138560
TRACK INSPECTION AND TESTING

Develops, recommends, implements and promotes an improved inspection and detection project in support of the FRA National Track Inspection Program. Provides for support of test activities and data collection and coordinates support with the Office of Safety, other FRA elements, government agencies, railroads and support contractors. Makes provisions for operation, maintenance and transportation of inspection vehicles and for data processing services.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Winn, JB (Tel (202) 426-1682)

STATUS: Active NOTICE DATE: June 1976 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138561
AUTOMATED TRACK INSPECTION, SYSTEM DEVELOPMENT

The objective of this program is to provide automated equipment to assist the FRA Track Inspectors in monitoring the National track network. A fleet of vehicles will be procured to measure track geometry and internal rail flaws. This fleet includes three existing measurement vehicles which provide real time data to both the inspector and the host railroad. Measurement systems will be developed and tested for potential use in the inspection vehicle.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Winn, JB (Tel (202) 426-1682)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138562
IMPROVED TRACK STRUCTURES RESEARCH PROGRAM

The Improved Track Structures Research Program has been established to achieve improvements in the safety of train operations by reducing the frequency of train derailments through providing guidelines, standards and techniques for achieving safer track structures and to improve the serviceability of the track structures through more effective maintenance techniques and with more durable, yet economic track structure designs. The program will accomplish these objectives through a series of contract research efforts and research at the Transportation Systems Center addressing both analytical studies and field test verification.

For subprograms see RRIS Nos. 01A 138563 and 01A 138564. RRIS. Bulletin 7602.

PERFORMING AGENCY: Federal Railroad Administration, Improved Track Structures Research Division
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Krick, RL (Tel (202) 426-4377)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138563
TRACK ACCIDENT REDUCTION RESEARCH SUBPROGRAM

The Track Accident Reduction Research Subprogram is directed toward improvement in the number and frequency of train accidents related to track structure causes by identification of operating limits for existing rolling stock running on contemporary track based on limiting adverse wheel/rail dynamic interaction and by specification of the safe structural load bearing limits of existing track systems and required inspection demands.

PERFORMING AGENCY: Federal Railroad Administration, Improved Track Structures Research Division
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Krick, RL (Tel (202) 426-4377)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138564
IMPROVED TRACK PERFORMANCE RESEARCH SUBPROGRAM

The Improved Track Performance Research Subprogram is directed toward improvement in track stability and life by development of cost effective guidelines for updating current track systems, for designing affordable alternatives and for maintenance requirements. The following technical areas are being considered: new rail quality, improved rail joining techniques, analysis and design for improved cross tie-track systems, ballast selection-material performance studies, soil stabilization studies, ballast tamping and consolidating equipment performance maximization, and track maintenance studies.

PERFORMING AGENCY: Federal Railroad Administration, Improved Track Structures Research Division
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Krick, RL (Tel (202) 426-4377)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138568
COOPERATIVE RESEARCH PROGRAM ON TIMBER CROSS TIE DEVELOPMENT

A variety of particle board specimens involving variations in geometry, orientation and binding resins for the fibers have been investigated for the production of a reconstituted cross tie. The design with seven laminated particle boards with the external laminates featuring fiber orientation have been subjected to laboratory tests showing them having characteristics much like sawn hardwood ties. Production of several hundred ties for service testing and economic analysis of the feasibility of such a product are being made.

PERFORMING AGENCY: Forest Products Laboratory, Department of Agriculture; Association of American Railroads Technical Center
SPONSORING AGENCY: Forest Products Laboratory, Department of Agriculture; Association of American Railroads

STATUS: Active NOTICE DATE: July 1976 START DATE: 1973

01 138798
RAIL OVERTURNING INVESTIGATION

As part of task 1 of Phase II of the Track Train Dynamics Program, this study considers the factors which can contribute to the overturning of rail.

PERFORMING AGENCY: Illinois Institute of Technology, Civil Engineering Department
SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1975 COMPLETION DATE: Dec. 1976

01 139163
ENGINEERING ANALYSIS OF STRESS IN RAILS

This program is to analyze procedure for predicting stresses in rails; to provide a description of stresses required for prediction of rail degradation and rail failure due to fissures, split heads and bolt hole cracks; to assess design and operational trade-offs on thermal, flexural, residual and contact stresses and to provide input to a rail reliability model. The goal is an analytical model where factors in rail degradation may be determined.

PERFORMING AGENCY: Battelle Columbus Laboratories
INVESTIGATOR: Johns, TG (Tel (614) 424-6424)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: McConnell, DP (Tel (617) 494-2451)

Contract DOT-TSC-1038
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: June 1975 COMPLETION DATE: July 1977

ACKNOWLEDGMENT: FRA

01 139165
COLLECTION AND ANALYSIS OF TEST DATA
Because of the premature failure of the Kansas Test Track, the contractor is to conduct a post mortem study of the instrumentation originally installed in concrete cross tie and concrete slab track. Premature termination of traffic meant that data sought was never obtained. Remaining instruments are to be examined for condition and environment with the aim of determining if the data that was obtained was valid.

PERFORMING AGENCY: Portland Cement Association
INVESTIGATOR: Weber, JW (Tel (312) 966-6200) Hanson, NW
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

Contract DOT-TSC-FR-90043
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: July 1971 COMPLETION DATE: Dec. 1976

ACKNOWLEDGMENT: FRA

01 139167
MEASUREMENT OF VERTICAL TRACK STIFFNESS
The objective is to demonstrate the feasibility of stiffness measurement using the Kansas Test Track and the FRA track measurement cars equipped with existing track surface measurement systems and then develop and demonstrate software to support real-time measurement of stiffness using Southern Railway's Track Measurement Car R-1. Soft spots may be determined before they develop into serious geometric defects and it can be found if an existing geometric defect is related to track stiffness.

PERFORMING AGENCY: ENSCO, Incorporated
INVESTIGATOR: Corbin, J (Tel (703) 321-9000)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel (202) 426-4377)

Contract DOT-FR-54174
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Aug. 1975 COMPLETION DATE: Sept. 1976

ACKNOWLEDGMENT: FRA

01 139168
DYNAMIC ANALYSIS OF NONCONVENTIONAL TRACK STRUCTURE AT KANSAS TEST TRACK
After premature failure of the Kansas Test Track, the objective is to determine reasons for observed large deflections of concrete beam and slab track structures, particularly at control joints. The mechanism for negative bending moment cracks on tops of beams and slabs is to be investigated. The effect of major system parameters on track structures responses is to be studied. Mathematical models will study track train dynamic characteristics of the track with extension to models of the nonconventional track sections as a basis for design improvements of beam/slab structures.

PERFORMING AGENCY: Mitre Corporation
INVESTIGATOR: Milner, JL (Tel (703) 790-6456)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: McCafferty, RM (Tel (202) 426-4377)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: July 1975 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: FRA

01 139170
TRACK ROUGHNESS STUDIES
Permissable levels of track roughness that can be accommodated by conventional rolling stock without unacceptable lading damage or passenger discomfort are to be investigated with the aim of determining track maintenance costs that can be incorporated into compensatory pricing. The contractor will collect and analyze available data to formulate a methodology for carrying out research to define service-related track maintenance costs.

Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel (202) 426-4377)

STATUS: Proposed NOTICE DATE: July 1976 START DATE: 1977

ACKNOWLEDGMENT: FRA

01 139176
APPLYING STATE OF THE ART EQUIPMENT TO THE IMMEDIATE RE-DENSIFICATION OF DISTURBED TRACK BALLAST
Quantification of the effects of accelerated ballast consolidation in cribs and shoulders and under ties in the U.S. are examined in the light of the success of the process in Europe. The railroad industry could observe the use of ballast consolidation equipment on its own track while the evaluation of accelerated consolidation could be made. Conclusions are to include inputs from participating railroads.

PERFORMING AGENCY: ENSCO, Incorporated
INVESTIGATOR: Cunney, EG (Tel (703) 569-9000)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel (202) 426-4377)

Contract DOT-FR-54174
STATUS: Completed NOTICE DATE: Aug. 1976 START DATE: June 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: FRA

02 055835
ENGINEERING DATA ON RAIL SYSTEM DYNAMICS
The efforts of the contractor are expected to result in: 1- A computer program to be operational on TSC equipment for predicting the forces and tracking errors of a slowly moving rail car negotiating curves and traveling over track with specified track irregularitiies and alignment variations. 2 -Analytical tools and computations subroutines for extension of linearized model response programs existing at TSC for predicting rail vehicle vibration and track forces in response to statistical and deterministic descriptions of track geometry and track irregularities to include the influence of significant rail system non-linearities. 3- definition of Test Requirements for validation of the analysis tools developed above for prediction of rail system dynamics.

PERFORMING AGENCY: Clemson University, Department of Mechanical Engineering
INVESTIGATOR: Law, EH Cooperrider, NK Hedrick, JK
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Weinstock, H (Tel (617)494-2038)

Contract DOT-TSC-902
STATUS: Active NOTICE DATE: July 1976 START DATE: Sept. 1974 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $95,000

ACKNOWLEDGMENT: FRA

02 058257
TRACK-TRAIN DYNAMICS RESEARCH PROGRAM, PHASE II
In a joint international Government-industry program, the Federal Railroad Administration in cooperation with the Association of American Railroads, the Railway Progress Institute, and the Canadian Transportation Development Agency has undertaken a ten-year comprehensive Track-Train Dynamics Research Program to develop a better understanding of the kinematics of railroad performance. This joint research effort is divided into three phases, the first of which has entailed the collection and analysis of data that is necessary to define quantitatively the characteristics of the present railroad system in North America. In the second phase (3 years) this data is to be applied to the development of requirements and interim performance specifications that will lead eventually to the development of improved equipment in the third (5 years) phase of the program. Initially in Phase II investigations will be conducted in the following areas: track structures, wheel-rail contact, trucks and suspension, carbody, couplers and draft gear and the brake system. The descriptive data in this research listing pertains only to that portion of the overall program that is sponsored by the Federal Railroad Administration. This support amounts to approximately one-third of the total resources dedicated to the TTD Research Program.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: Sutliff, DR (Tel 312-225-9600)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202)426-1227)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1976 COMPLETION DATE: July 1979 TOTAL FUNDS: $1,900,000

ACKNOWLEDGMENT: FRA

02 058263
ROLL DYNAMICS UNIT/VIBRATION TEST UNIT FOR U.S. DEPARTMENT OF TRANSPORTATION RAIL DYNAMICS LABORATORY
The U.S. Department of Transportation Rail Dynamics Laboratory (RDL) will house the Roll Dynamics Unit (RDU) and Vibration Test Unit (VTU) at the Transportation Test Center, Pueblo, Colorado. The RDL will permit analytical and experimental studies of railroad and transit vehicles, systems, and components in a controlled and scientific manner that are representative of actual, in-service conditions. Through the study of vehicle dynamics in the RDL, the number of dynamic related accidents and derailments and their attendant costs should be reduced significantly. The contractor is responsible to deliver a functional RDU and VTU. The RDU will be capable of simulating speeds of approximately 200 mph and will accommodate vehicles up to 108 feet long, 12 feet, weighing 200 tons. The VTU will subject rail equipment to vertical and lateral vibrations experienced on typical track and handle vehicles up to 90 feet long, 12 feet wide and weighing 160 tons.

PERFORMING AGENCY: Wyle Laboratories, Scientific Services and Systems Group
INVESTIGATOR: de Benedet, D (Tel 303-597-4500)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Gross, A (Tel (202)755-1877)

Contract DOT-FR-64200
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: Dec. 1977 TOTAL FUNDS: $7,000,000

ACKNOWLEDGMENT: FRA

02 058265
RAILROAD EQUIPMENT RIDE QUALITY ANALYSIS
This project will determine ride quality characteristics of various designs of railroad equipment trucks by means of computer simulation. Report under preparation.

PERFORMING AGENCY: Battelle Memorial Institute
INVESTIGATOR: Meekum, H (Tel 614-299-3151)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Gannett, CM (Tel 202-426-9655)

Contract DOT-FR-20077
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Jan. 1975 TOTAL FUNDS: $45,000

ACKNOWLEDGMENT: FRA

02 058303
FREIGHT CAR TRUCK DESIGN OPTIMIZATION
Phase I of the Truck Design Optimization project (TDOP) was a multiyear project to evaluate the performance characteristics of existing three-piece freight car trucks; to determine through cost-benefit analysis the feasibility of improving truck performance by mechanical modification; to provide performance and testing specifications for use in the development of freight car systems; and to study new truck concepts in anticipation of future test requirements.

Freight Car Truck Design Optimization Introduction and Test Plans Series 1, 2, & 3 Tests-Phase I, Rpt. No. FRA-OR&D 75-59, PB-248632

Freight Car Truck Design Optimization, Detailed Test Plan Series 4 Tests - Phase I, Rpt. No. FRA-OR&D 75-60, PB-246389

Freight Car Truck Design Optimization Detailed Test Plan Series 5 Tests - Phase I, Rpt. No. FRA-OR&D 75-82, OB-248631

Freight Car Truck Design Optimization, Truck Economic Data Collection and Analysis, Rpt. No OR&D 75-58A, PB-251400

Freight Car Truck Design Optimization, Methodology for a Comprehensive Study of Truck Economics, Rpt. No. FRA-OR&D 75-58, PB-248832

Freight Car Truck Design Optimization, Survey and Appraisal of Type II Trucks, Rpt. No FRA OR&D 76-133, PB-248633

Freight Car Truck Design Optimization, Literature Search- Volume I, Rpt. No. FRA-OR&D 75-81A, PB-248350

Freight Car Truck Design Optimization, Literature Search- Volume II, Rpt. No. FRA-OR&D 75-81B, PB-248351

Freight Car Truck Design Optimization, Literature Search- Volume III, Rpt. No FRA-OR&D 75-81C, PB-248352

PERFORMING AGENCY: Southern Pacific Transportation Company
INVESTIGATOR: Byrne, R (Tel 415-362-1212X-22547)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Fay, GR (Tel 202-426-0855)

Contract DOT-FR-40023
STATUS: Completed NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: July 1976 TOTAL FUNDS: $2,000,000

ACKNOWLEDGMENT: FRA

02 058316
CONTINUED DEVELOPMENT AND APPLICATION OF THE DYNALIST COMPUTER PROGRAM
The DYNALIST computer program was originally developed by TRW for DOT to compute complex eigenvalues for stability analyses of linear

dynamic systems of up to 500 degrees of freedom. The program was extended by J.H. Wiggins Company for DOT/TSC to compute response to both sinusoidal and stochastic excitations using complex modal synthesis. The purpose of the project is to refine the program (DYNALIST II) to provide improved versatility and to significantly reduce the level of user effort and sophistication presently required.

PERFORMING AGENCY: Wiggins (JH) Company
SPONSORING AGENCY: Transportation Systems Center, RR-515
RESPONSIBLE INDIVIDUAL: Brantman, RP (Tel (617)494-4224)

Contract DOT-TSC-990
STATUS: Active NOTICE DATE: July 1976 START DATE: Feb. 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $29,194

ACKNOWLEDGMENT: FRA

02 058401
AERODYNAMICS ON SUBWAY TUNNEL DESIGN AND EFFECTS OF OPERATIONAL COSTS
Objectives are: (1) Define key design parameters that relate to aerodynamics and determine the operational costs of the design options. (2) Determine the operational costs associated with the operational design options, i.e., train length and scheduling. (3) Assess the impact of environmental constraints on operational costs and related to the aerodynamics of the system.

PERFORMING AGENCY: National Aeronautics and Space Administration
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

IA DOT-AS-50030
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Feb. 1975 COMPLETION DATE: Nov. 1976 TOTAL FUNDS: $23,600

ACKNOWLEDGMENT: TRAIS

02 058465
WAYSIDE DERAILMENT INSPECTION REQUIREMENTS STUDY
The main objective is to establish the impact and causes of railroad derailments and derailment-related accidents, and to assess existing and possible new wayside inspection means for preventing or reducing the occurrence of these events. It is also the objective to produce an analysis and presentation of derailments and pertinent related matters organized in a manner to facilitate understanding, identification of common characteristics and ultimately, effective methods of correction. Finally, the effort seeks to establish a posture on future action with respect to wayside detection and prevention of derailments: what changes and improvements should be made, and what innovations can best efect improvement with respect to wayside detection and prevention of accidents.

PERFORMING AGENCY: Shaker Research Corporation
SPONSORING AGENCY: Transportation Systems Center, RR-523
RESPONSIBLE INDIVIDUAL: Ehrehbeck, R (Tel (617)494-2273)

Contract DOT-TSC-1029 (CPFF)
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $47,139

ACKNOWLEDGMENT: TRAIS (RR-523), FRA

02 058508
GUIDEWAY VEHICLE COST REDUCTION
The objective is to develop tradeoffs between transit vehicle suspension system sophistication and guideway/roadway smoothness while maintaining acceptable ride quality. These tradeoffs can be applied to reducing the costs of transportation system development and maintenance. A systems analysis approach shall be applied to a conventional urban bus and a conventional passenger railcar. The same unified approach shall be applied to each system, varying only the details of the particular model. Major emphasis shall be on vehicle modeling, railway/roadway and vehicle suspension feasibility determination. The deterministic ride quality work begun on a previous program shall be utilized and extended.

PERFORMING AGENCY: Arizona State University, Tempe, Department of Mechanical Engineering
INVESTIGATOR: Klinger, DL (Tel (602)965-6469)
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation; Arizona State University, Tempe
RESPONSIBLE INDIVIDUAL: Ravera, R (Tel (202)426-9365)

Contract DOT-OS-50107 (CS)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $128,000

ACKNOWLEDGMENT: TRAIS (PUR-50175), OST

02 058701
ENGINEERING SUPPORT FOR THE INVESTIGATION OF RIDE CHARACTERISTICS OF THE GENERAL ELECTRIC E6OCP ELECTRIC LOCOMOTIVE
Tasks include: 1. Prepare test plan for measuring track forces induced by Metroliner cars and electric and diesel-electric locomotives on Penn Central Transportation Company tracks between New York City and Washington, D.C. 2. Calculate track forces being induced by the General Electric Company E6OCP locomotive based upon test data furnished by General Electric Company. 3. Attend meetings at Washington and test runs between New York City and Washington on the PCTC. 4. Recommend the maximum safe operating speed of the E6OCP locomotive over PCTC tracks between New York City and Washington.

PERFORMING AGENCY: Battelle Columbus Laboratories
INVESTIGATOR: Meacham, HC
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Gannett, CM (Tel 202-4269665)

Contract FR-54197
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 TOTAL FUNDS: $9,748

ACKNOWLEDGMENT: TRAIS

02 080321
TRACK DYNAMICS DATA ACQUISITION SYSTEM
The design, construction and testing of an instrumented system for high speed (32 KBITS) acquisition of data on computer formatted magnetic tape on motion of the track and roadbed subjected to train loads is being carried out to provide essential data for improved design of both track and rolling stock. /RTAC/
REFERENCES:
Data Acquisition System--Design Manual Cornell, ER, CIGGT, Report 76-1, Mar. 1976

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 2.9
INVESTIGATOR: Corneil, ER
SPONSORING AGENCY: Canadian National Railways; Ministry of Transport, Canada; Queen's University, Canada

STATUS: Completed NOTICE DATE: Mar. 1976 START DATE: May 1974

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 081796
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II
The objectives of this program are the development of recommended performance specifications and design guidelines for railroad freight cars, track structures, and their components and subsystems. Performance specifications are to coincide with the demands of the dynamic operating environment to which such systems are subjected. Details of methods and scope are included under specific task references.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Sutliff, DR (Tel 312-225-9600 X-1463) Hawthorne, KL (Tel 312-255-9600 X-1463) Martin, GC (Tel 312-225-9600 X-1463)
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

02 081799
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 2--WHEEL/RAIL

Overall task goals are to improve knowledge of the mechanics of wheel/rail interactions and to establish recommended performance specifications and design guidelines for wheels and rail. Task will involve applied research in wheel and rail metallurgy in order to determine requirements for improved performance. Research will also be conducted in stress analysis and fracture mechanics with the goal of developing improved design techniques and life cycle prediction methods. Stress analysis will especially concentrate on the contact stresses at the wheel/rail interface. Wear research conducted under Task 9, Advanced Analytical Techniques, will supply important input to this task. Rail corrugation, with initial effort by Canadian participants in TTD, has been studied. The rail stress analysis investigation, with particular effort on determining the stresses within rails as developed by passage of a vehicle, is progressing. In the wheel area, present effort is on developing an elastic-plastic stress analysis because mechanical and thermal stresses can go beyond the yield point of steel.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR:
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

02 081803
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 7--TEST MANAGEMENT

Task objectives is to coordinate and conduct such tests as are necessary for the pursuit of Tasks 1-6 of Track Train Dynamics, Phase II. Task will provide clearinghouse function for data requests and will design and conduct appropriate laboratory and field tests.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Darien, H (Tel (312)225-9600 X-888)
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

02 081804
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 9--ADVANCED ANALYTICAL TECHNIQUES

Task objective is to assure that Track Train Dynamics-Phase II, Tasks 1-6 are equipped with the latest advances in applicable analytical techniques. Task will essentially be performed through contract efforts in such areas as stress analysis, fracture mechanics, and wear properties of ferrous materials.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Martin, GC (Tel 312-225-9600 Ext 877) Moyar, GJ (Tel 312-225-9600 Ext 877)
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

02 081805
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 8--PROGRAM ANALYSIS

The objective of this task is to assure economic justification of recommendations which result from research activities conducted in Tasks 1-6 of Phase II of the Track Train Dynamics Program. Task will include prior evaluation of research and implementation strategies to forecast potential economic benefits as an aid to priority determination. Areas selected for priority determination will be selected by program management. The principal technique for priority determination will be lifecycle costing based on data accumulated through existing industry channels supplemented by field surveys. Task will supply economic justification package for final recommendations based on industry status and forecasts and time of release.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Hawthorne, KL (Tel 312-225-9600 Ext 862)
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

02 099367
PILOT STUDY FOR THE CHARACTERIZATION AND REDUCTION OF WHEEL/RAIL LOADS

This project will be carried out in two phases, with the first phase developing a method for the analytic and experimental characterization of wheel/rail loads. In addition, this phase will provide a detailed program plan and a W/R load field measurement and data reduction plan for a specified track route that will then be implemented in Phase II. During Phase II, the W/R loads on selected track sections will be determined through implementation of the field measurement plan. These loads will be compared with those predicted through application of the analytical methodology. After modification and/or validation, the prediction method will be used to extrapolate W/R load data to alternative track, vehicle and operating conditions. This is intended to identify alternate strategies for reducing those W/R loads which are most closely associated with track degradation.

PERFORMING AGENCY: Battelle Memorial Institute
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Safety Research
RESPONSIBLE INDIVIDUAL: Kurzweil, L (Tel 617-494-2142)

Contract DOT-TSC-1051
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: Mar. 1977 TOTAL FUNDS: $325,430

ACKNOWLEDGMENT: FRA

02 099380
IMPROVED WHEEL AND RAIL PERFORMANCE VIA CONTROL OF CONTACT STRESS

A wheel-rail system should provide adequate traction and sufficient lateral guidance to prevent excessive flange contact and unstable dynamic modes of excess vibration and derailments. A general numerical method for analyzing contact stresses at conformal interfaces will be developed for conventional and new wheels and rails. Braking and acceleration will be considered in detail with the objective of greater safety.

PERFORMING AGENCY: Pennsylvania University, Philadelphia, Department of Mechanical Engineering and Applied Mechanics
INVESTIGATOR: Paul, B
SPONSORING AGENCY: Office of the Secretary of Transportation, Department of Transportation
RESPONSIBLE INDIVIDUAL: Gannett, CM

Contract DOT-OS-40093

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: June 1974 TOTAL FUNDS: $70,081

ACKNOWLEDGMENT: DOT

02 099388

FREIGHT LOSS AND DAMAGE PROGRAM

This program is based on the evaluation of cost-effective means of damage control and a study of commodities to which various cost effective methods are applicable. It is planned to develop an industry approach to damage control by establishing coordinated programs to demonstrate and evaluate control procedures. The program will be directed toward the control of damage to lading and the economics of such control. Adequate background data is necessary to clearly define any damage problem. It is necessary in certain cases to define the fragility of the product and design laboratory tests to simulate the train environment and produce the same type of damage experienced in transit. Some areas of experimental research provide data on over- the-road shock and vibration and distribution of forces and accelerations in loaded cars under end impact conditions. In cooperation with the Railroad Truck Safety Research and Test Project, the environment during over-the-road operation of a 60-foot box car was determined by extensive instrumentation and recording equipment. This test covered a distance of 5,000 miles over five different railroads. The data, recorded on 22-3600 foot magnetic tapes in analog form was later digitized and sampled in a mini-computer and printed out in a teletypewriter. The data was sampled at the rate of ten times per second or 36,000 times per hour. It describes vertical, floor and roof lateral acceleration occurrences at both ends of the car and speed occurrences. The data is presented in RMS (root-mean-square) format. Statistical computer programs have been written to provide addition analyses such as combining data on a hour by hour basis. Data on freight car vibration will serve as input to the Rail Dynamics Simulator at the Transportation Test Center at Pueblo, Colo. At the request of the National Freight Loss and Damage Prevention Committee, and working with the Transportation Committee of the U.S. Brewers Association, a program was undertaken to understand and alleviate the damage to beer in aluminum cans. This is a pilot program in the can damage area. AAR has also provided funds to the Illinois Institute of Technology for research on freight damage with objectives of establishing analytical methods of predicting vibration and shock and then to design cost-effective methods for control. A report covering the first year of the two year program has been published.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads

STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: AAR

02 099390

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS. PHASE II. TASK 10--SPECIAL PROJECT, LOCOMOTIVES

The objective of this task is to review accident statistics relating to derailments due to, or related to, locomotives for the purpose of determining whether or not six-axle locomotives are more prone to derailment than four-axle locomotives. Should the data reveal correlation between truck types and accidents, existing and/or newly developed computer models of locomotive trucks will be utilized for developing strategies for alleviating the problems.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Hawthorne, KL (Tel 312-225-9600 X-862) Polk, E
SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency

STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: AAR

02 099408

TRAIN/TRACK DYNAMICS PROGRAM. PHASE II

This is the second phase of a jointly sponsored program of theoretical and experimental research on train/track dynamics and related areas. The specific objectives of this phase of the work are: (a) Investigation of track wear including the effects of wheel and axle loadings, rail metallurgy and tribology. (b) Investigation of truck steering characteristics and methods of measurement of wheelset angle of attack. (c) Investigation of the applicability of laser equipment to the measure of vibrational and other characteristics of railway facilities including bridge structures.

PERFORMING AGENCY: Canadian Pacific
INVESTIGATOR: Bethune, AE (Tel 514-861-6811)
SPONSORING AGENCY: Canadian Pacific; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: McLaren, W (Tel 514-2834536)

STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1975 COMPLETION DATE: Feb. 1977

ACKNOWLEDGMENT: Transportation Development Agency

02 099409

TRAIN/TRACK DYNAMICS PROGRAM. PHASE II

The program is the second phase of a broad research and development program in Train/Track Dynamics and related subjects. Specific objectives of the second phase are: (a) Measurement of freight car truck ride characteristics and evaluation of overall truck performance. (b) Evaluation of curving performance of trucks of six-axle locomotives with lateral clearance. (c) Evaluation of track structures including concrete ties with conventional fasteners and design of improved track structures including improved rail metallurgy. (d) Instrumentation of wheel sets to measure wheel/rail forces. (e) Research on wheel/rail interaction during curve negotiation including the effects of wheel profile to reduce severe wheel and track wear in curves. (f) Development of train handling recorder for use in the development of simulators for engineman training. (g) Evaluation of operational ballast requirements. (h) Evaluation of the effectiveness of various rail tie-down systems.

PERFORMING AGENCY: Canadian National Railways
INVESTIGATOR: Rennie, RP (Tel 514-877-4337)
SPONSORING AGENCY: Canadian National Railways; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: McLaren, W (Tel 514-2834536)

STATUS: Active NOTICE DATE: July 1976 START DATE: Sept. 1974 COMPLETION DATE: Sept. 1976

ACKNOWLEDGMENT: Transportation Development Agency

02 099413

TO STUDY THE DYNAMIC BEHAVIOR OF RAILWAY CARS AND TRUCKS TO MINIMIZE WEAR AND LADING DAMAGE

Using over the road testing and hydraulic actuators or other perturbation to discover structural modes of vibrations, truck hunting characteristics, curving phenomena, wear mechanisms, remedial techniques and to encourage new designs. To develop new instrumentation to measure wheel and rail forces, geometric properties of truck designs and wheel profiles, and the mathematical relations between these parameters.

PERFORMING AGENCY: National Research Council of Canada, Division of Mechanical Engineering
SPONSORING AGENCY: National Research Council of Canada, Associate Committee on Railway Problems

STATUS: Active NOTICE DATE: Aug. 1975

ACKNOWLEDGMENT: National Research Council of Canada

02 099431

RAILROAD TANK CAR SAFETY AND TEST PROJECT. PHASE 15- SWITCH YARD IMPACT TESTS

In 1972 and 1974 catastrophic switchyard accidents involved the striking of light empty freight cars by several heavy tank cars carrying liquefied flammable gas. The resulting head puncture of the leading loaded tank car by the coupler of the empty car released gas which flooded the yard without instant ignition. When the gas cloud finally reached a point of ignition, violent explosion ensued. Because of these accidents, a fullscale test program, supplemented by analytical studies was undertaken. In the tests single empty freight cars will be impacted by loaded tank cars, up to, and beyond, destructive speeds. The objectives are to assess the efficiency of the shelf coupler, the head shield, or both in combination, toward preventing punctures in this particular accident scenario. Analytical studies will be conducted to broaden the understanding of the phenomenon, particularly regarding the ranges of variables not easily studied in the tests alone. The program is being conducted in cooperation with the FRA at the DOT Transportation Test Center.

See also RRIS 12A 081788.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1974 COMPLETION DATE: 1976

ACKNOWLEDGMENT: AAR

02 099434
DEVELOPMENT OF A TRAIN HANDLING CONTROL MODEL FOR FREIGHT TRAIN LOCOMOTIVE ENGINEER PERFORMANCE

The objective of this effort is to reduce data taken in locomotive cabs on revenue freight runs to the form of a mathematical model of the train handling performance of a locomotive engineer. As a minimum, the following phases of freight train handling will be modeled: starting the train from rest, controlling the train through changes in grade, and stopping the train. The data records include settings of locomotive controls, speed, accelerations, motor load, brake system pressures, wheel slip, drawbar force, slack condition, drawbar angle, and main generator voltage. Also available are supervisor ratings of each engineer's performance on each recorded test run. The development of this model is expected to contribute to the understanding and improvement of selection, training, and evaluation of engineers and to support the development of improved locomotive operating controls and displays.

Funds for this project are administered by DOT/Transportation Systems Center, Cambridge, Mass.

PERFORMING AGENCY: Turpin Systems Company
INVESTIGATOR: Birdsall, JB (Tel 213-998-1404)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Ofsevit, D (Tel (617)494-2617)

Contract DOT-TSC-1037
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $37,204

ACKNOWLEDGMENT: FRA

02 128041
CALCULATION OF TRAIN AERODYNAMIC DRAG (FOR ENERGY MANAGEMENT PROGRAM)

The purpose of this project is to: 1. Calculate the steady and unsteady aerodynamic drag of vehicles in tunnels and free air. 2. Modify and/or develop computer programs for the calculation of the aerodynamic drag of vehicles as required by the energy management program. A literature survey and review of the aerodynamics of trains in tunnels under project 3603 is well underway. Also, a computer program has been acquired to estimate the unsteady aerodynamic drag of vehicles in tunnels. With this program, it is now possible to start to perform the drag calculations for the purpose of obtaining preliminary power profile and energy loss estimates. It is anticipated that the program will have to be modified to incorporate the latest information obtained in the literature review. This project covers the calculation of aerodynamic drag for the three cases of deep tunnel, cut and cover, and free air, and studies on propulsion systems with and without energy storage. The result, conceptual designs on a total energy basis. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 3605
INVESTIGATOR: Colavincenzo, O
SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1975 COMPLETION DATE: 1976

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 130948
LINEAR STRUCTURAL SYSTEMS IDENTIFICATION

This research program considers an experimental, theoretical, and computational analysis of the identification of linear structural dynamical systems under random excitation, for example tall buildings observed under wind excitation, and bridge-type structures under wind and vehicle motion excitations. The emphasis is placed on structural systems characterized by regularly sampled stationary randomly excited ordinary differential equation systems. The objectives are to achieve maximum likelihood estimates of the parameters of scalar and multivariate time series fitted to computer synthesized, published, and field vibration data and to investigate theoretically and computationally the statistical performance of the estimates of the periods of vibration, damping parameters, transfer function; and differential equation descriptions (stiffness and damping matrix) of the structures.

This action provides a second year of support for continuing grant ENG-7409883.

PERFORMING AGENCY: Hawaii University, School of Arts & Sciences, Computer & Information Science
INVESTIGATOR: Gersch, W Nielsen, NN
SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG74-09883 A01

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: Aug. 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $56,900

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 3470 4)

02 138469
TRUCK DESIGN OPTIMIZATION PROJECT, PHASE II

Phase II of the Truck Design Optimization Project (TDOP) will finalize the performance and testing specifications and economic methodology generated in Phase I; characterize the performance and economics of Type II, special service freight car trucks; develop performance and testing specifications as well as the economic methodology for Type II trucks incorporating wear and performance indices; provide related economic and analytical models of freight car trucks; and determine the feasibility of advanced designs and integrated carbody support systems.

Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Fay, GR (Tel (202) 426-0855)

STATUS: Proposed NOTICE DATE: July 1976 START DATE: Jan. 1977 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: FRA

02 138566
LOCOMOTIVE TRUCK DYNAMICS

The purpose of this study is to establish the dynamic performance criteria of locomotive trucks. NASA will obtain experimental parameters, such as stiffness and mass property data, in a format useable for direct application to various dynamic truck models being developed by industry and government.

PERFORMING AGENCY: Marshall Space Flight Center, National Aeronautics and Space Administration
INVESTIGATOR: McPherson, J (Tel (205) 453-2475)
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Levine, D (Tel (202) 426-1227)

Contract DOT-AR-64231
STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1976 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: FRA

02 138569
FREIGHT DAMAGE RESEARCH

The two-year project has resulted in a mathematical computer model for the dynamics of a box car with a load using 24 degrees of freedom for the car and 3 degrees for the freight element. Another computer model related to freight lading under end impact conditions involves a two-tiered appliance load subjected to hump and flat yard switching. The computer program has been written.

A Mathematical-Computer Simulation of the Dynamics of a Freight Environment in a Railroad Freight Car, Illinois Institute of Technology, Rpt. No. IIT-TRANS-72-2

PERFORMING AGENCY: Illinois Institute of Technology
SPONSORING AGENCY: Association of American Railroads Technical Center

STATUS: Active NOTICE DATE: July 1976 START DATE: 1974 COMPLETION DATE: 1976

02 138572
CAR RETARDER YARD PROJECT
This project envisions the development of a computer simulation of car retarder yards and the theoretical investigatin into the friction mechanisms of retardation. An understanding of theoretical retardation mechanisms has developed and a small-scale replica of the retarding process will be used in development of appropriate friction coefficients for inclusion in the model and for validation and calibration of the model. The goal is a system for hump yards which will eliminate gross overspeed impacts during car coupling.

PERFORMING AGENCY: West Virginia University, Mechanical Engineering Department
SPONSORING AGENCY: Association of American Railroads

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975

02 138799
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS. PHASE II. TASK II-IFAST COORDINATION
The Interim Facility for Accelerated Service Test (IFAST) has been established at the Transportation Test Center at Pueblo, Colo., and the AAR and industry have given a considerable amount of input and support to developing types of tests and assisting in acquisition of materials and equipment. This task provided coordination between FRA, TTC and industry personnel.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Oct. 1975 COMPLETION DATE: 1976

ACKNOWLEDGMENT: Association of American Railroads Technical Center

02 139171
VEHICLE/GUIDEWAY INTERACTIONS
Improved understanding of vehicle/guideway interactions can lead to improved guideway designs. Since guideway often represents the major portion of initial capital investment and subsequent maintenance for a transportation system, improved design based on sound theoretical and engineering analysis can lead to lower overall system costs. Results should be useful to system palnners, public and private operators and construction contractors.

Contract not yet awarded.

SPONSORING AGENCY: Office of the Secretary of Transportation
RESPONSIBLE INDIVIDUAL: Ravera, R (Tel (202) 426-9364)

STATUS: Proposed NOTICE DATE: July 1976 START DATE: 1977

ACKNOWLEDGMENT: OST

02 139177
DYNAMIC PERFORMANCE CRITERIA FOR RAIL VEHICLE SAFETY
As part of an overall approach to assessment of track geometry standards and development of a core technology base for vehicle/track interaction, some work has been done on the effects of gage and cross level errors on dynamic performance. Efforts have been directed at derailment reduction dynamics with in-house work done on simplified wheelset models for defining influence of various factors on hunting instability. Algorithms and mathematical models of this phenomenon are being developed. Rock and roll stability has also been studied. The effect of track roughness on car dynamics is being studied.

PERFORMING AGENCY: Transportation Systems Center, Department of Transportation
INVESTIGATOR: Weinstock, H (Tel (617) 494-2038)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel (202) 426-4377)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1975 COMPLETION DATE: 1977

ACKNOWLEDGMENT: FRA

02 139178
FACILITY FOR ACCELERATED SERVICE TESTING (FAST)
Accelerated life testing of track structures and certain components of rolling stock. A 4.8 mile loop of track, divided into 22 sections, with experiments on rail metalurgy, ties (hardwood, soft wood, concrete, steel), ballast (different materials, depths, shoulder width), etc. Three 2,000 HP locomotives pulling more than 80 cars (hoppers, tanks, flats) each grossing over 100 tons, at average speed of 42 MPH for 16 hrs/day five days/week. Measurements taken during other 8 hours. Start operation in September 1976.

PERFORMING AGENCY: Federal Railroad Administration, Office of Research and Development
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development; Association of American Railroads
RESPONSIBLE INDIVIDUAL: Spanton, DL (Tel (202) 426-0850)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1976

ACKNOWLEDGMENT: FRA

03 025403
URBAN RAPID RAIL VEHICLE SYSTEMS PROGRAM
To enhance the attractiveness of rapid rail transportation to the urban traveler by providing existing and proposed transit systems with service that is comfortable, reliable, safe, and as economical as possible. Short range goals: Demonstration of the state-of-the-art in rapid rail vehicular technology. The Advanced Concept Train (ACT-1) phase calls for delivery of two next generation rail transit vehicles by early 1977 and the Advanced Subsystems Development Program (ASDP) calls for component development for near-term industry application.
Subcontractors for the project are St. Louis Car Company, AiResearch Manufacturing Company, and Transit Development Corporation.

PERFORMING AGENCY: Boeing Vertol Company
INVESTIGATOR: Cord, J (Tel 215-5223200)
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Silien, JS (Tel 202-4260090)

Contract CN-DOT-UT-10007
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1971 COMPLETION DATE: Dec. 1978 TOTAL FUNDS: $26,100,000

ACKNOWLEDGMENT: UMTA (IT-06-0026)

03 045009
STRUCTURAL STUDY OF HAZARDOUS MATERIAL TANK CARS
The ojectives of this research can be accomplished in three phases. The first phase shall be concerned with a review and evaluation of present specifications under which tank cars are currently being built. A study of the forces which tank cars are normally subjected to in service conditions will be part of this study. The next two phases are inter-related with one being an experimental study of a scale model one fourth or one fifth of a 112A 340W type tank car and the other being a theoretical analysis of a full scale tank car of the type 112A 340W using realistic thermal loads obtained from fire tests and analysis of fire accidents.

PERFORMING AGENCY: Louisiana Polytechnic Institute, Division of Engineering Research
INVESTIGATOR: Wilkinson, M
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202)426-1227)

Contract DOT-FR-30056 (CR)
STATUS: Active NOTICE DATE: July 1976 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $149,000

ACKNOWLEDGMENT: FRA

03 046502
RAILROAD WHEEL INVESTIGATION
An analytical elastic solution to determine the stresses developed in a railway car wheel when subjected to axisymmetric heating is being used to evaluate different geometric designs. The theory is being extended to include inelastic analysis which should permit the determination of residual stresses developed in the wheel. Hot spots developed in the wheel tread by brake action are also being examined to assist in better modeling of the temperature profile for the theoretical analysis.

PERFORMING AGENCY: Illinois University, Urbana, Department of Theoretical and Applied Mechanics
INVESTIGATOR: Wetenkamp, HR Bhattacharyya, RK Kipp, RM
SPONSORING AGENCY: Griffin Wheel Company

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: July 1971

ACKNOWLEDGMENT: Science Information Exchange (JGF 25)

03 048945
STUDY OF CRITERIA AND TECHNOLOGY FOR THE DESIGN OF SHELF COUPLERS
The contractor shall develop, test, and validate a comprehensive mathematical model with two principal capabilities: 1. It shall be suitable for simulating train action during derailment situations that may result in tank head penetration by couplers. 2. The second model segment shall be designed to simulate the structural response of couplers to design loads.

PERFORMING AGENCY: Washington University, St Louis
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Doyle, J

Contract DOT-OS-40106
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Mar. 1974 COMPLETION DATE: June 1976 TOTAL FUNDS: $420,000

ACKNOWLEDGMENT: Office of Systems Development and Technology (PR# PUR-1-40191)

03 050338
ARTICULATED RAIL CAR TRUCK DEVELOPMENT
Develop a dramatically improved freight car truck. Obtain background information for applying basic design to (a) locomotives; (b) rapid-transit cars, and (c) passenger cars.
Design, build, and test 100 ton capacity freight car trucks based on earlier work with 1/8 size scale models and a continuing work with mathematical models (computer simulation). Design a method of retrofilling existing 3-piece freight car trucks to give radial-steering.
Testing to 80 mph under empty and loaded car with worn wheels indicates that basic design and principles are sound. Plans being made for further testing multiple trucks in service.
REFERENCES:
An Evaluation of Recent Developments in Rail Car Truck Design, List, HA, ASME #71-RR-1, Apr. 1971, RRIS #050340-No 7401
Proposed Solutions to the Freight Car Truck Problems of Flange Wear and Truck Hunting, List, HA; Cardwell, WN; Marcotte, P, American Society of Mechanical Engineers, ASME #75-WA/RT-8, July 1975, RRIS #128632 in 7601

PERFORMING AGENCY: Railway Engineering Associates, Incorporated; Canadian National Railways; Dresser Transportation Equipment Division; Dominion Foundries and Steel, Limited
SPONSORING AGENCY: Railway Engineering Associates, Incorporated; Canadian National Railways; Dresser Transportation Equipment Division; Dominion Foundries and Steel, Limited
RESPONSIBLE INDIVIDUAL: List, HA Hawthorne, VT Bexon, H

In-House
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1971 COMPLETION DATE: 1977

ACKNOWLEDGMENT: Railway Engineering Associates, Incorporated, Dresser Transportation Equipment Division, Dominion Foundries and Steel, Limited

03 055604
A STRUCTURAL SURVEY OF CLASSES OF VEHICLES FOR CRASHWORTHINESS
It is the purpose of this contract to provide the technical data required for the evaluation and improvement of the crashworthiness of several classes of rail vehicles as required in the rail safety effort. This contract is also to provide preliminary technical data for planning of possible future crashworthiness tests efforts.

PERFORMING AGENCY: Boeing Vertol Company
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Raab, AR (Tel (617)494-2539)

Contract DOT-TSC-856 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: June 1977 TOTAL FUNDS: $239,139

ACKNOWLEDGMENT: UMTA, TRAIS

03 055636
RAIL SAFETY/EQUIPMENT CRASHWORTHINESS
The Transportation Systems Center (TSC) is providing technical assistace to the Federal Railroad Administration (FRA) in a program directed at improving railroad safety and efficiency by providing a technological basis for improvement and possible regulation in rail vehicle crashworthiness, inspection of equipment, surveillance of equipment, and other areas. As part of this program TSC is conducting technical analyses of passenger railcar collisions, derailments, and other accidents, directed toward minimizing occupant injuries.

PERFORMING AGENCY: Boeing Vertol Company
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Raab, AR (Tel (617)494-2539)

Contract DOT-TSC-821
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $137,064

ACKNOWLEDGMENT: FRA

03 055774
DEVELOPMENT OF DATA TO IMPROVE DESIGN CRITERIA OF RAILROAD WHEELS
To measure the mechanical loads and thermal gradients due to tread braking on railroad wheels in actual service; to determine the major wheel stresses resulting from these loads and thermal effects; and to develop improved wheel service life criteria.

PERFORMING AGENCY: IIT Research Institute
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Steele, RK (Tel (617)494-2002)

Contract DOT-TSC-855 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $202,000

ACKNOWLEDGMENT: TSC (PR# TME-0120)

03 055862
IMPROVEMENT OF RAILROAD ROLLER BEARING CERTIFICATION TEST PROCEDURES AND DEVELOPMENT OF ROLLER BEARING DIAGNOSTICS
The problem of railroad roller bearing failure shall be reviewed giving consideration at a minimum to the effects of the following factors: 1. over and under lubrication. 2. loose bearing components (i.e. cap screws, seals, backing rings). 3. bearing component design. 4. adaptor condition. 5. rebuild procedures. 6. environment (speed, load, temperature). The interaction of factors leading sequentially to different modes of failure should be clearly established. An analytical model of the bearing may be useful in assessing the importance of interactions between these factors leading to bearing failure.

PERFORMING AGENCY: Shaker Research Corporation
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, RR-414

Contract TSC-917 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Oct. 1974 COMPLETION DATE: June 1976 TOTAL FUNDS: $186,899

ACKNOWLEDGMENT: TRAIS (RR-414)

03 055916
IMPROVEMENT OF RAILROAD ROLLER BEARING CERTIFICATION TEST PROCEDURES AND DEVELOPMENT OF ROLLER BEARING DIAGNOSTICS
The problem of railroad roller bearing failure shall be reviewed giving consideration at a minimum to the effects of the following factors: 1. over and under lubrication. 2. loose bearing components (i.e. cap screws, seals, backing rings). 3. bearing component design. 4. adaptor condition. 5. rebuild procedures. 6. environment (speed, load, temperature). The interaction of factors leading sequentially to different modes of failure should be clearly established. An analytical model of the bearing may be useful in assessing the importance of interaction between these factors leading to bearing failure.

PERFORMING AGENCY: SKF Industries, Incorporated
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, RR-523

Contract TSC-935 (CPFF)
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Oct. 1974 TOTAL FUNDS: $31,415

ACKNOWLEDGMENT: TRAIS (RR-523)

03 058251
ASSESSMENT OF AUTOMATIC COUPLING SYSTEMS FOR RAILROAD FREIGHT CARS
The objective of this activity is identification, classification, and analysis of all significant concepts in rail freight car coupling systems which offer, through more-nearly automatic operation, a potential for an improvement in safety and overall operational costs compared to present couplers. Tasks include a literature survey, definition of operational characteristics of relevant concepts, preliminary engineering analysis and feasibility study of promising systems, preliminary estimation of life-cycle costs, and preparation of a recommended development plan.

PERFORMING AGENCY: Kearney (AT) and Company, Incorporated
INVESTIGATOR: Nyquist, A (Tel (312)782-2868)
SPONSORING AGENCY: Transportation Systems Center; Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Hazel, M (Tel (617)494-2528)

Contract DOT-TSC-1087
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: 1976 TOTAL FUNDS: $92,296

ACKNOWLEDGMENT: FRA

03 058301
RESEARCH OF FREIGHT DAMAGE, WHEEL-RAIL FRICTION AND ENGINE NOISE
The freight damage task consists of three areas: (1) identification and description of a freight car system for analysis to yield information for L&D problems faced by industry, (2) modelling of system, and (3) modelling of freight/packaging systems. The wheel-rail friction portion requires setup of a friction-creep test facility with improvements to equipment obtained from General Motors and performing tests to validate test results with previous tests. Engine noise investigations of structural vibration related noise radiation from the GM645E series engine are being performed.

Fifty percent funded by industry (AAR and GM-EMD).

REFERENCES:

Noise Investigation of a Railroad Diesel Engine Srivastava, N; Kumar, S, Illinois Institute of Technology, IIT-TRANS-74-1, May 1974, PB-232625/2

Friction-Creep and Wear Studies for Steel Wheel and Rail Karamchandani, KC; Kumar, S; Sciammarella, CA; Seth, B; etal, Illinois Institute of Technology, IIT-TRANS-75-1, May 1975

A Mathematical-Computer Simulation of the Dynamics of a Freight Element in a Railroad Freight Car, Shum KL; Willis, T, Illinois Institute of Technology, IIT-TRANS-75-2, May 1975

Structural Vibration Noise Abatement of a Large Diesel Engine, Varma, PK; Kumar, S, Illinois Institute of Technology, IIT-TRANS-72-2, Jan. 1976

Study of Friction and Creep Between Steel Wheels and Rail Sciammarella, C; Press, MD; Kumar, S; Seth, B; et al, Illinois Institute of Technology, IIT-TRANS-76-2, Mar. 1976

PERFORMING AGENCY: Illinois Institute of Technology
INVESTIGATOR: Kumar, S
SPONSORING AGENCY: Department of Transportation
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel (202) 426-4377)

Contract OS-40103
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Mar. 1974 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $120,000

ACKNOWLEDGMENT: FRA

03 058514
FATIGUE ANALYSIS OF PROTOTYPE TANK CAR HEAD SHIELD
Impact tests will be conducted utilizing an instrumented freight car truck for over-the-road tests. All tests are to be conducted with the head shield attached to the tank car in a manner such that there is a direct connection between the stub sill and shield support or there is sufficient damping to eliminate the vertical motions of the shield. The test plan shall give consideration to the following: (a) Specification of additional insturmentation requirements for both the additional impact tests and the over-the-road tests. (b) Delineation of test train operation variables, i.e., speed, length of run, track and terrain conditions, consist makeup, stop and start operation and off-site test requirements.

PERFORMING AGENCY: IIT Research Institute
SPONSORING AGENCY: Transportation Systems Center, RR-525
RESPONSIBLE INDIVIDUAL: Raab, AR (Tel (617)494-2539)

Contract DOT-TSC-1043 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1975 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $102,015

ACKNOWLEDGMENT: TRAIS (RR-525)

03 058674
INCREASED RAIL TRANSIT VEHICLE CRASHWORTHINESS IN HEAD-ON COLLISIONS
The effort will focus on recommendations concerning the longitudinal distributions of mass and force-deformation characteristics for urban railcars which will result in the least loss of life or serious injury due to head-on and rear-end collisions. These recommendations are to be developed as functions of such parameters as: 1. the number of cars in the consist, 2. the overall dimensions and weight of each car, 3. the placement and dimensions of windows and doors, 4. the placement and weights of mechanical equipment, 5. the interior configurations for passengers, 6. the velocity of the consists at impact, 7. carbody force-deformation characteristics, 8. the locations of carbody centers-of-gravity.

PERFORMING AGENCY: IIT Research Institute
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, UM-504

Contract TSC-1052 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $279,204

ACKNOWLEDGMENT: TRAIS (UM-504)

03 058677
GENERAL VEHICLE TESTING OF STANDARD LIGHT RAIL VEHICLE
The SLRV acceptance tests to be conducted at the TTC will be expanded to include the baseline tests defined in TSC's General Vehicle Test Plan. These tests will be conducted concurrently with the appropriate acceptance tests to avoid duplication of effort. Permanent records of test data will be provided on magnetic tape for data analysis. The instrumentation package being provided by the Boeing Vertol Company for acceptance testing will serve as partial instrumentation for the General Vehicle Tests. Additional instrumentation and test equipment will be supplied as Government Furnished Property (GFP) to supplement the Boeing instrumentation package for General Vehicle testing at the TTC.

PERFORMING AGENCY: Boeing Vertol Company
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, UM-504

Contract TSC-1062 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $108,908

ACKNOWLEDGMENT: TRAIS (UM-504)

03 058726
PROCUREMENT OF AN IN-TRACK WHEEL RIM INSPECTION SYSTEM
The system will be capable of detecting defects in wheel rims of trains moving at speeds up to 20 MPH.

PERFORMING AGENCY: Scanning Systems, Incorporated
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation

Contract TSC-1070 (FFP)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 TOTAL FUNDS: $113,426

ACKNOWLEDGMENT: TRAIS

03 058739
TRANSIT INDUSTRY INPUT ON RAILCAR STANDARDIZATION
The purpose of the work effort described herein is to provide to UMTA and the Associated Contractor (Project IT-06-0131) with transit industry input, advice and consensus on the Railcar Standardization Project. The resulting designs from the Associated Contract should achieve lower unit costs (first and life cycle), reduce maintenance problems, increase fleet availability, reduce penalties associated with unreasonable contractual terms and conditions, reduce requirements to design completely new vehicles for each procurement, preserve competition in the car building industry, and foster evolutionary improvement in technology.

PERFORMING AGENCY: Transit Development Corporation, Incorporated
SPONSORING AGENCY: Urban Mass Transportation Administration, DC-06-0121
RESPONSIBLE INDIVIDUAL: Mora, J (Tel 202-4260090)

Contract DC-06-0121
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: Sept. 1977 TOTAL FUNDS: $30,000

ACKNOWLEDGMENT: TRAIS (DC-06-0121)

03 081786
RAILROAD COUPLER SAFETY RESEARCH AND TEST PROJECT
Because of the recognition of a general lack of knowledge regarding the environment to which couplers and yokes are subjected because of the increased power from modern locomotives, higher operating speeds and increased use of high capacity cars, this project has as its objectives: (1) Study the operating and service conditions of couplers and yokes; (2) Investigate the technical, economic and safety aspects of coupler failures in service; (3) Evaluate standard coupler and yoke designs; (4) Prepare detailed guidelines for the proposed performance and test specifications for couplers and yokes; (5) Conduct a preliminary evaluation of current standard designs of coupler components under conditions listed in Item 4. Data has been acquired from instruments installed in a special test box car which has operated in various services. The With service testing nearly complete, attention is now being given to laboratory tests required for recommendations for purchase and acceptance specifications. Fatigue and fracture toughness characteristics of steels used in couplers and the stress levels in the components must be determined. Agreement has been given to merge this project into Phase II of the Track-Train Dynamics Project, Task 5. All of the objectives of the Coupler Safety Project will be retained.

PERFORMING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute
INVESTIGATOR: Morella, NA (Tel (216) 229-3400)
SPONSORING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Morella, NA (Tel 216-229-3400)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1972

ACKNOWLEDGMENT: AAR

03 081787
RAILROAD TRUCK SAFETY RESEARCH AND TEST PROJECT
This project has the objective of developing guidelines for new specifications for truck bolsters and side frames to meet the increasingly strenuous demands of rail freight transportation. Road service environmental tests to measure loads/stresses to which components are subjected under all types of operating conditions are essentially complete. IITRI reduction and analysis of recorded data is being translated to methods of laboratory bolster dynamic tests. Initial lab tests of 1975 are being continued into 1976, at the Test Engineering Department of American Steel Foundries. This work is to be used as environmental and physical test basis for the Track Train Dynamics Phase II task on Trucks.

PERFORMING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute
INVESTIGATOR: Evans, RA (Tel (312) 225-9600 X876)
SPONSORING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Evans, RA (Tel (312)-225-9600 X876)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1973 TOTAL FUNDS: $150,000

ACKNOWLEDGMENT: AAR

03 081798
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 3--TRUCKS AND SUSPENSION
Overall task objectives are the development of recommended performance specifications and test specifications for conventional three piece trucks. Specifications will be developed through a comprehensive research project built upon the RPI-AAR Railroad Truck Safety Research and Test Project and utilizing dynamic simulation computer models developed in Phase I of the Track Train Dynamics Program. Test specification development will involve determination of service loading and development of techniques necessary for predicting failure under dynamic loads. Task will also involve developing capability to fatigue test truck components. Field testing will include validation of the truck stability model developed by Clemson University and Arizona State University in conjunction with FRA and the TTD program. The model evaluates dynamic stability of a truck under a wide variety of service conditons and validation will enable it to be used in study of phenomena such as truck hunting. The Harmonic Roll Series computer programs have been used to show how suspension characteristics could be matched with the vehicle to alleviate problems related to rock and roll and harmonic bounce.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Martin, GC (Tel 312-225-9600 Ext 877) Korpics, F (Tel 312-225-9600 Ext 877)
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

03 081800
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 4--CAR STRUCTURES
Task objective is the development of recommended performance specifications and design guidelines for railroad freight car structures. Method will involve development of suitable fatigue analysis approach coupled with evaluation of advanced structural analysis methods. Task will include establishing test program goals for environmental loading tests to be pursued during the program. Test plans will be developed and tests conducted to validate fatigue analysis methods for car structural components. The basic approach adopted is a cumulative damage approach using the methodology which has been used in the aerospace and heavy-equipment industries. Development of interim guidelines using this methodology and presently available load spectrum and material fatigue performance was made available to TTD by ACF Industries. Further work in fatigue methodology and acquisition of additional load spectra from environmental sampling is progressing.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Przybylinski, P (Tel 312-225-9600 Ext 862)
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

03 081801
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 5--COUPLERS, DRAFTGEAR, AND CUSHION UNITS
Task objectives are development of recommended performance and/or test specifications and design guidelines for railroad freight car couplers, draftgear, and cushion units. Task will build on current RPI-AAR Railroad Coupler Safety Research and Test Project and will utilize dynamic simulation computer models developed during Phase I of the Track Train Dynamics Program. Coupler effort will concentrate on stress and fatigue analysis. Draft gear and cushion unit efforts will be directed toward investigations of opportunities for improved train handling through optimized operating characteristics.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Hawthorne, KL (Tel 312-225-9600 Ext 866) Brown, TR (Tel 312-225-9600 Ext 866)
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

03 099084
AMERICAN RAILROAD PASSENGER CARS 1830-1970
This study will be an engineering history of American railroad passenger cars. The design and construction of passenger cars will be traced. The development of wheels, trucks, couplers and other components will be outlined. The introduction of iron cars will be discussed. Specialty cars such as parlor and sleeping will also be treated. All eight chapters are finished.

PERFORMING AGENCY: Smithsonian Institution
INVESTIGATOR: White, JH
SPONSORING AGENCY: Smithsonian Institution, Museum of History and Technology

STATUS: Completed NOTICE DATE: July 1976 START DATE: June 1968

ACKNOWLEDGMENT: Science Information Exchange (ZTA 1586)

03 099382
WHEEL RESEARCH PROGRAM
It is the objective of this program to prevent the formation of cracks in various wheel locations which can occur because of various conditions and can ultimately result in catastrophic failure. The initial step was a full review of wheel failure statistics to isolate wheel contours generating the most frequent failures. The problem is to be alleviated by considering changes in wheel design and wheel material, with emphasis on design. Finite element analysis is conducted on each characteristic shape of wheel involving stress due to tread loading, lateral loading and to thermal inputs resulting from drag or emergency braking. Such analysis would be followed by service or dynamometer tests to verify results. The initial phase of this involved the 28-inch wheel and was a joint project with Trailer Train Co. It involved cracked wheel plates and shattered rims, and indicated some solutions which would be generally applicable. In addition to the loading problems. research is being conducted to define problems associated with overheated wheels. It was initially found that criteria for rejecting such wheels were overly restrictive. Non-destructive residual stress measurement techniques, such as the Barkhausen method, are being evaluated for detecting thermally damaged wheels. The thermal fatigue behavior of wheel steels is also being investigated. Detection of rim thermal cracks, utilizing ultrasonic techniques like those used in AAR's rail test program, are also proceeding.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads

STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: AAR

03 099407
LIGHT RAPID COMFORTABLE (LRC) PROTOTYPE EVALUATION
The overall objective of this Transportation Development Agency-supported program is to test and evaluate the prototype LRC (Light, Rapid, Comfortable) locomotive and coach are: Stage 1: To demonstrate the ability of the LRC to operate at conventional speeds on Canadian mainline track. Stage 2: To explore the full operating limits of the prototype LRC equipment under controlled conditions. Stage 3: To subject the prototype LRC

equipment to daily revenue operation over an extended period. Stage 4: To demonstrate the ability of the LRC to operate in excess of conventional limits on Canadian mainline track (up to 120 MPH). Stages 1, 2 & 3 are completed. Stage 1 was completed in conjunction with the Technical Research Department of Canadian National Railways which was responsible for establishing the permissible rail wheel dynamic parameters and acceptance criteria. Testing to satisfy these criteria was undertaken on CNR trackage. Stage 2 was completed using the facilities of U.S.-D.O.T.-F.R.A. highspeed ground test centre at Pueblo, Colorado. The LRC prototype covered 20,500 miles at Pueblo at an average speed of 96 MPH. In Stage 3 LRC equipment operated on CN "Tempo" service for one daily trip between Toronto and Sarnia between March and November 1975. Stage 4--Not yet addressed.

PERFORMING AGENCY: MLW Industries Limited
INVESTIGATOR: Byrne, J (Tel 514-255-3681)
SPONSORING AGENCY: Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Eggleton, P (Tel 514-283-4077)

STATUS: Completed NOTICE DATE: July 1976 START DATE: May 1973 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: Transportation Development Agency

03 099414
THE STRENGTH TESTING OF RAILWAY CARS AND LADING SECURING ARRANGEMENTS TO A.A.R. AND MIL SPECIFICATION FOR INDUSTRY
Using impact ramp, squeeze frame, jacks and in-service observations associated with strain gauge and accelerometer instrumentation, to assist industry in their car construction and tie down design, and to suggest or develop alternative lading protection devices where necessary.

PERFORMING AGENCY: National Research Council of Canada, Division of Mechanical Engineering
INVESTIGATOR: Watson, WJ (Tel 613-993-2432)
SPONSORING AGENCY: National Research Council of Canada, Associate Committee on Railway Problems

STATUS: Active NOTICE DATE: Aug. 1975

ACKNOWLEDGMENT: National Research Council of Canada

03 099426
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 9-DESIGN STUDY-TANKS AND ATTACHMENTS
Phase 09 concerns the behavior of tank car tanks and their appurtenances (fittings and attachments) in the mechanical environment of railroad accidents. The objectives are to study designs of tank shells, fittings and attachments in relation to the potential of product loss under mechanical impacts in accidents and to analyze, on a cost-effective basis, the feasibility of reducing losses through design improvements. This general area of study will continue under the Project. Currently, an extensive series of tests and theoretical analyses are planned. The tests will comprise impact testing of several bottom outlet configurations. The objective is to assess present specifications and to improve, where practical, their requirements for safe breakaway designs of bottom fittings and attachments.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1970 COMPLETION DATE: 1977

ACKNOWLEDGMENT: AAR

03 099430
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 14-STUB SILL TANK CAR BUCKLING
This phase concerns buckling which has occurred inboard of the stub still termination on certain designs of non-pressure stub sill cars in either compressive train action or yard impact situations. The problem has been limited to empty cars, indicating that for loaded cars the tensile stresses produced in the bottom fibers of the tank by the lading weight is sufficient to offset the otherwise critical compressive stresses. The primary objective is to determine quantitatively what design and test loads should be specified for such stub sill cars to assure that their resistance to buckling is at least as good as that of all other freight cars. A second objective is to develop data on the brittle lacquer or photostress techniques of experimental analysis, and on the electrical strain gage test procedures and interpretation methods, in order to improve specification requirements in these areas. This work, currently nearing completion, has involved static squeezing and dynamic impacting of nine stub sill cars of different designs, four of which have experienced various histories of buckling and five of which are of new improved design. Approximately 80 strain gage rosettes are employed on each car. Conclusions from this work will be made in report form to the AAR Car Construction and Tank Car Committees for their use in adopting specification changes, if deemed necessary.
See also RRIS 12A 081788.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1974 COMPLETION DATE: 1976

ACKNOWLEDGMENT: AAR

03 099432
ADVANCED COUPLING CONCEPTS PROJECT
The objectives of the Advanced Coupling Concepts project are: 1) To determine areas in which safety and efficiency could be improved by changes in the coupling system. 2) To quantify value to be achieved by such improvements. 3) To define functional requirements in the form of a specification to guide development of improved systems. The scope includes all functional elements essential to interfacing of railroad cars and locomotives including mechanical couplers, train lines, etc. An economic model is to be developed and data collected to evaluate new coupling concepts individually and as logically assembled systems.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Punwani, SK
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute

Contract TSC-1087 (CPFF)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1974 TOTAL FUNDS: $92,296

ACKNOWLEDGMENT: AAR

03 099435
LOCOMOTIVE CAB DESIGN DEVELOPMENTS
The objective of this effort is the development of a locomotive control compartment based on an evaluation of the operator's functional requirements and comprehensive human factors engineering studies. The contractor will develop specifications for the design, test, and evaluation of a locomotive cab which is in concert with all operational, human factors, safety, and occupant protection considerations. The cab design will incorporate the predictable technical and operational progress, as well as 10 to 15 year projections of train handling and control requirements. In Phase I of the contract, a number of potentially feasible conceptual alternative locomotive cab configurations were developed. The most suitable alternate will be selected on the basis of human factors, structural integrity, and cost trade-off studies now in progress. In Phase II, a detailed human factors design of the optimized locomotive cab will be accomplished, and a full scale mock-up fabricated. Operational feasibility will be determined in a limited series of performance tests utilizing the mock-up.
Funds for this project are administered by DOT/Transportation Systems Center, Cambridge, Mass.
Human Factors Engineering Systems Functional Analysis Tech Rpt. No. 1
Analysis of Locotive Cab Environment and Development of Cab Design Alternatives, Tech Rpt. No. 2
Locomotive Cab Design Development: Operator's Manual

PERFORMING AGENCY: Boeing Vertol Company, D339-10044
INVESTIGATOR: Robinson, J (Tel (215)522-3115)
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation
RESPONSIBLE INDIVIDUAL: Jankovich, JP (Tel 617-494-2129)

Contract DOT-TCS-913
STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1974 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $343,276

ACKNOWLEDGMENT: FRA

03 099439
HOT JOURNAL SENSOR AND LOCAL DERAILMENT DETECTOR
This multi-year program is aimed at reducing the number of train derailments. Active anti-derailment devices are needed by the railroad industry which when intalled on a train will automatically stop the train upon detection of a hot journal or a wheel on the ground. NAVSURFWPNCEN/WOL will develop, install and intiate in-service demonstrations of the Hot Journal Sensor (HJS) and the Local Derailment Detector (LDD) on a limited number of railroad cars. Hot box tests, over-the-road shock tests and normal bearing tests have been conducted on the Duluth, Missabe & Iron Range Railway at Duluth, Minn. Data from these tests will establish a design base for both the LDD and HJS. Laboratory testings has been conducted on a piezo-electric power source for an electro-explosive HJS device.

PERFORMING AGENCY: Naval Surface Weapons Center
INVESTIGATOR: Gratton, P
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D (Tel 202-426-1227)

IA AR54162
STATUS: Active NOTICE DATE: July 1976

ACKNOWLEDGMENT: FRA

03 099634
HOPPER-BOTTOM BOXCAR FOR RAILROAD TRANPORTATION
Investigate the feasibility of developing and using a convertible hopper-bottom boxcar for transportation of grain and soybeans in bulk and packaged freight as a means of helping to increase the utilization rates for railroad freight cars, thereby relieving the shortages of railroad equipment, increasing the efficiency of grain handling, and reducing transport costs.
Railroad car designs and building techniques for boxcars and covered hopper cars will be surveyed and the design specifications of the Association of American Railroads will be studied to assess the engineering feasibility of developing and building hopper-bottom boxcars. The current methods of shipping grain in box and covered hopper cars will be studied and grain and soybeans shippers and receivers and railroad operating officers will be surveyed to determine the operational feasibility of using hopper-bottom boxcars for transport of the products. If the results of the first two steps are positive, preliminary engineering designs for such equipment will be developed to enable the building of prototype cars for testing and evaluation.

PERFORMING AGENCY: Kearney (AT) and Company, Incorporated
INVESTIGATOR: Macomber, FS Breakiron, PL
SPONSORING AGENCY: Department of Agriculture, 0701-15841-008-C

Contract 12-14-1001-406
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: Current Research Information System (CRIS-0041196)

03 128045
URBAN RAIL BOGIE DESIGN
A thorough investigation of the curving and stability characteristics of of LRV bogies is being conducted to determine if it is possible to design a bogie which is stable up to 60 mph and can negotiate small radius curves without flange contact or wheel slip. First it is being determined if it is possible to provide the above performance with a simple self-steered bogie with flexible suspensions which allow the axles to align themselves radially in a curve through the action of creep forces between wheel and rail. If studies conclude that a self-steered bogie will not satisfactorily negotiate small enough radii curves, further investigations will be concentrated on steered bogies which mechanically yaw the axles radially during curve running. The feasibility of such a design for LRV's will be determined. National Research Council is currently interested in improving the curving ability of freight cars by use of steered bogies and it is expected that a cooperative effort will benefit both projects. This research studies the case of steel wheels negotiating short radii typical of LRV applications without flange contact to minimize noise, wear and risk of derailment, and which requires vehicle suspension characteristics in conflict with good stability at speed and continues the development of basic tradeoffs of lateral stability curving for self steering bogies and analytical models. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 3110
INVESTIGATOR: Young, J Elliott, L
SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: July 1976 START DATE: May 1975 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

03 128046
WHEEL/RAIL NOISE PROJECT PHASE II
In phase I a thorough understanding of the mechanics of wheel/rail noise generation was obtained. Wide disparity in the test conditions made it impossible to rank the existing wheel designs in order of their acceptability. However, qualitatively, the Bochum wheel was judged the best design. Two new wheel concepts resulted from the phase I study, both of which were based on the Bochum wheel. As a first step in the evaluation of these new designs, it is proposed to construct a model of each. These models will be used to study their physical properties with reference to noise generation mechanics. Thus the degree of coupling between radial and axial wheel motion and the wheel natural frequencies and the associated modal damping will be found. Similar data for the Bochum and S.A.B. wheels does not exist and it will be necessary to conduct similar experiments on these wheels. Extension will complete the design and dynamic experiments on the new wheel concepts. In addition, it is proposed to establish the validity of the finite element model of a railway wheel.

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 3109
INVESTIGATOR: Curmi, RA Elliott, GI
SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: May 1975 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

03 136342
DESIGN OF AN ADVANCED CONCEPT TRAIN
Description: The object of this project is to demonstrate new concepts for the subway and commuter rail car industry. These concepts will reduce life cycle costs; increase passenger appeal; and reduce the impact on the environment. Two vehicles are being built for demonstration of the operating properties. The methods for reducing life cycle costs are: 1. An efficient propulsion system which stores the vehicle braking energy in a flywheel to be used later to accelerate the vehicle. All accessories are shaft driven from this flywheel. 2. Reliability-Designing for reliability and designing parts out of the vehicle. 3. Designing more maintainable equipment. 4. Reducing operating personnel by automaticity and closed circuit T.V. monitors. 5. Reducing track wear thru a better slip-slid control and better ride quality. Ridership will be increased by: 1.Better ride quality thru a new type suspension and truck design. 2. Better air conditioning. 3. Reduced noise levels. 4. Improved exterior and interior vehicle asthetics. Less environmental impact thru: 1. Reduced noise using composite wheels. 2. Less thermal emission since the braking energy is stored as rotational energy interferences due to advanced propulsion design.

PERFORMING AGENCY: Garrett Corporation
INVESTIGATOR: Walecki, RH
SPONSORING AGENCY: Boeing Company

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (JBO 12 1)

03 138536
LIGHT RAIL ELEMENTS
Develop wheel-chair elevator for Light Rail Vehicles and demonstrate the device.

PERFORMING AGENCY: Boeing Vertol Company, Boeing Company
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Silien, JS (Tel (202) 426-0090)

STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1976 TOTAL FUNDS: $300,000

ACKNOWLEDGMENT: UMTA

03 138537
GAS TURBINE-ELECTRIC (GT-E) COMMUTER CARS
The objective is to develop a dual-powered advanced commuter car capable of gas-turbine or electric propulsion which is equivalent to all-electric car performance and can provide a no-change ride from suburbs beyond electrified territory. Each of the four-car trains began revenue service tests in June 1976 in New York City suburban territory and will subsequently be given engineering tests at the Transportation Test Center and will be used in services outside the New York region.
Subcontractors are Garrett AiResearch and General Electric Company.

PERFORMING AGENCY: New York State Metropolitan Transportation Auth
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation; New York State Metropolitan Transportation Auth
RESPONSIBLE INDIVIDUAL: Silien, JS (Tel (202) 426-0090)

Contract DOT-UT-613
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1971 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: $14,800,000

ACKNOWLEDGMENT: UMTA

03 138538
RAILCAR STANDARDIZATION
To reduce the purchase, operating and maintenance costs of new transit cars and to develop a method for comparative evaluation of the prices of transit cars and major subsystems, this project is to develop a family of standardized specifications in guideline format and to establish standards for performance, quality, reliability, maintainability and availability of the materials and components. Two major activities will involve study of propulsion control systems and of vehicle structural materials.

PERFORMING AGENCY: International Research and Technology
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Mora, J

STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1975 COMPLETION DATE: June 1978 TOTAL FUNDS: $2,200,000

ACKNOWLEDGMENT: UMTA

03 138539
ADVANCED SUBSYSTEMS DEVELOPMENT PROGRAM (ASDP)
The objective of this investigation, a part of the Urban Rapid Rail Vehicle Systems Program, is to achieve transit vehicles that are as reliable, safe and economical as possible, choosing subsystems which reduce the cost of operation and maintenance, reduce energy requirements and/or improve safety, comfort and performance. The components chosen as having the greatest potential payoff are the self-synchronous a-c traction motor, the monomotor truck with active suspension and the synchronous spin-slide control braking system with improved emergency stopping capability.
Subcontractors are Delco Electronics, Budd Company and Westinghouse Air Brake Division.

PERFORMING AGENCY: Boeing Vertol Company, Boeing Company
INVESTIGATOR: Cord, J
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Silien, JS (Tel 0090)

Contract DOT-UT010007
STATUS: Active NOTICE DATE: July 1976 START DATE: Dec. 1975 COMPLETION DATE: June 1979 TOTAL FUNDS: $11,300,000

ACKNOWLEDGMENT: UMTA

03 138542
STATE-OF-THE-ART CARS
To demonstrate the best available in current rapid rail technology to transit authorities and to the general public, this program has involved the construction, test and evaluation of two state-of-the-art rapid transit cars. Tests were conducted on operating properties in the U.S. with a new extended-test phase starting on the Philadelphia- area Port Authority Transit Corp. in June 1976.

PERFORMING AGENCY: Boeing Vertol Company, Boeing Company
INVESTIGATOR: Cord, J
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Silien, JS (Tel (202) 426-0090)

Contract DOT-UT-10007
STATUS: Active NOTICE DATE: July 1976 START DATE: Dec. 1971 COMPLETION DATE: Feb. 1977 TOTAL FUNDS: $5,610,735

ACKNOWLEDGMENT: UMTA

03 138559
VEHICLE INSPECTION
Provides surveillance and non-destructive inspection of both vehicle and components. Directs and monitors government and contractor development and evaluation efforts in the areas of automated vehicle on-board surveillance, wayside inspection, and non-destructive inspection of components. Provides for the design and fabrication of transducer, computerized data collection and automated detection systems.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Winn, JB (Tel (202) 426-1682)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1974 COMPLETION DATE: Oct. 1982

ACKNOWLEDGMENT: FRA

03 138565
ROLLING STOCK SAFETY
The goal of the Rolling Stock Safety Program is to improve railroad safety through the development of (a) performance criteria for vehicles and vehicle components which are less prone to failures, (b) techniques and mechanics for predicting, detecting, and reacting to the failures which do occur, and (c) concepts to increase the accident survivability of vehicle occupants. Work is being undertaken concerning locomotives, hazardous material tank cars, component failure prevention, and track-train dynamics.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Levine, D (Tel (202) 426-1227)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1976

ACKNOWLEDGMENT: FRA

03 138796
RADIAL-AXLE FREIGHT CAR TRUCKS
Agreement with South African Inventions Development Corp. covers application of radial-axle freight car trucks in North America based on

Scheffel principles originated on South African Railways. Special wheel tread profile and diagonal bracing between axles minimize flange guidance in curves. Reductions in truck hunting, and wheel and rail wear are major objectives.

See also 03A 138797 this bulletin.

PERFORMING AGENCY: Standard Car Truck Company
INVESTIGATOR: Bullock, RL
SPONSORING AGENCY: Standard Car Truck Company

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: 1975

03 138797
RADIAL-AXLE PASSENGER CAR TRUCKS

Agreement with South African Inventions Development Corp. covers development and prototype testing in North America of radial-axle trucks for main-line passenger, commuter and transit cars based on Scheffel principles organized on South African Railways. Objectives include improved running stability and riding comfort, and decreased wheel and rail wear.

See also 03A 138796 this bulletin.

PERFORMING AGENCY: General Steel Industries, Engineering Division
INVESTIGATOR: Jackson, KL
SPONSORING AGENCY: General Steel Industries, Engineering Division

STATUS: Active NOTICE DATE: Aug. 1976 START DATE: July 1976

04 048972
ENERGY STORAGE CARS (ESC) TEST PLANS
The objective of this contract is to expand the original High Speed Ground Test Center (HSGTC) Energy Storage Cars (ESC) test plans to be consistent with the standard procedures defined in TSC's General Vehicle Test Plan, GSP-064, in order to collect additional data to aid in the evaluation of the Energy Storage System for application to rail cars.

PERFORMING AGENCY: AiResearch Manufacturing Company
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation

Contract TSC-838 (CPFF)
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1974 TOTAL FUNDS: $41,140

ACKNOWLEDGMENT: TRAIS

04 054561
ON BOARD ENERGY STORAGE FOR TRANSIT CAR POWER CONSUMPTION REDUCTION
Description: The design, development and testing of an electric propulsion system with an onboard energy storage unit for use on various subway and commuter cars. The kinetic energy of the moving car during braking is directed to a motor driven flywheel resulting in storage of the energy by increasing the speed of the flywheel. During acceleration the flywheel energy is released and supplies the majority of power required for acceleration of the car. Third rail power supplies an average power flow which is low through a chopper for drag, mechanical and electrical losses. Performance by computer analysis indicates a potential energy savings of 30% and peak power reduction as high as 60% over a typical NYCTA track profile. Verification of performance compared to conventional cars will be accomplished by operation on the NYCTA subway lines.

PERFORMING AGENCY: Metropolitan Transportation Authority of New York
INVESTIGATOR: Nickel, E
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Mora, J

Contract DOT-UT-550
STATUS: Active NOTICE DATE: July 1976 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $1,900,000

ACKNOWLEDGMENT: Science Information Exchange (AR 182)

04 054697
MONITORING AND DIAGNOSTIC EQUIPMENT FOR MAINTENANCE OF DIESEL ELECTRICAL LOCOMOTIVES
This project is aimed at various aspects of preventive and predictive maintenance of diesel-electric locomotives. The main concern is the effectiveness of modern testing equipment for performance monitoring and maintenance, which includes certain electronic analyzers for the testing of mechanical components, SEARCH (System Evaluation and Reliability Checker) for the testing of electrical components, and onboard data-logger systems for continuous performance evaluation of locomotives.
REFERENCES:
Effectiveness Analysis of Search-Testing Rawat, SK, Canadian Institute of Guided Ground Transport, Report 74-2, July 1976

PERFORMING AGENCY: Queen's University, Canada, 3.11.72
INVESTIGATOR: Rawat, SK
SPONSORING AGENCY: Canadian Institute of Guided Ground Transport, Queen's University

STATUS: Completed NOTICE DATE: July 1976 START DATE: 1974 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: CIGGT

04 058269
DESIGN IMPROVEMENTS TO METROLINER PROPULSION AND AUXILIARY EQUIPMENT
Reduce the failure rate, out of service time and maintenance cost of Metroliner cars by design improvements to propulsion and auxiliary equipment. Assist in the testing of improvements to validate effectiveness.

PERFORMING AGENCY: Klauder (Louis T) and Associates
INVESTIGATOR: Watson, R (Tel 215-563-2570)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Gannett, CM (Tel 202-426-9665)

STATUS: Active NOTICE DATE: Feb. 1976 TOTAL FUNDS: $90,800

ACKNOWLEDGMENT: FRA

04 058270
ELECTRICAL PROPULSION
This sub-program is a continuous effort and is concerned with advanced analytical and laboratory studies in electrical propulsion, as well as basic studies for electrification. The work includes power conditioning systems, linear electric motors, power collection, power distribution, and cost analyses.

PERFORMING AGENCY: Transportation Systems Center
INVESTIGATOR: Raposa, FL (Tel 617-494-2031)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Guarino, M (Tel 202-426-9564)

PPA-RR-05
STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: FRA

04 058280
POWER AND PROPULSION SYSTEM TECHNICAL AND SCIENTIFIC SERVICES AND DATA
Task effort is to include: (1) energy charging analysis and charger station requirements for flywheel propulsion systems for various urban vehicles; (2) power conditioner surveys for the linear synchronous motor; (3) cost data and economic analysis of linear electric motor propulsion systems; (4) review of advanced propulsion, power, and train control approaches for improved freight operations; (5) updating of cost data of wayside power supply systems; (6) assess data gathered from transit authorities and vehicle manufacturers on the problems of electrically caused fires.

PERFORMING AGENCY: Alexander Kusco, Incorporated
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Nelson, R (Tel 617-4942032)

Contract DOT-TSC-965 (CPFF)
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Feb. 1975 TOTAL FUNDS: $124,000

ACKNOWLEDGMENT: TRAIS (612-0218)

04 099377
FLYWHEEL ENERGY STORAGE UNIT FOR YARD SWITCH ENGINES-FEASIBILITY STUDY
The objective of this research is to determine the technical and economic feasibility of employing flywheel energy storage technology to yard switch engines as a potential means of reducing fuel consumption, noise levels, exhaust emissions and overall maintenance costs. This work will include the development of a "breadboard" installation for testing with a 1500 HP locomotive. A trailing car will be used to house the flywheel unit and the necessary control integration and traction motor modification will be made to a railroad-furnished switcher. Four different railroads will assist in conducting 90-day operational evaluations.
The contract to a performing organization has not yet been awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr (Tel 202-426-0855)

STATUS: Proposed NOTICE DATE: July 1976 START DATE: Oct. 1976 COMPLETION DATE: Oct. 1979

ACKNOWLEDGMENT: FRA

04 099404
A.C. MOTOR PROPULSION SYSTEM
The overall objective of this project is to demonstrate a solid state inverter A.C. motor propulsion system based on current source and power factor

feedback control which is both simple and reliable. The more specific objectives are as follows: 1. Identify the requirements for an optimum system based upon reliability, simplicity, cost, weight and efficiency considerations. 2. Develop circuit configurations and design procedure for solid state inverter A.C. squirrel cage motor systems applicable to transportation, e.g. street cars, transit cars, etc. 3. Construct the "optimum" inverter configuration applicable to a propulsion system for a transit application. Status-preliminary feasibility studies have been completed, the concept has been demonstrated on a 3HP motor and works presently under way to build a system for a 120 HP motor.

PERFORMING AGENCY: Toronto University, Office of Research Administration
INVESTIGATOR: Dewan (Tel 416-928-6262)
SPONSORING AGENCY: Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Audette, M (Tel (514) 283-4073)

Contract DSS-OSU5-0034
STATUS: Completed NOTICE DATE: July 1976 START DATE: Apr. 1975

ACKNOWLEDGMENT: Transportation Development Agency

04 099440
METROLINER AUXILIARY POWER
The objective is to examine the possibility of substituting solid-state inverters for the motor alternator sets that supply the auxiliary power system on self-propelled Metroliner cars.

PERFORMING AGENCY: Transportation Systems Center
INVESTIGATOR: Raposa, FL
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Gannett, CM (Tel 202-426-9655)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1975 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: FRA

04 128005
PROPULSION SYSTEM DESIGN RATIONALE
A review of propulsion systems around the world reveals a very wide range of capacities in relation to vehicle mass and maximum speed gradients. The purpose of this project is to discover and set down fundamental reasons to account for the choice of a specific propulsion system. Basic laws of motion will be reviewed with a view to discovering relations between average speed, maximum power, energy consumed and trip distance. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 3405
INVESTIGATOR: Duncan, I
SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: 1976

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

04 128008
FLYWHEEL ENERGY STORAGE STUDY. PHASE I. TECHNOLOGY REVIEW AND FEASIBILITY STUDY
The purpose of this project is to conduct a technology review and data acquisition of existing operational flywheel units as well as of flywheel units that are being actively developed. The units to be considered are complete energy storage systems including the flywheel itself, the input/output motor and controls and the ancilliary systems such as the vacuum, lubricating, safety and containment systems. The factors of interest are the cost, energy storage properties and efficiencies, size and weight, reliability, safety, etc. This project will further conduct a preliminary assessment of the feasibility and viability of flywheel energy storage in rail transportation using a benefit cost analysis. This will lead into the Phase II study (if feasibility has been established) which will investigate actual flywheel energy storage applications and uses in terms of cost effectiveness, both in on-board and in-station configurations. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can
INVESTIGATOR: Soots, V Palm-Leis, A
SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: 1976

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

04 135721
DESIGN OF IMPROVED FLYWHEEL-TYPE ENERGY STORAGE DEVICES USING HIGH-STRENGTH FILAMENTS
Description: The purpose of this research is to develop more efficient designs of flywheels for energy storage applications in ground vehicles. Particular emphasis is placed on those using high-strength filament materials. Specifically, these types of flywheels are being investigated. 1. Radial brush type. 2. Laminated disk, consisting of multiple layers of filamentary composite material at various orientations. 3. Filament-wound disk. 4. Wound-rim type. 5. Concentric-ring type. The approach used is to perform stress analyses, using modern techniques of elastic and plastic mechanics and mechanics of filamentary and laminated composite materials. Then the stress analyses are used to arrive at optimal design for each of the configurations listed. To date, the first two types have been investigated and it was found that previous analyses found in the literature contain some serious errors. Future effort will be directed toward the other configurations listed above and to design optimization for vehicular applications.

PERFORMING AGENCY: Oklahoma University, School of Aeronautical and Mechanical Engineering
INVESTIGATOR: Bert, CW
SPONSORING AGENCY: Oklahoma University

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (NDY 19 1)

04 135723
ENERGY CONVERSION, ENERGY STORAGE AND RECONVERSION
To develop a family of systems for storing electrical energy and thereafter re-utilize the stored energy in various ways. In storage, major emphasis has been in the development of high-pressure (1000 to 3000 PSI) moderate temperature (300 to 400 degrees Fahrenheit) electrolysis cells, fuel cells and rechargeable fuel cells for the storage of electrical energy in the forms of high-pressure hydrogen gas (other alternatives include hydrides and liquid hydrogen). The stored hydrogen can be used in many ways: mechanical output: hydrogen engine, Aphodid burner turbine electrical output: fuel cells, high-speed turbine field modulated generator system heat output: burners synthetic fuel output: conversion of organic materials to hydrocarbon fuels. In reconversion, the emphasis at present is to develop a family of variable-speed constant (or adjustable) output frequency alternators by applying the field modulated frequency down conversion principle. These alternators will be driven at high speeds (around 10,000 RPM or higher) and consequently will be much smaller in size than conventional alternators of similar capabilities. Application of field modulated frequency down converters for variable speed mechanical inputs such as aeroturbines (wind energy systems) and for variable speed drive applications such as urban cars and prime-mover carrying mass transportation systems are currently being studied.

PERFORMING AGENCY: Oklahoma State University, School of Electrical Engineering
INVESTIGATOR: Hughes, WL Allison, HJ Ramakumar, R Lingelbach, DD
SPONSORING AGENCY: Oklahoma State University

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (NOK 99 1)

04 136017

ENVIRONMENTAL ENGINEERING AND ENERGY MANAGEMENT (FLYWHEEL ENERGY STORAGE SYSTEM)

The objective is to apply advanced space technology to the development of flywheel energy storage systems for application to ground transportation. The technical approach will include in-house studies and system simulations, and contracted efforts to fabricate the composite material flywheel energy storage system, mobile test vehicle, and test equipment. After interim testing of the vehicle with a battery set, the flywheel system will be integrated and final testing accomplished. The flywheel energy storage system for use on mobile vehicles for ground transportation will provide benefits in the areas of pollution control and more efficient utilization of energy sources. In addition, low maintenance and long life are expected from this concept.

PERFORMING AGENCY: Langley Research Center, National Aeronautics and Space Administration
INVESTIGATOR: Graves, GB
SPONSORING AGENCY: Langley Research Center, National Aeronautics and Space Administration

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange

05 058254
STUDY OF ADVANCED FREIGHT CAR BRAKING SYSTEMS
This study of alternative freight car braking systems is to determine the degree to which any existing concepts represent practical improvements in conventional freight operations. This technology assessment is not limited to alternatives which have been considered for high speed passenger trains, but is to include all known alternatives. The specific tasks include: 1) Detailed delineation of the functional performance of the present air brake system, including consideration of available optional equipment; 2) establishment of detailed life-cycle cost information for the existing system; 3) identification of areas in which the present system could be improved; 4) identification of alternative braking techniques/concepts; 5) analysis of those alternatives; and 6) recommendation of a research and development plan.

PERFORMING AGENCY: Kearney (AT) and Company, Incorporated
INVESTIGATOR: Eshelman, L (Tel (312)782-2868)
SPONSORING AGENCY: Transportation Systems Center; Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Hazel, M (Tel (617)494-2528)

STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: 1976

ACKNOWLEDGMENT: FRA

05 081802
INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 6--BRAKE SYSTEM
Task objective is evaluation of the performance of present braking systems to identify those areas where improvements would result from the establishment of performance specifications and/or design guidelines. Evaluation will include stopping distance, reaction time, recharge time, wheel tread temperatures, rigging efficiency, etc. Evaluation will include parametric sensitivity study utilizing dynamic simulation computer models developed in Phase I of the Track Train Dynamics Program. If desirable, field testing of modified braking systems will be conducted. Task will also include field testing of effects on stopping performance caused by different brake shoes. These tests will be single car "breakaway" tests and will be augmented to full train characteristics using the dynamic simulation computer models.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Misner, GR
SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Sutliff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

05 138570
ADVANCED BRAKING STUDY
This cooperative effort aims to describe mathematically the performance of pneumatic braking systems. The four phases are intended to culminate in recommendations for an advanced braking system. Phase I investigated the level of coupler force during various stopping situations with several train blocking types, utilizing a validated model of braking action produced by Westinghouse Air Brake. Phase II is aimed at describing the braking system in terms of mass, momentum and other relationships, rather than empirical equations. The first step was describing the ABD valve function.

Investigation of Intrain Forces During Freight Train Brake Applications by Computer Simulation, Canadian National Railways

Symbolic Representation of the ABD Brake Valve Canadian National Railways

PERFORMING AGENCY: Association of American Railroads Technical Center; Canadian National Railways
SPONSORING AGENCY: Association of American Railroads; Canadian National Railways

STATUS: Active NOTICE DATE: July 1976

06 080327
COMMUNICATIONS TECHNOLOGY SATELLITE COMMUNICATIONS SYSTEM
A study to investigate the feasibility of using a satellite communications link for railroad communication is underway. The Canadian Communication Technology Satellite will be used for this research. /RTAC/

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 1.2.72
INVESTIGATOR: Mackay, NA
SPONSORING AGENCY: Canadian National Railways; Canadian Pacific; Queen's University, Canada

STATUS: Terminated NOTICE DATE: July 1976 START DATE: May 1974

ACKNOWLEDGMENT: CIGGT

06 099410
THE DEVELOPMENT OF A TRAIN LOCATION IDENTIFICATION AND CONTROL SYSTEM
The objective of this study is the development of locomotive identification and control techniques for railway signalling applications. The work includes: (a) Definition of operational requirements. (b) Conduct of system design and preparation of technical specifications. (c) Specification, design, construction and factory tests of locomotive control unit, cab signalling unit, microwave site unit, computer interface unit, and test panel. (d) Provision of assistance in the installation of the above equipment on British Columbia Railway property and conduct of field test and debugging of system.

PERFORMING AGENCY: Glenayre Electronics Limited
INVESTIGATOR: Francis, JR (Tel 604-980-6041)
SPONSORING AGENCY: Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Rudback, NE (Tel 514-283-4077)

STATUS: Active NOTICE DATE: July 1976 START DATE: Feb. 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $184,670

ACKNOWLEDGMENT: Transportation Development Agency

06 099422
MANNED/UNMANNED TRANSIT SYSTEMS STUDY
This project will compare and evaluate the technical capabilities and safety aspects of two types of transit systems--one with on-board human control, the other fully automated with no on-board human control. The principal factors to be studied will be: public acceptance; safety and security for the passengers; and the reliability, maintainability and life cycle costs and benefits for the system. The findings are intended for use by authorities faced with advertising or deciding on selection and development of new systems. The project was started in the Office of the Secretary of Transportation where it was known as "Automatic Train Control Study" and was transferred to UMTA in April 1974 for expansion and completion.

PERFORMING AGENCY: Transportation Systems Center
SPONSORING AGENCY: Urban Mass Transportation Administration

STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1974 COMPLETION DATE: 1976 TOTAL FUNDS: $70,000

ACKNOWLEDGMENT: UMTA

06 129714
OPTICAL ACI INVESTIGATION
Investigation of different techniques involved in receiving retroreflective light from the color coded label and the associated signal processing will lead to a set of engineering requirements and a set of relevant performance specifications. This effort will define a more optimized system with increased performance especially readability.

PERFORMING AGENCY: Transportation Systems Center
INVESTIGATOR: Ingrao, H (Tel 617-494-2373)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr (Tel 202-426-0855)

Contract PPA-RR-716
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1976 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $515,000

ACKNOWLEDGMENT: FRA

06 130950
LARGE SCALE CONTROL SYSTEMS
This project focuses on the development of concrete analysis and synthesis methods for a number of problems associated with the control of finite and infinite state dynamical networks. This investigation includes the real time routing control problem of traffic control appearing in modern automated rapid transit systems. This is a supplement to NSF Grant ENG73-08319.

PERFORMING AGENCY: Yale University, School of Engineering, Engineering & Applied Science
INVESTIGATOR: Morse, AS
SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG73-08319 A01

STATUS: Active NOTICE DATE: July 1976 START DATE: Aug. 1975 COMPLETION DATE: 1977 TOTAL FUNDS: $8,300

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 5458)

06 135604
COMMAND AND CONTROL SYSTEMS FOR ADVANCED TRANSPORTATION SYSTEMS
DESCRIPTION: This project is a study of new "people mover" concepts which may evolve to provide practical attractive alternatives to the private automobile as a mode of transportation. Each concept requires a command and control system not only to provide safety but also to ensure efficient and expeditious movement of traffic. In all cases operation is automatic with respect both to the onboard control of the propulsion and brakes of the individual vehicles and also to the overall coordination of system functions. Development effort has been directed toward meeting new requirements of advanced system concepts. Especially in the area of Personal Rapid Transit, controls are being developed to meet the conflicting need to achieve traditional standards of rapid transit safety while permitting the short headways necessary for acceptable capacity with small vehicles. A family of control systems is being realized for applications varying widely with respect to vehicle characteristics, guideway configuration, and operating policy (scheduled or demand modes of service).

PERFORMING AGENCY: General Railway Signal Company, Advanced Engineering Division
INVESTIGATOR: Auer, JH
SPONSORING AGENCY: General Railway Signal Company

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1974 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AQ 881 2)

06 136338
COMPUTER APPLICATIONS IN CONTROL OF RAILWAY SYSTEMS
DESCRIPTION: This project encompasses development activity in the application of computers to the control of main line rail traffic, rail classification yards and high density rail and rapid transit interlockings. The general goals of these efforts are improvement of resource utilization, minimization of delays, and greater rail system throughout. Benefits are reduction in energy consumption and increased attractiveness of rail transport as an alternative to more energy intensive forms of transportation. Classification yard control includes automatic computer control of retarder for precise coupling speeds and the switching network for accurate car routing. Computer based management information systems operate in conjunction with the above for maintenance of rolling stock inventory. Development efforts are aimed at improving yard throughput while maintaining or improving coupling speed accuracy. Main line control projects currently underway emphasize centralization and simplification of dispatching and routing functions. Systems deployed to date utilize computer-aided control with the basic decision processes being performed by operating personnel. Development efforts are directed toward higher levels of automatic control encompassing larger areas of controlled territory to yield increased operating efficiency. High-density rail and rapid transit interlockings are ideal candidates for computer control because of their complexity and frequency of traffic. Computerized route finding is currently used in GRS systems, and systems in development will automatically perform many more of the necessary control functions allowing higher traffic densities to be accomodated.

PERFORMING AGENCY: General Railway Signal Company
INVESTIGATOR: Means, JB
SPONSORING AGENCY: General Railway Signal Company

STATUS: Active NOTICE DATE: Apr. 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AX 615 1)

06 138529
TRACK CIRCUIT RESEARCH PROJECT
The objectives of the Track Circuit Research Project are: 1) to develop a comprehensive file and bibliography on track circuits; 2) to develop analytical and computer models of the track circuit which can be used as research tools; 3) to collect the necessary data in order to validate the track circuit models; 4) to prepare several reports containing the information produced by the project. These reports fall into two separate categories, documentation of the track circuit models and a handbook containing the necessary information to understand track circuits.

PERFORMING AGENCY: Association of American Railroads Technical Center
INVESTIGATOR: Hartmann, PW
SPONSORING AGENCY: Association of American Railroads

STATUS: Active NOTICE DATE: July 1976 START DATE: Sept. 1975

ACKNOWLEDGMENT: AAR

07 049659
HUMAN FACTORS IN RAILROAD OPERATIONS
This continues a program of research and consultation on human factors in railroad safety in support of FRA regulatory responsibilities involving human performance. Current work includes measurement of air contaminants in the train crew environment, development and evaluation of train handling aids, studies of crew alertness, design of a locomotive cab based on functional requirements, and study of employee motivation.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research
INVESTIGATOR: Devoe, D
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D (Tel (202) 426-1227)

STATUS: Active NOTICE DATE: July 1976

ACKNOWLEDGMENT: FRA

07 055638
DEVELOPMENT OF EXPERIMENTAL DESIGNS AND PSYCHOMETRIC TECHNIQUES FOR THE STUDY OF RIDE QUALITY
The objective of this contract is to design the experiments and psychometric scaling tools necessary for the objective measurement of ride quality. The ride quality measurements are intended to support the development and specification of accurate, statistically reliable ride quality criteria for current and proposed ground transportation vehicles. The specification of these quality parameters is intended to provide the transportation designer with information which can be used (in conjunction with guideway surface characteristics, vehicle dynamic characteristics, projected vehicle velocity profiles, and associated costs) to determine the relative cost effectiveness associated with the use of various suspension systems.

PERFORMING AGENCY: ENSCO, Incorporated
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Burke, W (Tel 617-4942-42)

Contract DOT-TSC-864 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1974 TOTAL FUNDS: $59,127

ACKNOWLEDGMENT: TSC (PR# TI-0147), TRAIS

07 058479
INVESTIGATION OF METHODS FOR IMPROVING RAILROAD CREW VIGILANCE
The study will consist of two parts: (1) A pilot study to investigate the factors of expectancy or set as a determinant of human performance in a task similar to that of railway signal recognition. (2) An experimental study to test the operational principles forming the basis of currently used methods for maintaining alertness of railway crews.
Investigation of Methods for Improving Railroad Crews Vigilance, Lawrence Johnson and Assoc., DOT-TSC-1010-76-2, 1976

PERFORMING AGENCY: Johnson (Lawrence) and Associates
INVESTIGATOR: Jones, J (Tel 617-2774200) Lewis, M Shapiro, B
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, RR-509
RESPONSIBLE INDIVIDUAL: Abernethy, C (Tel 617-4942079)

IA TSC-1010
STATUS: Terminated NOTICE DATE: July 1976 START DATE: May 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: $40,000

ACKNOWLEDGMENT: TRAIS, FRA

07 058555
ANALYTICAL METHODS AND DESIGN IMPLICATIONS OF DETERMINISTIC RIDE QUALITY CRITERIA
No abstract.

PERFORMING AGENCY: Arizona State University, Tempe
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Doyle, J (Tel 202-4269745)

Contract DOT-OS-40101 (CS)
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Jan. 1974 TOTAL FUNDS: $20,000

ACKNOWLEDGMENT: TRAIS

07 058845
DEVELOPMENT OF TECHNIQUES AND DATA FOR EVALUATING RIDE QUALITY
The contract will require a series of experimental procedures and studies to determine levels of ride motion which would be considered acceptable by the great majority of the potential users of interurban rail systems and of urban bus systems.

PERFORMING AGENCY: Dunlap and Associates, Incorporated, 20/137
INVESTIGATOR: Pepler, RD (Tel (203) 655-3971) Vallerie, L
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation
RESPONSIBLE INDIVIDUAL: Sussman, ED

Contract DOT-TSC-1090 (CPFF)
STATUS: Active NOTICE DATE: Dec. 1975 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $99,939

ACKNOWLEDGMENT: TRAIS, Dunlap and Associates, Incorporated

07 129715
ALCOHOL AND DRUG ABUSE PROGRAMS IN THE RAIL INDUSTRY. PHASE I
To determine the basic characteristics of employee assistance programs in the railroad industry. Study policies and practices as they relate to funding, staffing, union involvement, discipline, treatment facilities, insurance, coverage, etc. Also examining other domestic transportation industries' methods of dealing with this problem.

PERFORMING AGENCY: Naval Weapons Support Center, Behavioral Sciences Division
INVESTIGATOR: Peay, J
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Collins, DM (Tel (202)426-2608)

Contract AR-64216
STATUS: Active NOTICE DATE: July 1976

ACKNOWLEDGMENT: FRA

07 130945
RIDE QUALITY JUDGMENTS AS A FUNCTION OF ENVIRONMENTAL, PERSONALITY AND RIDE SPECTRA CORRELATES
No summary has been provided to the Smithsonian Science Information Exchange.

PERFORMING AGENCY: Old Dominion University, Graduate School
INVESTIGATOR: Coates, GD Morgan, BB Kirby, RH
SPONSORING AGENCY: National Aeronautics and Space Administration, Office of Organization & Management, University Affairs Off, NSG 1225

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Aug. 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $40,717

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GH 15640)

07 130969
ALCOHOL EFFECTS ON DRIVING, PERCEPTION AND ATTENTION
The three prime goals of this study are to determine the nature of the alcohol-induced perceptual impairments in the driving situation, to understand the specific psychological processes underlying the changed perception, and to determine how factors such as age, sex, prior drinking hisotry, etc., interact with alcohol in influencing the performance changes.The research focuses on two aspects of driving: (1) the necessity to monitor several sources of information simultaneously and (2) the necessity to rapidly process this data in critical situations. Experimental tools include eye movement and fixation recording of a subject viewing the driving scene, and a series of previously tested measures of concentrated and divided attention, auditory and visual signal detection, rate of information processing, and

choice reaction time. The study will utilize these measures, which have been shown sensitive to low alcohol doses and of relevance to complex man-machine performance, to study the above issues and additionally, interaction effects of alcohol and fatigue and potential carryover effects after alcohol metabolization is complete. The studies will attempt to determine the behavioral mechanisms underlying the sensitivity of divided attention and information processing to alcohol. Finally, the above variables will be examined under the conditon of joint consumption of alcohol and marihuana.

REFERENCES:

Drinking Practices and Problems of Urban American Indians: Part I, Burns, M; Daily, J; Moskowitz, H, Planning Analysis and Research Institute, NIAAA, Los Angeles, Calif., 1974

Data Analysis for Driver Performance Studies Burger, RW; Kemmerer, R; Moskowitz, H, PDP-Data Acquisition System for Driver Simulation Lab, V1, Calif DOT, Amex Corp, 1974

PERFORMING AGENCY: California University, Los Angeles, School of Letters and Science, Department of Psychology
INVESTIGATOR: Moskowitz, HA Burns, M Ziedman, K
SPONSORING AGENCY: Public Health Service, Department of Health, Education and Welfare, AA 00251-06; National Institute on Alcohol Abuse

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: Sept. 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $98,167

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (1MH 18088 6)

07 136015

COMFORT JUDGEMENTS AS A FUNCTION OF AGE OF PASSENGER AND NOISE AND VIBRATION ENCOUNTERED ON URBAN MASS TRANSIT VEHICLES

The overall objective is to identify the levels of environmental stimuli (noise, vibration, etc.) which adversely affect passenger comfort on a city bus. Our specific concerns have been with methodological considerations in ride quality research. Paid passengers, selected on the basis of age, ride a chartered city bus over a standard route and give rating of their comfort for designated route segments and at the end of the ride. Measurements of noise and vibration are recorded. Our tentative results indicate that passenger comfort is a function of passenger age. The rating of the ride as a whole involves an approximately equal weighting of each segment of the ride and implies a good memory for comfort judgements with no dominant recency or primacy effects.

PERFORMING AGENCY: Norfolk State College, Undergraduate School
INVESTIGATOR: Colegate, RL Colson, WN
SPONSORING AGENCY: National Aeronautics and Space Administration, Organization & Management Office, University Affairs Office, NSG 1074 340-00-00

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: July 1974 TOTAL FUNDS: $43,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GH 14393)

08 045291
RAILROAD/HIGHWAY GRADE CROSSING SAFETY
The objective of this contract is to evaluate the effectiveness of new passive device systems to warn drivers of the potential hazard of railroad/highway grade crossings in the interest of greater safety to motorists crossing railroad tracks.

PERFORMING AGENCY: Systems Development Corporation
INVESTIGATOR: Hulbert, S
SPONSORING AGENCY: Federal Highway Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Gale, HG (Tel 202-4260743)

Contract FH-11-8141 (CPFF)
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: June 1973 TOTAL FUNDS: $240,000

ACKNOWLEDGMENT: TRAIS

08 048500
CONTROLLED GRADE CROSSING IMPACT TESTS TO ESTABLISH BASELINE DATA ON TRAIN/AUTOMOBILE INTERACTIONS
It is the purpose of this procurement to establish the baseline data required for the evaluation of the effectiveness of planned locomotive attenuator devices.

PERFORMING AGENCY: Ultrasystems, Incorporated, Dynamic Science Division
SPONSORING AGENCY: Transportation Systems Center; Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Polcari, S (Tel (617)494-2542)

Contract DOT-TSC-700 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1974 TOTAL FUNDS: $158,553

ACKNOWLEDGMENT: TRAIS, FRA (PR# TME-0111-GF)

08 049658
RAIL SAFETY/GRADE CROSSINGS PROTECTION
The program will consist of three major tasks: (1) Development of Application Guidelines for Train 'on board' conspicuity and impact attenuation devices. (2) Innovative System development will study new grade crossing protection concepts. (3) System Analysis will establish inter-administration state and railroad requirements for a data system to accommodate new FRA grade crossing inventory and other data.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research
INVESTIGATOR: Coulombre, RE (Tel 617-494-2449)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D (Tel 202-426-1227)

STATUS: Active NOTICE DATE: July 1976

ACKNOWLEDGMENT: FRA

08 055567
STUDY STANDARDIZATION OF GRADE CROSSING PROTECTIVE SYSTEMS AND DEVICES
The purpose of this procurement is to study the economic and technical feasibility of modularization and standardization used to improve the effectiveness and reduce the costs of active grade crossing protection, and to develop the information and technology foundation from which guidelines can be generated governing all appropriate aspects of implementation of active grade crossing protection. The primary immediate goal is enhancement of the effectiveness and reduction of the costs of all aspects of active protection--hardware, installation, maintenance, engineering design, and administration.

PERFORMING AGENCY: Storch Engineers
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Hopkins, J (Tel (617)494-2048)

Contract DOT-TSC-870 (CPFF)
STATUS: Completed NOTICE DATE: July 1976 START DATE: July 1974 TOTAL FUNDS: $70,944

ACKNOWLEDGMENT: TRAIS (PR# TME-0137-GF)

08 058459
ON-BOARD LOCOMOTIVE/AUTO IMPACT TEST DEVICE
Develop a locomotive/auto impact test device to be evaluated in train-strikes-vehicle validation tests at the DOT High Speed Ground Test Site at Pueblo, Colorado. The development is part of TSC Grade Crossing Safety Research and Development sponsored by the Federal Railroad Administration, Office of RD&D, and is directed toward possible improvement in protection for automobile occupants during grade crossing accidents. The attenuator is also intended to decrease the possibility of train derailment due to automobile engine block entrapment under the locomotive.

PERFORMING AGENCY: Minicars, Incorporated
SPONSORING AGENCY: Transportation Systems Center, RR-502
RESPONSIBLE INDIVIDUAL: Raab, AR (Tel (617) 494-2539)

Contract DOT-TSC-997 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1975 COMPLETION DATE: Apr. 1978 TOTAL FUNDS: $122,180

ACKNOWLEDGMENT: TRAIS (RR-502), FRA

08 080333
HUMAN FACTORS IN COLLISIONS AT RAILWAY CROSSINGS
This study develops a behavioral analysis of automobile drivers at level crossings involving road and rail traffic, and will provide recommendations designed to reduce the incidence of level crossing accidents. /RTAC/
REFERENCES:
An Observational Study of Driver Behaviour at Signalled Railroad Crossings, Wilde, GJS; Cake, LJ; McCarthy, MB, CIGGT 75-16, Nov. 1975

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 7.5.74
INVESTIGATOR: Wilde, GJS
SPONSORING AGENCY: Canadian National Railways; Canadian Pacific; Canadian Transport Commission; Queen's University, Canada

STATUS: Completed NOTICE DATE: Aug. 1976 START DATE: May 1974

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

09 058267
METALLURGICAL TESTS AND ANALYSIS FOR HAZARDOUS MATERIAL RAILROAD TANK CARS
The objectives of this task are to (a) collect a data base on railroad tank car and pressure vessel steels, (b) prepare guidelines for steels to be used in railroad tank car construction, (c) evaluate the elevated temperature performance characteristics of TC-128 steel, and (d) perform a metallurgical evaluation of full scale tanks tested at White Sands Missile Range and tanks involved in actual rail accidents

PERFORMING AGENCY: National Bureau of Standards, Insitute for Materials
INVESTIGATOR: Interrante, CG (Tel 301-921-2997)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202)426-1227)

AR-40008
STATUS: Active NOTICE DATE: July 1976 START DATE: Sept. 1973 COMPLETION DATE: June 1977

ACKNOWLEDGMENT: FRA

09 058484
WEAR AND FRACTURE CHARACTERISTICS OF CRITICAL COMPONENTS IN GROUND TRANSPORTATION SYSTEMS
Tasks include: 1-Determination of the properties of steels used in rails and rail couplings. 2-Modification and instrumentation of the existing roll-on-roll test facility in order to study wheel-on-rail wear and rolling contact fatigue. 3-Macrographic and micrographic wear studies on wheel-on-rail wear as a function of load, environment, speed and magnitude of tangential slip. 4-Perform metallurgical and wear analyses of at least 100 field samples of steels used in railroad wheels, rails, and rail couplings.

PERFORMING AGENCY: Syracuse University, Department of Materials Science
INVESTIGATOR: Keller, DV, Jr
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation; Association of American Railroads
RESPONSIBLE INDIVIDUAL: Lauriente, M (Tel 202-4269364)

Contract DOT-OS-50124
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: May 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: $102,579

ACKNOWLEDGMENT: TRAIS, OST

09 104358
FIBER REINFORCED CONCRETE
Economical sophisticated mix designs involving different cementitious materials and properties are being developed for steel fiber reinforced concrete. Physical properties are being determined. A study of mixing, handling and placing procedures in construction size quantities is a part of the project as is continued observations of the completed field installations. Anchorage of the fibers to the matrix is being studied. /SIE/

PERFORMING AGENCY: Illinois University, Urbana, Department of Theoretical and Applied Mechanics
INVESTIGATOR: Kesler, CE
SPONSORING AGENCY: United States Steel Corporation

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1972

ACKNOWLEDGMENT: Science Information Exchange (NIL 753 4), Illinois University, Urbana

09 104774
PROPERTIES AND PERFORMANCE OF CLEAR AND PIGMENTED COATINGS ON WOOD
An attempt is made to find which types of coatings have the best durability so that advice can be given to users and to determine which basic properties confer durability to assist in development of coatings with improved performance. Both natural and accelerated weathering are used in evaluation studies. Exterior exposures of clear finishes have been completed and a report prepared. Factory-coated sidings are being exposed in comparison with plastic materials. The results of the wood stabilization project are being assessed. /RTAC/ Reports Issued: The Swelling of Wood in Polar Organic Solvants, H.E. Ashton, Wood Science, Vol. 6, No. 2, pp 159, 1973. Exterior Exposure Study of Stains and Clear Finishes, H.E. Ashton, Canadian Paint and Finishing, Vol. 48, 2, pp 12 (February 1974). Removal of Solvent From Swollen Wood, H.E. Ashton, Wood Science, Vol. 6, 4, pp 368 (April 1974).

PERFORMING AGENCY: National Research Council of Canada, Division of Building Research
INVESTIGATOR: Ashton, HE
SPONSORING AGENCY: National Research Council of Canada

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: 1954

ACKNOWLEDGMENT: National Research Council of Canada, Div Bldg Res, Roads and Transportation Association of Canada

09 115802
FAILURE BEHAVIOR OF COMPOSITE MATERIALS
This project is attempting to describe the failure behavior of fiber-reinforced composites and determine the effects of materials and fabrication variables and environment on the failure behavior for utilization in the design of naval structures. This will permit the use of these materials with greater efficiency and greater reliability in applications such as shipboard use and underwater vehicles. The project will extend and use fracture mechanics concepts to study the failure behavior of composites, determine the effects of controlled defects and flaws on various modes of failure of fiber-reinforced composite structures, and derive fracture functions to describe each type of failure and apply these to typical prototype structures. /SIE/

PERFORMING AGENCY: Department of the Navy, Research Laboratory
INVESTIGATOR: Wolock, I Mast, PW Mulville, DR
SPONSORING AGENCY: Naval Facilities Engineering Command, Navy, DN619177

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1972

ACKNOWLEDGMENT: Science Information Exchange (ZQN619177)

09 130954
MOBILITY OF OIL-TYPE PRESERVATIVES IN IMMERSED WOOD
OBJECTIVE: Describe the movement of oil-type preservatives in treated wood immersed in water. APPROACH: Laboratory test the effects of water temperature and flow on migration of creosote along radial and longitudinal axes of treated Douglas fir and southern pine sapwood. Marine exposure to describe patterns of creosote migration in small piling immersed in marine waters. PROGRESS: Test installation of piling in estuarine waters is being maintained. Final sampling and analysis after June 1975 is planned.

PERFORMING AGENCY: Oregon State University, Agricultural Experiment Station, Forest Products Division
INVESTIGATOR: Miller, DJ
SPONSORING AGENCY: Oregon, State Government of, 0009588 ORE-F-00828

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 9588 5)

09 134773
COLLABORATIVE RESEARCH ON TRIAXIAL TESTING OF CONCRETE
This research is a collaborative effort among the University of Colorado, New Mexico State University, the University of California at Davis and three institutions in Western Europe; Italy, the United Kingdom and West Germany. Its principal objective is to study the wide scatter of results in contemporary experimental research on multiaxial stress states in plain concrete. The plan is to eliminate differences in the test materials and focus attention on the effects of different test methods. All material and specimen preparation will be undertaken at the University of Colorado. Stiffness and strength testing of two different materials, one mortar and one concrete, will be carried out at the different institutions according to a predetermined plan and time schedule. The test results will be evaluated in accordance with a common scheme designed to allow full correlation and identification of test methodology and techniques optimal for obtaining homogeneous stress and strain.

PERFORMING AGENCY: Colorado University, Boulder, Department of Civil and Environmental Engineering
INVESTIGATOR: Gerstle, KH Ko, H
SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG74-12252

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Sept. 1974 TOTAL FUNDS: $41,250

ACKNOWLEDGMENT: Science Information Exchange (GSE 4893)

09 135139
'SUPER ELASTIC' ALLOYS FOR SHOCK ABSORBER SYSTEMS
The objective of the program is to study the application of 'super elastic' alloys such as aluminum bronze to shock absorber systems such as gun mounts or vehicle bumpers. The ability of the material to deform considerably (18 to 20 percent), absorb energy of impact, and return to its original configuration after force of impact is removed, lends itself very well to this type of application. The material absorbs mechanical energy in two stages-by martensitic transformation and by elastic deformation. Either or both modes may be used for deformation energy absorbtion. These alloys function at any useful temperature, and hence would fill all requirements between say, minus 50 degrees C and 100 degrees C. Specifically, it is proposed to investigate this material in configurations where it will augment or replace overtaxed hydraulic systems in gun mounts. This is not overlooking the possible use of this material in the same configurations in vehicle bumpers or for that matter in any application where impact energy must be absorbed. The effect of temperature and loading rate and the configuration for energy absorbtion by buckling (long and short columns) as well as compressive blocks will be investigated. Also the fatigue characteristics will be looked into.

PERFORMING AGENCY: Department of the Army, Materials and Mechanics Research Center
INVESTIGATOR: Warnas, A Shepard, LA
SPONSORING AGENCY: Department of the Army, Department of Defense, DA0F4717

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA 64717)

09 135276
POLYMER-STRENGTHENED CONCRETE FOR MILITARY FACILITIES
The purpose to develop an organic admixture for making high strength polymer cement concrete. Monomer and/or resin systems, will be developed which can be used as admixtures (introduced into the mixer along with aggregates, cement, and water) to provide up to five-fold increase in compresive strength and commensurate increases in associated properties. Epoxies, epoxy-acrylates, latexes, and polyesters will be incorporated (one at a time) into concrete mixtures to produce a high-strength composite product. Consolidation methods will include hand-tamping, vibration, pressure-packing, and combinations of these. Both high-early-strength and regulated set cements will be utilized. Curing methods will include air, steam, and dry heat as well as combinations of these. In addition to uniformly-graded aggregate, gap-graded aggregate will be used to reduce the amount of polymer required for high strength. Bond strength and water absorption of the material will also be determined.

PERFORMING AGENCY: Naval Civil Engineering Laboratory, Department of the Navy
INVESTIGATOR: Keeton, JR Alumbaugh, RL
SPONSORING AGENCY: Naval Civil Engineering Laboratory, Department of the Navy, DN244079

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQN244079 2)

09 135495
EVALUATION OF SHOTCRETE THEORY AND TECHNIQUES
Purpose of study/investigation: To evaluate shotcrete as a construction material for application to Corps project, i.e., to determine correct sampling techniques, pertinent physical properties, problem areas, and limitations of usage. Approach or plan: A summary of what is known about (1) shotcrete from various users, (2) available equipment, and (3) laboratory tests will be made. Both fine and coarse aggregate mixtures will be utilized using the two types of shotcreting equipment (wet and dry). Basic properties, procedures, limitation, and applications will be studied. Progress to date: (1) To date. Laboratory work, approximately 80 percent complete, has been conducted on four types of shotcrete: fine and coarse dry process and fine and coarse wet process shotcrete. Information has been developed on the compressive, tensile, and shear strength of each type of shotcrete. In addition, data have been secured on bond of old shotcrete to fresh shotcrete, permeability and freeze-thaw resistance, and bond to reinforcing steel. (2) Anticipated FY 74. The remaining data on tests mentioned above will be secured, tabulated, and analyzed. The field application phase will be planned and initiated.

PERFORMING AGENCY: Department of the Army, Concrete Laboratory
INVESTIGATOR: Mather, B
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1973

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 367)

09 136074
SHEAR TRANSFER IN REINFORCED CONCRETE
The objective of this continuing research is to extend the study of shear transfer across a plane in reinforced concrete as follows: (1) To study the influence of a normal tension stress across the plane, on the shear transfer strength of reinforced concrete subject to cyclically reversing load. (2) To study the transfer of shear across the interface between concrete cast at different times (and between concrete and mortar) under the action of both single direction and cyclically reversing loads. (3) To study the influence of reinforcing bar diameter on shear transfer behavior, with particular reference to the possible limitations on the use of large diameter reinforcing bars as shear transfer reinforcement.In each instance the study will be directed toward the development of design recommendations for shear transfer in reinforced concrete under the conditions involved, through the attainment of a better understanding of the mechanics of behavior.
REFERENCES:
Shear Transfer in Reinforced Concrete with Moment or Tension Acting Across the Shear Plane, Mattock, AH; Johal; Chow, Journal of the Prestressed Concrete Institute, Vol. 20, No. 4, July 1975
Shear Transfer in Lightweight Reinforced Concrete Mattock, AH; Li; Wang, Journal of the Prestressed Concrete Institute, Vol. 21, No. 1, Jan. 1976

PERFORMING AGENCY: Washington University, Seattle, Department of Civil Engineering, 61-6808
INVESTIGATOR: Mattock, AH (Tel (206)543-6503)
SPONSORING AGENCY: National Science Foundation, Division of Engineering

Contract NSF-ENG74-21131
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Nov. 1974 COMPLETION DATE: Mar. 1977 TOTAL FUNDS: $93,400

ACKNOWLEDGMENT: Science Information Exchange (GSE 3608 2), Washington University, Seattle

09 136093
PROTECTION OF WOOD IN USE
OBJECTIVE: Modify existing procedures and develop new ones for imparting a high resistance to wood against biological degradation and harmful weathering action, with special attention to minimizing objectionable environmental side effects. APPROACH: Develop new concepts and procedures for preserving wood such as chemical modification of the polysaccharides in wood. Investigate the possibility of increasing the permeability of wood by chemical or microbiological methods. Develop an economical preservative treatment for wood piles to protect against all species of borers by a combination of creosote and inorganic salts. Determine the practicality of diffusion-type treatments for various wood species by studying the effectiveness of various combinations of salts and pretreating steps. Develop improved water-repellent-preservative finishes by increasing the permanence of fungicidal chemicals used in such finishes. Improve the permanence of coatings by modifying the surface of wood as

an acceptor of finishes. Develop effective preservatives for controlling degradation of pulp chips during outside storage.

PERFORMING AGENCY: Wisconsin University, Madison, Forest Products Laboratory
INVESTIGATOR: Hajny, GJ
SPONSORING AGENCY: Forest Products Laboratory, Department of Agriculture, 0040038 FPL3212

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 40038 2)

09 138557
IMPROVED INSPECTION, DETECTION AND TESTING RESEARCH
This Division will plan, implement, sponsor and provide overall technical control and direction to development programs in the area of improved inspection, detection and testing techniques and equipment designed to improve railroad safety. The Division is the FRA contact point for all such programs and will provide for interchange of technological information among interested parties within the department, other government agencies and industry. Programs include Safety Life-Cycle Testing, Vehicle Inspection, Track Inspection and Testing, and Automated Inspection System Development.

For the subprograms see RRIS Nos. 03A 138558, 03A 138559, 01A 138560 and 01A 138561.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Winn, JB (Tel (202) 426-1692)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975

ACKNOWLEDGMENT: FRA

09 138558
SAFETY LIFE-CYCLE TESTING
Develops, recommends, promotes and implements, a safety life-cycle testing and evaluation program. Provides facilities, equipment and technology necessary to detect and evaluate the cause and effect of rolling stock and track deterioration/failure thru the accumulation of Life-Cycle testing, data and experience.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Winn, JB (Tel (202) 426-1682)

STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1977 COMPLETION DATE: Oct. 1982

ACKNOWLEDGMENT: FRA

09 138571
EFFECTS OF MICROSTRUCTURE VARIABLES ON THE FATIUGE BEHAVIOR OF RAIL STEELS
This investigation of the properties of rail and wheel steels has indicated that non-metallic inclusions do shorten the time required to initiate fatigue cracks but do not affect the subsequent rate of crack growth and also show that the tension-compression loading ratio affects the rate of crack growth.

PERFORMING AGENCY: California University, Los Angeles
SPONSORING AGENCY: Association of American Railroads Technical Center
RESPONSIBLE INDIVIDUAL: Stone, DH

STATUS: Active NOTICE DATE: July 1976

09 139164
RAIL MATERIAL FAILURE PROPERTIES AND BEHAVIOR CHARACTERIZATION
This program is structured along three lines--experiments, analysis and metallography. The crack growth properties of U.S. rail population are determined. The importance of metallurgical factors (chemical composition, microstructure and production methods) are assessed. A fractographic reference standard for service failure analysis will be compiled. A failure model for prediction of rail failures, when small flaws are discovered, will be established. The model will be used to evaluate possible metallurgical changes for rail improvement.

PERFORMING AGENCY: Battelle Columbus Laboratories
INVESTIGATOR: Broek, D (Tel (614) 424-6424)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Steele, R (Tel (617) 494-2002)

Contract DOT-TSC-1076
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: June 1975 COMPLETION DATE: July 1977

ACKNOWLEDGMENT: FRA

10 048581
MAGNITUDE OF RAIL RAPID TRANSIT GENERATED NOISE ON THE CHICAGO TRANSIT AUTHORITY SYSTEM
The university will make an assessment and evaluation of the magnitude of rail rapid transit generated noise on the Chicago Transit Authority system. It will also study ways and means of abating such noise and the most cost effective techniques to use. This is one part of an overall UMTA program encompassing all cities with rail rapid transit. The Transportation Systems Center is providing technical direction on the program for UMTA. The effort will cover a 13 month period. Both track and station areas will be studied.

PERFORMING AGENCY: Illinois University, Chicago Circle
INVESTIGATOR: Silver, ML (Tel 312-9965165) Priemer, R
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Hughes, PG (Tel 202-426-0080)

Grant IL-11-0007
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1974 TOTAL FUNDS: $61,092

ACKNOWLEDGMENT: UMTA (IL-11-0007)

10 058132
PROGRAM FOR LOCOMOTIVE AND MARINE DIESEL ENGINE PERFORMANCE AND EMISSIONS
The first phase will focus on detailed problem definition including a survey and identification of existing methods to reduce emissions of white and black smoke and nitrogen oxides from and improve the thermal efficiency measurement procedures applicable to these engines; a study of engine duty cycles to establish representative test sceniarios and an evaluation of how the quality of ingested air, wear and engine maintenance influence emission levels and fuel consumption. The second pahse of this program will consist of laboratory and infield evaluative testing of changes and modifications selected by the government from those recommended in Phase I.

PERFORMING AGENCY: Southwest Research Institute
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, CG-407

Contract TSC-920 (CPFF)
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Nov. 1974 COMPLETION DATE: July 1976 TOTAL FUNDS: $247,117

ACKNOWLEDGMENT: TRAIS (CG-407)

10 058462
ASSESSMENT OF RAILROAD LOCOMOTIVE NOISE
To date, most available data on railroad noise has been of the opportunity type with little emphasis on controlled parametric testing. The intent of this project is to determine under controlled locomotive operating conditions overall and major source component noise levels, the directivity and the propagation efficiency (level vs. distance) of locomotive noise, and the proper measuring techniques required to accurately assess overall and component noise levels from a typical locomotive. An interim report is being prepared.
Co-sponsorship is from FRA, DOT and OST, DOT.

PERFORMING AGENCY: Bolt, Beranek and Newman, Incorporated
INVESTIGATOR: Remington, PJ (Tel (617)491-1850) Michale, R
SPONSORING AGENCY: Transportation Systems Center, OS-507
RESPONSIBLE INDIVIDUAL: Mason, R (Tel (617)494-2443)

Contract DOT-TSC-1016 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1975 COMPLETION DATE: July 1977 TOTAL FUNDS: $49,017

ACKNOWLEDGMENT: TRAIS (OS-507), TSC

10 058621
RAILROAD RETARDER NOISE REDUCTION
A cooperative effort is planned between DOT (TSC), and the BN to collect, assess and disseminate information regarding the character of the noise environment associated with the operation of active retarders in railroad classification (hump) yards and also, to present in useful form information as how to reduce retarder noise locally and to surrounding communities by the use of noise barriers. Information will be obtained by a measurement, barrier construction and evaluation program to be conducted at the Northtown freight classification yard of the Burlington Northern Railroad, Fridley, Minnesota.

PERFORMING AGENCY: Burlington Northern, Incorporated
SPONSORING AGENCY: Transportation Systems Center, OS-507
RESPONSIBLE INDIVIDUAL: Rickley, EJ (Tel (617)494-2372)

Contract DOT-TSC-1035 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $69,150

ACKNOWLEDGMENT: TRAIS (OS-507), FRA

10 058632
MEASUREMENT OF TOXIC SUBSTANCES IN TRAIN CREW ENVIRONMENTS
Perform measurements, at a minimum, of the following contaminants in the train crew breathing environment: Nitric oxide (NO), Nitrogen dioxide (NO2), Carbon monoxide (CO), Total hydrocarbon (THC), Aldehydes, Ozone (O3), and Particulates. Analyze all data and correlate these data with salient features of engine performance, terrain, meteorological conditions etc.

PERFORMING AGENCY: Scott Environmental Technology, Incorporated
INVESTIGATOR: Souza, A
SPONSORING AGENCY: Transportation Systems Center, RR-509
RESPONSIBLE INDIVIDUAL: Hobbs, J

Contract TSC-1071 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: Apr. 1976 TOTAL FUNDS: $37,114

ACKNOWLEDGMENT: TRAIS (RR-509), FRA

10 058675
DEVELOPMENT OF ENGINEERING DATA ON IN-SERVICE PERFORMANCE AND COSTS OF METHODS FOR CONTROL OF URBAN RAIL SYSTEM NOISE
The objective is (1) to develop definitive engineering data on long term costs and performance of four noise control techniques, and (2) to organize and present the data to permit engineering estimates of costs and performance of the techniques on any urban rail transit system in the United States. The techniques are: (a) use of resilient wheels on transit cars, (b) use of damped wheels, (c) use of wheel truing equipment to remove wheel flats and reduce wheel roughness, and (d) use of rail grinding equipment to reduce rail roughness.

PERFORMING AGENCY: De Leuw, Cather and Company
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, UM-504

Contract TSC-1053 (CPFF)
STATUS: Active NOTICE DATE: July 1975 START DATE: June 1975 TOTAL FUNDS: $379,073

ACKNOWLEDGMENT: TRAIS (UM-504)

10 099085
ENVIRONMENTAL NOISE MEASUREMENT
Federal noise control legislation has resulted in an increased need for valid procedures for the measurement of environmental noise. Through the development of measurement methodologies for tire noise, truck and air compressor certification tests; the establishment of data bases in the areas of surface transportation; machinery and community noise; and the development of specialized measurement and analysis instrumentation, NBS programs have contributed to satisfying this need. Future work will build upon this base and extend the understanding of generation mechanisms of various environmental noise sources as the initial step in developing noise control technology and appropriate measurement procedures. Objective: To provide government and industry with the technical basis for noise abatement and control through the development of measurements standards, development of specialized instrumentation and conduct of research in support of accurate, reliable noise measurements.

PERFORMING AGENCY: National Bureau of Standards, Department of Commerce

INVESTIGATOR: Blomquist, DS
SPONSORING AGENCY: National Bureau of Standards, Department of Commerce, 2130150

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1974 COMPLETION DATE: June 1977 TOTAL FUNDS: $223,000

ACKNOWLEDGMENT: Science Information Exchange (ZBA 5729 2)

10 099381
RESEARCH ON URBAN TRANSPORT PLANNING METHODS AND ENVIRONMENTAL IMPACTS
The objective is to make the transportation planning methodology wider in scope in defining the costs and impacts of investments. Land use patterns are determined simultaneously with the transportation system and the ambient air quality is a function of the system's configuration, level of service, and modal distribution of demand. The planning techniques were improved to include alterations to existing ambient air quality resulting from transportation network changes. The research is being conducted in several phases. The first has been a model for forecasting emissions. Emissions from stationary sources are derived from patterns of land use and an inventory of point sources. Then a diffusion model to obtain macro level ambient air quality forecasts for zones will be developed. Both models have been calibrated for the Boston and Los Angeles areas and are applicable to other urban areas. Then, land use relationships are developed through econometric analysis of transportation and land use patterns (e.g. auto ownership and mode choice as a function of socioeconomic-demographic characteristics of households). The final product will be a consistent planning model incorporating land use patterns as an endogenous variable, and predicting air quality.

PERFORMING AGENCY: Harvard University, Department of Economics
INVESTIGATOR: Ingram, GK
SPONSORING AGENCY: Office of the Secretary of Transportation, Department of Transportation
RESPONSIBLE INDIVIDUAL: Cooper, N

STATUS: Active NOTICE DATE: Aug. 1976 TOTAL FUNDS: $200,000

ACKNOWLEDGMENT: DOT

10 100807
ANALYSIS OF A NEW APPROACH FOR ENVIRONMENTAL POLICY EVALUATION
This project will study environmental policy issues related to six problem areas, in order to attempt the development of general methods for using pareto analysis as a means of evaluation the political feasibility of various decisions. These problems are: (1) control of urban air pollution-stationary sources; (2) control of air pollution-mobile sources; (3) environmental aspects of electric power plant siting; (4) residual management in land use planning: (5) control of urban fires; (6) urban soild waste management. /SIE/

PERFORMING AGENCY: Harvard University, School of Engineering, Engineering & Applied Physics
INVESTIGATOR: Thomas, HA
SPONSORING AGENCY: National Science Foundation, Division of Engineering Systems and Research, GI-35117A #3

STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $303,100

ACKNOWLEDGMENT: Science Information Exchange (GSQ 331 2)

10 115804
METHODS FOR ANALYSIS OF HYDROCARBONS IN MOBILE SOURCE EMISSIONS
Low levels of hydrocarbons expected in 1975-76 automobile exhaust present a problem for instruments and methods developed for higher present day levels. A comprehensive review and definition of hydrocarbon analysis and sample collection procedures is underway with a view toward defining interferences, linearity, and repeatability at the mandated exhaust concentrations. /SIE/

PERFORMING AGENCY: National Environmental Research Center, Environmental Protection Agency
INVESTIGATOR: Sigsby, JE
SPONSORING AGENCY: Environmental Protection Agency, Office of Research and Development, 26 ACV 05 72P18333
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1972 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Science Information Exchange (AO 18333 1)

10 130953
ANALYSIS OF A NEW APPROACH FOR ENVIRONMENTAL POLICY EVALUATION
This project will complete analysis of environmental policy issues related to five problem areas, for the purpose of developing the general methods and techniques for using Pareto Analysis as a means of evaluating the political feasibility of various decisions. The problem areas are: 1) Control of air pollution-stationary sources; 2) Control of air pollution-mobile sources; 3) Environmental aspects of electric power plant siting; 4) Residuals management in land-use planning; and 5) Urban solid waste management. This final phase also focuses on producing a monograph that provides an introduction to Pareto Environmental Analysis (PEA); practical applications; the development of PEA theory; and conclusions in which PEA is evaluated and advantages and disadvantages are discussed. The PEA method which is being developed formalizes the decision-making process. It involves a method for identifying interest groups and quantifying their evaluation of alternatives. The tool is intended to improve decisions and make decision technicians far more useful.

PERFORMING AGENCY: Harvard University, School of Engineering, Engineering & Applied Physics
INVESTIGATOR: Thomas, HA
SPONSORING AGENCY: National Science Foundation, Division of Advanced Environmental Research & Technology, AEN72-03523 A04

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: Dec. 1975 COMPLETION DATE: Nov. 1976 TOTAL FUNDS: $212,900

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 331 3)

10 135661
CHARACTERIZATION AND CONTROL OF AIR POLLUTANT EMISSIONS FROM COMBUSTION OF FUELS
Description: The overall objectives of this research project are to determine the characteristic air pollutant emission types and levels from: (1) Combustion of current fuels in use, and (2) Combustion of new fuels that are projected for major use in the future. This project will evaluate the air pollutant control potential for a wide range of liquid, gaseous, and solid fuels. All of the investigation will be performed under controlled laboratory conditions and will provide information that will establish the air pollutant emission picture of fuel in different combustion systems. A series of fuels will be tested for emission characteristics over a wide range of conditions with appropriate combustors. This series will include heavy oils, desulfurized heavy oils, distillate oils, crude oil, methanol, low and high BTU gases, and coal. A survey of fuels will be made, concentrating on obtaining information (cost, composition, etc.) about fuels in present use and new "clean" fuels that may become major energy resources as new air pollution control regulations are passed.

PERFORMING AGENCY: National Environmental Research Center, Environmental Protection Agency
INVESTIGATOR: Martin, GB
SPONSORING AGENCY: Environmental Protection Agency, Office of Research and Development, 21 ADG 46

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1972 COMPLETION DATE: June 1977

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AO 20684 2)

10 135753
POLYNUCLEAR AROMATIC HYDROCARBON EMISSIONS FROM HEAVY DUTY DIESEL ENGINES
This project has as its objective the determination of the polynuclear aromatic hydrocarbon content of diesel fuels and diesel engine exhaust gases. Several different types of engines and individual operating modes will be examined. The approach to be taken involves first establishing that a satisfactory sampling procedure has been developed. Then a survey of some

20 diesel fuels will be made to establish typical levels of PNA in commercial products. From this survey a typical baseline fuel will be selected and used in seven (7) different types of heavy duty diesel engines. Exhaust gases from the Federal exhaust hydrocarbons emission cycle and also from the Federal smoke cycle will be separately analyzed. Finally, on one engine, the exhaust from 13 individual modes will be examined. Initial plans are to develop the sampling procedure and validate its use.

PERFORMING AGENCY: Gulf Research and Development Company
INVESTIGATOR: Stindt, RS
SPONSORING AGENCY: Environmental Protection Agency, Office of Research and Development, 68-01-2116 72P21626

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AO 21626 1)

10 136145
MASS TRANSIT SYSTEMS STUDY
EPA agrees to join in a cooperative interagency contract for a policy study on mass transit systems. The other agencies involved are OAWP, SASD, Land Use Planning Branch, and the Office of the Assistant for Environment and Urban Systems, Department of Transportation. The contractor would review, report, and advise on information on traffic congestion, air pollution and energy requirements associated with urban transportation, project the results of current trends in these areas, assuming no change in outside influences, and evaluate the consequences of continuation of the present Federal goals for urban area mass transportation and air quality. The contractor would also determine the air pollution implications of various forms of mass transit now under consideration by UMTA, including magnetic levitation, tracked air cushion and over-the-water air cushion vehicles, hydrofoil, personalized rapid transit, dual-mode vehicles, dial-a-ride, and increased use of taxis.

PERFORMING AGENCY: Urban Mass Transportation Administration
INVESTIGATOR: Winkler, F
SPONSORING AGENCY: Environmental Protection Agency, Office of Research and Development, IAG 107 72P21175

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AO 21175)

10 138380
LATERAL VERTICAL AND VIBRATIONAL PRESSURES IN BULK POTATOES
Determine pressures exerted by bulk stored potatoes and how these pressures are influenced by size, shape of tubers, friction, temperatures, humidity. Determine effect of vibrational pressure caused by trains passing on tracks adjacent to stored potatoes. Install in commercial size storage, "Pressure panels." Monitor pressures during filling, emptying, "cool-down," "warm-up" humidity cycles, length of time stored. Use russet skin, smooth skin, round shape, flat shape, mostly larger than 2-1/2 inches-mostly smaller and 2-1/2 inches. Thirteen vertical load cells and thirteen horizontal load cells (hermetically sealed) were installed at the end of a 24 ft. wide by 19 ft. high by 80 ft. long prototype bin. Norchip variety potatoes were piled 18 ft. deep. Unit lateral pressures reached initial peak value near floor within 3 days after bin filling. These then decreased for 2 to 3 weeks before increasing again. Second series of peak values occurred 2 feet above initial peak unit lateral pressure location. Sawtooth lateral pressure pattern developed with time. Vertical (floor) unit pressures continued to increase with time. Preliminary analysis of data indicate ARS-52-32 data can not be extrapolated to wide shallow bins. Preliminary data indicate definite vibration effects on pressure due to trains.

PERFORMING AGENCY: Agricultural Research Service, Department of Agriculture, 3506-15630-006
INVESTIGATOR: Yaeger, EC Schaper, LA Shaw, R
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: Aug. 1974 COMPLETION DATE: Aug. 1977

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0041318)

10 138534
NOISE ABATEMENT
Identified as a major systems problem for transit authorities, this program has as its objective the reduction of noise and vibration on urban rail transit systems. Problem areas have been identified and the noise climate on operating authorities has been appraised. Tests and evaluation of available abatement hardware are to be made. New technology is to be developed. A handbook on noise and vibration control is to be produced.

PERFORMING AGENCY: Transportation Systems Center, Department of Transportation
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Spencer, PR (Tel (202) 426-0090)

Contract UM-604
STATUS: Active NOTICE DATE: July 1976 START DATE: 1971 COMPLETION DATE: June 1979 TOTAL FUNDS: $3,500,000

ACKNOWLEDGMENT: UMTA

11 038789
TRACKED AIR CUSHION RESEARCH VEHICLE, PHASE V, TEST
The TACRV Phase V Test Operations Program will be implemented and conducted in the conformance with Grumman Report PMT-B4-R72-6 TACRV Phase V Test Operations Plan. Effort will be required at DOT's High Speed Ground Test Center and Grumman, Bethpage to satisfy the various activities associtated with TACRV test operations. The TACRV Test Operations Program consists of the following tasks: Test Operations-HSGTC, Test Operations-Bethpage, Ingress/Egress System Design, Fabriction and Installation, Guideway Perturbations Design, TACRV Remote Control Design, TACRV Systems Interface Management and TACRV Arrestment System Study.

PERFORMING AGENCY: Grumman Aerospace Corporation
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Lampros, AF (Tel 202-4269564)

Contract DOT-FR-30041 (CPFF)
STATUS: Active NOTICE DATE: July 1975 START DATE: Feb. 1973 COMPLETION DATE: June 1977 TOTAL FUNDS: $2,806,716

ACKNOWLEDGMENT: TRAIS (PR# 72-158)

11 048879
ANALYSIS OF UT NEEDS WITH PARTICULAR EMPHASIS ON PRT SYSTEMS
The primary objective of this effort is to develop and describe the most appropriate role for PRT systems within the overall U.S. transportation system with particular consideration given to the 1985 and 2000 time periods.

PERFORMING AGENCY: Johns Hopkins University, Baltimore
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Herringer, FC (Tel 202-426-4040)

Grant DOT-MD-11-0001-00
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Apr. 1974 TOTAL FUNDS: $82,710

ACKNOWLEDGMENT: TRAIS (MD-11-0001-00)

11 048919
EXPERIMENTS IN GUIDEWAY LEVITATION VEHICLE INTERACTION DYNAMICS
The Contractor shall furnish all necessary qualified personnel, facilities, materials, and such other services required to construct and test experimental models of various guideways and vehicles. Primary attention will be on beam type guideways of multiple spans and the Tracked Levitated Research Vehicle (TLRV) and the Prototype Tracked Air Cushion Vehicle (PTACV). Results of the test will be analyzed using the latest computer techniques and will be compared where available to theoretical computations.
REFERENCES:
Experiments in Guideway-Levitation Vehicle Interaction Dynamics, Wilson, JF, Duke University, Civil Engineering Dept., Jan. 1976

PERFORMING AGENCY: Duke University, School of Engineering
INVESTIGATOR: Wilson, JF (Tel (919)684-2434)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: McCafferty, RM (Tel (202)426-4377)

Contract DOT-FR-4-4098
STATUS: Completed NOTICE DATE: July 1976 START DATE: June 1974 TOTAL FUNDS: $35,000

ACKNOWLEDGMENT: FRA

11 058272
TESTING OF ADVANCED POWER CONDITIONING UNIT (PCU) AND LINEAR INDUCTION MOTOR (LIM) PRESENTLY INSTALLED IN THE TLRV (TRACKED LEVITATED RESEARCH VEHICLE)
Testing of an advanced PCU and LIM on available guideway and 8.25 kV wayside power at the Transportation Test Center (TTC). The PCU may be used with rotary squirrel-cage motors on conventional railroads, as well as for LIMs on non-conventional transportation systems. The PCU is more powerful than the electric drive of any existing locomotives, and features variable-voltage, variable- frequency, a high power-to-weight ratio, and a high-power- to-volume ratio. The advanced features of the PCU are made possible by the use of a synchronous condenser and water cooling system. The PCU and LIM will undergo shakedown and low-speed tests through June 1976.

PERFORMING AGENCY: AiResearch Manufacturing Company
INVESTIGATOR: Kalman, G (Tel 213-323-9500)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Guarino, M (Tel 202-426-9564)

Contract DOT-FR-40016
STATUS: Active NOTICE DATE: July 1975 START DATE: Jan. 1974 COMPLETION DATE: June 1977

ACKNOWLEDGMENT: FRA

11 058273
EVALUATION OF ELECTRICAL PROPULSION BY MEANS OF IRON-CORED SYNCHRONOUSLY OPERATING LINEAR MOTORS
This project constitutes the initial research phase of synchronous linear motors for transportation. The motors considered are restricted to those having both the excitation and armature windings on the same structure, i.e., on board the vehicle. The primary objectives are to determine the feasibility of two types (the homopolar inductor and the claw-pole) for propulsion of railroad vehicles, and to establish a basis for further exploratory R&D on a test wheel. The aim is to develop an alternate to the present linear induction motor, with the potential for higher efficiency and power factor, larger clearances with the reaction rail, and useful attraction and guidance forces to inhibit vehicle derailment.

PERFORMING AGENCY: Polytechnic Institute of New York
INVESTIGATOR: Levi, E (Tel 212-643-4486)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Guarino, M (Tel 202-426-9564)

STATUS: Active NOTICE DATE: July 1975 START DATE: Apr. 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: FRA

11 058274
TEST PROGRAM ON THE LINEAR INDUCTION MOTOR RESEARCH VEHICLE (LIMRV)
The primary objective of this test program is to obtain essential test data on linear induction motors and on truck/rail dynamics, as well as correlation of this data with theory and mathematical models. The LIMRV is considered an important testbed because of its unique instrumentation and speed range. The LIMRV has established a world speed record for steel-wheel on steel-rail vehicles of 411.5 km/h.

PERFORMING AGENCY: AiResearch Manufacturing Company
INVESTIGATOR: D'Sena, G (Tel 213-323-9500)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Guarino, M (Tel 202-426-9564)

Contract DOT-FR-40016
STATUS: Completed NOTICE DATE: June 1976 START DATE: Jan. 1973

ACKNOWLEDGMENT: FRA

11 058355
DEVELOP DESIGN PARAMETER CONSTRAINTS FOR ELEVATED PERSONAL RAPID TRANSIT (PRT) GUIDEWAYS
Performance measures to be considered are stability, acceleration, rate of change of acceleration, guideway roughness, and guideway deflection. The system parameters to be varied include dimensionless quantities representative of vehicle speed, guideway mass and stiffness, guideway camber, guideway boundary conditions and curvature, and vehicle suspension characteristics. Computations will be made to determine the acceptability of preliminary PRT vehicle concepts in terms of stability, passenger comfort and guideway roughness and flexibility.

PERFORMING AGENCY: California University, Los Angeles
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Doyle, J

Contract OS-40080 (CS)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Apr. 1974 TOTAL FUNDS: $92,506

ACKNOWLEDGMENT: Office of Systems Development and Technology

11 058375
MORGANTOWN PERSONAL RAPID TRANSIT SYSTEM IMPACT EVALUATION
The study will consist of the pre-PRT stage prior to the passenger operation of the system and the post-PRT stage, after the system has been placed into revenue service, with the following objectives: a. to measure the service and accessibility of the system, b. to determine the nature of system patronage, c. to describe the operational costs and revenues of the system, d. to examine the attitudes of the people in the community toward the system, e. to measure the impact of PRT upon: travel and traffic, the economy, the society, and the environment in the PRT corridor, f. to create a methodology for extrapolation of the results. The pre-PRT stage has been completed. The Post-PRT stage is scheduled to occur during cy 1977.

PRT Impact Study, Pre-PRT Phase. March 1976, Volume 1- Travel Analysis, SEG Elias; Volume 2-Data Collection Methodology and Coding Manual; Volume 3-Frequency Tabulations from Transportation Related Surveys, CN Redwine.

PERFORMING AGENCY: West Virginia University, WV-03-0006
INVESTIGATOR: Elias, SEG (Tel (304)293-5131)
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, UM-639
RESPONSIBLE INDIVIDUAL: Stearns, MD 230 (Tel (617)494-2796)

Contract DOT-TSC-985
STATUS: Completed NOTICE DATE: July 1976 START DATE: Feb. 1975 TOTAL FUNDS: $110,097

ACKNOWLEDGMENT: UMTA, West Virginia University

11 058378
LONGITUDINAL CONTROL SYSTEM DESIGN SUMMARY
Provide a report documenting the Morgantown Phase IB LCS design effort. The report shall contain the following elements: a. General System Description--Provide a general description of the longitudinal control system elements and operation of the overall system. b. Phase IB Design Task Requirements--Describe the requirements on the system and the resulting design, analysis and development test program undertaken to meet these requirements. c. Analysis and Test Results--Describe the major analysis and test results obtained, emphasizing the major problem areas encountered and the solutions to these problems. d. Analytical model which provides a detailed description of design effort. e. Potential system improvements: Identify potential improvements to the system on the basis of experience with the Morgantown system, which are logical candidates for future research and development.

PERFORMING AGENCY: Boeing Company, Aerospace Group
SPONSORING AGENCY: Transportation Systems Center, UM-533
RESPONSIBLE INDIVIDUAL: Patt, NG (Tel (617)494-2237)

Contract DOT-TSC-994 (CPFF)
STATUS: Completed NOTICE DATE: July 1976 START DATE: Mar. 1975 TOTAL FUNDS: $21,000

ACKNOWLEDGMENT: Pittsburgh University, Washington, D.C.

11 058429
TESTING OF THE PROTOTYPE TRACKED AIR CUSHION VEHICLE AT THE TRANSPORTATION TEST CENTER
Perform the maximum number of specific tests feasible within the funding limitations of this contract. The contractor shall utilize his best efforts to decrease the number of tests required by eliminating incremental speed tests wherever it appears advisable to do so.

PERFORMING AGENCY: Rohr Corporation
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Mitchell, MB (Tel 202-426-0966)

Contract DOT-FR-54089 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Feb. 1975 TOTAL FUNDS: $550,000

ACKNOWLEDGMENT: TRAIS (4089-4)

11 058512
RIDE QUALITY STUDIES ON GROUND-BASED TRANSPORTATION SYSTEMS
Objectives are: (1) To measure and record sufficient acceleration and vibration data to provide a description of the characteristic ride motions of the Dallas/Fort Worth (DFW) Airport AIRTRANS vehicles and to allow the development of mathematical models of the vehicles and the validation of these models; (2) To develop vehicle dynamics models for the AIRTRANS vehicle(s) and to study the effects of the steering arm and power collector motor inputs on the vehicles' dynamic behaviors; and (3) To identify the analysis techniques and to prepare the computer programs required for the correlation of the measured vehicle ride motions and the subjective responses of passengers.

PERFORMING AGENCY: Texas University, Department of Mechanical Engineering
INVESTIGATOR: Healey, AJ
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Sussman, ED

Contract DOT-OS-50126 (CS)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $49,870

ACKNOWLEDGMENT: TRAIS (PUR-50185), OST

11 099406
DYNAMICS OF TRACKED LEVITATED VEHICLE SUSPENSIONS
The main objective is to undertake analytical and experimental research concerning the dynamics of suspensions applicable to two forms of tracked levitated guided ground transportation systems: A. Ferromagnetic Suspensions Research: (attractive)-1. Specific experimental magnet dimensions based on inputting estimated ICTS characteristics into existing analytical model. 2. Design of magnet, magnet test platform, inverter controllers and instrumentation. 3. Construction of test apparatus. 4. Debugging test apparatus and commissioning on UTIAS heave table. 5. Testing on heave table and analysis of results. 6. Documentation and reporting results. The final report of the above system is being prepared. B. Flexible-skirt TACV Suspension Research:-1. Static and dynamic testing of hinged-lip model. 2. Construction of large open-loop skirt models. 3. Static and dynamic testing of open-loop skirt models. 4. Completion of nonlinear analytical model and calibration using experimental test results. 5. Documentation and reporting results. The report is in preparation.

PERFORMING AGENCY: Toronto University
INVESTIGATOR: Slemon, G (Tel 416-928-3117) Sullivan, PA (Tel 416-667-7711)
SPONSORING AGENCY: Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Eggleton, P (Tel 514-283-4077)

Contract MOT-99025
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1974 COMPLETION DATE: Apr. 1976 TOTAL FUNDS: $82,500

ACKNOWLEDGMENT: Transportation Development Agency

11 099412
LINEAR INDUCTION MOTOR COMPARATIVE ANALYSIS
To carry out theoretical and experimental research into linear inductions Motors (LIM's). The objectives are: 1) To review, understand, and quantify the basic differences between the predictive models of a LIM developed by various researchers worldwide with particular emphasis on the influence of compensating windings to improve motor performance. 2) To study and quantify end effects for single and double sided LIM's. 3) To investigate and quantify through experimentation the effects of compensating windings with respect to energy consumption, efficiency and economic viability when used in a practical vehicle configuration. 4) To formulate a predictive analytical model based upon the world knowledge to date, and the experience gained during this work, and then verify the model experimentally.

PERFORMING AGENCY: Centre de Recherches des Transports, Montreal University
INVESTIGATOR: Mukhedkar, D (Tel 513-343-7575)
SPONSORING AGENCY: Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Rudback, NE (Tel 514-283-4077)

Contract
STATUS: Active NOTICE DATE: July 1976 START DATE: Dec. 1974 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $17,320

ACKNOWLEDGMENT: Transportation Development Agency

11 110862
MAGNETIC LEVITATION STUDY
The study is concerned with non-contact suspension and propulsion for 300 mph interurban transportation. Magnetic levitation is produced by the repulsive interaction between superconducting magnets on a moving vehicle and the eddy currents induced in guideway mounted aluminum conductors. Propulsion is by a linear synchronous motor which also uses vehicle mounted superconducting magnets and energised guideway coils. A 25 ft diameter rotating wheel test facility has been built in Kingston to test full scale levitation and propulsion magnets. Vehicle characteristics and guideway configurations are being analysed. Theoretical and experimental studies of magnetic lift, drag and guidance forces and the linear synchronous motor are in progress. The Canadian study complements U.S. D.O.T. sponsored studies and there is also a technical information exchange agreement with Germany. Phase III (1975-77) of the maglev program is being directed towards expanding the theoretical base for maglev vehicle/guideway design and verifying the design concepts through experimental work. It is intended that the project will produce an identification of a feasible maglev design, mathematical models describing the levitation, guidance, suspension, stability, propulsion and dynamic performance of the vehicle and an experimental verification of design proposals.
REFERENCES:
Performance Characteristics of Variable Speed Linear Synchronous Motors, Dawson, GE; John, UI, Canadian Institute of Guided Ground Transport, Report No. 74-6, Aug. 1974
Interim Report on Linear Synchronous Motor Experimental Models, Dawson, GE; John, UI; Sen, PC; Bennett, JA, Canadian Institute of Guided Ground Transport, Report No. 74-7, Aug. 1974
Superconducting Magnetic Levitation & Linear Synchronous Motor Propulsion for High Speed Guided Ground Transportation, Atherton, DLA; Eastham, AR, Canadian Institute of Guided Ground Transport, Report No. 75-5, Mar. 1975

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, TDA07
INVESTIGATOR: Atherton, DL Bennett, J Slemon, GR Robertson, SD Dawson, GE Burke, PE John, VI
SPONSORING AGENCY: Ministry of Transport, Canada, Transportation Development Agency; National Research Council of Canada

STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1971 COMPLETION DATE: Oct. 1976

ACKNOWLEDGMENT: CIGGT

11 130488
WATER RESOURCES ASPECTS OF COAL TRANSPORTATION BY SLURRY PIPELINE
Large quantities of low sulfur coal are located in the western part of the United States, particularly in Wyoming, Montana, and the Dakotas. Unfortunately, available water resources in these areas are limited. The increased usage of coal has resulted in increased efforts regarding coal gasification and coal liquefaction. In addition, requirements for the reclamation of strip-mined land are forth-coming. In the low-sulfur coal areas of the West, the increased usage of coal conversion (either gasification or liquefaction) and reclamation of strip-mined land will add a substantial burden to already stressed water resources. Three significant water resource considerations are evident concerning coal transportation by slurry pipelines. These are the water quality deterioration that can be expected from the process, the possibility of using water of low quality (municipal and industrial effluents) as the source of water for the slurry, and the treatment procedures required both at dump stations and at the receiving end of the pipeline. The proposed research program includes all three of these major areas.

PERFORMING AGENCY: Arkansas University, Fayetteville, Water Resources Research Center
INVESTIGATOR: Moore, J
SPONSORING AGENCY: Department of the Interior, Office of Water Research and Technology, B-050-ARK

STATUS: Active NOTICE DATE: May 1975 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $54,817

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GUY 203)

11 130949
THE DYNAMICS OF ELASTIC STRUCTURES WITH HIGH ELECTRIC CURRENTS
This research is a continuation of a program dealing with the mechanics of elastic structures carrying large electric currents. The experimental program will be extended to: (1) The study of the vibration and stability of a superconducting coil under its own field, and under external magnetic fields. (2) The generation of compressional and torsional stress waves by a transient magnetic field in a ferromagnetic elastic bar. (3) The dynamics of magnetically levitated vehicles on a rotation wheel. (4) The stresses and dynamics of a linear induction motor reaction rail using a rotating wheel. The analytical program will consider: (1) The prediction of deformation and stresses in beams and plates under a transient current pulse. (2) The calculation of stresses in rectangular and non-circular superconducting coils. (3) The study of currents, magnetic fields, and stresses in a linear motor reaction rail for a two-sided and single- sided motor. (4) The stresses in conductors due to a moving contact such as occur in power collectors, motor brushes, and superconducting homopolar motors.
This action provides a second year of support for continuing grant EN-7509079.

PERFORMING AGENCY: Cornell University, School of Engineering, Department of Theoretical & App Mech
INVESTIGATOR: Moon, FC
SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG75-09079 A01

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Sept. 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $45,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 5028 1)

11 130956
PIPELINE TRANSPORTATION OF SOLIDS IN SLURRY FORM
Objective: To assist in the development of this technique for the transportation of bulk solids. Approach: (a) To conduct experimental studies of the factors governing energy consumption for typical materials in pipelines up to 12 inches in diameter; (b) to examine new materials or equipment proposed for such pipelines; (c) to study procedures or design changes which could reduce capital costs or improve pipeline reliability; (d) to examine the application of this new technique to new situations. Progress: 1. A thorough study of the pipeline behaviour of Western Canadian metallurgical coals in water: Studies of Manitoba limestone in water, Quebec iron ore in water, Saskatchewan potash in brine, and various sands in water have been completed. 2. A preliminary study of the preparation, pumping, separation and utilization of Western Canadian coal-oil slurries is being completed. 3. Various theoretical studies and research contract investigations for commercial clients are in progress. 4. Current plans include the study of mixtures containing coarse (one inch diameter and above) particles. The major application of such work will be in coal mining.
This project is also supported by the Transportation Development Agency.

PERFORMING AGENCY: Saskatchewan University, Canada, School of Engineering, Chemistry & Chemical Engin
INVESTIGATOR: Shook, CA Husband, WH
SPONSORING AGENCY: National Research Council of Canada

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (SJ 632)

11 135957
GUIDEWAY DESIGN FOR GROUND TRANSPORT SYSTEMS
Description: New modes of ground transportation systems will require guideways which must often be elevated and discretely supported to negotiate rights-of-way and topological barriers. Further, guideway costs will represent a substantial portion of total system costs. The dynamic response of various guideway configurations is therefore being examined to determine design configurations which most efficiently meet deflection (ride comfort) and safety (stress) design constraints.

PERFORMING AGENCY: Texas University, Austin, Department of Mechanical Engineering
INVESTIGATOR: Smith, CC
SPONSORING AGENCY: Texas University, Austin

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (NTX 382 1)

11 135964
PETROLEUM TRANSPORT
Description: Objective is to improve the technology for pipeline transport of petroleum, petroleum products and other energy-related materials. The effort encompasses study of all phases of pipeline transport, including improvements in the efficiency of existing systems as well as extension to new applications.

PERFORMING AGENCY: Shell Development Company, Bellaire Research Center
INVESTIGATOR: Hood, GC
SPONSORING AGENCY: Shell Oil Company

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BM 596 1)

11 135965
RESEARCH INITIATION-PRACTICAL METHODS OF SUSPENSION OPTIMIZATION
The objective of the research will be to formulate optimal design procedures for implementation of active controllers with digital air flow modulation components with application to air cushion suspensions. In order for the study to be a general approach with the results being applicable to a broad class of transportation vehicles, an algorithm for analytically evaluating the suspension dynamics subject to typical random guideway irregularity inputs will be formulated. The algorithm will be based on the utilization of the random input describing function for mathematically modeling the digital components which are inherently nonlinear. Application of the random input describing function will enable synthesis of optimal controller designs with the digital components. The ride quality characteristics with the resulting nonlinear digital controllers will be compared to known characteristics of optimal suspensions with linear continuous controllers. The random vibration characteristics of the air cushions as predicted by the algorithm will be determined experimentally in order to determine accuracy limitations on the algorithm. A model for a flexible base air cushion suspension will be used to conduct the experimental phase of the program.

PERFORMING AGENCY: Texas University, Arlington, Graduate School
INVESTIGATOR: Hullender, DA
SPONSORING AGENCY: National Science Foundation, Division of Engineering, GK-42156

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Apr. 1974 TOTAL FUNDS: $17,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 4707)

11 138791
AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY
The AGT Program will develop a coordinated and comprehensive technical information base for automated guideway system development. In particular the technical information developed on the program will be organized into a structured data bank. This data bank will serve as the basis for periodic progress reports with program results distributed to government, universities and industry. The projects will fall into three general classifications: (1) System technology, (2) Subsystem and component technology, (3) Wayside technology.
Performing organization contracts not yet awarded.

SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: MacKinnon, D (Tel (202) 426-4048)

STATUS: Active NOTICE DATE: July 1976 START DATE: Nov. 1975 COMPLETION DATE: Jan. 1979 TOTAL FUNDS: $12,725,000

ACKNOWLEDGMENT: UMTA

11 138792
MORGANTOWN PRT SYSTEM
Develop a personal rapid transit system capable of carrying 5,000 passengers per lane per hour at a 15-second headway, prove the technical feasibility of a fully automated PRT, determine economic and service benefits of a PRT system and assess the institutional problems encountered in building such a system in an urban environment. The concept of automatical control for a vehicle system operating on close headways and the fail-safe concept using checked redundancy have been validated. Design for expansion of the system is underway.

PERFORMING AGENCY: Boeing Company; West Virginia University
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Barsony, SA (Tel (202) 426-2896)

Contract WV-06-0005
STATUS: Active NOTICE DATE: July 1976 START DATE: 1970 COMPLETION DATE: July 1976 TOTAL FUNDS: $9,000,000

ACKNOWLEDGMENT: UMTA

11 138793
AUTOMATED GUIDEWAY TRANSIT INDEPENDENT STUDIES
The objectives of this project are to provide technical studies and analyses to support the development of critical technologies under the AGT program. The entire program was initiated in 1973 but the current phase calls for vehicle/guideway trade-off studies; environmental impact guidelines, functional analysis, and technical studies and analysis to support the automated guideway transit technology program.

PERFORMING AGENCY: Mitre Corporation
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Izumi, G (Tel (202) 426-4047)

Contract UT-50016
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: May 1978 TOTAL FUNDS: $460,000

ACKNOWLEDGMENT: UMTA

12 045276
DEVELOP A TRANSPORTATION SAFETY PROGRAM COORDINATION INFORMATION CENTER REPORT
The system would include reporting by agencies, with the objective of allowing the Office of Safety Program Coordination to: 1. Summarize number and rates of fatalities, injuries, accidents, as well as hazards, risks and causes of accidents identified with each mode of transportation on a periodic basis. 2. Identify from DOT sources, catastrophies, severe accidents emerging hazards and risks on a quick response basis for coordinative purposes. 3. Focus on information regarding the progress made by each transportation mode's safety program toward hazard identification, accident cause perception, and action toward reduction of risks.

PERFORMING AGENCY: Planning Technology, Incorporated
SPONSORING AGENCY: Department of Transportation, Office of Safety Affairs
RESPONSIBLE INDIVIDUAL: McGuire, C (Tel 202-4264468)

Contract DOT-OS-20216
STATUS: Completed NOTICE DATE: Feb. 1976 TOTAL FUNDS: $49,984

ACKNOWLEDGMENT: DOT (PR# DOT-OS-20216), TRAIS

12 048655
OBSERVATIONAL PROGRAMS
The U.S. Atomic Energy Commission shall perform or have performed observational programs for surveillance of radioactive materials in transportation.

PERFORMING AGENCY: Nuclear Regulatory Commission
INVESTIGATOR: Barker, LI
SPONSORING AGENCY: Materials Transportation Bureau, Department of Transportation; Nuclear Regulatory Commission
RESPONSIBLE INDIVIDUAL: Grella, AW (Tel 202-4262311)

IA DOT-AS-40025
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Feb. 1974 TOTAL FUNDS: $30,000

ACKNOWLEDGMENT: TRAIS (PR# DOT-AS-40035)

12 048790
STUDY OF THE PHYSICAL PARAMETERS OF TRANSPORTATION ACCIDENTS
This study will involve a literature data search of the various information which now exists with regard to the physical forces and parameters involved in transportation accidents. The study will analyze this data and develop accident damage test criteria to represent those accident conditions.

PERFORMING AGENCY: Energy Research and Development Administration
SPONSORING AGENCY: Materials Transportation Bureau, Department of Transportation; Energy Research and Development Administration
RESPONSIBLE INDIVIDUAL: Grella, AW (Tel 202-4262311)

IA DOT-AS-20071
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1972 TOTAL FUNDS: $65,000

ACKNOWLEDGMENT: TRAIS (PR# DOT-AS-20071)

12 048924
STUDY OF CURRENT STATUS OF TRANSPORTATION SAFETY RESEARCH AND DEVELOPMENT
The objective of this task is to determine the current status of transportation safety R&D by analyzing, reviewing, critiqueing and/or performing pertinent studies in the field. Three study areas have been identified: analysis and critique of causal factor studies; analysis and critique of cost/benefit studies, and an investigation of the impacts of R&D innovations. The results of these determinations will be used as inputs to subsequent efforts aimed at maximizing the return on the safety R&D investment and to indicate avenues for future safety related R&D efforts.

PERFORMING AGENCY: Science Management Corporation, Decision Studies Group
INVESTIGATOR: Suto, P
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Smith, RT (Tel (617)494-2076)

Contract DOT-TSC-860 (CPFF)
STATUS: Terminated NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: TRAIS (PR# SP-0063 & A), OST

12 048967
OPTIMIZATION OF AUDIBLE WARNING DEVICES
The objective of this contract is to maximize effectiveness and minimize annoyance of motor and railroad carrier audible warning signals. The requirements for both urban and suburban areas will be investigated.

PERFORMING AGENCY: Society of Automotive Engineers; Bolt, Beranek and Newman, Incorporated
INVESTIGATOR: Hanson, CE (Tel (617)491-1850)
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Skeiber, SC (Tel (617)494-2443)

Contract DOT-TSC-868
STATUS: Completed NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: July 1976 TOTAL FUNDS: $99,000

ACKNOWLEDGMENT: TRAIS, TSC (PR# TMP-0205)

12 048973
STUDY THE DYNAMICS OF TRAIN REAR-END COLLISION ACCIDENTS
It is the purpose of this contract to establish the preliminary baseline data, through the medium of controlled train impacts, required to study the dynamics of train rear end collision accidents.

Train-to-Train Rear End Impact Tests. V1 Pre-Impact Determine Vehicle Prop, V2 Impact Test Summ, V3 App, Dec. 1975

PERFORMING AGENCY: Ultrasystems, Incorporated, Dynamic Science Division
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Raab, AR (Tel (617)494-2539)

(CPFF)
STATUS: Completed NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1975 TOTAL FUNDS: $544,782

ACKNOWLEDGMENT: TRAIS (PR# TME-1028-RN), FRA

12 054567
RAILROAD TANK CAR SAFETY VALVE TEST PROGRAM
This program is being accomplished under the area of technology transfer in the AFRPL Rocket Propulsion Plan. This AFRPL conducted program will provide data required by the Federal Railroad Administration of the Department of Transportation in their job of seeking means to improve railroad tank car safety in accidents. The object of this program is to determine the relief and flow characteristics of class DOT-112A tank car safety relief valves. The program consists of four basis phases. The first phase of effort in this program is the analysis phase, and will define the most appropriate way to measure the performance of the relief valves. The second phase is system build-up. The third phase is valve testing and the last phase is preparation of the final report. Under the analysis phase additional ways to accomplish steady state and blowdown tests of saturated and superheated propane will be evaluated. The instrumentation needed to obtain flow data will be investigated and an instrumentation list compiled for each approach. Each test approach will be analyzed for the capability to expand to test larger valves at a future date. Specific equipment and materials needed will be determined for each test approach. The third phase of the program will be to test the relief valves in water. GN2 and propane in accordance with approved procedures resulting from phase I. The first test to be run will be a proof test of the propane tank at one and one-half times the tank maximum working pressure of 500 psi. The nitrogen and water flow tests, to be run next, will check out the flow measurement capabilities of the system and provide flow data for the test values. These tests will also calibrate the epoxy flow nozzles used for flow measurement. Data from the nitrogen and water tests will be correlated with other data generated for these types of valves and will also serve as a baseline for comparison of known fluids with propane. The cracking and reseat pressures of the test valves will also be determined. The propane flow tests will then be conducted. These tests will be conducted with saturated vapor, as well as saturated liquid which will flash through the valves. Flow rates for the valves will be determined for

various pressures from cracking pressure of approximately 280 psig to 475 psig. The final item to be accomplished in the program will be to write a final report.

PERFORMING AGENCY: Department of the Air Force, Rocket Propulsion Laboratory
INVESTIGATOR: Silver, R
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202)426-1227)

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1973 COMPLETION DATE: Dec. 1976

ACKNOWLEDGMENT: Science Information Exchange (ZQF342540 1)

12 055784
TOXICOLOGICAL AND SKIN CORROSION TESTS ON HAZARDOUS MATERIALS
Toxicological data are inadequate for classifying certain of the materials being transported. The work is to verify further the suitability of proposed transportation health hazards classification criteria and to permit classification of additional materials according to these proposed criteria.

PERFORMING AGENCY: Department of the Air Force, Toxic Hazards Division
SPONSORING AGENCY: Materials Transportation Bureau, Department of Transportation
RESPONSIBLE INDIVIDUAL: Harton, EE (Tel 202-4262311)

IA AS-40079
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $58,880

ACKNOWLEDGMENT: TRAIS, Materials Transportation Bureau

12 058266
RAILROAD TANK CAR FIRE PROGRAM
The objectives of this task are to (1) perform laboratory scale fire tests to evaluate the effectiveness of coatings in providing fire protection for tank cars and (2) develop analytical models of pool and torch fires.

PERFORMING AGENCY: Ames Research Center, National Aeronautics and Space Administration
INVESTIGATOR: Mansfield, J (Tel 415-965-5991)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202)426-1227)

AR-30033
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1973 COMPLETION DATE: Sept. 1977

ACKNOWLEDGMENT: FRA

12 058268
HAZARDOUS MATERIAL RAILROAD TANK CAR TORCHING AND POOL FIRE STUDY
The objectives of this task are to (a) construct a facility which would enable the flow structure and properties of a burning jet to be characterized and (b) design and conduct a series of torch and pool tests to evaluate the ability of railroad tank cars to withstand the effects of torching with and without insulation

PERFORMING AGENCY: Ballistic Research Laboratory
INVESTIGATOR: Baicy, E (Tel 301-272-3979)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Levine, D (Tel 202-426-1227)

AR-44061
STATUS: Active NOTICE DATE: July 1976 START DATE: Feb. 1974 COMPLETION DATE: Sept. 1977

ACKNOWLEDGMENT: FRA

12 058482
A FIELD COMPARISON OF STANDARD EMERGENCY-VEHICLE SIGNALS WITH A SEQUENTIALLY-FIRED FLASH TUBE ARRAY
Determine experimentally the relative visibility and informational content in actual field environments of several of the more commonly used emergency vehicle warning and signal systems. The visibility of these systems shall be compared in a variety of atmospheric conditions including rain, fog, snow, and clear conditions during the day and at night. Research will be performed on a light signal system based on phi-effect perception between adjacent gas discharge flash tubes. The optimum coding of information by such a device shall be experimentally determined and the performance of the system compared in effectveness with present standard signals.

PERFORMING AGENCY: South Dakota University, Vermillion, Department of Psychology
INVESTIGATOR: Berkhout, J
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: MacKinnon, JH (Tel (202)426-2702)

Contract DOT-OS-50121 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $30,337

ACKNOWLEDGMENT: TRAIS (PUR-50156), OST

12 058683
TRANSPORTATION SAFETY ANALYSIS
This effort is intended to provide for DOT a first assessment of the safety implications of projected inter-city passenger movements based upon already existing data and estimating and projecting currently existing relationships. This first-generation model will not explicitly attempt to embody major structural shifts in the relationship between vehicular and demographic factors and safety outputs. The model will predict accidents, fatalities and injuries, by mode, incorporating contractor-identified forecasted inputs from TSC such as projected vehicle miles of travel, load factors, passenger miles of travel, schedule frequency/temporal distribution, the pleasure/business travel split, etc., as well as the safety interrelationships that can be derived from existing data.

PERFORMING AGENCY: Center For The Environment and Man, Incorporated
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, OS-543
RESPONSIBLE INDIVIDUAL:

Contract DOT-TSC-1089 (CPFF)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: $34,984

ACKNOWLEDGMENT: TRAIS (OS-543)

12 058838
SYSTEM SAFETY-AN INTERDISCIPLINARY APPROACH TO TRANSPORTATION SAFETY
The effort concerns an analysis of system safety at the planning and design stages of new transportation facilities, equipment or programs and in the operational stages of existing facilities or ongoing programs. Specific results shall be generated in methodology and guidelines and in case studies. The specific objectives of the first phase of the research are: 1. To transfer applicable systems reliability concepts to the transportation safety sector. 2. To identify and resolve key issues in transportation safety. 3. To develop a preliminary systems safety methodology applicable to the transportation modes.

PERFORMING AGENCY: Polytechnic Institute of New York, Transportation Planning and Engineering Department
INVESTIGATOR: Pignataro, LJ (Tel (212) 643-5272) Cantilli, EJ Shooman, M
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Bolger, PH (Tel 202-4264458)

Contract DOT-OS-50241 (CS)
STATUS: Active NOTICE DATE: Jan. 1976 START DATE: Sept. 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $147,000

ACKNOWLEDGMENT: TRAIS (PUR-50315), OST, Polytechnic Institute of New York

12 081788
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT
This project is directed at improving the performance of tank cars in derailments and minimizing the danger of catastrophic tank car accidents. When initiated, it consisted of 12 Phases with additional Phases subsequently added. Phase 08, Reduced Scale Model Studies and Phase 13, Head Shield Study are completed. The other phases, on which work is continuing, are the following: Phase 01--Accident Review; Phase 02--Accident Data Analysis; Phase 03--Material Study; Phase 04--Literature Review; Phase 05--Head Study; Phase 06--Safety Valve in Liquid Study; Phase 07-Safety Relief Devices; Phase 09--Design Study, Tanks and Attachments; Phase 10--Design Study, Car; Phase 11--Thermal Effects Studies; Phase 12--Vessel Failure Research; Phase 14--Stub Sill Car Buckling Study; Phase 15---Switchyard Impact Tests.

PERFORMING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute
INVESTIGATOR: Phillips, EA (Tel 312-5673607)
SPONSORING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 099389
RAIL VEHICLE SAFETY RESEARCH PROGRAM
This program has as its objectives: (1) Increase the safety of hazardous material cars; (2) Decrease number and severity of accidents caused by vehicle component failures; (3) Decrease the number of accidents caused by human error; (4) Reduce the number and severity of grade crossing accidents; (5) Improve communication and control systems. Torch and relief valve test facilities have been completed and used for the on-going hardardous material tank car project. On-board automatic inspection and monitoring systems are being developed as a means of component failure prevention. Development of cab and train handling simulator as part of the human factors project began late in FY 75. Modularized grade crossing equipment has been developed under the grade crossing safety project, which started in early FY 75.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Levine, D (Tel (202) 426-1227)

STATUS: Active NOTICE DATE: July 1976

ACKNOWLEDGMENT: FRA

12 099392
LOCOMOTIVE CAB SAFETY
A number of special projects directed toward improving the safety of the work space provided for operating crews in the cabs of locomotives have been undertaken. After an in-depth review of FRA-funded studies of accidents and potential hazards, it was determined that the railroad industry should respond with effective cab improvements. AAR had Electro-Motive and General Electric develop "clean" locomotive cab mock-ups. Modifications were based on reviews of these mock-ups. As a result, about 20 improvements are being incorporated in the cabs of production locomotives. These changes eliminate potentially hazardous sharp corners and edges, provide protective padding on certain exposed surfaces, provide added protection to prevent injuries associated with cab doors, provide improved drinking water facilities and improved sanitary facilities. Another project is a study of the consequences of head-on and rear-end collisions between trains. A test program is intended to provide the information necessary to redesign locomotives to increase the survival rate in train-to-train collisions. Furthermore locomotive cab seats are being examined in light of human factors criteria to arrive at generic specifications for the design and development of safer, more comfortable seats to be incorporated in new locomotive deliveries.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railroad Labor Organizations
RESPONSIBLE INDIVIDUAL: Hawthorne, KL (Tel (202)567-3584)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1973

ACKNOWLEDGMENT: AAR

12 099424
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 2-ACCIDENT DATA ANALYSIS
Analysis of accident data is handled under this phase. A general breakdown of the 1965-1970 data shows two main damage categories-mechanical and thermal. With few exceptions, the mechanical damage occurs first in the accident sequence. Exceptions involved fires originating from non-tank car sources. The analysis under this Phase includes the assignment of dollar losses incurred by the railroads due to product loss from the tank cars in these accidents. These losses are categorized by the specific types of damage which cause them. From this, the potential values of design solutions are determined. The values of overlapping solutions are also given. Some overlap positively and some negatively. For example, the value of a combined head and shell shield is greater than the sum of their individual values. Conversely, the value of a combined head and thermal shield is less than the sum of their individual values. All values must be reduced by the estimated efficiencies of actual design solutions which are developed. This leads to actual "benefit" values for each solution. The final cost effectiveness evaluation is made made simply comparing the actual benefit values with the estimated costs of solutions.
See also RRIS 12A 081788.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 099425
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 11-THERMAL EFFECTS STUDY
The whole thermal question, including fire environment and thermally induced stresses, is being covered under this phase. The major activity has been a search for a practical heat shield material, such as an ablative, intumescent, or simply an insulative coating, that can be applied to the non-insulated 112A (114A) pressure tank cars, which are the cars most vulnerable to violent rupture from external heat. Many companies which produce fire protective coatings have submitted samples which were studied in a laboratory fire test apparatus which was designed for initial screening. Two of the most promising materials were selected for application to 1/5 scale model tank cars which were subjected to large enveloping fires. These tests were conducted at the White Sands Missile Range in cooperation with the FRA. The objectives were to confirm laboratory findings and theoretical analyses, to ascertain some of the properties of fires which were not yet will defined, and, finally, to prepare for subsequent full scale tests. This was followed by two full scale fire tests, one with an uncoated and the other with a coated tank. A report on these fire tests has been published. Currently, the "torch" type fire is being studied. This is a highly convective fire involving local impingement as compared to the highly radiative all-enveloping fire used in the tests just described. These torch fire studies are being conducted by FRA at the DOT Transportation Test Center. When these tests are complete it is planned to finalize a specification for use in qualifying candidate coating materials for actual application on tank cars. Such qualification will include performance requirements to be met in a redesigned (upgraded) laboratory fire test apparatus. The current major programs in this Phase concern impact and accelerated service tests (ALT) of tank cars equipped with sprayed on coating type and insulation-jacket type thermal shields. These tests are being conducted at the DOT Transportation Test Center to evaluate in service reliability of the thermal shields. The tank cars will accumulate a total of approximately 160,000 miles in the facility for accelerated tests (FAST) program at the DOT Test Center.
See also RRIS 12A 081788 and 12A 058266.

PERFORMING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute; Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 099427
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 7-SAFETY RELIEF DEVICES-GENERAL
This Phase covers all currently used safety relief devices on all classes of tank cars. It has the general objective of seeking means, through design changes in these devices, for safer containment, or safer release, of hazardous products in accidents. Activity has not progressed beyond initial planning since, to date, there has not been sufficient evidence that either deficiencies exist or that design changes would lead to significant improvement. This Phase will be activated when and if, results from other studies (viz. Phases 01, 06, and 11) indicate such a need.
See also RRIS 12A 081788.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 099428
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 6-SAFETY VALVE DISCHARGE CAPACITY
When a tank car carrying liquified compressed gas is heated in a fire, its contents can expand to where the tank can become nearly shellfull at the safety valve pressure setting. The safety valve must then maintain safe tank pressure by momentarily discharging liquid. It may also be called upon to do this through liquid discharge in the event the tank is overturned and exposed to fire. As in other pressure vessel codes, the tank car specifications require that safety valves be sized and tested on the basis of vapor discharge. There being no firm data on liquid discharge capacities, this Phase was established with the objective of determining such capacities by means of full-scale test. Toward this end, a special 20,000 gallon test tank was fabricated with provisions for mounting the currently used safety valves on both the top and bottom of the tank. The tank has been installed at Edwards Air Force Base, and tests have been run using water, air, and vapor and liquid LPG. This program is being conducted on a cooperative basis with the FRA. Results, not yet available, will be published after all data is reduced.
See also RRIS 12A 081788 and 12A 054567.

PERFORMING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute; Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 321-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1970 COMPLETION DATE: 1976

ACKNOWLEDGMENT: AAR

12 099436
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 1-ACCIDENT DATA COLLECTION
This is a major Phase and deals with the collection and cataloging of accident data. Any accident involving a tank car, loaded or empty, in which there is damage to the tank, its attachments and fittings, or its insulating steel jacket, is included. During the first two years of the project, such data were collected for the six year period 1965-1970. Currently, an update is nearly complete covering the five year period 1971-1975. Following this, procedures are established for collecting data on a continuing basis. Most of the information has been coded and computerized. For the six year period 1965-1970 the files contain data on 3853 tank cars damaged in 2321 accidents. This corresponds to an annual average of 642 tank cars damaged in 387 accidents.
See also RRIS 12A 081788.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 130498
METRO SUBWAY CAR FIRE HAZARD EVALUATION
Objective: This program will assess the potential hazards to occupants of METRO subway cars from fire and smoke originating from combustible materials examined in the completely assembled car. Progress: The work to date has been concerned with planning, materials procurement, and construction of the subway car mock-up.

PERFORMING AGENCY: National Bureau of Standards, Department of Commerce, NBS No. 4927371
INVESTIGATOR: Braun, E
SPONSORING AGENCY: Washington Metropolitan Area Transit Authority

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $67,200

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BL 649)

12 130946
QUANTITATIVE DESCRIPTIONS OF TRANSPORTATION ACCIDENTS INVOLVING HAZARDOUS MATERIALS
Description: Sandia's continuing effort in this area includes the following major components: Assessment of the probability of occurrence and the severity of the five major environments (impact, fire, puncture, crush and immersion) experienced by casks or containers in air, highway and rail transportation. Analyses of these predicted environments to assess possible revisions or regulatory standards. Consideration of specific examples, e.g., the response of a radioactive material shipping cask involved in a rail grade crossing accident, to determine threat probabilities for potentially large contamination incidents. Revision of analytical descriptions to make the results more applicable to an increasing number of specific risk analysis studies aimed at optimizing procedures for transporting radioactive materials. Compilation of pertinent accident information in a data bank to provide retrievability of specific information to parties performing analyses.
This project is also supported by Sandia Laboratories.

PERFORMING AGENCY: Sandia Laboratories, Division of Applied Mechanics
INVESTIGATOR: Priddy, TG Hartman, WF Foley, JT
SPONSORING AGENCY: Energy Research and Development Administration, Division of Waste Management and Transportation

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GPW 51 1)

12 130957
COMBUSTIBLE GASES, FLUIDS, AND MATERIALS
Objective: To familiarize the CFR staff with the hazards in this area and identify the role of NBS in the reduction and control of hazards associated with the transportation and use of combustible gases, fluids, and materials and propose appropriate programs. Approach: Identify responsible agencies and programs and available accident data. Analyze accident data and identify deficiencies in existing programs. Propose appropriate programs for NBS to undertake.

PERFORMING AGENCY: National Bureau of Standards, Department of Commerce
INVESTIGATOR: Winger, JH
SPONSORING AGENCY: National Bureau of Standards, Department of Commerce, 4922676

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $37,400

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZBA 7042)

12 130966
DEVELOPMENT OF A HEAT-ACTIVATED ALARM SYSTEM FOR RAILCARS CARRYING EXPLOSIVES
To develop a simple, low-cost, portable heat-activated alarm system for protecting railroad boxcars carrying explosive materials for the navy. Railcars typically used for transporting explosive materials for the navy will be identified. Existing safety regulations and material handling method will be reviewed. The probable heat propagation mechanisms in these cars will be studies in light of the findings of accident investigations such as those compiled at Naval Weapon Center (NWC), China Lake and railroad companies. The desired characteristics of an optimum heat detection system such as the principle of detection, threshold temperature, response time, detector location, possible circuitry, alarm transmission, recording, and power requirements will be identified and design criteria developed. An experimental model of a heat-activated alarm system will be designed and breadboarded. Laboratory tests will be conducted under simulated conditions to determine the sensitivity and to insure the proper function of the system. Field tests will be conducted using existing large scale facilities such as those used by NWC. A prototype system will be constructed. A technical note will be issued on the prototype heat alarm system development.

PERFORMING AGENCY: Naval Civil Engineering Laboratory, Department of the Navy
INVESTIGATOR: Jenkins, JF Alumbaugh, RL
SPONSORING AGENCY: Naval Facilities Engineering Command, Department of the Navy, DN587075

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQN587075 1)

12 135594
STUDY OF PHYSICAL PARAMETERS OF TRANSPORTATION ACCIDENTS
The aim of the project is to extend the Transportation Accident Criteria study to describe the transportation accident environments to which large shipping casks can be exposed. These descriptions are required to determine the risk of shipment and for use in preparing environmental impact statements. Study will cover truck, rail, and waterways transport and include frequency of occurrence of impact, crush, puncture, fire, and immersion subsequent to such accidents.

PERFORMING AGENCY: Sandia Laboratories, ALO 117B
INVESTIGATOR: Hartman, WF (Tel (505) 264-4753) Dennis, A
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract E(29-1)-789
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: May 1972 TOTAL FUNDS: $371,000

ACKNOWLEDGMENT: Energy Research and Development Administration

12 135595
PRELIMINARY ANALYSIS OF SAFETY ASSESSMENT IN TRANSPORTING RADIOACTIVE MATERIALS IN THE COMMERCIAL SECTOR
The aim of the project is to examine the technical basis for analyzing safety in transport of radioactive materials with the objective of providing program definitional assistance to NRC transportation research activities.

PERFORMING AGENCY: Sandia Laboratories, 06-19-05 A1035
INVESTIGATOR: Luna, R (Tel (505) 264-5276)
SPONSORING AGENCY: Nuclear Regulatory Commission
RESPONSIBLE INDIVIDUAL: Lahs, W (Tel (301) 443-6947)

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: July 1975

ACKNOWLEDGMENT: Nuclear Regulatory Commission

12 135596
MAINTENANCE OF A TRANSPORTATION ACCIDENT ENVIRONMENTAL DATA BANK
The maintenance of this data bank involves the active pursuit of sources of new data, the updating of indices, and responding to official users who wish to obtain environmental data. A necessary part of this continued work is the processing of data and entry into the storage and retrieval system. As needs for new data are identified, these will be sought. User requests for nonexisting data are expected to be a major contributor to this identification.
REFERENCES:
Transportation Accident Environment Data Index Foley, JT; Davidson, CA, SAND 75-0248

PERFORMING AGENCY: Sandia Laboratories, AL 0517A
INVESTIGATOR: Foley, JT (Tel (505) 264-3036)
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract AT(29-1) 789
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1974 TOTAL FUNDS: $216,000

ACKNOWLEDGMENT: Energy Research and Development Administration

12 135597
NEW STANDARDS FOR PACKAGE SAFETY QUALIFICATION TESTS
The aim of the project is to develop a practical set of test regulations and procedures in coordination with the pertinent Governmental agencies which are consistent with the earlier Transportation Accident Criteria Study. Candidate standards will be established; a test series will be designed and conducted on a selected container to be provided by ECT. Finally, the proposed system will be presented and justified to standards personnel.

PERFORMING AGENCY: Sandia Laboratories, AL 0917B
INVESTIGATOR: Hartman, WF (Tel (505) 264-4753)
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract E(29-1)-789
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 TOTAL FUNDS: $312,000

ACKNOWLEDGMENT: Energy Research and Development Administration

12 135598
IMPACT ANALYSIS PROGRAM
The aim of the project is the promotion of a better understanding of the impact phenomena and the development of better techniques of evaluating the behavior of Type B packages subjected to impact loading. Existing analysis methods for each specific load configuration will be developed. Material property needs will be identified. Finally, procedures will be selected and analysis techniques developed for application to particular needs.

PERFORMING AGENCY: Los Alamos Scientific Laboratory, LS 8217A
INVESTIGATOR: Neudecker, JW (Tel (505) 667-7021)
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract W-7405-ENG-36
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: July 1977 TOTAL FUNDS: $405,000

ACKNOWLEDGMENT: Energy Research and Development Administration

12 135599
FULL SCALE VEHICLE TESTING PROGRAM
This project plans full scale accident tests to determine the integrity of shipping casks for transportation of nuclear wastes. The problem of transporting nuclear wastes becomes more acute as operating reactors increase. Demonstrations of shipping container integrity are necessary. Three extreme accident full scale tests using obsolete casks are planned: (1) High speed locomotive impact on stalled truck cask; (2) High speed

derailment of rail cask into solid abutment followed by fire; (3) Truck mounted cask at high speed into solid barrier. Modeling and analysis will precede instrumented tests. Results will aid in prediction of performance of currently used, better designed casks.

PERFORMING AGENCY: Sandia Laboratories, AL 3617A
INVESTIGATOR: Yoshimura, RH (Tel (505) 264-2452)
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract E(29-1)-789
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $1,170,000

ACKNOWLEDGMENT: Energy Research and Development Administration

12 135719
DYNAMIC PROPERTIES OF PACKAGING MATERIALS IN TRANSPORT ACCIDENTS
The aim of the project is to develop data on dynamic material properties for materials of construction for shipping casks, particularly those properties required for analysis of transport accidents. Structural problem areas during dynamic loading of shipping casks will be delineated; experimental techniques (mostly models) will be used for material and structure studies. Results will be used as benchmarks for computer codes being developed at LASL for dynamic loading problems of shipping casks.

PERFORMING AGENCY: Battelle Memorial Institute, CH 0407A
INVESTIGATOR: Robinson, RA (Tel (614) 424-6424 X3414)
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract W-7405-ENG-92
STATUS: Active NOTICE DATE: Dec. 1975 START DATE: July 1975

ACKNOWLEDGMENT: Energy Research and Development Administration

12 136084
TRANSPORTATION SAFETY STUDIES
The aim of the project is to develop and use a model for assessing the risks associated with the shipping of radioactive and other hazardous materials. Failure characteristics and thresholds will be determined for crush, impact, puncture, fire, and water immersion. Evaluation of release consequences will be assessed. Existing data sources on equipment failure rate, accident frequency, and accident severity will be used to fullest extent possible, supplemented by surveys or other means when data is not available.
REFERENCES:
An Assessment of the Risk of Transporting Plutonium Oxide and Liquid Plutonium Nitrate by Truck, McSweeney; Hall, BNWL-1846, Aug. 1975

PERFORMING AGENCY: Battelle Memorial Institute/Pacific Northwest Labs, RL 5917B
INVESTIGATOR: Hall, RJ (Tel (509) 946-2459)
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract ERDA AT-(45-1)-1830

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: Mar. 1973 TOTAL FUNDS: $668,000

ACKNOWLEDGMENT: Energy Research and Development Administration

12 138531
SAFETY AND RELIABILITY
The objective is to improve the safety and reliability of urban rail systems through data gathering, analysis and hardware development. This includes vehicle crashworthiness analysis (current and proposed models) and computer models, feasibility studies of obstacle detection and study of safety hardware along with establishment of National Reliability Data Bank.

PERFORMING AGENCY: Transportation Systems Center, Department of Transportation
SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Spencer, P (Tel (202) 426-0090)
Contract UM-604
STATUS: Active NOTICE DATE: July 1976 START DATE: 1974 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $2,800,000

ACKNOWLEDGMENT: UMTA

12 138567
SAFETY VALVE STUDY
By analysis and small scale experiments, study the flow phenomena occurring when a safety valve of a pressurized tank car discharges when engulfed in a fire.

PERFORMING AGENCY: Maryland University, College Park
INVESTIGATOR: Sallet, DW (Tel (301) 454-4216 Ext 4)
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202) 426-1227)

Contract DOT-FR-64181
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1976 COMPLETION DATE: Oct. 1977

ACKNOWLEDGMENT: FRA

12 139173
TRANSPORTATION OF HAZARDOUS MATERIALS
To aid in proposed redesign evaluations, a systems analysis of hazardous materials tank cars and tank trucks is to be developed in which those system parameters most likely to influence the severity of an accident can be identified. An analytical model should be developed to estimate the risks to people, property and the environment for various accident scenarios as a function of the tank system parameters.
Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202) 426-1227)

STATUS: Proposed NOTICE DATE: July 1976 START DATE: 1977

ACKNOWLEDGMENT: ERA

13 054560
DEVELOPMENT OF NEW CORROSION PROTECTION DEVICES FOR SUBWAY EQUIPMENT
Description: To research and develop new or improved corrosion protection devices for subway equipment installed in severely corrosive environments. Project will result in improved reliability and safety to public and operating personnel and will reduce maintenance costs.

PERFORMING AGENCY: Long Island Lighting Company
SPONSORING AGENCY: Long Island Lighting Company
RESPONSIBLE INDIVIDUAL: Driscoll, TJ

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1973 COMPLETION DATE: Unknown

ACKNOWLEDGMENT: Science Information Exchange (AP 698)

13 099411
CANADIAN RAILWAY ELECTRIFICATION STUDY PHASE I-DEVELOPMENT OF STUDY PLAN
OBJECTIVES: To bring into sharper focus the time frame that electification of significant portions of Canadian railways is likely to occur, and to develop and describe a program of investigation, research, and development designed to permit a smooth transition to effective electrified operation at that time. SCOPE AND METHOD: Identify the factors upon which the Canadian decision to electrify is dependent, or which will influence that decision. Explore these factors in order to determine their effect on the timing and economics of conversion, and to identify gaps in technological, operational and managerial knowledge or skills necessary to achieve conversion satisfactorily. Develop programs of investigation, research and development to overcome the identified gaps in technological, operational and managerial knowledge or skills, and to enable smooth transition to electrified operation under Canadian conditions. Identify the cost items involved in electrification and recommend an approach for the methodology for costing the electrification stages. Establish general economic criteria for evaluation of the electrification decision. Identify alternative approaches to, and methods of, financing electrification. Develop and recommend a process for monitoring future trends of relevant characteristics of particular factors which will have a significant influence on the electrification decision. Consider and suggest appropriate areas for Canadian railway pilot electrification projects, both freight and passenger, which might be implemented as intermediate, experience gaining steps towards major conversions, and suggest the rationale and general planning for their implementation.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport
INVESTIGATOR: Corneil, ER (Tel 613-547-5777)
SPONSORING AGENCY: Transportation Development Agency
RESPONSIBLE INDIVIDUAL: Brenckmann, M (Tel 514-283-7846)

Contract 14 ST. T8200-5-5507
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $144,000

ACKNOWLEDGMENT: Transportation Development Agency

13 129700
RAILROAD ELECTRIFICATION/ENERGY PROGRAM
Project Independence seeks to reduce vulnerability to petroleum import disruptions--electrification of a major segment of the nation's railroads will contribute toward this goal. FRA is in the planning state of an electrification program for identifying the nation's and the railroad operator's benefits, which accrue from electrification, determining the incentives which the railroad industry needs to start electrification, and doing R&D where it is most cost effective in the field of electrification. Already established is the fact that 100,000 barrels of petroleum would be saved per day if 22,000 miles of track were electrified (and 22,000 seems economically justified.). Additional savings would result if modal shifts from auto and intercity truck freight occured. There are plans to electrify the 14-mile passenger track at the Transportation Test Center. The immediate use of the electrified track will be for testing of Northeast Corridor equipment prior to putting it into revenue service and for determining cost effective methods of installing the catenary system. In addition, the railroad industry will be surveyed to determine what use they may have for the facility.
Contract not yet awarded, planned for FY 1977.
SPONSORING AGENCY: Federal Railroad Administration, Office of Passenger Systems Research and Development
RESPONSIBLE INDIVIDUAL: Novotny, R

STATUS: Proposed NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

13 131757
ENVIRONMENTAL AND ENERGY IMPACTS OF RAILROAD ELECTRIFICATION
Description: The potential environmental and energy impacts associated with conversion of land transportation modes are being evaluated in terms of reductions in air pollutant emissions, ambient air pollutant levels along roadways and railway lines, noise pollution, and reduced water pollution impact. Specific studies are being conducted of freight and passenger traffic diversion in the Houston-Dallas intercity corridor, of long distance coal energy transshipment from Wyoming to Texas, and for short line coal-hauling railroads in Texas. Comparative impacts upon localized ambient air quality are being projected for mobile line source highway and diesel rail modes with stationary point source coal-fired power plants used to power electrified railroads. Energy consumption requirements for freight and passenger railroad electrifications are developed for comparison to alternative modes.

PERFORMING AGENCY: Texas University, Austin, Department of Civil Engineering
INVESTIGATOR: Cooper, HB
SPONSORING AGENCY: Texas University, Austin, Center for Energy Studies

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (NTX 487)

13 138475
WAYSIDE FLYWHEEL ENERGY STORAGE CONCEPT
This project will study the technical and economic feasibility of a wayside flywheel energy recovery system. The system to be studied would employ flywheels located in wayside stations for the purpose of storing braking energy of trains descending a grade for later utilization by other trains ascending a grade in same area. The study will consider suitable locations for wayside stations and establish locomoitve/train parameters to be considered in such a system.
Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Cracker, WF (Tel (202) 426-0855)

STATUS: Proposed NOTICE DATE: May 1976

ACKNOWLEDGMENT: FRA

15 045815
BART IMPACT PROGRAM
Under this task TSC is providing staff personnel and special consultants necessary to perform required management functions for the complex and comprehensive BART Impact Program. Management of the four basic types of tasks as specified by the basic ordering agreement will be provided. A summary of these tasks is as follows: (1) overall management and data management, (2) specific analysis efforts, (3) identifying particular impact areas, (4) specialized efforts of overall program objectives.

PERFORMING AGENCY: Metropolitan Transportation Commission
SPONSORING AGENCY: Office of the Secretary of Transportation; Department of Housing and Urban Development
RESPONSIBLE INDIVIDUAL: Weiner, E (Tel (202) 426-4168)

Contract PPA-OP-634
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1973 TOTAL FUNDS: $146,900

ACKNOWLEDGMENT: TRAIS (PR# DOT-OS-30176)

15 045966
A METHOD FOR ASSESSING PRICING AND STRUCTURAL CHANGES ON TRANSPORT MODE USE
Development of a mechanism which is capable of examining a policy change, for example, a central business district parking surcharge, and of tracing out the effects of such a change, not only on the relative utilization of alternative modes, but also on the spatial distribution of travel from changes in modal usage.

PERFORMING AGENCY: Northwestern University, Evanston, Department of Civil Engineering, 6078-414
INVESTIGATOR: Stopher, PR
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Weiner, E (Tel 202-4264168)

Contract DOT-OS-40001
STATUS: Active NOTICE DATE: Jan. 1976 START DATE: Apr. 1974 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $196,000

ACKNOWLEDGMENT: TRAIS (PR# DOT-OS-40001), Northwestern University, Evanston

15 055977
SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACTS ON INDIVIDUALS AND INSTITUTIONS IN AREAS ADJACENT TO KEY TRANSPORTATION FACILITIES
As a basis for development of policy initiatives, the study is to identify adverse impacts associated with the removal, or anticipated removal, of existing land uses for the key airport, highway, and mass transit facilities, and the effects of construction and operation of these facilities, such as noise, air pollution, property values, and mobility of residents. Possibilities for enhancing beneficial impacts are also to be identified, including joint development of adjacent lands. Where feasible, means to define contours of impact intensity are to be developed.

PERFORMING AGENCY: Urban Systems Research & Engineering, Incorporated
SPONSORING AGENCY: Office of Environment, Safety and Consumer Affairs; Federal Aviation Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Cooper, NL

Contract DOT-OS-40058 (CPFF)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Nov. 1973 TOTAL FUNDS: $152,838

ACKNOWLEDGMENT: TRAIS

15 129701
METRO IMPACT STUDY
As part of its ongoing programs, the Washington Area Council of Governments is conducting for UMTA an assessment of impacts of the METRO rail system in the Washington area. The program is somewhat narrower in scope than the BART Impact Work, with more extensive consideration of construction impacts.

PERFORMING AGENCY: Washington Area Council of Governments, 1225 Connecticut Avenue, NW
SPONSORING AGENCY: Urban Mass Transportation Administration, Office of Transit Planning
RESPONSIBLE INDIVIDUAL: Ettinger, J

STATUS: Active NOTICE DATE: July 1976

ACKNOWLEDGMENT: UMTA

15 129717
EFFECT OF TRANSIT SERVICE ON AUTO OWNERSHIP
Develops a theoretical behavioral model to estimate auto ownership that takes into account existing behavioral processes, as well as the effects of changes in technology and policy inputs. A simultaneous model of auto ownership and mode choice to work is developed. The resultant model examines the sensitivity of auto ownership to various transportation policies through the development of elasticities of auto ownership with respect to transit level of service and with respect to auto ownership and operating costs.

PERFORMING AGENCY: Cambridge Systematics
SPONSORING AGENCY: Office of Policy, Plans and International Affairs
RESPONSIBLE INDIVIDUAL: Weiner, E (Tel 202-426-4168)

Contract DOT-OS-30056
STATUS: Active NOTICE DATE: July 1976

ACKNOWLEDGMENT: Office of Policy, Plans and International Affairs

15 129718
INTEGRATED TRANSPORTATION AND LAND USE PLANNING
Contractor is to integrate land use modeling and transportation modeling. The result of the research will be a package that can comprehensively investigate the interactions of transportation policy and the resulting land use patterns.

PERFORMING AGENCY: Pennsylvania University, Philadelphia
INVESTIGATOR: Putman, SH
SPONSORING AGENCY: Office of Policy, Plans and International Affairs; National Science Foundation
RESPONSIBLE INDIVIDUAL: Weiner, E (Tel 202-426-4168)

Contract DOT-AS-50064
STATUS: Active NOTICE DATE: July 1976

ACKNOWLEDGMENT: Office of Policy, Plans and International Affairs

15 129719
A STUDY TO EVALUATE THE LAND-USE IMPACTS OF MAJOR RAPID TRANSIT IMPROVEMENTS IN THE U.S. AND CANADA
The objective of the project is to evaluate the land-use impacts of recent major rapid transit improvements in the U.S. and Canada, with the purpose of guiding future policy in investment choices among various modes. In particular, the study will evaluate transit investments and their impact upon total population growth, promotion of densities, decline or improvement of the CBD and similar land-use impacts of transit.
Contract not yet awarded.

SPONSORING AGENCY: De Leuw, Cather and Company
RESPONSIBLE INDIVIDUAL: Weiner, E (Tel 202-426-4168)

Contract DOT-OS-60181
STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: Office of Policy, Plans and International Affairs

15 135075
THE IMPACT OF TECHNOLOGY UPON THE INDUSTRAL WORKER AND HIS COMMUNITY
One of the societal groups most affected by the inexorable progress of technology has been the industrial worker who has found his work habits, life style, and community and family life significantly changed over the last decades by new advances in technology. The interface between technology and society has recived increasing attention in recent years by academic scholars. However, with few exceptions, no attempt has been made to learn

directly from those most affected what the real technological impacts--both positive and negative--have been. In an attempt to help remedy this, faculty members at Tulane University, in cooperation with the Louisiana State AFL-CIO, plan to undertake an experimental communications program focusing on the many interfaces between technology and union members in the New Orleans area. A series of five two-day forums on the economic and social implications of technology--both current and projected--will be held for middle level union leaders, businessmen, and government officials. Specific subjects to be covered in the forums include: urban transportation modes, automation and unemployment, land use and urban planning, economic growth versus environmetal protection, impact of technology of leisure time, family living, social mobility, and consumption. An advisory group of union leaders and faculty members will be established to provide overall guidance to the program. A final report will be prepared listing specific projects which can be undertaken in the future by the union to capitalize on the educational benefits of this program.

PERFORMING AGENCY: Tulane University, Department of Mechanical Enginering
INVESTIGATOR: Hrubecky, HF
SPONSORING AGENCY: National Science Foundation, Office of Government and Public Programs, GM-42671

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Apr. 1974 TOTAL FUNDS: $45,000

ACKNOWLEDGMENT: Science Information Exchange (GSI 22)

15 136344
SOCIAL MOBILITY IN PHILADELPHIA
The Philadelphia Social History Project studies how the nation's second largest city, 1850-1880, was changed by the forces which shaped modern America: Urbanization, Industrialization, and Immigration. More specifically, the research is concerned with the impact of these forces on social mobility, migration, family structure, neighborhood formation, and the development of transportation networks. To this end, a machine-readable data base (numbering several million card images) has been created containing individual level census data (Federal manuscript schedules of population and manufacturing), city business directories, and a complete reconstruction of all means of transportation (trolley, train, omnibus) available to Philadelphians. An interdisciplinary research team, with scholars from history, economics, sociology, demography, and urban geography, are currently analyzing the data base at the University of Pennsylvania. Bibliographic references: Frank Furstenberg, Theodore Hershberg and John Modell, "The Origins of the Female-Headed Black Family: The Destructive Impact of the Urban Environment," Journal of Interdisciplinary History, (September, 1975); Bruce Laurie, Theodore Hershberg and George Alter, "Immigrants and Industry: The Philadelphia Experience, 1850-1880," Journal of Social History (December, 1975); this essay, presented to the Sixth International Congress on Economic History (Copenhagen, 1974), will also appear in Richard Ehrlich, ed., Immigrants in Industrial America (Charlottesville, 1976).

PERFORMING AGENCY: Pennsylvania University, Philadelphia, School of Arts and Sciences
INVESTIGATOR: Hershberg, T
SPONSORING AGENCY: National Institute of Mental Health, Department of Health, Education and Welfare, MH 16621-07

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: Sept. 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $181,265

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (1MH 16621 7)

16 058398
CATEGORIZATION AND MEASUREMENT STANDARDS FOR TRUCK AND BUS FUEL ECONOMY IMPROVEMENTS
DOT desires to gather information and consensus recommendations on measurement methods for commercial vehicle fuel economy and how those measures relate to vehicle productivity.

PERFORMING AGENCY: Society of Automotive Engineers
SPONSORING AGENCY: Transportation Systems Center, OS-514
RESPONSIBLE INDIVIDUAL: Mason, R

Contract DOT-TSC-1007 (CR)
STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1975 COMPLETION DATE: 1976 TOTAL FUNDS: $99,896

ACKNOWLEDGMENT: TRAIS (OS-514)

16 058730
STUDY OF ENERGY AND ECONOMIC IMPACTS OF PROJECTED FREIGHT TRANSPORTATION
A comprehensive assessment of present and future energy costs for each of the major freight modes along with an accounting of the economic and environmental impacts of the anticipated changes in freight systems and a projection of resultant modal shares in 1980 and 1985 will be made.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company
SPONSORING AGENCY: Transportation Systems Center, 55 Broadway, OP-502

Contract DOT-TSC-1001 (CPFF)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: $99,000

ACKNOWLEDGMENT: TRAIS (210-0094-AT)

16 128051
RAIL VEHICLE POWER AND ENERGY CONSUMPTION STUDY
The purpose of this study, which is part of the general Energy Management Program, is to determine the power requirements and energy consumptions of transit vehicles operating in free air and in tunnels under various conditions as specified by operational parameters such as acceleration, maximum speed, station spacing etc. The study first establishes the mechanical limits of power requirements, energy consumption, regeneration and energy storage in terms of the operational conditions and free air and in tunnels. The calculations within this part of the study will use the results of the aerodynamic drag study (project #3605) and operational criteria established in other studies. The study then incorporates the performance characteristics of various propulsion systems-DC series, shunt or separately excited motors, as well as AC motors-with and without energy saving devices such as choppers and flywheels. The study relies here on input from investigations carried out by the Electrical Group. The resulting calculations will produce actual power and energy consumption profiles of the different propulsion systems under the various operational conditions considered. The energies associated with drags, momentum change, regeneration and equipment losses will be identified. The results will be used in the Economic Evaluation Program to determine the viabilities of the various propulsion options. The viable alternatives will then be investigated further with refined performance data and extended operational ranges in order to provide basic data for preliminary conceptional design of the total energy system. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 3607
INVESTIGATOR: Soots, V Palm-Leis, A
SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: 1976

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

16 129720
TRANSPORTATION ENERGY CONSUMPTION AND URBAN FORM RELATIONSHIP
There is a long-term need to reduce energy consumption in all sectors of the economy and urban transportation is a major user. The project will extend previously developed simulation studies to explore and verify, analytically and empirically, the fundamental relationship between urban land form, the transportation system, and transportation energy consumption. Via simulation, urban form, defined in terms of shape, density, and land use arrangements, will be constructed to estimate travel requirements and compute resulting energy consumption. It will identify realistic policy options that, if implemented, could affect land use and the transportation system and identify their effect on energy consumption at both the micro and macro levels. Alternative policy options will be explored via a literature search and those parameter values which can be influenced by policy options will be identified. Guidelines for allocation of resources for urban development, for assessment of land-use controls, and for development of land-use plans should results.

PERFORMING AGENCY: Northwestern University, Evanston, Department of Civil Engineering
INVESTIGATOR: Schofer, JL (Tel 312-492-5183)
SPONSORING AGENCY: Office of the Secretary of Transportation, Office of University Research
RESPONSIBLE INDIVIDUAL: Weiner, E (Tel 202-426-9366)

Contract DOT-OS-50113
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $43,800

ACKNOWLEDGMENT: OST

16 130505
IMPROVEMENT OF ENERGY UTILIZATION IN CANADA-TRANSPORTATION SECTOR
Objective: To investigate methods for improving the effectiveness of energy utilization in Canada. This study will concentrate on energy used in the Transportation Sector which represents about 30% of total end use energy. Progress: In Canada, transportation accounts for a substantial share of the energy consumed; approximately 18 percent of the primary energy and 38 percent of the petroleum is used each year to move people and goods.Estimates were made of efficiency in the use of energy for a number of modes of transportation such as automobiles, trucks, trains, etc. The values assigned to each mode reflect not only the inherent thermopropulsive efficiency, but also the occupancy and freight load factors, as well as the road-rail-water system in Canada. The future demand for energy has been projected to the year 2000 and on the basis of past trends the efficiency of the transportation sector as a whole is expected to decrease if left unchecked. A number of schemes were developed to save fuel. A 32 percent reduction of energy and oil could be realized through the use of more economical cars and through the partial shift of automobile, air and truck traffic to rail and urban transit. With some electrification of intercity rail, and urban auto, transit, and truck traffic another 25 percent could be saved. The total savings of 57 percent corresponds to one fifth of the total consumption of oil in Canada. Further technical work especially in the areas of electrification and alternate sources of energy will be carried out. Additional benefits are expected through an investigation of various public policy options which can be directed towards the transportation sector to conserve energy.

PERFORMING AGENCY: Carleton University, Canada
INVESTIGATOR: Lukasiewicz, J Saravanamuttoo, H Hedley, T Swinton, M Paquet, G
SPONSORING AGENCY: Department of Energy, Mines and Resources, Canada, 1135-D13-9-194/74

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Apr. 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: $20,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BJ 42 1)

16 130955
RELATIONSHIPS BETWEEN ENERGY CONSUMPTION IN PASSENGER TRANSPORTATION AND URBAN FORM
Description: Large-scale computer simulation studies were conducted to explore the relationships between consumption in passenger travel and urban form (shape, density and arrangement of land uses). Macroscopic studies have documented the clear advantages of clustering of employment and other activities, utilization of transit, and increasing auto occupancy. Microscopic studies of neighborhood land uses will explore short-term implications for zoning and land-use policies. Bibliographic references: J. Edwards and J.L. Schofer, "Relationships between Energy Consumption in

Transportation and Urban Spatial Structure," Proceedings, Second Annual Energy Conference, University of Illinois at Chicago Circle, 1974.

PERFORMING AGENCY: Northwestern University, Evanston, School of Technology, Department of Civil Engineering
INVESTIGATOR: Schofer, JL
SPONSORING AGENCY: Northwestern University, Evanston

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (NNW 35 1)

16 135132
INCREMENTAL COSTS AND TRADE-OFFS BETWEEN ENERGY EFFICIENCY AND PHYSICAL DISTRIBUTION EFFECTIVENESS IN THE INTERCITY FREIGHT MARKET
This is a pioneer study to develop an analytical model to measure the physical distribution costs, transportation performance alternatives, and energy use for commodities of various densities and values shipped by rail, motorcarriers, and watercarriers in specific intercity freight markets. Also to be considered are the individual modes of transportation and the impact of these alternatives on intra-and inter-modal performance. Furthermore, aggregate policy scenarios will be developed to interrelate individual policies and assess energy, modal shifts, and dollar impacts of various government strategies.

PERFORMING AGENCY: Massachusetts Institute of Technology, Center for Transportation Studies
SPONSORING AGENCY: Federal Energy Administration, CO-50154-00

STATUS: Active NOTICE DATE: May 1976 START DATE: June 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BP 451)

16 135137
PRICE ELASTICITIES OF DEMAND FOR TRANSPORTATION FUELS
This research will develop improved models of the transportation demands for gasoline, jet fuel and diesel fuel. These models will be used to forecast transportation fuel demands over the 1975-1990 price periods using scenarios incorporating various fuel price and conservation policies and economic conditions. The first part of the study will be a state-of-the-art review of existing econometric fuel demand studies, transportation studies and preparation of an annotated bibliography. Available data bases will also be collected and analyzed. The second part of this study will develop models to measure the demand for transportation fuels by type of use (urban/interurban, passenger/ freight) and mode (auto, bus, air, truck, etc.). The third part of this study is a forecast of transportation fuel demand using a model of passenger automobile fuel demand, a model of fuel demand for truck and rail freight, a model of aviation fuels demand, algorithms to split auto and truck fuels demand into gasoline and diesel and any necessary supplemental information. Carefully chosen scenarios will be used to model the effects of changes in fuel prices on the total demand for each of the three fuels-jet, diesel and gasoline.

PERFORMING AGENCY: Charles River Associates, Incorporated
INVESTIGATOR: Campbell, H
SPONSORING AGENCY: Federal Energy Administration, C-04-50115-00
RESPONSIBLE INDIVIDUAL: Chiffriller, K

Contract
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Feb. 1975 TOTAL FUNDS: $111,500

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BP 447), Federal Energy Administration

16 135752
PHILADELPHIA-LINDENWALD HIGH SPEED LINE-ENERGY CONSERVATION IMPACT STUDY
This study examines the energy saving impact of the Lindenwold High-Speed line as follows: 1. Documents changes in observed modal choice, an effect of the energy shortage which began in late 1973, as reflected in changes in Line ridership, bus patronage and bridge traffic volumes. 2. Determines the energy consumption of the High-Speed Line, both on a per car-mile and per passenger-mile basis in KWH's and BTU's. 3. Estimates total energy consumption for work trips (commuting) With-the-Line and Without-the-Line. This short run analysis, based on 1970 data, tentatively indicates that the Line has little impact on the total energy used for work trips in the corridor, as rail trip lengths appear to be to be greater than trip lengths for the alternative modes.

PERFORMING AGENCY: Pennsylvania University, Philadelphia, Graduate School
INVESTIGATOR: Stuntz, MS, Jr
SPONSORING AGENCY: Federal Energy Administration, 14-01-0001-1700
RESPONSIBLE INDIVIDUAL: Boyce, D

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1974 TOTAL FUNDS: $25,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BP 459), Federal Energy Administration

16 135828
A STUDY OF TRANSPORT MODES FOR LONG-DISTANCE FREIGHT
Description: A study of several important economic and social factors related to a possible shift of long-distance freight hauling from motor truck carriers to railroads. Some subjects studied are available comparative data on energy-intensiveness of various transport modes; the identification of important related economic and social factors; and an analysis of some of the economic and social impacts resulting from a mode shift from trucks to rail.

PERFORMING AGENCY: Oak Ridge Associated Universities, Institute for Energy Analysis
INVESTIGATOR: Perry, AM Zelby, L
SPONSORING AGENCY: Federal Energy Administration, ORAU-8

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Mar. 1975 COMPLETION DATE: Feb. 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BJ 355 1)

16 136028
STUDY TO AID THE FEDERAL ENERGY ADMINISTRATION IN UNDERSTANDING THE MICRO-ECONOMIC ASPECTS OF ENERGY CONSERVATION
The study will provide micro-economic analyses of the following energy conservation actions: 1. Improvement of automobile efficiency, both in terms of stock and use; 2. Improvement of thermal properties of existing residential structures; 3. Establishment of minimum energy standards for new residential and commercial buildings; 4. Improvement of industrial use of energy, with particular attention to natural gas and the socially optimal level of replacement of capital stocks; 5. Enhancement of electric utility load management; and 6. Improvement of freight transportation, with consideration of air, water, rail, highway and pipeline modes.

PERFORMING AGENCY: Institute for Defense Analyses
SPONSORING AGENCY: Federal Energy Administration, CO-04-50174

Contract
STATUS: Active NOTICE DATE: May 1976 START DATE: May 1975

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BP 379)

16 136071
ENERGY TRANSPORT AND DISTRIBUTION RESEARCH
Description: This project will further the goals of Project Independence by seeking the best combination of methods for exploiting available fuels and distributing energy. For example, development of coal resources involved trades in whether coal is used to generate electricity on site, or distributed as a fuel in bulk by trains or in slurry via pipeline. Environmental pollution restrictions can be satisfied by gasification, liquefaction, or conversion of coal to methanol on site followed by shipment of the resultant fuel, or by bulk shipment of coal and stack gas cleaning following combustion. Full evaluation of the competing technologies must include comparison of transportation and distribution economics. Additional trades are required in consideration of power plant centralization versus shipping fuel in bulk or various intermediate forms to decentralized power plants.

PERFORMING AGENCY: Boeing Company, Engineering Division
INVESTIGATOR: Payne, NR
SPONSORING AGENCY: Boeing Company

STATUS: Active NOTICE DATE: May 1976 START DATE: Jan. 1976 COMPLETION DATE: Dec. 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (JBO 20 1)

16 138528
INTERCITY RAIL EFFICIENCY FOR PASSENGER AND FREIGHT MOVEMENT
The major objectives are to develop: Passenger Train Performance Model and a Rail Passenger Demand Model. The Buffalo/New York City Rail route is being used as a senario for modeling and evaluation. A considerable amount of data are being collected. Last part of the research is estimation of energy efficiency of intercity rail system.

PERFORMING AGENCY: Union College, Mechanical Engineering Department
INVESTIGATOR: Mittal, RK (Tel (518)370-6268)
SPONSORING AGENCY: Department of Transportation, Office of University Research

Contract DOT-OS-60124
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1976 COMPLETION DATE: July 1977

ACKNOWLEDGMENT: Union College

17 045821
COMPUTER-BASED RAILROAD NETWORK MODEL
The objective of this project is the development of a computer based railroad network model which will be capable of facilitating the analyses of, and providing insights into the potential impacts of alternative public policies aimed at plant and/or corporate rationalization of the railroad industry. Outputs of primary interest will include rates of plant utilization, revenue generation, estimated costs and probable viability, all analyzed on a segment-by-segment basis. Additional modifications to be completed April 1976.

PERFORMING AGENCY: International Business Machines Corporation
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Bouve, T (Tel 202-426-2920)

Contract DOT-FR-40012
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Oct. 1973 COMPLETION DATE: June 1976 TOTAL FUNDS: $1,400,000

ACKNOWLEDGMENT: FRA

17 048781
INTEGRATED COMPUTER SYSTEM NETWORK (ICSN)
Contractor will furnish an Integrated Computer System Network (ICSN) which will be instrumental in providing the degree of simulation fidelity required for the variety of dynamic situations to be investigated within the Wheel/Rail Dynamic Laboratory.

PERFORMING AGENCY: Datacom, Incorporated
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Haas, J (Tel (303) 545-5660)

Contract DOT-FR-40009
STATUS: Completed NOTICE DATE: Aug. 1976 START DATE: Mar. 1974 COMPLETION DATE: July 1976 TOTAL FUNDS: $1,651,282

ACKNOWLEDGMENT: FRA (PR# 74-02-1-2-3-4-5)

17 058277
INTERMODAL INFORMATION SYSTEM
Two management systems will be developed as part of the Intermodal Network Implementation Program. These two systems will provide accurate and timely information to control costs, improve profitability, and assure service. Extensive use will be made of exception reporting to highlight problem areas requiring attention. Also, information will be assembled to facilitate advanced planning such as modeling. Phase I now in progress, will develop general and detail design of a specialized management information system which will improve intermodal operations in the areas of driver assignment, blocking policies, equipment inventory control, equipment distribution and planning, billing practices, sales and marketing. Phase II will cover completion of development under a separate future contract.

PERFORMING AGENCY: Association of American Railroads
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Edson, WD (Tel 202-426-0771)

Contract DOT-FR-65101
STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $76,000

ACKNOWLEDGMENT: FRA

17 080332
RAILWAY TERMINAL SIMULATION MODELING
A simulation model is being developed for a railway terminal under the control of Terminal Management Information Service (TMIS). It will be used to investigate methods in which TMIS can be used to improve terminal performance. Data will be used from the Vancouver Terminal of CP Rail. /RTAC/

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 5.30.74
INVESTIGATOR: MacEwen, GH
SPONSORING AGENCY: Canadian Pacific; Ministry of Transport, Canada, Transportation Development Agency; Queen's University, Canada

STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

17 099386
ACCIDENT INFORMATION SYSTEM
This activity has two phases: (1) Systems Development involving railroad accident information reporting systems, safety inspection reporting systems and grade crossing inventory; (2) Application for rationalizing data bases and report production and for making failure analyses.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Systems Analysis and Program Development
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: George, BF (Tel 202-4262920)

STATUS: Active NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

17 099399
FREIGHT CAR UTILIZATION RESEARCH PROGRAM. PHASE I. TASK 2--DEVELOPMENT OF CAR UTILIZATION DEFINITION AND MEASUREMENT
Develop a definition of freight car utilization consistent with railroad industry and program objectives. The definition should recognize the need for both physical and economic measures and for their appropriate interaction. Develop a set of utilization measures consistent with this definition, and the specifications for the data necessary to support these measures. Implement these measures in a demonstration project to assess to costs and benefits of the use of such a utilization measurement system in managing rail operations.
For further information on related studies see also RRIS 099398 Section 26A, 099400 17A, 099401 17A, 099402 24A, 099403 21A.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: Bryant, AH (Tel 415-3621212)
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Leilich, GM (Tel (202)293-5018)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: July 1977

ACKNOWLEDGMENT: AAR

17 099400
FREIGHT CAR UTILIZATION RESEARCH PROGRAM. PHASE I. TASK 3--CAR CYCLE ANALYSIS
Draw a statistically based sample, collect car movement data using car location messages (CLM) and other sources, and anlayze the movements of the sample cars to develop representative car cycle profiles for selected car type-commodity combinations. An industry task force will be appointed to assess the car cycle data. The objects of the task are to identify specific car utilization problems which will suggest corrective action by railroads and/or shippers, and to form a basis for recommendations for future car utilization program tasks.
For further information on related studies see also RRIS 099398 Section 26A, 099399 17A, 099401 17A, 099402 24A, 099403 21A.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: West, JB (Tel 415-6321212X21016)
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Leilich, GM (Tel (202)293-5018)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: July 1977

ACKNOWLEDGMENT: AAR

17 099401
FREIGHT CAR UTILIZATION RESEARCH PROGRAM. PHASE I. TASK 4--RECOMMENDED FREIGHT CAR MANAGEMENT AND CONTROL SYSTEMS
An industry task force will be appointed to assist FRA in developing and formulating a research, development and demonstration program for railroad car management systems. Such a task force will include members knowledgeable in railroad computer systems, railroad operations, and the planning, control and evaluation aspects of freight car management. The FRA program will be an integral part of, and closely coordinated with, the car utilization program.

For further information on related studies see also RRIS 099398 Section 26A, 099399 17A, 099400 17A, 099402 24A, 099403 21A.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: Jones, JL (Tel 404-688-0800 X-395)
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Leilich, GM (Tel (202)293-5018)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: AAR

17 099419
FINANCIAL ACCOUNTING AND REPORTING ELEMENTS (FARE), TASK V
Under this phase of the FARE project, additional effort to develop management information systems, using the FARE data base will be undertaken. Requirements for improvement management information-handling capabilities will be assessed, and concepts for a standardized, integrated management information system will be designed for sample operations. In addition a computer-oriented processing plan for FARE external reporting will be designed.

PERFORMING AGENCY: Andersen (Arthur) and Company
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Pierce, RE (Tel (202) 426-9274)

IT-06-0094
STATUS: Active NOTICE DATE: Aug. 1976 TOTAL FUNDS: $860,000

ACKNOWLEDGMENT: UMTA

17 099438
CARGO DATA INTERCHANGE SYSTEM (CARDIS)
Develop the necessary standard codes and procedures to allow interchange of shipping information in machine readable form among the parties involved in domestic and international commerce: shippers, carriers, forwarders, banks, insurance companies, etc. Define industry and Government requirements, design and test an experimental system present draft standards at domestic and International forums. The CARDIS Program is currently undergoing an intensive review to: (1) analyze and review what has been done to date; and (2) develop policy direction for the technical design and implementation of a proposed CARDIS System, with special attention paid to cost/benefits.

CARDIS Legal, Security, Output, and Foreign Data Element Requirements, National Committee on International Trade Documentation, June 1976

General Systems Specification, Gen Program Spec, Ref Manual & Gen Commun Spec for Prototype Elect Data Interchange Syst, Transportation Data Coordinating Committee, Final Report, Apr. 1976, PB-252937, 936 & 938

Experimental Test Concept for a CARDIS Computer Sciences Corporation, Volumes 1 & 2, Apr. 1976

PERFORMING AGENCY: Transportation Data Coordinating Committee; National Committee on Intl Trade Documentation; Computer Sciences Corporation
INVESTIGATOR: Carley, J (Tel 202-293-5514) Hemley, E (Tel 212-687-6261) Ruthling, C (Tel 703-533-8877)
SPONSORING AGENCY: Office of Environment, Safety and Consumer Affairs
RESPONSIBLE INDIVIDUAL: Ronayne, M (Tel 202-4264317)

Contract DOT-PS-50017
STATUS: Active NOTICE DATE: July 1976 START DATE: 1974 COMPLETION DATE: 1980

ACKNOWLEDGMENT: DOT

17 129722
GTW CAR CONTROL AND ACCOUNTING SYSTEM
Participate in the Grand Trunk Western "RAILS" computerized tele-processing car control and accounting system to permit incorporation of additional features to allow simulation. Project will serve as a prototype interface between a large terminal information and management sytem and a railroad-level system.

Detailed Functional Specifictions for the Rails System Grand Truck Western Railroad Company, June 1975

PERFORMING AGENCY: Grand Trunk Western Railroad
INVESTIGATOR: Tischler, H
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Shamberger, RC (Tel (202)426-2920)

Contract DOT-FR-4-5020
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: June 1977 TOTAL FUNDS: $1,000,000

ACKNOWLEDGMENT: FRA

17 135261
INTEGER LINEAR PROGRAMMING AND NETWORK OPTIMIZATION
This is a continuation of research previously supported under AG504. G. Bradley will continue his development of the theory and new algorithms for integer linear programming problems. Among the applications are: bid evaluation for energy procurement, large scale transportation problems, including transshipment, and optimal truck routings.

PERFORMING AGENCY: Department of the Navy
INVESTIGATOR: Bradley, GH
SPONSORING AGENCY: National Science Foundation, Division of Mathematics and Physical Science

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: Mar. 1975 COMPLETION DATE: Feb. 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange

17 135950
THE DESIGN OF ROBUST SYSTEMS
This project studies the robustness or insensitivity of linear dynamic system behavior to changes in operating points and parameter values. This study has important applications to chemical processes, power systems, transportation systems and ecological systems.

PERFORMING AGENCY: Rice University, Department of Electrical Engineering
INVESTIGATOR: Pearson, JB
SPONSORING AGENCY: National Science Foundation, Division of Engineering, GK-39893

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1974 TOTAL FUNDS: $40,250

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 4357 1)

17 138526
MISSOURI PACIFIC'S COMPUTERIZED FREIGHT CAR SCHEDULING SYSTEM
To develop and implement an automated freight car scheduling system. A prototype capability will first be developed. This research and demonstration project will establish the feasibility and determine the operational benefits of automated freight car scheduling. The project will provide considerable impetus to interline freight car scheduling reports and demonstrations will be made available to the railroad industry and the procedures, computer programs and related documentation of MoPac's Transportation Control System including the automated freight car scheduling system will be made available to interested railroads.

See also 21A 044569.

State-of-the-Art Survey Apr. 1976

Project Work Plan Mar. 1976

PERFORMING AGENCY: Missouri Pacific Railroad
INVESTIGATOR: Sines, GS
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Shamberger, RC (Tel (202)426-2920)

Contract DOT-FR-65139
STATUS: Active NOTICE DATE: July 1976 START DATE: Nov. 1975 COMPLETION DATE: Feb. 1979 TOTAL FUNDS: $5,500,000

ACKNOWLEDGMENT: FRA

17 139172
FLOW MANAGEMENT AND CONTROL
Improved transportation network and control analyses can have broad multi-modal application and will assist the entire transportation community in achieving efficient flow management for existing and proposed systems.
Contract not yet awarded.

SPONSORING AGENCY: Office of the Secretary of Transportation
RESPONSIBLE INDIVIDUAL: Ravera, R (Tel (202) 426-9364)

STATUS: Proposed NOTICE DATE: July 1976 START DATE: 1977

ACKNOWLEDGMENT: OST

18 080324
THE RAILWAY FREIGHT RATE ISSUE
The historical development of the railway freight rates in Canada is traced to provide the basis for explaining the complex roles played by freight rates and their evolution from an economic function to a sociological or political phenomenon. The inhibiting effects on the development of sound transportation and regional development policies are also analysed. /RTAC/

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport
INVESTIGATOR: Darling, H
SPONSORING AGENCY: Canadian Institute of Guided Ground Transport

STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

18 099595
DETERMINATION OF UNIT MAINTENANCE COSTS FOR INTERMODAL FLATCARS
The objective of this project is to determine accurately the maintenance cost per mile of intermodal flatcars operating in dedicated service between city pairs. The method used is to operate six specially-identified cars between Chicago and New Orleans on the Illinois Central Gulf Railroad. All repairs will be tabulated through the AAR Data Exchange System, and the mileage for each car will be recorded on an axle-mounted odometer. Pre-test and post-test measurements of critical components will be made in order to project their useful life.

PERFORMING AGENCY: Trailer Train Company
INVESTIGATOR: Greenfield, LP (Tel 312-786-1200)
SPONSORING AGENCY: Trailer Train Company

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: July 1975 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: Trailer Train Company

18 129705
RAIL INDUSTRY COST ANALYSIS
This program develops methods to determine investment and operating cost changes associated with change in rail transportation activity and for individual rail movements. The application of these sophisticated cost control techniques to the rail industry will contribute to the efficiency and effectiveness of the railroads.
Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Policy and Program Development
RESPONSIBLE INDIVIDUAL: Cantey, W

STATUS: Proposed NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

18 129723
RAILROAD INDUSTRY FINANCIAL FORECASTING
Develop an interactive computer-based simulation model of rail industry financial measures and relevant trends, designed to yield periodic forecasts of balance sheet, income items and cash sources with applications under a diversity of operating, revenue and expense assumptions.
Railroad Industry Financial Forecasting TOPS-On-Line Services, Incorporated

PERFORMING AGENCY: TOPS-On-Line Service, Incorporated
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Boone, JW (Tel (202) 426-8692)

STATUS: Completed NOTICE DATE: July 1976 START DATE: Apr. 1973 TOTAL FUNDS: $61,000

ACKNOWLEDGMENT: FRA

18 129724
FREIGHT CAR AND LOCOMOTIVE COSTING
Develop a set of methodologies and procedures for use in estimating the nature of cost and its variability in purchasing, maintaining, and operating freight cars and locomotives with application to pricing control and other management purposes.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company; Southern Railway System; Reebie (Robert) and Associates, Incorporated
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel 202-426-0771)

Contract DOT-FR-55055
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: Dec. 1977 TOTAL FUNDS: $485,021

ACKNOWLEDGMENT: FRA

18 129725
EFFECTIVE UTILIZATION OF WORK FORCE
Conduct research in the economic factors critical to effective utilization of the railroad work force. Factors to be included are employee compensation, effect of working conditions on employee productivity, investment in training/experience, effects on employment of line abandonments, employee willingness to relocate, etc.
Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development
RESPONSIBLE INDIVIDUAL: Collins, DM (Tel 202-426-0771)

STATUS: Active NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

18 138470
FORECASTING CHANGES IN COST COMPONENT PROFILES
It is intended that the study will investigate the forces which will cause differential cost escalation, develop cost level forecasting techniques, and prepare a set of indices that can be applied to reailway cost component estimates beyond the normal planning horizon.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport
INVESTIGATOR: Daub, M Lake, RW
SPONSORING AGENCY: Canadian National Railways; Canadian Transport Commission

STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1976 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: CIGGT

18 138471
ROAD MAINTENANCE COST MODEL
The purpose of the proposed research is the development of a road maintenance cost model which uses the physical rates of deterioration of individual track components to superimposed cost sensitivity to a wider range of relevant variables than is possible using existing accounting records. The study will integrate variability in maintenance requirements implied by previous technical research into the cost framework for M/W, supplementing these with traffic density-related cost penalties. The integrated model is intended to be applied to the problem of estimating route and service specific unit costs.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport
INVESTIGATOR: Roney, MD Lake, RW
SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1976 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: CIGGT

18 138472
EFFECTS OF PEAK/OFF-PEAK DEMAND ON COSTING OF RAILWAY SERVICES
The impact of the peak and off-peak demand for rail transportation service on the cost components of the capacity investment decision will be analyzed. This becomes particularly important in view of the recognized need of major Canadian railways for additional capital for capacity exapansion.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport
SPONSORING AGENCY: Canadian National Railways; Canadian Institute of Guided Ground Transport

STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1976 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: CIGGT

18 138474
LONG-TERM IMPACT OF REPLACEMENT VALUE COSTING
The objective of the study is to enumerate, illustrate, and quantify in general terms, the advantages and disadvantages of replacement value costing. The effect of RUC principles exercised over a sustained period will be examined with respect to marketing as affected by the "floorprice", cash flow generation, discounted cash flow analysis debt service implications and macroeconomic consequences for four senarios: generally increasing capital asset prices, generally decreasing capital asset prices, fluctuating asset prices and constant price levels.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport
INVESTIGATOR: Lake, RW
SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1976 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: CIGGT

18 138480
CAPITAL NEEDS STUDY--DEFERRED MAINTENANCE
To estimate the deferred maintenance of the U.S. Class I railroads as required under section 504 of the Railroad Revitalization and Regulatory Reform Act of 1976.
Subcontracted to Peat, Merwick, Mitchell and Co. Sponsored by the Office of Rail Economics and Policy Development of FRA.

PERFORMING AGENCY: Dyer (Thomas K), Incorporated
INVESTIGATOR: Dyer, TK (Tel (617) 862-2075)
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Mewkirk, JL (Tel (202) 426-0771)

Contract DOT-FR-65153 Task 2
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1976 TOTAL FUNDS: $150,000

ACKNOWLEDGMENT: FRA

18 138512
ACCESSORIAL SERVICES COSTING METHODOLOGY
To develop, test and justify a set of methodologies and procedures to be used for estimating the costs of providing, maintaining and operating railroad accessorial services and their application to pricing, control, investment and other management purposes.
Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel (202) 426-0771)

Contract DOT-FR-5168
STATUS: Proposed NOTICE DATE: July 1976 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: FRA

18 138513
TRAIN OPERATION AND CONTROL COSTING METHODOLOGY
To develop, test, and justify a set of methodologies and procedures to be used for estimating the costs of providing, maintaining and operating train operating and control facilities and their application to pricing, control, investment and other management purposes.

PERFORMING AGENCY: Young (Arthur) and Company
INVESTIGATOR: Kerridge, J (Tel (202) 785-4747)
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel (202) 426-0771)

Contract DOT-FR-65141
STATUS: Active NOTICE DATE: July 1976 COMPLETION DATE: June 1977 TOTAL FUNDS: $241,175

ACKNOWLEDGMENT: FRA

18 138514
GENERAL AND ADMINISTRATIVE SERVICES COSTING METHODOLOGY
To develop, test, and justify a set of methodologies and procedures to be used for estimating the economic costs of providing and maintaining railroad general administrative services and for management control and decision making.
Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel (202) 426-0771)

Contract DOT-FR-5167
STATUS: Proposed NOTICE DATE: July 1976 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: FRA

20 045166

STUDY OF SHIPPER DEMAND CONCERNING EMPTY RAILROAD FREIGHT CARS NEEDED FOR MATERIAL AND COMMODITY LOADING

Create a functional design of the elements and processes (system architecture) necessary for a technically advanced system to collect and predict shipper requests (orders for freight cars to load). Such a system must be operationally suitable and economically justifiable for use by individual Class I railroads as part of their system-wide empty freight car distribution activity. These are related to current FRA project reports on Car Management Studies.

PERFORMING AGENCY: Association of American Railroads
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Shamberger, RC (Tel 202-4262608)

Contract DOT-FR-30058 (CR)
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1973 TOTAL FUNDS: $171,699

ACKNOWLEDGMENT: FRA

20 045810

A MULTIREGIONAL INPUT-OUTPUT STUDY OF U.S. COMMODITY FREIGHT SHIPMENTS

A multiregional input-output (MRIO) model provides a consistent framework within which reliable estimates of transportation requirements by industry and region, and all the many interactions between changes in the rest of the economy and transportation can be studied in considerable industrial and regional detail.

REFERENCES:

Computational Problems with Multiregional Input - Output Models, Fencl, Z, Massachusetts Inst Technology, Urban Studies and Planning, DOT Rpt. 1, Aug. 1973, PB-235882

A guide for Users of the U.S. Multiregional Input-Output Model, Polenske, KR; Anderson, CW; Shirley, MM, Massachusetts Inst Technology, Urban Studies and Planning

The Disparities in Growth Between the California-Oregon Washington Region and the Rest of the U.S., Tatzin, DL, Massachusetts Inst Technology, Urban Studies and Planning, DOT Rpt. 5, Aug. 1974, PB-236625

Comparison Tests of the Column Coefficient and the Gravity Coefficient Models, Fencl, Z; Ng, NK, Massachusetts Inst Technology, Urban Studies and Planning, DOT Rpt. 6, Aug. 1974, PB-235881

Analysis of the 1963 Interregional Commodity Trade Estimates Mohr, M, Massachusetts Inst Technology, Urban Studies and Planning

Multiregional Economic Impacts of Energy and Transportation Policies, Polenske, KR: Levy, PF, Massachusetts Inst Technology, Urban Studies and Planning, DOT Rpt. B, Mar. 1975

Analysis of the Column Coefficient Version of the Multiregional Input-Output Model for the U.S., Shalizi, Z, Massachusetts Inst Technology, Urban Studies and Planning, DOT Rpt 9, Oct. 1974

PERFORMING AGENCY: Massachusetts Institute of Technology
INVESTIGATOR: Polenske, KR
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Harman, J (Tel 202-4264214)

Contract DOT-OS-30104
STATUS: Completed NOTICE DATE: July 1976 TOTAL FUNDS: $383,999

ACKNOWLEDGMENT: TRAIS (PR# PUR-1-30303)

20 055810

TRANSPORTATION SYSTEM DEVELOPMENT FOR ALASKA

This project is directed at the analysis of policy and transportation system development alternatives upon the economy of the State of Alaska as well as upon the performance of the intercity freight transportation networks. A macroeconomic model, previously developed by the Brookings Institution shall be adopted for use in representing the basic structure and interrelationships of the Alaskan economy. A transportation network simulation model shall also be developed as part of this effort which includes each of the major intercity freight carrying modal systems operating or expected or be operating in Alaska.

PERFORMING AGENCY: Alaska University, College
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Dyle, J

Contract DOT-OS-40008 (CS)
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1973 COMPLETION DATE: Oct. 1976 TOTAL FUNDS: $375,418

ACKNOWLEDGMENT: TRAIS (PR# PUR-2-30685)

20 058333

TRUCK BROKERS AND MOVEMENTS OF AGRICULTURALLY EXEMPT COMMODITIES

Develop an understanding within DOT and USDA of the nationwide patterns and problems of truck movements of exempt agricultural commodities (particularly fresh fruits and vegetables). It is felt that a field survey of agricultural truck brokers will serve this objective well, since truck brokers are, perhaps, the one group in the exempt products distribution system which is in a position to have an understanding of the overall transport/marketing patterns in the agriculturally exempt commodities trade. In the course of meeting the study's main objective, detailed information also will be gathered on the truck brokers and the nature of the services they provide.

PERFORMING AGENCY: Department of Agriculture
INVESTIGATOR: Hutchinson, TQ (Tel 202-447-6363)
SPONSORING AGENCY: Office of Policy, Plans and International Affairs
RESPONSIBLE INDIVIDUAL: Canellos, G (Tel 202-4264420)

IA DOT-AS-50042
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Jan. 1975 TOTAL FUNDS: $30,000

ACKNOWLEDGMENT: TRAIS

20 058460

TRANSPORTATION REQUIREMENTS FOR COAL MOVEMENTS THROUGH 1985

Develop and analyze rail and barge industry estimates of the total coal flows by 1985 and the equipment and facilities required to handle increased coal traffic. Critical system constraints that may hinder traffic growth will be determined and carrier solutions sought. The rail and barge industry planning processes to 1985 will also be examined and discussed.

Rail and Water Transportation Requirements for 1980 U.S. Coal Flows, IOCS, Cambridge, Mass., June 1976

PERFORMING AGENCY: Small Business Administration
INVESTIGATOR: Desai, S (Tel (617) 661-8700) Witten, J
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, OP-602
RESPONSIBLE INDIVIDUAL: Anderson, D 210 (Tel (617) 494-2752)

IA TSC-1000
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $135,000

ACKNOWLEDGMENT: TRAIS, OST

20 058467

DATA REQUIREMENTS ON INTERCITY FREIGHT DEMAND PLANNING

The objective is a critical review of present data sources and reporting methods. Emphasis is on the usefulness of the data in calibration and estimation of existing forms of demand models and recommendations on better sources or collection techniques for more effective forecasting of commodity flows. Data of primary concern are indications of shippers' choice; commodity attributes; production, consumption and pricing of commodities; and transportation attributes. A careful review of the form of the model and variables needed to predict modal choice by shippers is to be made. Various methods of data collection, processing, storage and retrieval and their related costs are to be evaluated for achieving the goals.

REFERENCES:

Design of a Structure and Data Analysis Scheme for Intercity Freight Demand Forecasting, Chung, C; Roberts, PO, CTS Rept. #75-15, 154 pp, Sept. 1975

A Commodity Attribute Data File for Use in Freight Transportation Studies, Samuelson, RA; Roberts, PO, CTS Rept. #75-20, 27 pp, Nov. 1975

Developing Freight Origin-Destination Data for Use in Freight Planning, Roberts, PO, CTS Rept. #76-3, Feb. 1976

PERFORMING AGENCY: Massachusetts Institute of Technology, Center for Transportation Studies, 82796
INVESTIGATOR: Roberts, PO (Tel (617) 253-7123)
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, OP-509
RESPONSIBLE INDIVIDUAL: Wright, D (Tel (617) 494-2196)

Contract DOT-TSC-1005 (CR)
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: Apr. 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $38,000

ACKNOWLEDGMENT: TRAIS, Massachusetts Institute of Technology

20 058473
AUTOMOTIVE SCRAPPAGE AND RECYCLING INDUSTRY STUDY
This project will include a literature search of the industries associated with the recycling of automotive materials, the preparation of an overview of the automobile recycling industry, and the performance of in-depth studies on the aspects of the automobile recycling such as automobile shredding and the reclamation of rubber from the automobile.

PERFORMING AGENCY: Small Business Administration
INVESTIGATOR: Kaiser, R
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, OS-514
RESPONSIBLE INDIVIDUAL: Powell, SF (Tel (613)494-2124)

IA DOT-TSC-1028 (FFP)
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1975 COMPLETION DATE: Apr. 1976 TOTAL FUNDS: $49,988

ACKNOWLEDGMENT: TRAIS, TSC

20 058488
AN EXPERIMENT IN FREIGHT MODAL CHOICE: DELINEATING THE RAIL-TRUCK INTERFACE
A methodology, capable of delineating the rail-truck interface for use by policy makers in their efforts to rationalize freight traffic, is to be developed and tested. Rail transport has been deemed superior in terms of energy consumption, environmental impact, and economic costs. The project shall develop a rail/track modal choice model combining the "revealed preference" and the "Commodity-movement" concepts. The segments of freight traffic that are rail/truck competitive will be identified and analyzed further by various multivariate statistical techniques to establish what economic factors determine the choice of one mode over another. The magnitude of any misallocation that occurs between the modes will be estimated and strategies, most likely to be successful in inducing switching freight from one mode to the other, to reduce the social misallocation costs are to be identified. The methodology will be structured, described, and documented in such a form that will be implementable by government agencies and carrier management.

PERFORMING AGENCY: Pennsylvania State University, University Park, College of Business Administration
INVESTIGATOR: Stenger, AJ
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Meck, JP (Tel 202-4264138)

Contract DOT-OS-50120 (CS)
STATUS: Completed NOTICE DATE: July 1976 START DATE: July 1975 TOTAL FUNDS: $42,266

ACKNOWLEDGMENT: TRAIS (PUR-50232), OST

20 058489
TRANSPORT OF SOLID COMMODITIES VIA FREIGHT PIPELINE
Objectives are: (1) to explore the feasibility and viability of the freight pipeline as an effective mode of transporting solid commodities over long distances, and (2) if the conclusion of that exploration is positive, to evaluate the issues surrounding the freight pipeline. The research shall focus on evaluation of the concept through a technical and market feasibility study. In specific terms, the study is expected to quantify, as much as possible, the traffic, social, economic, energy, legal, regulatory, institutional, political, and environmental impacts of freight pipeline within the context of a number of varied, but possible, scenarios.

PERFORMING AGENCY: Pennsylvania University, Philadelphia, Department of Civil and Environmental Engineering
INVESTIGATOR: Zandi, I
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Ryan, DC (Tel 202-4264208)

Contract DOT-OS-50119 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $68,023

ACKNOWLEDGMENT: TRAIS (PUR-50030), OST

20 058686
STUDY OF AUTOMOBILE MARKET DYNAMICS
Objectives include a projection of medium and short run (i.e., up to 1980) changes in the size and distribution of the market for passenger cars in the U.S. as a result of stipulated changes in new car price and performance characteristics likely to be made in the interest of fuel economy. Market impacts to be assessed include total sales (units and dollars) distribution by size and price class; and fraction imported. An estimation will be made of the extent of market disruption associated with varying degrees of physical and price changes. Particular attention should be devoted to the determination of threshold effects. Ideally, this effort should result in quantitative statements of the percentage of sales lost in a given market in a given year as a function of critical vehicle parameters.

PERFORMING AGENCY: Little (Arthur D), Incorporated
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, OS-514

Contract DOT-TSC-1060 (CPFF)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $105,671

ACKNOWLEDGMENT: TRAIS

20 058837
ANALYSIS OF FREIGHT MARKETS
This project has four objectives: 1. To develop a better understanding of the factors which are important in the choice of mode for intercity freight shipments. 2. To examine and evaluate existing theories and models which shall be useful for general freight modelling, for analysis of physical or policy changes in transportation supply such as increases in the allowed truck sizes and weights, and market analysis for new transportation services. 3. To develop new or modified models and test them, and 4. To utilize 1972 Census of Transportation data and other data sources both for evaluating existing models and as the basis for new calculations and model development.
REFERENCES:
Factors Influencing the Demand for Goods Movement Roberts, PO, CTS Rept. #75-16, 34 pp, Sept. 1975

PERFORMING AGENCY: Massachusetts Institute of Technology, Center for Transportation Studies
INVESTIGATOR: Roberts, PO (Tel (617) 253-7123)
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Harman, J (Tel 202-4264214)

Contract DOT-OS-50112
STATUS: Active NOTICE DATE: Mar. 1976 START DATE: June 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $92,332

ACKNOWLEDGMENT: TRAIS, Massachusetts Institute of Technology

20 080313
DEMAND INFORMATION AND FORECASTING RESEARCH PROJECT
To create a functional design of the elements and processes (system architecture) necessary for a technically advanced system to collect and predict shipper requests (orders for freight cars to load). Such a system must be operationally suitable and economically justifiable for use by individual

Class I railroads as part of their system-wide empty freight car distribution activity.

Freight Car Demand Information and Forecasting Research Project. Phase I: Final Report, Mar. 1975

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: Minger, WK (Tel (202) 293-5023)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Shamberger, RC (Tel 202-4262920)

Contract DOT-FR-30058
STATUS: Active NOTICE DATE: July 1976 START DATE: 1974 COMPLETION DATE: June 1977 TOTAL FUNDS: $208,491

ACKNOWLEDGMENT: FRA

20 080328
CANADIAN FREIGHT TRANSPORT MODEL

The aim of this research is to model the flow of commodity freight in Canada, in order to assist industry and government planners in evaluating future changes to the transport system. The rail transport model is emphasized but the effects of competition by other models are included. An optimizing network flow model of the mainline operation of a railroad is developed. This model predicts the optimal routing of traffic and the congestion at each yard and over each yard track section in the system. Congestion-dependent expressions are included for time delays in the yards and over-the-road. The time-optimal assignment pattern for railcar flow is then obtained for a given set of origin-destination demands for railcar movement, using a new assignment algorithm. The mainline Canadian Rail networks of both CN and CP are modelled. Historical railcar tracing data are summarized and compared with model predictions. A model of modal choice by shippers is also developed in order to obtain modal splits of commodity forecasts. Relative usage of various modes is represented as a function of both modal and shipment characteristics and the relationships are tested statistically. To provide the necessary empirical data, an extensive data base has been collected incorporating historical commodity freight data on volume cost, time and location of rail, ship and for-hire truck movements in Canada. Common codes for commodity grouping are developed to integrate the diverse modal schemes currently used and the data are transformed to a common regional basis. /RTAC/

REFERENCES:

Railcar Network Model Feasibility Report Petersen, ER; Fullerton, HV; Cloutier, JE, CIGGT, Queen's University, Kingston, Ontario, Report 71-5, Mar. 1971

Traffic Assignment Algorithm ODF Low Cloutier, JE, CIGGT, Queen's University, Kingston, Ontario, Report 71-1, July 1971

Bulk Service Queues: With Application to Train Assembly Times, Petersen, ER, CIGGT, Queen's University, Kingston, Ontario, Report 71-2, Aug. 1971

Bulk Queues with Random Batch Size: With Application To Railroad Modelling, Petersen, ER, CIGGT, Queen's University, Kingston, Ontario, Report 71-3, Aug. 1971

Over-the-Road Transit Time for a Single Track Railroad Peterson, ER, CIGGT, Queen's University, Kingston, Ontario, Report 71-4, Aug. 1971

A Railway Network Model of the Canadian National Railway System, Taylor, AJ, CIGGT, Queen's University, Kingston, Ontatio

A Railcar Network Model of the Canadian Pacific Railway System, Fullerton, HV, CIGGT, Queen's University, Kingston, Ontario

A Network Flow Model for Mainline Freight Petersen, ER; Fullerton, HV; Taylor, AJ; Cloutier, JE, Proc CIGGT, Seminar on Transport Res & Ed., 7-8 Feb., 1972

Canadian Freight Transport Data Base Petersen, ER, CIGGT, Queen's University, Kingston, Ontario

The Railcar Network Model Petersen, ER; Fullerton, HV

A User Analyst Guide to the Extended Railcar Newtork Model Schwier, C; Granton, TD; MacDonald, JA

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 5.10
INVESTIGATOR: Fullerton, HV Petersen, ER Turner, RE
SPONSORING AGENCY: Canadian Pacific; Canadian National Railways; Ministry of Transport, Canada; Queen's University, Canada

STATUS: Completed NOTICE DATE: June 1976 START DATE: May 1971

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

20 083440
AN ECONOMIC ANALYSIS OF PRESENT AND POTENTIAL TRADE BETWEEN ALASKA AND WASHINGTON

The project will identify present and future trade relationships between Alaska and Washington; identify characteristics of the distribution system; suggest innovations needed to improve the performance of the physical distribution system; and considering above, determine the composition of future trade. The investigation is designed to collect and analyze primary data of commodity movements; using the above information plus secondary data, project future trade flows; interview and analyze information on the physical distribution system from selected firms and government agencies involved in commerce between the two states. From these interviews, problem areas will be identified and analyzed and related to the effects on future trade composition.

See also RRIS 20A 099627.

PERFORMING AGENCY: Alaska University, College, Department of Agricultural Sciences
INVESTIGATOR: Thomas, WC
SPONSORING AGENCY: Department of Agriculture, ALK-274-5584

STATUS: Active NOTICE DATE: July 1975 START DATE: Oct. 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0064860)

20 083479
IMPACT OF CHANGING TRANSPORTATION SYSTEMS ON LOCAL GRAIN AND FARM SUPPLY FIRMS

OBJECTIVES: Estimate quantities of grain that will move through country elevators and commercial channels in 1975 and 1980 by counties; estimate demand for feed and fertilizer. Project alternate changes in grain transportation; determine economic feasibility of alternative systems of grain movement from producers to destinations; determine effect of changes listed under C and D on number, size, type and location of country elevators and on local employment and services; determine consequences of projected transportation changes on distribution of feed and fertilizer; and develop guidelines which individual firms can use in investment and transportation decisions. APPROACH: Will obtain data through survey schedules, transportation rate information and published reports. Develop models which will give estimates by counties and geographic units, evaluate alternative modes of transportation, project changes, and generate least cost information for various situations. Iowa, Kansas and Nebraska will participate in objectives A, B, C, D, F, and G. Iowa and Nebraska will participate in objective E. Illinois will participate in objectives A, B, C, D, and E. PROGRESS REPORT: A case study of the impact of branch line abandonment has been completed and the results reported in a paper given before the annual meeting of the American Agricultural Economics Association. The study indicated that in the one area with access to water-truck combination for transport the impact of abandonment on agricultural marketing and production firms was very slight Fertilizer firms appeared to be affected more than grain and feed firms. In a second area with no ready access to water transportation, abandonment reduced the rate of firm growth, retareded investment in facilities, and weakened the market for cash grain. Development of predictive models is continuing.

PERFORMING AGENCY: Illinois University, Urbana, Department of Agricultural Economics, ILL U-05-366
INVESTIGATOR: Hill, LD
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Illinois University, Urbana (CRIS 0064467), Smithsonian Science Information Exchange (gy 64467 1)

20 083481
SYSTEM ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING

The purposes of this project are to: determine the effects of changing farm programs on the efficiency of the marketing, utilization, and distribution of grain and soybeans and their products; determine the implication of farm programs for shipping patterns and quantities shipped to foreign markets; and investigate the operation of the marketing systems as they affect the economics of physical distribution and processing of grains. APPROACH: The grain marketing system will be approximated by a spatial equilibrium model determining the optimum size, type, and number of firms. Relationships between prices and market structure will be analyzed using daily prices from Illinois elevators. The appropriateness of test weight standards of corn for communicating quality preferences will be evaluated. US price-support programs, export sbusidies, OCC credit sales and inter-grain price relationships will be examined. Programs and policies of major importing countries and measurement of the incidence of trade restrictions will be evaluated for US exports. Export potentials for US grains will be estimated. PROGRESS REPORT: Work was concentrated in two areas appraisal of Sino-American trade prospects and direction of European integration. The results suggest that the United States has a good chance of becoming an important supplier of wheat, cotton, vegetable oils, and perhaps tobacco and coarse grains to China. A new basis for trade may be created through direct U.S. investments, joint undertakings, and the extension of most-favored-nation treatment to Chinese goods. The European Community is in a state of crisis and is confronted with three possibilities at this juncture. Regress into a free trade area with no common agricultural and economic policies. Stand still and hold on to what it has achieved to date. Push ahead toward a federal economic and monetary union, with supranational institutions.

REFERENCES:

An Enlarged European Community and Agricultural Trade Policy Choices for Third Countries, Schmidt, SC, Journal of Agricultural Economics, Vol. 24, Vol. 1, pp 141-164, Jan. 1973

East-West Trade in Wheat: Present and Potential Schmidt, SC, Economic Planning, Vol. 9, No. 3-4, pp 3-24, May 1973

The Demand for On-Farm Heated-Air Grain Dryers Kau, P; Hill, LD, Illinois University, Dept of Agri Econ, Agri Expt Station, AERR 118, Jan. 1973

Test Weight as a Grading Factor for Shelled Corn Hall, G; Hill, LD, Illinois University, Dept of Agri Econ, Agri Expt Station, AERR 124, Sept. 1973

European IntegrationÖ Where To? Schmidt, SC, Illinois Business Review, 31(10): 6-8, Nov. 1974

Test Weight Adjustment Based on Moisture Content and Mechanical Damage of Corn Kernels, Hall; Glenn; Hill, LD, American Society of Agricultural Engineers--Transactions, 17:3, pp 578-79, Feb. 1974

PERFORMING AGENCY: Illinois University, Urbana, Department of Agricultural Economics, ILLU-05-0315
INVESTIGATOR: Hill, LD Schmidt, SC Hieronymus, TA
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Illinois University, Urbana (CRIS 0060066)

20 083485

LOGISTICAL FACTORS INVOLVED IN DOMESTIC AND FOREIGN MARKETING OF IOWA'S GRAINS, LIVESTOCK AND MEATS

OBJECTIVES: The project is to continue the investigation of patterns of transportation to domestic and foreign markets as a result of the grain transportation crisis of 1972-73 and current agricultural policy, and a analyze and recommend possible changes in transportation regulations affecting the movements of Iowa's grains, oilseeds, livestock and meats. APPROACH: Recommendations for legislative changes will be determined by results of research underway on U.S. Department of Transportation contracts and reports to be submitted in September 1973. PROGRESS REPORT: Research on U.S. Department of Transportation project. "An Economic Analysis of Alternative Grain Transportation Systems: A Case Study." Writing manuscript on Executive Summary for above project and reviewing and editing Final Report Phase I of same. Arranged and attended series of research meetings on Livestock and Meat Transportation during October and November. Meetings with Task Force Groups on Iowa Railroad Problems. Initiated first phase of possible research project on container movements of grains from Iowa. Acted as coordinator of grain transportation research with College of Engineering research team working on D.O.T. Contract D.O.T.-OS 30106. "Integrated Analysis of Small Cities Intercity Transportation to Facilitate the Achievement of Regional Goals."

An Economic Analysis of Alternative Grain Transportation Systems: A Case Study, Department of Transportation, Exec. Summary, FRA-OE-73-4, Nov. 1973

PERFORMING AGENCY: Iowa State University, Ames, Department of Industrial Administration, IOW02003
INVESTIGATOR: Thompson, WH
SPONSORING AGENCY: Department of Agriculture; Iowa, State of

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Iowa State University, Ames (CRIS 0064289)

20 083488

IMPACT OF CHANGING TRANSPORTATION SYSTEMS ON LOCAL GRAINS AND FARM SUPPLY FIRMS

The objectives of this project are to: estimate quantities of grain that will move through country elevators and commercial channels in 1975 and 1980 by counties; estimate demand for feed and fertilizer; project alternate changes in grain transportation; determine economic feasibility of alternative systems of grain movement from producers to destinations; determine effect of changes on number, size, type, and location of country elevators and on local employment and services; determine consequences of projected transportation changes on distribution of feed and fertilizer; and develop guidelines which individual firms can use in investment and transportation decisions.

REFERENCES:

Kansas 1966-71 Livestock-Feed Balances Doxtader, MW; McCoy, JH

Projected 1980 Kansas Livestock-Feed Balances Doxtader, MW; McCoy, JH

Market Flow Patterns for Wheat, Milo, Corn and Soybeans from Kansas Origins, 1971-72, Sheldon, R; Sorenson, LO

PERFORMING AGENCY: Kansas State University, Agricultural Economics Department, KAN00843
INVESTIGATOR: Sorenson, LO McCoy, JH
SPONSORING AGENCY: Department of Agriculture, 0061435 KAN00843

STATUS: Active NOTICE DATE: Mar. 1976 START DATE: June 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Kansas State University (CRIS 0061435), Smithsonian Science Information Exchange (GY 61435 3)

20 083507

PLAN AND PROMOTE IMPROVED WHOLESALE FOOD MARKETING FACILITIES AND METHODS IN NEW ORLEANS, LOUISIANA

The objective of this project is to improve the wholesale food marketing facilities in New Orleans, Louisiana. The approach will include the following: Determine the number and types of food firms including their locations and tenure status, methods of receipts, volumes handled, selected costs of operations, and adequacy of present facilities in terms of efficiency, organization, and space use; Formulate plans for those firms needing new facilities and recommend the type of facility which will help reduce marketing costs; Evaluate acceptable sites in relation to proximity to center of distribution and consumption, accessibility to truck and rail transportation and convenience for buyers; Develop a master plan for the site and determine the total investment for land and facilities and management needs, and estimate the annual revenue required to operate the proposed facilities; and Compare selected costs in the present market with those in the proposed facilities. The progress report will include a plan for a new regional wholesale food distribution center for New Orleans was developed and presented to local officials and food wholesalers at a public meeting in New Orleans. It calls for the initial development of $13.4 million worth of facilities on 92 acres of land to meet the immediate needs of 54 local food wholesalers. The center is designed to be expanded to more than twice its initial size to meet future needs. As much as $1.5 million could be saved at the outset each year in the handling and distribution of all kinds of food products. A site for constructing the initial facility has been purchased by the city and plans are underway for its development. A report of the study is written and has been submitted for publication.

REFERENCES:

Central Refrigeration System for A Proposed Food Distribution Center in New Orleans, Louisiana, Taylor, EG, Agricultural Research Service, NE-26, Aug. 1973

PERFORMING AGENCY: Agricultural Research Service, Agricultural Marketing Research Institute, 1104-15863-016

INVESTIGATOR: Taylor, EG Brasfield, KH
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0040306)

20 083508
PLAN AND PROMOTE IMPROVED WHOLESALE FOOD MARKETING FACILITIES AND METHODS IN DALLAS, TEXAS
The objective of this project is to improve the wholesale food marketing facilities in Dallas, Texas. The approach will include the following: Determine the number and types of food firms including their locations and tenure status, methods of receipts, volumes handled, selected costs of operations, and adequacy of present facilities in terms of efficiency, organization, and space use; Formulate plans for those firms needing new facilities and recommend the type of facility which will help reduce marketing costs; Evaluate acceptable sites in relation to proximity to center of distribution and consumption, accessibility to truck and rail transportation and convenience for buyers; and develop a master plan for the site and determine the total investment for land and facilities and management needs, and estimate the annual revenue required to operate the proposed facilities. The progress report will include plans for improved wholesale food facilities in Dallas Texas, have been completed for firms facing displacement by highway or other urban renewal plans. Twenty-eight firms handling over 399,000 tons of good products annually are included. Fifteen specialized buildings arranged on 58 acres of land will meet their needs in the initial development. Future development of a farmers' market and allied industries would add another 50 acres bringing the total land area needed to over 100 acres. The total cost for the new center would be about $11.3 million. Highlights of the study were presented at a public meeting in Dallas in September 1973. Since that time, meetings have been held with food industry representatives in Dallas to discuss implementation of the study and recommendations were drafted and are in the process of publication.
REFERENCES:
Central Refrigeration System for a Proposed Food Distribution Center in Dallas, Texas, Overheim, RK, Agricultural Research Service, NE-27, Aug. 1973

PERFORMING AGENCY: Agricultural Research Service, Agricultural Marketing Research Institute, 1104-15863-002
INVESTIGATOR: Overheim, RK Brasfield, KH
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0040307)

20 083526
IMPACT OF CHANGING TRANSPORTATION SYSTEMS ON LOCAL GRAIN AND FARM SUPPLY FIRMS
The objectives of this project are to: estimate quantities of grain that will move through country elevators and commercial channels in 1975 and 1980 by counties; Estimate demand for feed and fertilizer: project alternate changes in grain transportation; Determine economic feasibility of alternative systems of grain movement from producers to destinations; Determine effect of changes on number, size, type and location of country elevators and on local employment and services; Determine consequences of projected transportation changes on distribution of feed and fertilizer; and develop quidelines which individual firms can use in investment and transportation decisions. Data will be obtained through survey schedules, transportation rate information, and published reports, and models which will give estimates by counties and geographic units, evaluate alternative modes of transportation, project changes, and generate least cost information for various situations will be developed. A six-county area in south-central Nebraska is the focus of a case study of abandonment implications. Results will aid elevator operators and other grain shippers in investment and other management decisions. Results of an economic-engineering analysis of grain trucking costs are being edited for publication. Average per unit costs were found to be affected by truck size, average length of haul and annual volume. Operating costs, particularly the cost of fuel, were important factors. Results will be useful to shippers, truck owners and operators and regulatory authorities. Comparisions are being made between truck costs and published rail rates for grain shipments over various length of haul. Results will be of use to grain shippers in their choice of mode and will offer quidelines to feasibility of private truck carriage. There may also be implications for regulatory rate and service policies. Dr. J. R. Felton, has been analyzing the supply-demand aspects of rail grain shipments. Included in his findings is a proposed market allocation system for freight cars. The system would substitute market pressures for present authoritarian car allocation methods and would render car shortages impossible in an economic sense.
REFERENCES:
Interline Freight Car Movement and Owner Compensation Felton, JR, Nebraska Univ., Lincoln, Dept of Agricultural Economics, Staff Paper 1973-13, 19 pp, 1973

The Importance of Grain Transportation to the Farm Economy and the Railroad Industry, Felton, JR, Nebraska Univ., Lincoln, Dept of Agricultural Economics, Staff Paper 1973-14, 18 pp, 1973

Private and Public Influences on the Size and Allocation of the Freight Car Fleet, Felton, JR, Nebraska Univ., Lincoln, Dept of Agricultural Economics, Staff Paper 1973-16, 20 pp, 1973

Measurement of the Adequacy and Efficiency of the Freight Car Fleet, Felton, JR, Nebraska Univ., Lincoln, Dept of Agricultural Economics, Staff Paper 1973-18, 12 pp, 1973

Proposed Solutions to the Problem of Freight Car Supply Felton, JR, Nebraska Univ., Lincoln, Dept of Agricultural Economics, Staff Paper 1973-19, 15 pp, 1973

PERFORMING AGENCY: Nebraska University, Lincoln, Department of Agricultural Economics, NEB-10-062
INVESTIGATOR: Anderson, DG
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0060519)

20 083533
SYSTEMS ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING
The objectives are: (1) Determine the effects of changing farm programs on the efficiency of the Marketing, Utilization and Distribution of Grain and Soybeans and their products; (2) Study changes in price relationships as a consequence of differences in location and production resulting from farm programs; (3) Ascertain changes in the relative utilization of different grains in the feeding of livestock and other uses; (4) Determine the implications of farm programs for shipping patterns and quantities shipped to foreign market; (5) Investigate the operations of marketing systems as they affect: (a) The economics of physical distribution and processing of grains. (b) Managerial decision-making by grain marketing firms. Secondary data will be supplemented by station experimental data, farm records, previous studies and from agencies and individual firms involved in various phases of the grain industry. Time series data will be analyzed and related to the long and short run demand for grain. U.S. price support programs, export subsidies, C.C.C.sales and inter-grain price relationships will be analyzed. Programs and policies of importing countries will be analyzed from standpoint of their relationship to U.S. exports. A spatial equilibrium model determining the optimum size, type, and number of firms will be developed. Existing desision-making models will be adapted and improved or new ones will be developed through studying operating parameters and external constraints of marketing firms. PROGRESS REPORT: Cost of alternative move-store activities for small grains from the field to a central market were estimated. Included in the analysis were farm trucks, semi-trailer trucks, single car, multiple car, and unit train rates, farm storage, and elevators of 100,000, 400,000, and 1,500,000 bushels storage capacity. Resultant budgets for alternative movements of grain from field to a central market were ranked from 1 to 58 by total cost and compared with the most commonly used system. These budgets ranged from 27.97 cents per bushel to 52.97 cents with the typical system estimated at 41.84 cents. Limitations on some least cost budgets and justifications for more costly budgets were given. A Master's thesis was completed on marketing strategies of a sample of central N.D. grain farmers. This study indicated that country elevators were the predominant grain sales outlet.
REFERENCES:
The Cost of Seed Processing Anderson, DE, NDSU, Agricultural Experiment Station, Nov. 1973

Grain Marketing Methods in the United States: Theory Assumptions and Approach, Anderson, DE, NDSU, Agricultural Experiment Station, AA-EA-CAES-WAEA Conf Paper, Aug. 1973

A Budget Analysis of the Logistics System for North Dakota Small Grains, Jensen, RC, NDSU, Department of Agricultural Economics, Unpublished MS Thesis, May 1974

North Dakota Farmers Grain Marketing Strategies Bedker, GM, NDSU, Department of Agricultural Economics, Unpublished MS Thesis, Mar. 1974

North Dakota Farmers Grain Marketing Practices Bedker, GM; Anderson, DE, NDSU, Agricultural Experiment Station, North Dakota Farm Research, Oct. 1974

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics, ND01354
INVESTIGATOR: Anderson, DG
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0060238)

20 099625
SYSTEMS ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING

Determine the effects of changing farm programs on the efficiency of Marketing, Utilization and Distribution of Grain and Soybeans and their products; Study changes in price relationships as a consequence of differences in location and production resulting from farm programs. Ascertain changes in the relative utilization of different grains in the feeding livestock and other uses. Determine the implications of farm programs for shipping patterns and quantities shipped to foreign markets.
Secondary data will be supplemented by station experimental data, farm records, previous studies and from agencies and individual firms involved in various phases of the grain industry. The grain marketing system will be approximated by a spatial equilibrium model determining the optimum size, type, and number of firms. Projections of grain production and consumption will be made. Time series data will be analyzed and related to the long and short run demand. U.S. price-support programs, export subsidies, C.C.C. sales and inter-grain price relationships will be analyzed. Programs and policies of importing countries and measurement of the incidence of trade restrictions will be evaluated for U.S. exports. Export potentials for U.S. grain will be estimated.
A survey was made of multiple rail car loading country elevators and sub-terminals in Southern Minnesota to determine how new multiple rail car export rates are influencing grain marketing patterns and the structure of the country elevator industry. The results were summarized and a manuscript prepared. In mid-1974, 19 elevators in Southern Minesota were operating facilities capable of loading unit grain trains. Several were under construction and at least three more elevators with unit train capability will be built in 1975. These elevators were shipping sizeable quantities of corn and soybeans by rail to the Gulf and Duluth-Superior for export. Unit train grain shipments from country points to export ports have several advantages favoring their continued heavy use. One railroad has also announced its intentions to extend lower multiple-car rates on domestic shipments to terminal markets and processors. This will give an advantage to country shippers that can ship in large quantities.
REFERENCES:
Grain Transportation and Sub-Terminals Dahl, RP, Farmers Elevator Association of Minnesota, Minneapolis, Speech, Feb. 1974

PERFORMING AGENCY: Minnesota University, Saint Paul, Department of Agricultural and Applied Economics
INVESTIGATOR: Dahl, RP
SPONSORING AGENCY: Department of Agriculture, MIN-14-069

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0060487)

20 099628
APPRAISAL OF CAPABILITY OF TRANSPORTATION SYSTEM TO MEET NEEDS OF AGRICULTURE AND RURAL AREAS

of the transportation system to economically move inputs system to meet incurred demand for services and the capacity of the transportation system to economically move inputs under a policy of full production. Quantify effects of sharply increased exports on farm product storage and transportation facilities and identify long-run structural problems affecting the capability of the transportation system to serve rural areas.
Utilize secondary data sources and interview local, state and Federal officials to obtain an assessment of the capability of the transportation system to meet agriculture's need. Models and other appropriate analytical tools are basic to making systematic appraisal of the data upon which to draw conclusions.
An interim report was submitted to the Congress showing that extraordinary demands for grain and soybean transporation in 1973 were met. The hardships and costs of meeting the demands were discussed. Some of the long-run structural problems of the transportation industry were identified and data availability for analysis of the problems assessed. Held a workshop on rural transportation problems and assisted in planning and conducting four Extension Workshops concerning the activities generated by the Regional Rail Reorganization Act of 1973.
Transportation in Rural America: An Interim Report US Senate, Committee on Agriculture & For., Comm Print, Committee Print, 18 pp, Apr. 1974

PERFORMING AGENCY: Kansas State University, USDA National Economic Analysis Division
INVESTIGATOR: Schnake, LD
SPONSORING AGENCY: Economic Research Service, Department of Agriculture, NEA-14-126-20-01

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1974 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041789)

20 099644
APPRAISAL OF THE CAPABILITY OF THE TRANSPORTATION SYSTEM TO MEET NEEDS OF AGRICULTURE AND RURAL AREAS

Appraise the effectiveness of the rural transportation system to meet incurred demand for services and the capacity of the transportation system to economically move inputs under a policy of full production. Quantify effects of sharply increased exports on farm product storage and transportation facilities and identify long-run structural problems affecting the capability of the transportation system to serve rural areas.
Utilize secondary data sources and interview local, state and Federal officials to obtain an assessmant of the capability of the transportaion system to meet agriculture's need. Models and other appropriate analytical tools are basic to making systematic appraisal of the data upon which to draw conclusions.
An interim report was submitted to the congress showing that extraordinary demands for grain and soybean transportation in 1973 were met. The hardships and costs of meeting the demands were discussed. Some of the long-run structural problems of the transportation industry were identified and data availability for analysis of the problems assessed. Held a workshop on rural transportation problems and assisted in planning and conducting four Extension Workshops concerning the activities generated by the Regional Rail Reorganization Act of 1973.
Transportation in Rural America; An Interim Report US Senate, Committee on Agriculture and For., Committee Print, 18 pp, Apr. 1974

PERFORMING AGENCY: Economic Research Service, Department of Transportation Economics
INVESTIGATOR: Reinsel, EI
SPONSORING AGENCY: Department of Agriculture, NEA-14-126-11-00

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1974 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (G4 41661)

20 099645

EVALUATION OF PUBLIC TRANSPORTATION POLICIES AFFECTING AGRICULTURE

Assess on a regular basis the economic performance of the general-purpose transportation system for agriculture and the effect on efficiency and equity of proposed adjustments in services and rates. Project short and long-run needs for transportation services by agriculture and evaluate resource allocation processes in the privately operated transportation system. Determine capacity, growth, economies of size and other factors about for-hire livestock truckers and trucking.

Measure modal and cross-modal elasticities for transport demond by agricultural shippers for basic information for use in policy analyses. Develop weighted aggregative indexes of railroad weights for specific commodity groups food commodities combined and all commodities combined. Use surveys and other appropriate techniques to obtain primary data as required to carry out specified research.

Short-run needs for transportation services by the grain and soybean industries in FY 1974 were estimated; the supply of services likely to be available was found to be adequate to meet needs. Surveys were conducted of livestock shippers, feed and fertilizer distributors to determine their transportation practices. Limited surveys of livestock truckers were conducted to determine size and time in business. Potential loss of rail service in the Midwest-Northeast in zones where aqriculture, forestry and rural development activities are important were estimated to occur for less than 10 percent of the carloads of traffic originated and terminated in the selected zones. Surveys now underway to obtain information about the nature and severity of economic effects from the potential loss of service. The food transportation bill for 1973 was estimated to be $6.1 billion, no change from 1972. Transportation rates were higher in 1973 than in 1972, a decline in th equantity of U.S. produced foods consumed by the domestic civilian population offset the rate increases. Conducted analyses on various transportation rate and service actions and proposals to assist policy makers in understanding and evaluating the effects of changes on agriculture and rural areas.

REFERENCES:

Grain and Soybean Transportation Problems in Fiscal 1974 Umberger, DE; Hutchinson, TQ, Economic Research Service, Marketing and Transportation Sit., MTS-191, pp 22-28, Nov. 1973

The Price of Agricultural Transportation Gerald, JO, Grain Transportation Forum, Bismarch, North Dakota, Mar. 1974

Nature and Quality of Livestock Transportation Services Used by Shippers, Hoffman, LA, Transportation Committee of American Nat'l Cuttlemen's Ass, Jan. 1974

Changing Technology in Grain Transportation Hutchinson, TQ, International Conr Quality Conference, Champaign, Illinois, Oct. 1973

Problems in Transporting Fiscal 1974 Grain and Soybean Exports, Umberger, DE; Hutchinson, TQ, Economic Research Service, For. Agri. Trade of U.S., pp 18-24

PERFORMING AGENCY: Washington State University
INVESTIGATOR: Casavant, KL
SPONSORING AGENCY: Department of Agriculture, NEA-14-125-53-01-X2

Contract 12-17-04-8-917-X
STATUS: Active NOTICE DATE: May 1976 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (G4 41788 46 286117)

20 099646

EVALUATION OF PUBLIC TRANSPORTATION POLICIES AFFECTING AGRICULTURE

Assess on a regular basis the economic performance of the general-purpose transportation system for agriculture and the effect on efficiency and equity of proposed adjustments in services and rates. Project short and long-run needs for transporation services by agriculture and evaluate resource allocation processes in the privately operated transportation system. Determine capacity, growth, economics of size and other factors about for-hire livestock truckers and trucking.

Measure modal and cross-modal elasticities for transport demand by agricultural shippers for basic information for use in policy analyses. Develop weighted aggregative indexes of railroad weights for specific commodity groups food commodities combined and all commodities combined. Use surveys and other appropriate techniques to obtain primary data as requred to carry out specified research.

Short-run needs for transportation services by the grain and soybean industries in FY 1974 were estimated, the supply of services likely to be available was found to be adquate to meet needs. Surveys were conducted of livestock shippers, feed and fertilizer distributors to determine their transportation practices. Limited surveys of livestock truckers were conducted to determine size and time in business. Potential loss of rail service in the Midwest-Northeast in zones where agriculture, forestry and rural development activities are important were estimated to occur for less than 10 percent of the carloads of traffic originated and terminated in the selected zones. Surveys now underway to obtain information about the nature and severity of economic effects from the potential loss of service. The food transportation bill for 1973 was estimated to be $6.1 billion, no change from 1972. Transportation rates were higher in 1973 than in 1972, a decline in th equantity of U.S. produced foods consumed by the domestic civilian population offset the rate increases. Conducted analyses on various transportation rate and service actions and proposals to assist policy makers in understanding and evaluating the effects of changes on agriculture and rural areas.

REFERENCES:

Grain and Soybean Trasnportation Problems in Fiscal 1974 Umberger, DE; Hutchinson, TQ, Economic Research Service, Marketing & Transportation Sit., MTS-191, pp 22-28, Nov. 1973

The Price of Agricultural Transportation Gerald, JO, Grain Transportation Forum, Bismarck, North Dakota, Mar. 1974

Nature and Quality of Livestock Transportation Services Used by Shippers, Hoffman, LA, Transportation Comm of Amer Nat'l Cattlemen's Ass, San Diego, Jan. 1974

Changing Technology in Grain Transportation Hutchinson, TQ, International Com Quality Conference, Champaign, Ill, Oct. 1973

Problems in Transporting Fiscal 1974 Grain and Soybean Exports, Umberger, DE; Hutchinson, TQ, Economic Research Service, For Agri. Trade of U.S.

PERFORMING AGENCY: Economic Research Service, Department of Transportation Economics
INVESTIGATOR: Gerald, JO Hutchinson, TQ
SPONSORING AGENCY: Department of Agriculture, NEA-14-125-11-00

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (G4 41660), DABAPA11000100

20 099647

EVALUATION OF PUBLIC TRANSPORTATION POLICIES AFFECTING AGRICULTURE

Assess on a regular basis the economic performance of the general-purpose transportation system for agriculture and the effect on efficiency and equity of proposed adjustments in services and rates. Project short and long-run needs for transportation services by agriculture and evaluate resource allocation processes in the privately operated transportation system. Determine capacity, growth, economics of size and other factors about for-hire livestock truckers and trucking.

Measure modal and cross-modal elasticities for transport demand by agricultural shippers for basic information for use in policy analyses. Develop weighted aggregative indexes of railroad weights for specific commodity groups food commodities combined and all commodities combined. Use surveys and other appropriate techniques to obtain primary data as required to carry out specified research.

Short-run needs for transportation services by the grain and soybean industries in FY 1974 were estimated; the supply of services likely to be available was found to be adequate to meet needs. Surveys were conducted of livestock shippers, feed and fertilizer distributors to determine their transportation practices. Limited surveys of livestock truckers were conducted to determine size and time in business. Potential loss of rail service in the Midwest-Northeast in zones where aqriculture, forestry and rural development activities are important were estimated to occur for less than 10 percent of the carloads of traffic originated and terminated in the selected zones. Surveys now underway to obtain information about the nature and severity of economic effects from the potential loss of service. The food transportation bill for 1973 was estimated to be $6.1 billion, no change from 1972. Transportation rates were higher in 1973 than in 1972, a decline in the quantity of U.S. produced foods consumed by the domestic civilian population offset the rate increases. Conducted analyses on various transportation rate and service actions and proposals to assist policy makers in understanding and evaluating the effects of changes on agriculture and rural areas.

REFERENCES:

Grain and Soybear Transportation Problems in Fiscal 1974 Umberger, DE; Hutchinson, TQ, Economic Research Service, Marketing & Trans Sit., MTS-191, pp 22-28, Nov. 1973

The Price of Agricultural Transportation Gerald, JO, Grain Transportation Forum, Bismarck, North Dakota, Mar. 1974

Nature and Quality of Livestock Transportation Services Used by Shippers, Hffman, LA, Transportation Com Amer Nat'l Cattlemen's Ass, San Diego, Jan. 1974

Changing Technology in Grain Transportation Hutchinson, TQ, International Corn Quality Conference, Champaign, Ill.

Problems in Transporting Fiscal 1974 Grain and Soybean Exports, Umberger, DE; Hutchinson, TQ, Economic Research Service, For. Agri. Trade of U.S.

PERFORMING AGENCY: Illinois University, Urbana, USDA, National Economic Analysis Division
INVESTIGATOR: Bunker, AR
SPONSORING AGENCY: Economic Research Service, Department of Agriculture, NEA-14-125-17-01

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information System (GY 41787), Smithsonian Science Information Exchange (CRIS 0041787)

20 100248

A SIMULATION MODEL FOR ESTIMATING THE EFFECTS OF RATIONALIZING THE GRAIN COLLECTION, HANDLING AND DISTRIBUTION SYSTEM UPON THE PRAIRIE ECONOMY

The objective is to develop a framework in which rationalization of the grain transportation system in western Canada can be analyzed with respect to rural community effects. The system's approach will be employed at a regional level to assess the impact of railway branch-line abandonment and elevator closure upon the economy of prairie communities affected. Simulation and evaluation of some rationalization proposals in a specified bounded production region will occur to estimate the change in direct employment income to the region with total effect to be estimated by deriving a local multiplier. Tax revenue changes and changes in local infrastructure investment and maintenance--chiefly roads--will also be estimated. /RTAC/

PERFORMING AGENCY: Manitoba University, Canada
INVESTIGATOR: Magarrell, HK
SPONSORING AGENCY: Ministry of Transport, Canada, Transportation Development Agency

STATUS: Active NOTICE DATE: July 1976 START DATE: Sept. 1973

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

20 128022

DOCK STRIKES AND EXPORT LOSSES IN THE INTERNATIONAL GRAIN TRADE

The study will be limited to international trade in grain (wheat, barley, oil-seeds). Also, estimates of the financial impact of such strikes on the economy will be limited to Canada and the United States (North American Exporters). In line with the above-mentioned objectives, this study is an attempt to develop a model which will allow accurate estimation of the impact of future strikes of various duration and location. Such estimates will be in terms of losses to the struck economy and gains to its neighbor and additional gains to its chief competitors in the market. An important practical advantage of this analysis would be that by application of the model to estimate results of potential strikes in advance of their occurrence, public and private officials would be able to formulate appropriate marketing and transportations policies to cushion the estimated adverse impacts of such strikes. Further work on the project will focus attention on such questions as: (1) What is the critical duration for a strike during which serious shifts in the Canadian grain export markets may be expected to occur? (2) What factors influence the duration of the strike? (3) How can these shifts be measured?, and (4) What are the policy implications of these critical durations for the government and grain handling firms. /RTAC/

PERFORMING AGENCY: Manitoba University, Canada, Center for Transportation Studies
INVESTIGATOR: Tangri, OP
SPONSORING AGENCY: Ministry of Transport, Canada, Transportation Development Agency

STATUS: Active NOTICE DATE: July 1976 START DATE: June 1973 COMPLETION DATE: 1977

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

20 129707

TECHNOLOGICAL FORECASTS, 1975-2000, A DESCRIPTIVE OUTLOOK AND METHOD FOR QUANTITATIVE PREDICTION

A description of expected trends in transportation for both passenger and freight movements for the next 30 years. A methodology is also described for forecasting, at an aggregate level of detail and as a function of time value, out of pocket costs and trip distance, the modal split of passengers in a forecast year between 1975-2000.

Contract not yet awarded.

SPONSORING AGENCY: Office of Policy, Plans and International Affairs
RESPONSIBLE INDIVIDUAL: Velona, WD

STATUS: Proposed NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

20 129726

ANALYSIS OF ALTERNATIVES AVAILABLE TO THE ALASKA RAILROAD FOR COMPLEMENTING THE PRESENT AND FUTURE ALASKA TRANSPORTATION

Assess the effect of the present transportation environment on the Alaska Railroad and make recommendations with respect to the most practicable future role of that railroad through the year 2000.

PERFORMING AGENCY: Consad Research Corporation
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development
RESPONSIBLE INDIVIDUAL: Anderson, EW (Tel 202-426-0771)

Contract DOT-FR-43010
STATUS: Active NOTICE DATE: July 1976 START DATE: 1974 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $65,000

ACKNOWLEDGMENT: FRA

20 129728

CTS DATA BASE STANDARDIZATION STUDY

Development of a commodity flow data base utilizing the 1963, 1967 and 1972 Commodity Transportation Surveys (CTS) specifically designed to facilitate retrieval of directly comparable, detailed data for those three census years. In terms of immediate research needs, an update of the modal split will be prepared.

PERFORMING AGENCY: Transportation Systems Center
INVESTIGATOR: Jordan, L
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development; Federal Highway Administration; Office of the Secretary of Transportation
RESPONSIBLE INDIVIDUAL: Bourque, WL (Tel 202-426-0771)

STATUS: Active NOTICE DATE: Feb. 1976 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $30,000

ACKNOWLEDGMENT: FRA

20 130940

STUDY OF THE POTENTIAL MOVEMENT OF FERTILIZERS, CENTRAL OKLAHOMA

OBJECTIVE: Study existing and probably future production, marketing, and transportation by barge of fertilizer in an area along the Deep Fork River of Oklahoma. APPROACH: Fertilizer needs and uses for 50 years will be estimated.

PERFORMING AGENCY: Kansas State University, Agricultural Experiment Station

INVESTIGATOR: Schruben, LW
SPONSORING AGENCY: Kansas, State Government of, 0067736 KAN-05-348

STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 67736)

20 136085
STUDY OF RADIOACTIVE MATERIAL TRANSPORT PROBLEMS 1976-2000
The aim of the project is to examine future transportation systems, trends, and problems associated with transport of radioactive and fuel cycle materials to assure a more orderly problem solving approach. Work areas include: (1) characterize the current transportation systems; (2) project future transportation needs and systems; (3) identify and analyze potential future transportation problems; (4) suggest actions to minimize impact of potential problems.

PERFORMING AGENCY: Battelle Memorial Institute/Pacific Northwest Labs, RL 6617B
INVESTIGATOR: Loscutoff, WV (Tel (509) 946-2768) Hall, JH
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract ERDA-AT-(45-1)-1830
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $275,000

ACKNOWLEDGMENT: Energy Research and Development Administration

20 136339
COAL MINING, PROCESSING, AND CONVERSION
Description: The purpose is to improve the efficiency and productivity of coal mining, processing, and transportation and of cokemaking and conversion of coal to liquid and gaseous fuels and other materials. Important considerations are mine safety and environmental factors. Specific objectives are a continuous mining system for underground mines, faster roof-drilling methods, improved longwall and shortwall mining systems, dilution of methane at the mining face, improved formcoke quality, increased recovery of coal from refuse piles, stockpiling and disposal of refuse, reduced ash and sulfur in coal, pipeline transportation of coal, improved coke production, and injection of coal fines into the blast furnace. A significant objective is the development of an integrated process for converting high-sulfur coal to metallurgical-grade coke, chemicals, and liquid and gaseous fuels by a combined carbonization-hydrogenation technique. Addenda: Estimated calendar year funding reported as 1974 $187,000, 1975 $697,000. This project is also supported by: United States Steel Corp.

PERFORMING AGENCY: United States Steel Corporation
INVESTIGATOR: Gross, JH
SPONSORING AGENCY: Energy Research and Development Administration, Office of Coal Research

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BM 367 1)

20 138123
IMPACT OF CHANGING TRANSPORTATION SYSTEMS ON GRAIN AND FARM SUPPLY MARKETING FIRMS
OBJECTIVE: Estimate the quantities of grain that will move through South Dakota country elevators and commercial channels in 1980. Estimate the South Dakota demand for feed grains, processed feed and fertilizer in 1980. Project alternate changes in grain transportation for South Dakota. Determine the economic feasibility of alternative modes of grain movement from producers to shipment destinations. APPROACH: Develop estimates by crop reporting district of the quantites of grain and livestock produced and grain marketed to 1975 and 1980. Formulate similar estimates of the demand for feed and fertilizer to 1975 and 1980. Project changes on grain transportation including railroad abandonment and equipment avaliability. Determine transportation rates of various modes of transportation available to shippers in the crop reporting districts. Develop cost estimates of alternative systems of grain transportation.

PERFORMING AGENCY: South Dakota State University, Agricultural Experiment Station, Dept of Economics
INVESTIGATOR: Payne, WF
SPONSORING AGENCY: Department of Agriculture, South Dakota Cooperative State Research Service, 0065580 SD00694

STATUS: Active NOTICE DATE: May 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 65580 1)

20 138364
EVALUATION OF ALTERNATIVE TRANSPORTATION SYSTEMS AND POLICIES FOR RURAL MISSOURI
Estimate transport requirements to 1985 and 1990. Estimate economic effects of alternative rural transport systems. Assess state and federal roles in setting transport policy and planning and regulating transport systems. Study economic effects of alternate plans and policies on carriers, shippers and rural areas. Present Missouri rural transport system will be described. Demand for services will be measured and projected to 1985 and 1990. Expected changes in the system will be identified. Cost and service levels will be compared under simulated modal combinations and regulatory patterns. Merits of alternative systems and policies will be evaluated. A survey of grain transportation methods, costs and volume of movement has been completed in a 16 county area of Northwest Missouri. Input data is being evaluated in a location---transshipment model as a basis for cost-reducing and energy-conserving decisions in the handling and marketing of grain. Preliminary findings indicate the possiblity of significant cost-savings through adjustment of assembly and storage patterns to permit long-haul transport in larger volume shipments at lower unit cost. Field work has been completed on an inventory of transportation services available to shippers in rural Missouri. In addition to providing a basic description and evaluation of the transport infrastructures and services, the study identifies stress points or impediments within the system, such as inadequate intermodal coordination and problems of equipment supply and allocation. Data has been made available to state angencies for use in transportation policy and systems planning. Results will also be reported for use in private sector decision making. State-wide studies are in the planning stage, making broader application of the methodology and input data developed. These studies will be coordinated to provide the information base needed by state agencies and by transportation and shipper firms for transportation policy and planning decisions.
REFERENCES:
Missouri Rural Transportation in Jeopardy Moser, DE, Missouri University, Extension Division, Vol. 18; No. 8, Aug. 1975
PERFORMING AGENCY: Missouri University, Columbia, Department of Agricultural Economics, MO00040
INVESTIGATOR: Moser, D
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: June 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0068730)

20 138365
TRANSPORTATION MODEL OF THE GRAIN AND FERTILIZER SECTOR OF NORTHWEST OHIO
Describe the present condition of the rural transportation system in selected areas of Ohio. Estimate probably grain and fertilizer, in selected areas of Ohio. Estimate the optimal flow of commodities between production and consumption points through the network. Trace the effects of alternative government transportation policies on the operation of the transportation system. Conduct cost- benefit analyses of alterntive investments in the rural transportation system. Develop a transportation model to evaluate the impact of changes in the transportation system and government policy on the movement of agricultural commodities and future needs of the transport industry. The research to date on this project has focused on identifying the branch rail lines which will be abandoned in the study area and the number and size of grain and fertilizer firms located on the branch lines. The rail abandonment problem has been conceptualized as a transshipment problem

in a transportation network of links and nodes with specified capacity constrants. Data collection will begin in the near future.

REFERENCES:

Rail Transportation Problems in Ohio Larson, DW, Ohio State University, Dept Agri Econ and Rural Soc, No. 577

The World Food Crisis: Implications for Trade and Aid Larson, DW, Ohio State University, Dept Agri Econ and Rural Soc

PERFORMING AGENCY: Ohio State University, Agricultural Economics and Rural Sociology, OHO00534
INVESTIGATOR: Larson, D
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: June 1978

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0067954)

20 138367
NATIONAL TIMBER AND WOOD PRODUCTS REQUIREMENTS

Analyze the present and prospective consumption of timber and wood products in the national economy by components and relate these requirements to the national timber supply situation. Develop and apply sampling systems to measure quantities consumed in construction, manufacturing, shipping and other major end uses. Develop and employ accurate models which monitor shifts in wood raw materials use. Develop and apply techniques for converting wood product consumption estimates into estimates of timber supply requirements.

PERFORMING AGENCY: Forest Products Laboratory, Department of Agriculture, FPL-4202
INVESTIGATOR: Stone, RN
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1975 COMPLETION DATE: Apr. 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0042894)

20 138370
EVALUATION OF PUBLIC TRANSPORTATION POLICIES AFFECTING AGRICULTURE

Assess on a regular basis the economic performance of the general-purpose transportation system for agriculture and the effect on efficiency and equity of proposed adjustments in services and rates. Project short and long-run needs for transport services by agriculture and evaluate resource allocation processes in the privately operated transportation system. Determine capacity, growth, economies of size and other factors about for-hire livestock truckers and trucking. Measure modal and cross-modal elasticities for transport demand by agricultural shippers for basic information for use in policy analyses. Develop weighted aggregative indexes of railroad weights for specific commodity groups food commodities combined and all commodities combined. Use surveys and other appropriate techniques to obtain primary data as required to carry out specified research. A survey of livestock truckers was conducted to determine their tenure, growth, economies of size, rate-cost relationships, and other facts about their competitiveness and efficiency. Analysis of the survey is underway. Surveys of local Federal government employees to determine users of rail services at 100 rural stations in the Midwest-Northeast regions and of users located at 16 Midwest agricultural stations were conducted. Agribusiness firms subject to loss of rail service were found likely to suffer either direct financial loss or reduction of growth potential. Loss of rail service was not expected to have serious impacts on current rural development. An analysis of the impacts of higher fuel prices on the mobility of rural people found a relatively larger cost increase to rural than to urban people. The increased annual cost to the average urban household of a 25 cent per gallon price rise was $175; and to the average rural household, $250. An analysis of actual versus perceived variability of transit time found little difference in variability.

Effects of the Proposed Northeast-Midwest Rail Reorganization on Rural Areas, U.S. Senate, Agriculture and Forestry Comm, Mar. 1975

PERFORMING AGENCY: Kansas State University, Transportation Economics Division, NEA-14-125-53-01-X1
INVESTIGATOR: Casavant, KL
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1974 COMPLETION DATE: Jan. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0041974)

20 138376
IMPACT OF CHANGES IN WORLD FOOD SUPPLY-DEMAND UPON SELECTED AGRICULTURAL MARKETS

Estimate input usage to achieve the projected agricultural production, considering probable price and availability of farm inputs. Determine the adaptability of the existing agricultural input market organization to meet projected changes in agricultural output (and to suggest alternative organization in case input market structure is found to be inadequate). Input usage ranges will be estimated based on technical coefficients from secondary sources: input studies, farm management budgets and LP analyses. Consideration will be given to likely changes in resources mixes. Budgeting or linear programming procedures will be used to determine expected future resource utilization rates. Production projections from secondary sources will be used in estimating total input requirements. A multiple-product (LP) cost evaluation model will be used to measure the effect of price changes on farm input retailing costs. Sensitivity analysis applied to cost coefficients will facilitate the measurements. The effects of factor and product price changes on scale, volume and product diversity economies will be measured by rerunning the LP model using alternative price assumptions. Results of the LP runs will be used to compare optimum-cost structural conditions with actual conditions in order to assess operational efficiency.

PERFORMING AGENCY: Nebraska University, Lincoln, Department of Agricultural Economics, NEB-10-060
INVESTIGATOR: Anderson, DG Lytle, PW
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: June 1976 START DATE: Aug. 1971 COMPLETION DATE: June 1977

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0060266)

20 138381
PREDICTED EFFECTS OF SELECTED POLICY AND TECHNOLOGY CHANGES ON THE GRAIN MARKETING SYSTEM

Evaluation the effects of alternative government policies and technological changes on the market structure in the grain industry. Illinois' contribution to SM-42 will focus on the identification of marketing facilities and flow of grain using secondary sources of data as well as sample survey techniques. Due to availability of data on daily prices of grain at 30 points across the state from the Illinois Market News Service, the explanation of spatial and temporal price differentials in Illinois will serve as a pilot study for the rest of the region. Spatial equilibrium models will be used to determine the least cost structure for the marketing system based on the recorded pattern of flows and prices. Micro and macro optima will be investigated to provide guidance in the adjustment toward the least cost organization of the industry. Analysis of grain flow by origin, destination, and mode of transport is continuing. The data have been used in several public information types of articles and in development of position statements on the effect of changes in water and rail rates. The data indicate that the Illinois River provides over 10 percent of all transportation of Illinois soybeans and the bordering counties are therefore the major source of soybeans moving to the Gulf Ports. Changes in the pattern of movement due to the expansion of unit train rates will be evaluated from comparison of the 1970 data with a supplemental survey of the same sample of elevators interviewed in 1974.

PERFORMING AGENCY: Illinois University, Urbana, Agricultural Economics, ILL-05-0374
INVESTIGATOR: Hill, LD Scott, JT Brooks, BL
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1970 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0006106)

20 138437
APPRAISAL OF THE CAPABILITY OF THE TRANSPORTATION SYSTEM TO MEET NEEDS OF AGRICULTURE AND RURAL AREA

Appraise the effectiveness of the rural transportation system to meet incurred demand for services and the capacity of the transportation system to economically move inputs under a policy of full production. Quantify effects of sharply increased exports on farm product storage and transportation facilities and identify long-run structural problems affecting the capability of the transportation system to serve rural areas. Utilize secondary data sources and interview local, state and Federal officials to obtain an assessment of the capability of the transportation system to meet agriculture's need. Models and other appropriate analytical tools are basic to making systematic appraisal of the data upon which to draw conclusions. An interim report was submitted to the Congress showing that extraordinary demands for grain and soybean transportation in 1973 were met. The hardships and costs of meeting the demands were discussed. Some of the long-run structural problems of the transportation industry were identified and data availability for analysis of the problems assessed. Held a workshop on rural transportation problems and assisted in planning and conducting for Extension Workshops concerning the activities generated by the Regional Rail Reorganization Act of 1973.

Transportation in Rural America: An Interim Report Committee on Agriculture and Forestry, US Senate, 18 pp, Apr. 1975

PERFORMING AGENCY: Economic Research Service, Department of Transportation Economics, ERS NEA
INVESTIGATOR: Hart, RK
SPONSORING AGENCY: Department of Agriculture, NEA-14-126-11-00-X1

ID 12-17-04-5-1030
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1974 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0041972)

21 036356
NATIONAL INTERMODAL NETWORK FEASIBILITY STUDY
Quantify the effect of a National Domestic Intermodal Network on the U.S. economy and the Nation's rail carriers.

PERFORMING AGENCY: Reebie (Robert) and Associates, Incorporated
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: DeBoer, DJ (Tel 202-426-9682)

Contract DOT-FR-20065
STATUS: Completed NOTICE DATE: Feb. 1976 START DATE: June 1973 TOTAL FUNDS: $725,600

ACKNOWLEDGMENT: FRA

21 045142
INSTALLATION OF A RAIL TERMINAL MANAGEMENT SYSTEM (RTMS)
Rail Terminal Management System is a developmental system. This represents the first full-yard RTMS implementation and encompasses the use of automatic car identification scanners, wheel directional sensors, mini-computers and other related equipment at Deramus Yard, Shreveport, Louisiana and will permit a real-time inventory of the terminal to be maintained. As cars enter the yard a switch list preparation is automatically initiated and when trains are dispatched, an accurate consist list is immediately available. The Rail Terminal Management System is expected to be beneficial, both to the railroad in the form of increased efficiency and to the general shipping public in reduced delays and improved service.

PERFORMING AGENCY: Kansas City Southern Railway; Louisiana and Arkansas Railway
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr

Contract DOT-FR-30047
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1973 COMPLETION DATE: Nov. 1977 TOTAL FUNDS: $400,000

ACKNOWLEDGMENT: FRA

21 058027
CHICAGO RAILROAD TERMINAL INFORMATION PROJECT (CRTIS)
Collect data and study elapsed yard times, car cycles and other factors which can increase car utilization and speed car movements within the Chicago terminal area.

PERFORMING AGENCY: Chicago Railroad Terminal Information System, Inc.
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Braddock, C (Tel 426-2920)

Contract FR-20071
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1972 COMPLETION DATE: June 1975 TOTAL FUNDS: $2,317,549

ACKNOWLEDGMENT: TRAIS

21 058252
ANALYSIS OF CLASSIFICATION YARD TECHNOLOGY
This study comprises a survey and assessment of the state-of-the-art in rail freight car classification yard technology. Separate tasks include establishment of a detailed description of the hardware, costs, performance characteristics, and operational practices of existing yards; formulation of general yard-network interaction concepts; collection of detailed background information concerning the yard population in the United States, categorized by type, technology, and function; estimation of the demands likely to be placed upon the nation's network of freight car terminals during the forseeable future, and an assessment and prioritization of those areas of terminal operations which warrant further technological research or development.

PERFORMING AGENCY: Stanford Research Institute
INVESTIGATOR: Petracek, S (Tel 415-326-6200)
SPONSORING AGENCY: Transportation Systems Center; Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Hopkins, J (Tel 617-4942048)

Contract DOT-TSC-968
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $127,781

ACKNOWLEDGMENT: FRA

21 058278
TRUCK/RAIL INTERMODAL OPERATIONS: AN OPTION FOR THE FUTURE?
The study evaluated the effect and impact of an improved rail piggyback operation, using available equipment and facilities, between Portland, Oregon and Los Angeles, California. The study estimates the potential and likely diversion of traffic between modes, the impact of the service on motor carriers, forwarders and shippers and the effect on highway traffic levels and highway needs.
REFERENCES:
Task A (Preliminary) Traffic Divertability May 1974
Task B (Preliminary) Impact on Carriers and Shippers Mar. 1975
In Improved Truck/Rail Operation: Evaluation of a Selected Corridor, Ainsworth, DP; Keale, MJ; Liba, CJ; Levinson, HM, Dec. 1975

PERFORMING AGENCY: Reebie (Robert) and Associates, Incorporated
INVESTIGATOR: Ainsworth, DP (Tel 203-661-8661)
SPONSORING AGENCY: Federal Highway Administration; Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Sonnenberg, AT (Tel (202)426-0570) Keale, MJ (Tel (202)661-8661)

Contract DOT-FH-11-8158 (CPFF)
STATUS: Completed NOTICE DATE: July 1976 START DATE: June 1973 TOTAL FUNDS: $175,420

ACKNOWLEDGMENT: FRA

21 058279
SYSTEMS ENGINEERING FOR INTERMODAL SYSTEMS
The objective of the systems engineering effort in connection with intermodal systems is to define and analyze the great number of variables that affect the design, layout and equipment for use in a rail-highway intermodal system. The areas to be investigated include the functions required of gateway and intermediate terminals (light density as well as heavy density service in each type of terminal), the equipment needed to operate an efficient system such as rolling stock, handling equipment and propulsion and the control processes necessary to optimize utilization of plant.
The contract to a performing organization has not yet been awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Blachfield, JR (Tel (202)426-0808)

STATUS: Active NOTICE DATE: July 1976 START DATE: Feb. 1977 COMPLETION DATE: Feb. 1979

ACKNOWLEDGMENT: FRA

21 058461
INVESTIGATION OF THE AERODYNAMIC DRAG OF CONTAINERS AND TRAILERS ON FLATCARS
Wind tunnel tests have been conducted on one fortieth scale models of trailers on flatcars (TOFC) and containers on flatcars (COFC). Various configuration changes to reduce aerodynamic drag were explored. Experiments on very simplified models were also conducted to obtain a fundamental understanding of the phenomena involved.

PERFORMING AGENCY: Hammitt (Andrew G) Associates
INVESTIGATOR: Hammitt, AG (Tel 213-541-1328)
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, 612-0278-AT
RESPONSIBLE INDIVIDUAL: Barrows, T (Tel 617-494-2451)

Contract DOT-TSC-1002 (FFP)
STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1975 COMPLETION DATE: 1976 TOTAL FUNDS: $24,900

ACKNOWLEDGMENT: TRAIS (612-0278-AT)

21 097348
ST. LOUIS TERMINAL PROJECT
The railroad industry's Labor/Management Committee, which is comprised of the chief executives of railroads and labor organizations, established a number of labor/management programs to work on specific problems areas. The St. Louis Terminal Project is one such activity. A Task Force on Terminals was established by the Labor/Managemnt Committee with the objective of increasing the reliability, speed and efficiency of car movements through a major existing railroad terminal so that the quality and saleability of rail transportation is improved, thereby attracting additional traffic and improving employment opportunities. The improvements are to be made without capital expenditures. This objective is being achieved through a series of experiments involving changes in operating practices, labor agreements, rates, and regulations. Missouri Pacific's St. Louis Terminal division was selected as the laboratory for this experimentation. A Project Team was formed to head up the project. The Project Director and Assoc. Director were recruited from the ranks of management and labor. The St. Louis Terminal Project consists of the following activities: 1) identification of potential changes, 2) implementation of experiments, and 3) method to measure the quantitative impacts of experiments, a computerized car movement evaluation system was developed. This system and the underlying approach can be used by any railroad. This project is unusual in the labor and management are working together to implement significant changes in railroad terminal operations which will hopefully lead to improved service, more and better jobs. The lessons learned from this project should have wide application throughout the industry.

See also RRIS 21A 129731.

PERFORMING AGENCY: Task Force on Rail Transp of the Labor/Mgt Comm
INVESTIGATOR: Dyer, VG (Tel (314) 622-2750) Zamarioni, FJ
SPONSORING AGENCY: Railroad Labor Organizations; Association of American Railroads; Federal Railroad Administration; Missouri Pacific Railroad
RESPONSIBLE INDIVIDUAL: Collins, DW (Tel (216) 228-9400 X-32)

Contract EB-400-0-ARR-849
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Oct. 1973 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: $890,000

ACKNOWLEDGMENT: FRA

21 099387
FREIGHT CAR MANAGEMENT PROGRAM
This program presently involves four phases: (1) Systems Operations including service reliability studies, data interface standards and car cycle sampling; (2) Operating Practices as involved with Car Service rules, per diem rates and car distribution procedures; (3) Information Technology developing Car Assignment Model and Demand Forecast Model; (4) Operating Systems with the Line Operations phase involving Grand Trunk Western and Missouri Pacific and the Yard Operations phase involving the Kansas City Southern at Shreveport, La., and the Chicago Railroad Terminal Information System.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Systems Analysis and Program Development
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Braddock, C (Tel 202-4262920)

STATUS: Active NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

21 099397
FREIGHT CAR UTILIZATION RESEARCH PROGRAM--PHASE I
Since an increase in car utilization would effectively increase the car supply, a research and action program directed at improving utilization has been undertaken. A significant improvement probably can be achieved without revolutionary changes on the part of shippers, railroads and government agencies. A quantitative assessment of the potential for improvement can be made when an adequate data base on car cycles is available. Analysis of these car cycles from load to load would reveal the fraction of time a car spends being loaded, being moved by railroads and being unloaded. Car utilization is expressed in terms of a wide variety of indices. None is wholly satisfactorily for evaluation of all aspects of utilization and none in common use permits analysis of the economic effectiveness of use of the car fleet. A $12 million program, extending through 1980, is projected. The first phase, a two-year program, includes: Analysis of current practices and problems; (2) Development of car utilization measurement standards; (3) Collection of data for a more complete car cycle analysis; (4) Recommendation of projects for FRA consideration; (5) Analysis of the impact of AAR and ICC rules, directives and orders on car utilization; (6) Study of freight car time reliability. Each of these projects is expected to identify specific opportunities for improvement in car utilization.

PERFORMING AGENCY: Association of American Railroads
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute; Federal Railroad Administration; Interstate Commerce Commission; Railroad Labor Organizations; Transportation Association of America
RESPONSIBLE INDIVIDUAL: Leilich, GM (Tel 202-293-5018)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $2,365,000

ACKNOWLEDGMENT: AAR

21 099403
FREIGHT CAR UTILIZATION RESEARCH PROGRAM. PHASE I. TASK 6--RELIABILITY STUDIES
Design and conduct a series of experiments, coordinated with Task 3, which will permit statistically sound evaluations of alternatives to improve rail service reliability and the effects these alternatives have on equipment utilization.

For further information on related studies see also RRIS 099398 Section 26A, 099399 17A, 099400 17A, 099401 17A, 099402 24A.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: Yarbrough, HF (Tel 404-688-0800)
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Leilich, GM (Tel 202-293-5018)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: June 1977

ACKNOWLEDGMENT: AAR

21 107295
UTILIZATION AND IMPROVEMENT OF VEHICLES FOR TRANSPORT OF GRAIN
The objectives are to improve the utilization of present transport equipment for grain and to develop new transport concepts, in order to hold down transport costs and reduce loss and damage to grain in transit. The approach will be to study present equipment, methods, and techniques for the transport and physical distribution of grain, evaluate each phase of distribution on the basis of cost and performance, and develop concepts for changes in equipment and methods with a view toward: better utilization of present equipment; development of improved transport equipment and techniques; faster loading and unloading of vehicles; reducing overall physical distribution time; reducing the number of times the product is handled and transferred; evaluating and testing new ideas. The Progress Report will include: Exploratory work was continued to determine if it might be feasible to increase the utilization of railroad boxcars through heavier loading of cars. Data were obtained on 2,000 box car loads of wheat and corn handled at Chicago, Minneapolis, and Kansas City. That data indicated that boxcars have an average load limit of about 65 tons, and that the average weight of grain loaded into the cars is about 60 tons. Although it would appear that cars could, on the average, be loaded with 5 more tons of grain, it was found not feasible to do so. There are four factors which, in combination, prevent heavier loading. They are: Variation in load limits of cars; variation in grain weight; grain door height (some open space above door must be allowed through which to insert the loading spout); and, some space must be allowed between the top of the load of grain and the car roof so that a man has room to maneuver to insert a grain probe.

PERFORMING AGENCY: Agricultural Research Service, Transportation Facilities Division, 1104-15841-006
INVESTIGATOR: Guilfoy, RF, Jr
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1972 COMPLETION DATE: June 1977

ACKNOWLEDGMENT: Current Research Information System (CRIS 0022877)

21 129729
RAILROAD YARD OPERATIONS COSTING METHODOLOGY
To develop, test, and justify a set of methodologies and procedures to be used for estimating the cost of providing, maintaining, and operating Yards and Terminals and their application to pricing, control, investment and other management purposes.

PERFORMING AGENCY: Haskins and Sells; Seaboard Coast Line Railroad; Whitten (Herbert O) and Associates
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel 202-426-0771)

Contract DOT-FR-65135
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1976 COMPLETION DATE: Dec. 1977 TOTAL FUNDS: $482,299

ACKNOWLEDGMENT: FRA

21 129730
RAILROAD LABOR STUDY-LINE HAUL
Expand experiments at St. Louis terminal to other terminals and conduct line-haul experiments to improve car utilization, employee productivity and capital utilization.

PERFORMING AGENCY: Association of American Railroads
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development
RESPONSIBLE INDIVIDUAL: Collins, DM (Tel 202-426-0771)

Contract DOT-FR-43003
STATUS: Active NOTICE DATE: Feb. 1976 TOTAL FUNDS: $670,000

ACKNOWLEDGMENT: FRA

21 129731
RAILROAD LABOR STUDY-TERMINALS
To identify and test, on an experimental basis, certain changes in railroad terminal operations including changes in labor agreements, where necessary, designed to improve employee productivity, capital utilization and shipper service. To design and utilize effective means of evaluating the effectiveness of said changes.

This is FRA funding toward St. Louis Terminal Project, RRIS 21A 097348.

PERFORMING AGENCY: Association of American Railroads
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development
RESPONSIBLE INDIVIDUAL: Collins, DM (Tel (202) 426-2608)

Contract DOT-FR-4-3003
STATUS: Active NOTICE DATE: July 1976 START DATE: 1974 TOTAL FUNDS: $135,000

ACKNOWLEDGMENT: FRA

21 130499
SOLID WASTE RAIL HAUL AND DISPOSAL SYSTEM
The City of Philadelphia has received an Environmental Protection Agency Grant to design and implement a demonstration rail haul and disposal system of 1,000 tons of refuse. The objective is to demonstrate that municipalities can effectively work together such that solid waste can be transported from a local transfer station to a sanitary landfill at least 100 miles from Philadelphia in an environmentally and economically acceptable manner utilizing a railroad carrier. Phase I of the grant is for a six (6) month period and involves the U.S. Environmental Protection Agency, the State of Pennsylvania Department of Environmental Resources and the City of Philadelphia in finding an environmentally sound strip mine landfill in Pennsylvania at least 100 miles from Philadelphia. During this period, the County in which this land is located would be aided in forming the necessary legal structure to enter into a contract with the City of Philadelphia for receipt of the material and operating the disposal facility. Phase II is for one (1) year and involves design and construction of the facilities to operate the system. The present approach to handling the refuse, is to load containers using the City's truck transfer stations, hauling the containers by tractor trailer to a railroad transfer site where the containers will be loaded on to flatcars. At the disposal site, the containers will be unloaded from the flatcar on to specially designed hauling vehicles. These vehicles will transport the containers to the active face of the landfill and unload them. The empty container will be returned to the rail site and loaded back on to flatcars. The empty train with the containers will be returned to Philadelphia. The total round trip for container through loading, hauling, unloading and return haul would be 3 days, requiring 3 trains in some stage of operation at all times. Phase III is for one (1) year and involves operation and evaluation of the system.

PERFORMING AGENCY: Philadelphia, City of, Pennsylvania, Department of Streets
INVESTIGATOR: Smith, G
SPONSORING AGENCY: Environmental Protection Agency, Office of Research and Development

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1974 COMPLETION DATE: Aug. 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AO 20448)

21 135097
A STUDY OF AERODYNAMIC METHODS TO REDUCE FUEL CONSUMPTION BY PRESENT AND FUTURE TRACTOR-TRAILERS
Transportation Systems Center, DOT, estimates that over one billion gallons annually of diesel fuel can be saved by means of practical aerodynamic modifications to the U.S. intercity truck fleet, consisting of van-type and semi-trailer vehicles. Some 3-1/2% of the total national energy consumption is today absorbed by truck aerodynamic drag. The market for inexpensive drag-reducing devices is well aggregated. Focussing on the special opportunity presented by the tractor-trailer combination, this project has the dual aims of developing, verifying and disseminating information on devices suitable to improve fuel consumption on the existing truck fleet and of generating new design concepts and optimized configurations for tractor-trailers of the future. The work builds on an extensive base of experience earlier accumulated in University of Maryland's wind tunnel, where nearly full-scale conditions can be simulated. Phase I will concentrate on the possibilities for airflow improvement by "aeromodifications" to the tractor shape, the gap, front face, corners and base of the trailer. A preliminary design and testing phase will be followed by verification roads tests (drag by deceleration from speed and direct fuel consumption measurement) and re-test of the final design. Phase II will consist of interactive tests and design studies on more advanced, radical methods for future generations. Continual attention will be devoted to safety, stability, effects of winds, and acceptability under the existing or modified regulatory structure. Dissemination will be accomplished through a carefully selected review board, workshops, and publication in a variety of media specifically adapted to truck operators and manufacturers.

PERFORMING AGENCY: Maryland University, College Park, Department of Mechanical Engineering
INVESTIGATOR: Buckley, FT Walston, WH
SPONSORING AGENCY: National Science Foundation, Office of Systems Integration Analysis, SIA 74-14843

STATUS: Active NOTICE DATE: Sept. 1974 START DATE: Aug. 1974 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: $184,500

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1081)

21 138372
IMPROVING RAILROAD REFRIGERATED TRANSPORTATION OF FRESH MEATS
Improve the efficiency of transporting fresh meats from packinghouses to consignee using railroad refrigerated trailers. Studies designed to evaluate and improve the present handling procedures and equipment performance will be conducted to determine where significant improvements can be made in distribution. Equipment cleaning and pretripping maintenance practices will be thoroughly reviewed to provide information where improvements in the present distribution systems needs to be made, then a series of recommended procedures will be developed. These suggestions, applied to actual meat shipments, will be evaluated by a team of researchers and industry representatives.

Cooperation with APHIS, Association of American Railroads, individual railroad companies, refrigeration equipment companies, and other Government Agencies will be encouraged. The practices and procedures followed by three railroads and three truck cleaning facilities for the preparation of refrigerated meat trailers prior to loading with carcass or boxed meat were reviewed to obtain information on such items as water volume, water temperature, detergents and cleaning agents used, sanitation program followed, and cleaning of meat hooks. Since railroad piggyback meat trailers have a longer turn- around time between loading at packinghouses than do truck meat hauling trailers, they are more difficult to clean. A cleaning and sanitizing program for refrigerated meat trailers is being developed.

PERFORMING AGENCY: Department of Agriculture, Transportation and Packaging Research Laboratory, 1104-15841-011
INVESTIGATOR: Hoke, KE
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: Nov. 1974 COMPLETION DATE: Nov. 1977

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0041945)

21 138525
FREIGHT CAR UTILIZATION PROGRAM-PHASE I
As freight car utilization is a nationwide problem beyond ability of a single railroad to correct, there is a need for cooperative research program between the railroad industry and the Federal Government. This program is addressing six critical research and demonstration needs: analysis of current practices and problems; development of car utilization definitions and measurement standards; car cycle analysis; freight car control projects; impact of AAR and ICC rules, directive; and reliability studies. These studies will define more precisely the problems that are being confronted by the railroads, shippers and FRA in attempting to improve car utilization.
See also 21A 099397.

Manual of Car Utilization Practices and Procedures Final Draft, June 1976

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: Leilich, GM (Tel (202)293-5018)
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Shamberger, RC (Tel (202)426-2920)

Contract DPT-FR-65146
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1976 COMPLETION DATE: May 1977

ACKNOWLEDGMENT: FRA

21 138527
CHICAGO TERMINAL PROJECT
To increase the reliability, speed and efficiency of car movements through a major existing railroad terminal so that the quality and saleability of rail transportation is improved, thereby attracting additional traffic improving employment opportunities. The improvements are to be made without capital expenditures. This objective is being achieved through a series of experiments involving changes in operating practices, labor agreements, rates, and regulations.

Co-sponsors include Railroad Labor Organizations, Association of American Railroads and Chicago Railroad Terminal Information System.

PERFORMING AGENCY: Task Force on Rail Transportation, Missouri Pacific Railroad, Proj No. 5178
INVESTIGATOR: Fleisher, WB
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Collins, DW (Tel (202)426-2608)

TOTAL FUNDS: $682,050

ACKNOWLEDGMENT: FRA

22 052066
FREEZING PROBLEMS DURING RAIL TRANSPORTATION
Field survey to obtain information regarding experimental and analytical studies, field trials, product or equipment evaluation, description of type and severity of freezing problems, current practices and their effectiveness, operating cost estimates and current energy utilization.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, Queen's University
INVESTIGATOR: Colijn, H
SPONSORING AGENCY: Canadian National Railways; Ministry of Transport, Canada; Queen's University, Canada

STATUS: Active NOTICE DATE: July 1976 COMPLETION DATE: Sept. 1976

ACKNOWLEDGMENT: CIGGT

22 058248
DEVELOPMENT OF PERFORMANCE-ORIENTED CONTAINER STANDARDS FOR PACKAGING OF HAZARDOUS MATERIALS--CARBOYS AND BAGS
Performing theoretical analyses, and conducting selective experimentations and laboratory investigations with the objective of developing accurate, reproducible, reasonably concise, performance-based tests and requirements for carboys and bags (and inside containers and linings, where comparable) is the objective of this project. Each performance test is to assess one or more environmental characteristics being simulated.

PERFORMING AGENCY: Naval Ordnance Laboratory
SPONSORING AGENCY: Office of Environment, Safety and Consumer Affairs
RESPONSIBLE INDIVIDUAL: Gigliotti, ME (Tel 202-4262311)

IA DOT-AS-50032
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Jan. 1975 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: $90,000

ACKNOWLEDGMENT: TRAIS

22 058834
INVESTIGATION OF EFFICIENT COMPLEMENTARY TRANSPORTATION AND MARKETING SYSTEMS FOR SOUTH DAKOTA
This effort will: 1. Conduct an integrated study of the current structure and organization of transportation and marketing systems for the three or four major commodity flows in the South Dakota and the Western Plains/Rocky Mountain Region. 2. Investigate alternative distribution systems designed to maximize the net returns from South Dakota's two or three major outbound commodity shipments and to minimize the net costs of the major inbound commodities to South Dakota. 3. Develop recommendations on measures appropriate for implementation of efficient, socially desirable distribution alternatives for South Dakota's major commodity flows.

PERFORMING AGENCY: South Dakota State University
INVESTIGATOR: Rudel, RK
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Canellos, G (Tel 202-4264420)

Contract DOT-OS-50229 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $89,723

ACKNOWLEDGMENT: TRAIS (PUR-50169)

22 080322
THERMAL CONDUCTIVITY MEASUREMENTS OF MOIST BULK MINERAL CONCENTRATES UNDER FREEZING CONDITIONS
An experiment to determine the thermal conductivity characteristics of various moist bulk mineral concentrates under freezing conditions is underway. The parameters determined will be used in the mathematical model of the freezing process now being developed under this program.
REFERENCES:
Thermal Conductivity of Bulk Ore Concentrates Penner, J, Report 76-8, July 1976

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 3.25.74
INVESTIGATOR: Paterson, J
SPONSORING AGENCY: Canadian National Railways; Canadian Pacific; Noranda Research; Queen's University, Canada

STATUS: Completed NOTICE DATE: July 1976 START DATE: May 1973

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

22 080323
DEVELOPMENT OF A MATHEMATICAL MODEL OF FREEZING AND THAWING IN A RAILCAR
This study will develop a 3-dimensional heat transfer model of a railcar containing a moist granular material. Its objective is to permit rapid simulation studies of the movement of specific commodities under various freezing weather conditions to determine the extent and character of the freezing process. It is part of the overall freezing research program. (See Colijn, Paterson) /RTAC/
REFERENCES:
A Numerical Study of Freezing and Thawing of Bulk Materials During Rail Transportation, Oousthuizen, PH; Rush, CK, ASME, 75WA/HT-87, Nov. 1975

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 3.24.73
INVESTIGATOR: Oousthuizen, PH
SPONSORING AGENCY: Canadian National Railways; Noranda Research; Queen's University, Canada; Canadian Pacific

STATUS: Active NOTICE DATE: July 1976 START DATE: May 1974 COMPLETION DATE: Sept. 1976

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

22 083444
PREDICTED EFFECTS OF SELECTED POLICY AND TECHNOLOGY CHANGES ON THE GRAIN MARKETING SYSTEM
In this project, the present grain marketing system will be compared with a simulated least cost system to identify and determine areas of inefficiency in the present grain marketing structure. Alternative government policies and technological developments that affect grain marketing will be selected and will be evaluated by using the spatial equilibrium models to assess the impact of changes on grain marketing system in the South. Progress Report: Arkansas utilization of manufactured feed is estimated to increase from 4.6 million tons in 1970 to 6.2 million tons in 1980. Approximately 900 thousand tons of this increase will be fed in Northwest Arkansas. Southwest Arkansas will need an estimated 428 thousand tons more than in 1970. The other two areas will need an increase of less than 200 thousand tons each. Northeast Arkansas would need 11 new feed mills to process the quantity of feed, if the optimum 78 thousand tons annual capacity plant was built. Southwest Arkansas would need 5 or 6 new mills of this capacity. With the trend toward increase in the percentage of feed being processed in the area of utilization and with 73% of the present feed mills producing less than 10,000 tons annually, the expansion in formula feed production may come from smaller mills. procurement and distribution cash must be considered along with milling costs in determining the optimum size mill.
REFERENCES:
Trends in Livestock Production-Predicted Effects of Selected Policy & Technology Changes on the Grain Marketing System, Morrison, WR, Ohio Agricultural Research and Development Center, SM-42, Regional Res. Rept. #1, Apr. 1973

PERFORMING AGENCY: Arkansas University, Fayetteville, Department of Agricultural Economics and Rural Sociology
INVESTIGATOR: Morrison, WR
SPONSORING AGENCY: Department of Agriculture, ARK00730

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1970 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0057175)

22 083483
SYSTEM ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING
The purposes of this project are to: determine effects of changing farm program on efficiency of Marketing, Utilization and Distribution of Grain and Soybeans and their products; study changes in price relationships as a consequence of differences in location and production resulting from farm programs; ascertain changes in relative utilization of different grains in feeding of livestock and other uses; determine implications of farm programs for shipping patterns and quantities shipped to foreign markets; investigate operations of marketing systems as they affect both vertical and horizontal integration in marketing of grains. Approach: Secondary data will be supplemented by experimental data, farm records, previous studies, and from agencies and individual firms involved in various phases of the grain industry. Projections of production and consumption will be made. Major importing countries and instance of trade restrictions will be evaluated. U.S. price support programs, export subsidies, C.C.C. credit sales and inter-grain price relationships will be examined. Analysis will be made of emerging systems in terms of forces and incentives affecting closer vertical and horizontal interrelations, decision-making, and potential adjustments likely to be faced by firms in different segments of the industry. Progress Report: A study of grain marketing patterns by Indiana farmers was carried forward, and a survey of truck shipments of grain by Indiana country elevators for the 1973-74 marketing year was initiated. A third study dealing with vertical coordination in cooperative grain marketing systems was completed and the results incorporated in a Ph.D. thesis. This study focused on evolving patterns of forward transfer within the cooperative system, with special emphasis on reasons for the loss of grain from the system between local cooperatives and their affiliated regionals. Possibilities for improved performance by regional cooperatives might include consolidation into larger organizations, diversification into processing and exporting grain, and general emphasis on flexibility and innovation in merchandising and procurement.
REFERENCES:
Vertical Coordination in Cooperative Grain Marketing Systems, Schwartz, DR, Purdue University, Unpublished PhD Thesis, 1974

PERFORMING AGENCY: Purdue University, Department of Agricultural Economics, IND01732
INVESTIGATOR: Farris, PL
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: Mar. 1976 START DATE: July 1971 COMPLETION DATE: June 1977

ACKNOWLEDGMENT: Purdue University (CRIS 0060205)

22 083490
SYSTEMS ANALYSIS OF WHEAT QUALITY
The purpose of the project is to discover and apply modern scientific management techniques to the wheat industry sector of the American economy for the twofold purpose of providing an improved basis for government policy decisions and increasing the efficiency of the performance of the individual firm serving agriculture to the end that costs of marketing wheat as a food and feed can be reduced. Specifically, this research is to develop a mathematical model of the wheat supply-marketing-demand complex to indicate the nature and extent of the major economic activities, measure the influence of change within the sector and determine how best to use the computer in practical application of the model as developed. Approach: Build economietric model of wheat industry in order to derive normative solutions with which to compare real world practices. Progress Report: This research analyzes the efficiency of the transfer of wheat and wheat products to the ultimate consumer. Mathematical models for several subsystems are currently in different stages of development. The subsystem to minimize freight costs is operational and has been successfully integrated for actual use to solve real-world problems. One large scale project has been completed in which the impact of a proposed change in the cost of shipping wheat was evaluated. Synthesis of costs for milling of wheat into flour for three sizes of flour mills have been developed to be incorporated into the general marketing systems model.
REFERENCES:
Computerization of Wheat Mixes Niernberger, FF; Phillips, DP, Cereal Science Today, Amer. Assoc. of Cereal Chemists, Vol. 17, p 194, July 1972
Factors in Wheat Purchasing by Flour Mills. Proceedings of Wheat Marketing Field Day for Kansas Wheat Producers, Niernberger, FF, Kansas Agricultural Experiment Station, 1973
Wheat Mix Make-up Procedures Niernberger, FF; Ward, AB, Cereal Science Today, Amer. Assoc. of Cereal Chemists, Vol. 18, pp 125, Aug. 1973
Blending Wheat to Meet Product Specifications Niernberger, FF, Association of Operative Millers Technical Bulletin, pp 3395-3400, Sept. 1973
Trends in Wheat Economics. Proceedings of Wheat Marketing Field Day for Kansas Wheat Producers, Schruben, LW, Kansas Agricultural Experiment Station, 1974
Wheat Market Watchers Guide Schruben, LW, Kansas Agricultural Experiment Station, 1973
The Economics of Wheat to Flour. Proceedings of Wheat Marketing Field Day for Kansas Wheat Producers, Niernberger, FF, Kansas Agricultural Experiment Station, 1974
Evaluation of Wheat Tempering and Blending Models of Hard Winter Wheats Under Experimental Conditions, Posner, E; Ward, AB; Niernberger, FF, Association of Operative Millers Technical Bulletin, pp 3425-3438, Jan. 1974

PERFORMING AGENCY: Kansas State University, Food and Feed Grain Institute, KAN-05-017
INVESTIGATOR: Schruben, LW
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: Mar. 1976 START DATE: Dec. 1967 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Kansas State University (CRIS 0056748)

22 083506
DETERMINE COSTS FOR DIFFERENT SYSTEMS FOR MARKETING POTATOES FROM THE GROWER TO THE RETAIL STORE
Objectives: Develop the least cost system(s) for handling, distribution, storing, processing and packaging potatoes by improving the efficiency for each function in the marketing systems. Approach: Establish the cooperation of growers, packers, processors, wholesalers, retailers and transportation firms to participate in the study. Run test shipments from the producing areas to the retail store level. Make industrual engineering studies, economic analyses and cost evaluation comparisons to determine the optimum system(s) for marketing potatoes. It will be necessary to enlist the aid of Federal and State agriculture extension personnel, land grant colleges, potato associations and the knowledge of other laboratories within the Agricultural Marketing Research Institute. Progress Report: Research was conducted and completed on two systems of harvesting and transporting California potatoes from field to packing shed. The harvesting system employing a truck and trailer combination, had total costs that were 18 percent lower than the system that used only the truck. Preliminary research was conducted on handling Long Island, Maine, and Florida potatoes. Research on packing shed operations in California and Florida is continuing to identify and measure packing costs. Unitized and palletized shipping of potatoes is being investigated.

PERFORMING AGENCY: Agricultural Research Service, Agricultural Marketing Research Institute, 1104-15842-001
INVESTIGATOR: Volz, MD Anthony, JP Bouma, JC
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: May 1973 COMPLETION DATE: May 1978

ACKNOWLEDGMENT: Current Research Information System (CRIS 0040246)

22 083511
IMPROVED SYSTEMS FOR SHIPPING AND HANDLING GROCERIES FROM MANUFACTURER TO WHOLESALE WAREHOUSE
The objective of this project is to measure the cost for less-than-truckload (LTL) shipments of groceries from manufacturer to wholesaler and determine the feasibility of reduced cost with a regional warehouse to store products of several manufacturers and ship full truckloads of grocery products from several manufacturers. Basic information relative to volume of groceries shipped from manufacturer to wholesaler by less than truckload, truckload, and rail car is being obtained. Research advantages and disadvantages of various unitload handling systems from supplier to distribution warehouse and to determine the feasibility of shipping smaller unitloads such as 40 inch by 32 inch. The need for this research is great because the industry pallet exchange program is not working satisfactorily.

PERFORMING AGENCY: Agricultural Research Service, Agricultural Marketing Research Institute, 1104-15864-001
INVESTIGATOR: Bouma, JC
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: Nov. 1973 COMPLETION DATE: Nov. 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0040668)

22 083516
CONTROL OF DAMAGE AND LOSS IN DISTRIBUTION
The objectives of this project are to find characteristics of commodities and items which are damaged in distribution, determine environment factors causing damage, to propose methods of damage reduction, and to develop an economics of distribution loss control. The approach will be as follows: Procure damage histories for specific commodities and items; Analyze package systems used in connection with damage history in the laboratory and in the field; Using established design procedures, redesign packages to reduce loss; Establish total economic advantages in use of redesigned packages including resource use and the ecological impact; Using information assembled in case by case approach, establish generalities relating to damage control; and Develop sub-projects to explore specific problems in the areas of cushion properties, distribution environment, item fragility and system evaluation procedures. Progress Report: Damage boundary technique applied to container survival. Conducting testing audit of the specification properties of corrugated fiber board. Conducting compression and dynamic performance tests for plastic container board. Developing material tests and specifications for this board. Utilized plastic container board as a shipping container for Michigan celery. Report issued.

PERFORMING AGENCY: Michigan State University, East Lansing, Department of Packaging, MICL 03108
INVESTIGATOR: Goff, JW
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: Aug. 1971

ACKNOWLEDGMENT: Current Information Research System (CRIS 0060632)

22 083527
SYSTEMS ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING
The objective of this project is to investigate the operations of marketing systems as they affect the economics of physical distribution and processing of grains. Managerial decision-making by grain marketing firms will also be investigated. A spatial equilibrium model of the grain marketing system will be developed to determine the optimum size, type and number of firms. Parametric programming will be used to simulate various conditions of supply, demand, technology and transportation rates and the effects on the market structure will be traced within the model. The project will examine existing managerial decision-making models for grain marketing firms and adopt or create new models. Operating parameters and external constraints of marketing firms will be analyzed. Data will be obtained from private and public agencies including EDP companies and trade associations. Management Systems-A financial planning system for diversified grain marketing and farm supply firms was developed and tested. The system includes a monthly and an annual budgeting process, a monthly and an annual cash flow analysis based upon budgeted expectations, and instructions for completing and using the budgets and the cash flow analysis. This system is designed to aid the manager and owners in planning and controlling the financial well being of the business. It deals specifically with sales volume, price policy, expense control, credit policy, capital requirements, and repayment ability. Physical systems-A Nebraska grain producers survey has been completed. It measured harvesting methods and on-farm drying and storage capacity. A survey of 30 country elevators was also completed. This survey determined physical capacities and transfer of ownership patterns and will be used as input to a regional analysis.
REFERENCES:
Grain Drying and Storage Systems Lytle, PW; Kniep, MD, Nebraska Quarterly, Vol. XX, No. 3, Sept. 1973

PERFORMING AGENCY: Nebraska University, Lincoln, Department of Agricultural Economics, NEB-10-061
INVESTIGATOR: Turner, M Lytle, PW
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0060246)

22 083543
SYSTEM ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING
The objective is to investigate the operations of marketing systems as they affect: (1) The economics of physical distribution and processing of grains; (2) managerial decision-making by grain marketing firms. A spatial equilibrium model of the grain marketing system will be developed to determine the optimum size, type and number of firms. Parametric programming will be used to simulate various conditions of supply, demand, technology and transportation rates and the effects on the market structure managerial decision-making models for grain marketing firms and adopt or create new models. Operating parameters and external constraints of marketing firms will be analyzed. Data will be obtained from private and public agencies including EDP companies and trade associations. Data on storage capacities of existing grain facilities was compiled and used as a basis for selecting alternative plant sizes to be considered in the model. Areal delinations were made and production and consumption estimates were obtained corresponding to these areas. Direct and published sources were used to obtain truck and rail transportation rates. Selected elevators in each size group were surveyed to obtain operating cost data and information concerning operating revenues and annual storage and handling volumes. Annual expense budgets were developed for each size group to determine operating cost per unit of grain. A spatial equilibrium model of the subject area's grain marketing system is being constructed. The spatial equilibrium model is constructed so that the parameters in the model can be changed to depict alternative conditions of supply, demand and technology and thus permit their effects on the system to be analyzed. The introductory, theory and methodology sections of the research report have been written. /CRIS/

PERFORMING AGENCY: Oklahoma State University, Department of Agricultural Economics, OKL01521
INVESTIGATOR: Oehrtman, RL
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS-0060577)

22 083556
THE FEASIBILITY OF DEVELOPING ADDITIONAL BEEF PROCESSING FACILITIES IN SOUTH DAKOTA
The objective of this research is to determine the feasibility of developing additional beef processing facilities in South Dakota. Associated objectives include: Estimate costs of kill and chill plants; estimate costs of breaking facilities; estimate transportation rates; simulate the coordinated development of beef production with beef processing and transportation systems in South Dakota. The method used will be a systems analysis approach based on a transportation model. Data for the model will be derived by cost feasibility analysis of beef processing plants. Transportation rates will be obtained by regression analysis of rates provided by the railroads, P.U.C. and the trucking industry.

PERFORMING AGENCY: South Dakota State University, Department of Economics
INVESTIGATOR: Rudel, RK
SPONSORING AGENCY: Department of Agriculture, SD00656

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0063916)

22 099623
FUTURE ECONOMIC ADJUSTMENTS IN THE MARKETING OF SELECTED NORTHEAST FRUITS AND VEGETABLES
Determine the economic impact of changes in consumption and buying patterns for apples, potatoes and tomatoes in fresh and/or processed form in the Northeast on: cost, margins, and price making practices at each transfer point in the marketing channels. Producer decisions concerning alternative markets.
Conduct a mail survey to evalutate the usefulness of market information currently available to potato growers. Analyze the nature and extent of the impact of potato market information upon the price making mechanism. Review the basic objectives for and alleged advantages and disadvantages of trading in Maine potato futures, and investigate the alternatives for improving flow patterns of nonregulated trucks for Maine, and the Boston and the New York market areas. Identify shortages in supply (trucks available for loading) and the causes, investigate means of alleviating shortage in supply to specific areas. Analyze capabilities of existing potato storage and marketing facilities, and relate to projected changes in market channels.
Analysis of truck shipment data concerning availability of trucks from origins to destinations, and seasonality of movements of Maine potatoes showed 25,000 to 31,000 truckloads of potatoes per season shipped from Maine in past 4 marketing seasons. About 1/2 of shipments were in March, April, and May each year. About 1/3 of shipments went to New England points and 2/5 to New York, New Jersey, and Penn. Truck shortages reported 45 and 35% of time in past 2 seasons. Truck vs rail freight rates compared. Recent and proposed changes prompt reevaluation. Analysis of Maine tablestock potato shipments describds marketing characteristics for the 1966-1972 Crop years. Deadheading problem for specific carrier was analyzed. A 30% response obtained to mail survey of number and capacity of potato storage facilities. Follow-up questionnaire drifted. Regression analysis indicated information on potato production, wholesale market unloads, and storage stocks of frozen french fries was nearly wholly reflected in Maine cash and futures potato prices. Differences between monthly estimates and the revised annual figures were calculated for both acreage planted and production of potatoes in the Fall states. Performance of the estimates improved over the 1950-1943 study period.

REFERENCES:

An Analysis of the Impact of Market Information Upon Maine Potato Prices, Green, RC, Maine University, Department of Agr. & Resources Economics, Masters Thesis, June 1974

Marketing Characteristics in Shipments of Maine Tablestock Potatoes, Johnston, EF; Pelsue, NH, Jr, Maine University, Maine Experiment Station, Mis. Rpt. No 163, Sept. 1974

POTATOES: Planting and Production Estimates, Research in the Life Sciences, Pelsua, NH, Jr, Maine University, Life Sciences & Agr. Experiment Station, V22 N4, Nov. 1974

PERFORMING AGENCY: Maine University, Department of Agricultural and Resource Economics
INVESTIGATOR: Johnston, EF Pelsue, HN, Jr
SPONSORING AGENCY: Department of Agriculture, ME00293

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1973 . COMPLETION DATE: June 1977

ACKNOWLEDGMENT: Current Research Information System (CRIS 0064637)

22 099624
IMPROVING TRANSPORT AND HANDLING OF CONCENTRATED FORAGE PRODUCTS TO OVERSEAS MARKETS
Develop and evaluate improved methods and equipment for transporting and handling overseas shipments of concentrated forage products.
Evaluate present forms and methods of concentrating forage products, and handling, storing, transporting and using the products. Determine how these steps interface and the effect of such interfacing. Develop improved equipment and techniques or modifications of present technology. Evaluate improvements in commercial shipping experiments to overseas markets. Determine comparative handling and transport efficiencies in terms of physical performance and costs. Recommend best equipment and methods and develop guidelines for their use.
Evaluation of grass seed residue industry current practices indicate: Major manufacturing problem is difficulty in achieving a proper density of 25 lbs. per cu. ft. or less; moisture level below 10 percent; and flat rate charges per container ($200 per 20 foot and $300 per 40 foot van) resulting in high transport cost because of low density of current product shipped. Technical problems such as the drying process for cubes, densification and recompressing of bales have not been solved as yet. Availability of containers--steamship lines will allocate their containers to highest paying cargo--is also a current problem.

PERFORMING AGENCY: Agricultural Research Service, Western Region Oregon-Washington Area
INVESTIGATOR: Fountain, JB
SPONSORING AGENCY: Department of Agriculture, 5805-15880-001

STATUS: Active NOTICE DATE: July 1975 START DATE: Nov. 1973 COMPLETION DATE: Nov. 1978

ACKNOWLEDGMENT: Current Research Information System (CRIS 0040669)

22 099626
SYSTEMS ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING
Determine effects of changing farm programs on efficiency of Marketing, Utilization and Distribution of Grain and Soybeams and their products: Study changes in price relationships as a consequence of differences in location and production resulting from farm programs. Ascertain changes in relative utilization of different grains in feeding of livestock and other uses. Determine implications of farm programs for shipping patterns and quantities shipped to foreign markets.
Secondary data will be supplemented by station experimental data, farm records, previous studies and from agencies and individual firms involved in various phases of the grain industry. Grain marketing system will be approximated by a spatial equilibrium model determining the optimum size, type, and number of firms. Projections of grain production and consumption will be made. Time series data will be analyzed and related to the long and short run demand. U.S. price-support programs, export subsidies, C.C.C. sales and inter-grain price relationships will be analyzed. Programs and policies of importing countries and measurement of incidence of trade restrictions will be evaluated for U.S. exports.
The regional project has concentrated on a survey of country elevators and Wisconsin did not proticipate because a similar survey was conducted in Wisconsin under another project which duplicated the interests of the regional project. The investigator attended the meetings of the Technical Committee of NC-104. The April meeting included a seminar with the Kansas City Board of Trade and the October meeting included a seminar with the staff members of the Continental Grain Company. The investigator will continue to meet with NC-104 technical committee.

PERFORMING AGENCY: Wisconsin University, Madison, Department of Agriculatural Economics
INVESTIGATOR: Peterson, G
SPONSORING AGENCY: Department of Agriculture, WIS01819

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System

22 099629
ORGANIZATION AND MANAGEMENT OF FARM SUPPLY FIRMS
Identify and evaluate the potential impact on firms of changes in structure and operating methods of farm supply industries. Develop and test management practices and procedures for farm supply industry firms.
The existing market structure for Missouri farm supply industries will be determined. Expected changes in industry structure will be identified. The potential impact of structural change on industry firms will be examined. As new products or practices are introduced, their potential impact on the operations of individual firms will be studied. Operations research and simulation techniques will be adopted to the types of managerial problems faced by agribusiness firm managers. Areas of work which will receive

attention include local distribution, inventory control, and management planning.
Computer analysis has been completed on a study of the market structure of fertilizer retailing in Missouri. Basic information on feed enterprises has been assembled for a financial simulation model for farm supply firms. The model will allow evaluation of changing conditions upon elevator operations. The model will assist managers in long range planning. A contributing project designed to evaluate fertilizer inventory policy for farm supply firms has been designed to evaluate fertilizer inventory policy for farm supply firms has been developed. Preliminary data has been gathered. The model to be developed will assist managers in optimizing inventory. A survey of approximately 80 country elevators to determine storage, capacity, handling facilities, transportation facilities and grain receipts by months was completed for a 16 county area in N.W. Missouri. This will be useful as background information on the grain industry as well as input data for a location-transshipment model to be used as a basis for transportation decisions in the area. A survey and analysis of farm to market grain transport, methods and costs has been completed. The analysis will be useful in making cost-reducing and energy-conserving decisions in the handling and marketing of grain. A statement on agricultural transportation needs and problems has been provided to the Missouri Department of Agriculture and the State Transportation Policy Council for use in transportation policy and planning studies at state level.

REFERENCES:

Transportation Change and Missouri's Agribusiness Future Moser, DE, Missouri University, Columbia, Extension Division, Agri-Business Newsletter, Mar. 1974

Transportation Problems and Policy Concerns of Agriculture Moser, DE, Missouri University, Columbia, Extension Division, Agri-Business Newsletter, Nov. 1974

PERFORMING AGENCY: Missouri University, Columbia, Department of Agricultural Economics
INVESTIGATOR: Devino, GT Moser, D
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: Jan. 1972

ACKNOWLEDGMENT: Current Research Information System (CRIS 0061002)

22 099631

PACKAGING, TRANSPORT, AND STORAGE EFFECTS ON CONDITION AND DISTRIBUTION OF FRESH BEEF

Determine the effectiveness and costs of different types of treatments, packaging, handling, and transportation environments on maintenance of quality, shelf-life, and consumer acceptability of fresh beef.
Studies designed to evaluate the effects of three types of refrigerated transport trailers--(1) standard, (2) vacuumized, and (3) controlled atmospher-will be conducted to determine the operation costs and effects on condition for beef quarters and other wholesale beef cuts. Studies on packaging of boxed wholesale and institutional-type beef cuts prepared under different packaging systems and employing different types of films will be conducted to evaluate their effects on condition during storage and transport. Appropriate retail cuts will be prepared from the boxed wholesale beef cuts to study and determine the shelf-life of the retail cuts.

PERFORMING AGENCY: Texas A&M University, Agricultural Experiment Station
INVESTIGATOR: Carpenter, ZL Hoke, K
SPONSORING AGENCY: Department of Agriculture, 1090-15842-010-A

Contract 12-14-1001-407
STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041163)

22 099635

POTENTIAL FOR EXPANDING GRAIN STORAGE IN NEW ENGLAND AND ACHIEVING FREIGHT RATE REDUCTIONS

The problem is high transportation rates on feed grains into New England as compared to the Southeast. Present rates are clearly discriminatory. In the absence of discriminatory rates, minimum transportation costs cannot be achieved without a "reorganization" of the feed industry. Water-rail alternatives will be considered.
Obtain present storage capacity and unloading facilities. Determine number of grain consuming animal units for 80, 85, and 1990. Determine minimum number of days of available feed. Compare costs of storage in Mid-West and New England. Compare transportation of the present with costs after storage capacity is increased.
It has been shown that the corn markets in the mid-west are part of a single-priced market structure and that weekly prices in Cincinnati and Toledo, move together. R sq over 0.95 were obtained when correlating weekly prices in the two markets. Freight rates on corn from country elevators to river crossings on southern movement is 70-80 percent of the rate from country elevators to terminal markets supplying corn to New England. Efforts are currently underway to ascertain the economic feasibility of modernizing and reorganizing the feed storage and milling industries of New England to take advantage of unit train tariff rates established for shipments of raw grain. to data a list of feed mills and grain storage facilities has been compiled which identifies the current structure of industry in New England. These firms have been surveyed to obtain data on their feed grain receiving and storage capacities, milling capacities and retail and wholesale marketing parameters. Progress also has been made in developing economy of scale schedules for feed grain storage centers. Synthesized schedules have been developed showing the various per unit costs attached to changes in the size of elevator storage areas. Also estimates on the investment requirements to expand feed grain storage facilities have been synthexized.

REFERENCES:

Virified Statement Before Interstate Commerce Commission Seaver, SK, Interstate Commerce Commission

PERFORMING AGENCY: Connecticut University, Storrs, Department of Agricultural Economics
INVESTIGATOR: Seaver, SK Farrish, RO Hanekamp, WJ
SPONSORING AGENCY: Department of Agriculture, CONS00452

STATUS: Active NOTICE DATE: May 1976 START DATE: Feb. 1974 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 649071)

22 099636

ECONOMICS OF CONSUMPTION, DISTRIBUTION, AND PRODUCTION OF SECONDARY MANUFACTURED WOOD PRODUCTS

Improve the efficiency of performance of the markets for secondary manufactured wood products in Eastern United States in satisfying the needs of society and using available resources effectively.
The major research will be concerned with the pallet, furniture, and flooring industries. Studies will seek to determine the optimum raw material mix. Industrial trends and consumer preferences will be studied. Wooden pallet standards will be developed. Studies will be made to develop a model for optimizing the flow of pallets to meet the demands for shipment, handling and storage of product. This will include evaluation of a pallet exchange pool. Other studies will be concerned with developing alternatives to the labor intensive nature of the production of many wood products.
A body of fundamental physical and economic relationships has been established from the study of the performance of wooden pallets in pallet exchange programs. For the first time, it is possible to differentiate between different degrees of quality in pallets. Quality standards and specifications have now been written to produce pallets that will reduce the average cost per use 80 percent as compared with normal warehouse pallets. The U.S. Postal Service has adopted these standards and introduced an $8 million palletized mail program. National Pallet Leasing Systems, Inc. in contract with Sears, has also adopted these standards and have instituted a pilot pallet exchange program with their suppliers. As the program is expanded, it will ultimately include about 3000 of Sears suppliers. The nucleus of what could become a National Pallet Exchange program is now in operation.

REFERENCES:

Required Pallet Research: Economic Aspects Opportunities for Virginia's Pallet, Industry, Proceedings, Wallin, WB, VPI & State University, 121, pp 32-38, 73

The Performance of Wooden Pallets in Pallet Exchange Programs, Sardo, WH, Jr; Wallin, WB

Quality Distribution of Pallet Parts From Low-Grade Lumber Large, HR; Frost, RE, USDA Forest Service Research, Paper NE-266, 6pp, illus, 1974

Factors Influercing the Selection of State Office Furniture Anderson, RB, USDA Forest Service Research, Paper NE-266,6 pp, illus., 1973

FActors Affecting the Use of Hardwood Flooring in Urban Rehabilitation, Nevel, RL, Jr, USDA Forest Service Research, Paper NE-273, 7 pp,

illus., 1973
PERFORMING AGENCY: Northeastern Forest Experiment Station
INVESTIGATOR: Martens, DG
SPONSORING AGENCY: Department of Agriculture, NE-4304

STATUS: Active NOTICE DATE: July 1975 START DATE: Aug. 1967 COMPLETION DATE: May 1978

ACKNOWLEDGMENT: Current Research Information System (CRIS 0023183)

22 099637
IMPROVED PACKAGING OF AGRICULTURAL PRODUCTS
Reduce product damage, develop and evaluate new materials or ways of using substitute packaging materials for those in short supply that will reduce the cost of packaging, handling, and transport of perishable agricultural products.
In cooperation with package and container manufacturers develop new containers, packages, or packaging materials such as air cushion bags and plastic corrugated boxes. Test the physical performance of such materials in protecting the packaged product in the laboratory, commercial packing plants, and through distribution systems. Gather data on cost of materials, packing, handling, storage, transport, and distribution and data on the suitability of the new containers, packages, or packaging materials for meeting the requirements of the marketing system and consumers of the product. Compare the cost of using the new packages, containers, or packaging materials and the efficiency with which they can be packed, shipped, and handled on pallets or in some other type of unit load with conventional forms of packaging in current use.
In cooperation with package materials manufactures, new air cushion pads--film bags inflated with air--were developed and tested in the laboratory and under field conditions for immobilizing and cushioning bulk and tray packs of apples. Apples packed in pulpboard and polystyrene shipping trays and overwrapped with shrink film were test shipped by the Yakima, Washington Packaging laboratory and evaluated by the AMRI, TPRL package researchers. Newly developed corrugated high density polyethylene shipping containers were also tested for the shipment of celery and cut flowers. The design of the corrugated polyethylene containers in being modified to provide more ventilation and protection to the product. Analysis of data collected on the evaluation of 3-pound size consumer trays for McIntosh apples was completed.
REFERENCES:
Economic Aspects of Prepackaging Stokes, DR, OECD, Paris France, Doc No. DAA 1066, Mar. 1974

PERFORMING AGENCY: Agricultural Marketing Research Institute, Transportation and Packaging Research Laboratory
INVESTIGATOR: Stokes, DR
SPONSORING AGENCY: Department of Agriculture, 1104-15841-001

STATUS: Active NOTICE DATE: July 1975 START DATE: Oct. 1968 COMPLETION DATE: May 1977

ACKNOWLEDGMENT: Current Research Information System (CRIS 0020042)

22 099638
EVALUATE SYSTEMS FOR HANDLING AND TRANSPORTING FROZEN FOOD FROM PROCESSING PLANT TO WHOLESALER
Determine and evaluate various systems for handling and transporting frozen food from processing plant to wholesaler and to develop methods for improving the efficiency for the total system.
This project will be conducted in cooperation with the American Frozen Food Institute which will assist in establishing industry contacts and evaluating research findings. Project leadership will be provided by the Market Operations Research Laboratory. The objectives will be approached by detailed studies of the layout, methods, equipment, and labor required in processor warehouses on frozen foods from storage through loading of transport vehicles; at public or regional frozen food warehouse on receiving, storing, and loading, and at wholesale warehouse on receiving and storing frozen foods. Evaluations will be be made of various systems for handling and transporting frozen food from the processing plant to wholesale warehouses and if possible, develop systems that will reduce the cost. Labor, equipment, methods and handling costs at the various facilities for different systems will be analyzed and evaluated.
Studies were initiated to determine the most economical systems for handling and transporting frozen foods from processing plant to wholesalers, including direct shipments and through regional and public warehouse. Preliminary studies were made in four processing plants in New Jersey, Maryland, and Virginia to try to determine the magnitude and complexity of frozen food products, handling, and marketing characteristics, and to determine what aspects of the frozen food industry would be studied first. Plans were made to analyze the major marketing systems from processing plant to wholesaler with emphasis on obtaining labor, equipment, and material inputs and costs on the distribution systems studied. Research was completed at two public refrigeration warehouses and at a corporate chain warehouse. Research has been initiated on handling methods and loading costs, both manual and unitized, in four processing plants in Florida.

PERFORMING AGENCY: Agricultural Marketing Research Institute, Market Operations Research Laboratory
INVESTIGATOR: Mongelli, RC
SPONSORING AGENCY: Department of Agriculture, 1104-15864-004

STATUS: Active NOTICE DATE: July 1975 START DATE: May 1974 COMPLETION DATE: May 1979

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041067)

22 099639
SYSTEMS FOR MARKETING BEEF FROM SLAUGHTERHOUSE TO RETAIL FOOD STORE
Determine costs for various systems of marketing beef from slaughterhouse to retail food store and to develop improvements in these systems or develop a composite of two or more systems that would reduce marketing costs.
Leadership will be provided by the Market Operations Research Laboratory. The objective will be met by detailed cost studies of 11 different systems for marketing beef. Cost data will be gathered from 16 firms including slaughterers, packers, central processors, and retail stores. Data gathered will include transportation methods and cost, labor cost and productivity, cutting losses, product shrinkage, description of methods, and other pertinent information. Most information will be based on company records with labor costs verified by time studies. Upon completion of data gathering, an analysis will be made to determine the most efficient system. Following this, field tests will be implemented to verify findings as to the system hat appears to hold the greatest potential for cost reduction.

PERFORMING AGENCY: Agricultural Marketing Research Institute, Market Operations Research Laboratory
INVESTIGATOR: Goulston, CL
SPONSORING AGENCY: Department of Agriculture, 1104-15864-005

STATUS: Active NOTICE DATE: July 1975 START DATE: Aug. 1974 COMPLETION DATE: Aug. 1977

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041735)

22 099640
MAINTAINING AND IMPROVING QUALITY AND MARKET LIFE CALIFORNIA-ARIZONA CITRUS IN FOREIGN MARKETS
Determine the effects of transit temperatures and relative humidities, postharvest fungicidal treatments, and handling, packaging, palletizing and containerization on arrival condition and appearance, quality, and market life of California-Arizona citrus in foreign markets.
Ship citrus fruit, or hold in simulated transit conditions, after treating with individual or combinations of fungicides. Determine fungicide concentrations necessary to control storage decays and fruit spoilage. Determine fungicide residues on or in fruit at time of treatment and upon arrival in Europe or Japan. Develop and improve analytical methods for fungicides now used or expected to be used, as needed. Compare palletized and hand stacked shipments in mechanical and iced rail cars and containers for fruit cool-down rates, uniformity of fruit temperature control, and fruit injury and carton deterioration due to cargo shifting during loading, unloading and

in transit.
Oranges treated with high and low thiabendazole (TBZ) levels were run through a Sunkist Grower's Inc. citrus products pilot plant. TBZ residues were measured on whole fruit, wet pulp, juice, molasses, oil, and dry citrus pulp cattle feed. TBZ stability was determined by analyzing the cattle feed every two weeks for 12 weeks. Data is being used in establishing a U.S. 10 ppm TBZ tolerance on fresh citrus. Industry-USDA cooperative shipping tests showed warm citrus sent to eastern US markets in mechanically refrigerated rail cars was poorly cooled, especially in the "B" end of cars. Hand-stacked chimney-vented loads cooled better than solid, palletized loads. Receivers increasingly prefer palletized shipments. Two tests, a simulated shipping test and an actual shipment, indicate feasability of shipping field-run nontreated oranges in bulk bins via refrigerated ship van containers to foreign countries. Chief advantages appear to be reduction in cost (fruit shipping carton cost is avoided and fruit is cleaned, graded and packed in foreign countries), and avoidance of pesticide and food additive legal restrictions in some countries. A thin-layer chromatographic method is being developed to measure behomyl residues on citrus. The station was moved from Pomona to the UCR campus, Riverside during the year. Research progress was somewhat restricted because of the transfer.

PERFORMING AGENCY: Agricultural Research Service, Market Quality Laboratory
INVESTIGATOR: Hauck, LG Norman, SM
SPONSORING AGENCY: Department of Agriculture, 5210-15880-001

STATUS: Active NOTICE DATE: July 1975 START DATE: Mar. 1974 COMPLETION DATE: Mar. 1979

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041023)

22 099641
MAINTAINING QUALITY IN EXPORTED TEXAS FRUITS AND VEGETABLES
Determine the most effective methods for protecting, fruits and vegetables exported to foreign markets.
Explore packaging and unitization systems as they relate to citrus fruit quality during overseas shipment and movement throughout foreign market channels. Factors including temperature, relative humidity, and atmospheric composition will be monitored during accompaniment of shipments. Stacking patterns will be tested to determine the most effective utilization of the ship's ventilation system. Based on the above relationships, recommendations will be made with respect to minimizing losses and maintaining quality of exported fruits and vegetables.

PERFORMING AGENCY: Agricultural Research Service, Nematology Research Laboratory
INVESTIGATOR: McDonald, RE
SPONSORING AGENCY: Department of Agriculture, 7202-15880-002

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1974 COMPLETION DATE: July 1977

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041394)

22 099642
MARKETING MARGINS AND COST COMPONENTS IN THE OIL CROPS INDUSTRY
Determine price spreads and cost components in producing transporting, storing, and manufacturing oil crops and major products; and relate changes in structure, technology, and practices to changes in prices, margins and costs.
Determine farm-to-retail price spreads from secondary data and develop cost components from special studies and surveys, using economic-engineering data and budget analyses. Develop costs for producing, storing, transporting and manufacturing oil crops and major products with initial attention being given to costs of manufacturing margarine, cooking and salad oil, and crushing soybeans.
Initiated work in cooperation with Virginia Polytechnic Institute and State University to provide cost component data for the manufacture of cooking oil, salad oil, and margarine. Advised the VPI group on a number of industry contracts and furnished them with considerable reference material to avoid duplication of effort. Collection of cost component data for the solvent extraction of soybeans is in progress.

PERFORMING AGENCY: Economic Research Service, Department of Agriculture
INVESTIGATOR: Doty, HO
SPONSORING AGENCY: Department of Agriculture, CE-07-062-11-00

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041588)

22 099643
ORGANIZATION AND EFFICIENCY OF THE PRODUCTION AND MARKETING SECTOR FOR OIL CROPS
Develop a structural schematic for producing, storing, processing, and distributing products in the oil crops industry. Analyze the competitive position of the oil crops industry with competing commodities and with the same commodities from competing countries. Evaluate the impacts of changes in economic, technical, and requlatory factors on the organization and efficiency of the oil crops industry.
Determine the present economic structure of the oil crops industry and quantify the product flow through the various marketing channels as background to the development of the oil crops research program. Evaluate marketing patterns, regional competition, stock management and storage and transportation problems. Develop a spatial-temporal model for soybeans to analyze the impacts on industry organization and efficiency of changes in supply, demand, cost and institutional factors.
Developed and published a model to analyze the spatial-temporal flow of soybeans and corn. The model uses separable programming as the solution algorithm. Prepared an unpublished report "Optimal Solutions Involving Cross- Product Relationships Through Separable Programming". This report outlines the problems associated with including cross-product coefficients in a programming model and shows how they can be overcome.
REFERENCES:
Storage Utilization in a Deficit Region Boutwell, A; Kenyon, E, Southern Journal of Agricultural Economics, V5, N1, pp 233-237, July 1973
Grain Storage in the Deficit South Atlantic Region Kenyon, E; Boutwell, A, VPI and State University, Research Division, Bull N90, 69 pp, May 1974

PERFORMING AGENCY: Economic Research Service, Department of Agriculture
INVESTIGATOR: Boutwell, WA
SPONSORING AGENCY: Department of Agriculture, CE-07-064-11-00

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041590)

22 099648
IMPROVED TRANSPORT EQUIPMENT AND TECHNIQUES FOR OVERSEAS SHIPMENTS OF CITRUS FRUITS AND VEGETABLES
Improve packaging, palletization, and transport to reduce overseas marketing costs of fresh fruits and vegetables.
Develop better shipping containers, palletization methods, transport modes, and handling procedures for exporting fresh fruits and vegetables. Emphasis on developing less expensive cartons for "in register" stacking patterns that can be palletized to permit greater air circulation for product maintenance. Data on carton and product condition, air circulation, product temperatures, atmospheres, trade reaction, cost of materials, packing, palletizing, handling and transport costs will be obtained at the time when experimental shipments are made.

PERFORMING AGENCY: Agricultural Research Service, Market Quality Research Laboratory
INVESTIGATOR: Camp, TH
SPONSORING AGENCY: Department of Agriculture, 7302-15880-001

STATUS: Active NOTICE DATE: July 1975 START DATE: Aug. 1974 COMPLETION DATE: Feb. 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041734)

22 100472
THE ECONOMICS OF PRODUCT ASSEMBLY AND DISTRIBUTION
This project is for the purpose of conducting field trials to prove the practicability of research discoveries. It is attempting to develop a body of economic knowledge concerning the relationships between costs and physical handling of farm products. It will assemble rates charged for transport by truck, rail, barge, air, and pipeline, and relate these to the warehousing and inventory practices of agribusiness firms as these effect marketing costs of farm products and purchased supplies. /SIE/

PERFORMING AGENCY: Kansas State University, Agricultural Experiment Station
INVESTIGATOR: Schruben, LW
SPONSORING AGENCY: Kansas, State of, 0061020 KAN-05-231

STATUS: Active NOTICE DATE: Mar. 1976 START DATE: July 1972

ACKNOWLEDGMENT: Kansas State University, Smithsonian Science Information Exchange (GY 61020 2)

22 111280
FOOD PRESERVATION SYSTEMS
The objective of the project is to improve present systems and develop new systems for the preservation of food including cereal grains, cereal products, oilseeds, fresh vegetables and fruit. The transporting, storing and processing of foods as they move from the farmers' field to the consumers' table is to be considered as a complex interrelated system. The two computer simulation programs already developed to predict temperatures in unaerated and aerated grain bins will be combined. Then this program will be developed to simulate the complete grain preservation beginning with the standing crop in the field and ending with the delivery of the grain at a foreign country. /RTAC/

PERFORMING AGENCY: Manitoba University, Canada
INVESTIGATOR: Muir, WE
SPONSORING AGENCY: National Research Council of Canada

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Sept. 1973 COMPLETION DATE: Oct. 1978

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

22 129704
RAIL COMMODITY SERVICE ANALYSIS
This program focuses on improving the efficiency of transporting principal commodities by rail. Specifically, the potential for large-scale productivity improvements in the physical distribution systems of principal rail-carried commodities is being assessed.
Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Policy and Program Development
RESPONSIBLE INDIVIDUAL: Cantey, W

STATUS: Proposed NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

22 129732
A LONG-TERM STUDY OF TRANSPORTATION AND DISTRIBUTION OF PERISHABLE FOODS
This four-part study will include an examination of the logistics systems alternatives for fruits and vegetables in the states of California, Washington, Texas and Florida. The report will summarize chief characteristics of the perishable food products industry with special emphasis on current production, marketing and distribution problems arising from the industry's structure and transportation requirements. Present and possible alternative food distribution patterns and their costs will be examined. In addition, an assessment will be made of available technology for handling and transporting these commodities. Recommendations for the most cost-effective alternatives for perishable food distribution will be developed.
Subcontractor: Reebie Associates.

PERFORMING AGENCY: Manalytics, Incorporated
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Newkirk, JL (Tel 202-426-0771) Boone, JW

Contract DOT-FR-65024
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 TOTAL FUNDS: $627,000

ACKNOWLEDGMENT: FRA

22 134796
SYSTEM FOR HANDLING AND TRANSPORTATION OF TRANSURANIC CONTAMINATED WASTE
The purpose here is to provide an integrated study and development of a standardized packaging, package container, handling, and transportation system for the safe, timely, and economical relocation of transuranic wastes. The following situations will be considered: (1) interim retrievable storage; (2) pilot permanent repository; (3) permanent repository. The approach to this problem emphasizes coordinating and balancing the requirements of the various elements of the TRU waste chain.

PERFORMING AGENCY: Rockwell International Division, International Atomics, AL 2117A
INVESTIGATOR: Merlini, RJ (Tel (30) 497-2631)
SPONSORING AGENCY: Energy Research and Development Administration
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-3561)

Contract E-(29-2)-3533
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: Sept. 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $105,000

ACKNOWLEDGMENT: Energy Research and Development Administration

22 135001
ALTERNATIVE SYSTEMS FOR TRANSPORTING AGRICULTURAL OUTPUTS TO MARKET AND INPUTS TO PRODUCTION AREAS
OBJECTIVE: Determine the optimal transportation systems and facilities for transporting grain and fertilizer to maximize producer income. APPROACH: Estimate demand for transportation; estimate costs of alternative modes and handling facilities; estimate optimal transportation modes, system and location and types of facilities. PROGRESS: Principal progress to date has been collection of existing cost data for fertilizer handling and initiation of estimates of cost of transporting fertilizer by various modes of transportation.

PERFORMING AGENCY: Iowa State University, Ames, Agricultural Experiment Station
INVESTIGATOR: Baumel, CP
SPONSORING AGENCY: Department of Agriculture, Iowa Cooperative State Research Service, 0065178 IOW02016

STATUS: Active NOTICE DATE: May 1976 START DATE: July 1974 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 65178 1)

22 135610
ECONOMICS AND DESIGN OF ALTERNATIVE TRANSPORTATION SYSTEMS FOR AGRICULTURE AND RURAL AREAS
OBJECTIVE: Analyze the economics and design of alternative transportation systems for agriculture and rural areas; evaluate the consequences of various economic and technological changes on the transportation system used to move production inputs to the farm and farm products from farms to market; develop and analyze alternative financial methods of maintaining rail lines that have been classified as excess by federal regulatory officials but considered essential by state authorities or local interests. APPROACH: Describe the transportation system used to move commodities into and through a selected rural area; develop the methodology and mathematical models necessary to analyze alternative transportation systems; collect, develop, and analyze the necessary transportation costs, commodity supplies and product demands. PROGRESS: The geographical region presently being served by the Canastota-Vernon branch rail line has been selected for analysis. The method of analysis has been specified and data collection has been initiated. A physical distribution audit of one of the major users of the rail line has been scheduled.

PERFORMING AGENCY: Cornell University, Department of Agricultural Economics
INVESTIGATOR: Lifferth, DR (Tel (315) 256-5464)
SPONSORING AGENCY: Department of Agriculture, New York Cooperative State Research Service, 0065824 NYC-121448
RESPONSIBLE INDIVIDUAL: Van Demark, NL

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: July 1974 COMPLETION DATE: Aug. 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 65824), Cornell University

22 136086
A SAFETY AND ECONOMIC STUDY OF SPECIAL TRAINS
The aim of the project is to evaluate the safety and economics of special trains for the shipment of nuclear fuel cycle materials and compare them with those of regular trains. The transportation system and shipments affected will be identified; the economic and logistics aspects of special trains will be evaluated; safety of such trains will be assessed; and the costs and benefits of special trains will be compared to use of regular trains.

PERFORMING AGENCY: Battelle Memorial Institute/Pacific Northwest Labs, RL 6717A
INVESTIGATOR: Loscutoff, WV (Tel (509) 946-2768) Hall, RJ
SPONSORING AGENCY: Energy Research and Development Administration, Environmental Control Technology Division
RESPONSIBLE INDIVIDUAL: Sisler, JA (Tel (301) 973-5361)

Contract ERDA-AT(45-1)-1830
STATUS: Active NOTICE DATE: Nov. 1975 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $90,000

ACKNOWLEDGMENT: Energy Research and Development Administration

22 138363
NEW AND IMPROVED SYSTEMS TO HANDLE PEANUTS AT COMMERCIAL STORAGES
Develop new or improved systems to handle peanuts as they are received, dried, stored, graded, shelled, bagged, and shipped. Presently used systems of handling peanuts will be evaluated for efficiency and cost. Where needed new or improved facility layouts, handling or flow processes, bagging and bulk handling, and sampling methods and equipment will be developed to reduce marketing cost and maintain quality as peanuts move through marketing channels. Field studies made to gather data on labor, methods, and equipment required to containerize and ship shelled peanuts. Bulk containers redesigned or modified to incorporate changes such as closed flute openings and improved sanitation. One type container improved and requires 1.75 minutes to assemble, which is much less than other types. Other studies made to use throw away liners and reuse containers. Other problems such as loading railcars, difficulty in loading space between railcar doors, and container strengths for truck and rail shipments are being studied. A new method of handling bags using portable conveyors from bagging to carrier shows promise of improving present method of bag handling. Experimental unit for automatic bag stacking is almost completed. Analysis of the impact damage data has been completed and a manuscript is being written. Drop height, impact surface, and peanut temperature are significant causes of damage but drop height has most effect.
REFERENCES:
Dimensional Changes in Peanut Pods, Kernels, and Hulls as Moisture is Removed During Curing, Slay, WO, J Amer Peanut Res and Educ Assoc., 1974

PERFORMING AGENCY: Agricultural Research Service, Department of Agriculture, 7704-15700-007
INVESTIGATOR: Slay, WO
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: Nov. 1974 COMPLETION DATE: Nov. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0041935)

22 138366
INCREASING EFFICIENCY IN THE GRAIN HANDLING STORAGE AND SYSTEM SERVING THE SOUTH PLAINS
Develop a detailed description of spatial and temporal grain flows and alternative mode freight rates. Determine least- cost grain distribution patterns and most efficient mode use for described grain flow. Estimate least-cost number, size and location of country elevators and feed mills to serve cattle feeding industry. Develop an interregional competition model of feed grain sector with emphasis on South Plains. Via personal interview and mail questionnaires of grain handlers, transportation companies and truck brokers, existing grain flows and utilized mode freight rates are estimated. These data are entered into a spatial model to resolve least-cost distribution patterns and modes and then are contrasted with actual distribution and utilized modes. Grain elevator, feed mill and transport cost functions and feed grain production data estimated and entered into model to optimize industry organization serving area cattle feeding industry. Spatial analysis of feed grain sector accomplished by estimation of regional demand and supply functions and transport costs which are data inputs for spatial equilibrium model. Operations research procedures necessary for rationalizing a regional grain handling, storage and transportation system are being developed and tested. Several out-of-kilter and implicit enumeration techniques show promise. A main and telephone survey of Texas' grain elevators, feedyards, feedmills, broiler and dairy operations has been completed. The purpose of the survey is to determine structural characteristics of the grain handling industry interstate and interstate grain flows of Texas originated grain, origin of out-of-state produced grain which enters Texas and modes of transportation utilized in alternative grain flows. Analysis of this data will not commence. These data are being used by the Texas grain deaaers association.
REFERENCES:
A Modification of the Modified Stollsteimer Model Fuller, S, Southern Journal of Agricultural Economics, Vol. 7, No. 1, July 1975
Plant Location Involving a Discontinuous Plant Cost Function Fuller, S, Paper presented at Southern Agricultural Econ Assoc, Feb. 1975
Optimizing Subindustry Marketing Organization: A Large Scale Fuller, S, Paper presented at American Agricultural Econ Assoc, Aug. 1975

PERFORMING AGENCY: Texas A&M University, Agricultural Economics Department, TEX-6087
INVESTIGATOR: Fuller, SW
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: Mar. 1975 COMPLETION DATE: Mar. 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0067558)

22 138368
IMPROVED HANDLING AND DISTRIBUTION METHODS FOR DOMESTIC MARKETING OF FRUITS AND VEGETABLES
The objective of this project is to find more efficient and effective ways of handling and distributing perishables from Florida to domestic markets and determine their effects on market quality and consumer preferences. Test and evaluate improved handling methods under simulated and commercial environmental conditions. Develop and test methods for filling, handling, and transporting bulk pallet bins bagged or bulk citrus. Develop and test pallets and/or slipsheets for unitized handling of citrus peppers, and celery from production areas to retail warehouses. Explore possibilities for developing methods whereby railcars can be used more effectively in transporting citrus and winter vegetables from Florida production area.

PERFORMING AGENCY: Department of Agriculture, Horticultural Research Laboratory, 7606-15840-004
INVESTIGATOR: Miller, WR Hatton, TT
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: Nov. 1975 COMPLETION DATE: Nov. 1978

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0042873)

22 138369
COORDINATED MARKETING OF MEAL BY COOPERATIVE SOYBEAN PROCESSING PLANTS
Describe the geographic market for soybean meal produced by the cooperative soybean processing plants in Iowa and Minnesota. Identify excess movement of product. Report on the savings to individual plants and the cooperatives as a group from more coordination in soybean meal marketing. Collect data on soybean meal sales from cooperative soybean processing plants in Minnesota and Iowa. Map the area served by each plant. Develop and/or collect transportation cost information. Estimate the least-cost movement pattern for supplying meal to customers. Examine and compare product flows and transportation costs.

PERFORMING AGENCY: Department of Agriculture, Farmer Cooperative Service, FCS-1-77
INVESTIGATOR: Powe, CE Miner, BD
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: June 1974 COMPLETION DATE: Feb. 1977

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0042781)

22 138375
IMPROVED PACKAGING, HANDLING, AND TRANSPORT OF WESTERN FRUITS AND VEGETABLES
Improve efficiency of packaging palletization, handling, and transport of western fruits and vegetables to reduce marketing costs and maintain product quality. New packages and methods of palletizing or unitizing these packages will be developed for efficient handling, transport, and marketing of fruits and vegetables. Research will determine package strength, will relate design and loading patterns to cooling rates and transit temperatures, and will correlate packaging, handling, and transport systems to maintenance of product quality. Research will include studies on new packaging and handling systems compatible with mechanical produce and with efficient use of transport vehicles. Lettuce: Hand harvested lettuce packed in 2-dozen size cartons had more trim loss (34 percent) than machine harvested lettuce jumble-filled in bin containers (18 percent). A new cartons size has been developed that can be stacked efficiently on 35 x 42 inch pallets and on 48 x 40 inch pallets, and can dimensions of 20-3/4 inches by 11-1/4 inches by 17 inches. Stone Fruits: Nectarines shipped in a jumble-filled 40-pound fiberboard box did not show great differences in fruit quality from those shipped in the currently used placed-packed fiberboard box or jumble-filled 26-pound wood box. The large 40-pound also performed as well as the standard 26-pound box.

PERFORMING AGENCY: Agricultural Research Service, Department of Agriculture, 5202-15840-001
INVESTIGATOR: Hinsch, RT Rij, RE
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1969 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0020846)

22 138377
SYSTEMS ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING
Investigate the operations of marketing systems as they affect: Communications and market information needs and managerial decision-making by grain marketing firms. Will develop a model to be used to anlayze the evaluate and the need and availability of information used in decision-making. Grain firms will be interviewed to identify specific information needs of the grain industry. The catalogue of information obtained will be computerized to aid the analytical process. Will develop decision-making models by adopting the improving existing models or marketing firms will be assembled and evaluated. These data will be assembled and evaluated. These data will be obtained from private and public agencies including EDP companies and trade associations. This project is developing procedures for solving large-scale mathematical models on a regional or national scope. A special transportation-grain flow procedure has been tested with multi-mode transportation areas in Kansas, Nebraska, Colorado, Oklahoma and Texas. Procedures also were developed and tested to evaluate the impact of possible rail abandonment on individual farmers. The procedures performed in an excellent manner.

REFERENCES:
Effects of Railroad Abandonment on Grain Producers and Grain Elevator Supply Areas in North Central Kansas, Mennem, Kansas State Univ, Agric Econ Dept, PhD Thesis, 1974
The Utilization of Railroad Wheat Cars Owensby, Kansas State Univ, Agric Econ Dept, PhD Thesis, 1974

PERFORMING AGENCY: Kansas State University, Agricultural Economics Department, KAN00827
INVESTIGATOR: Schruben, LW
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1971

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0061432)

22 138378
FOOD AND FEED GRAINS SUBSECTOR: AN ANALYSIS OF THE DISTRIBUTION AND STORAGE SYSTEM
Identify historic patterns for storing inventories of specific grains, emphasing year-end stocks. Identify critical economic factors that tend to change location and distribution of storage and year-end stocks. Formulate a model that will simulate the storage system as a part of the grain subsector. Estimate the impact of various market and policy alternatives on the food and feed grains subsector in light of the storage function. U.S.D.A. publications will be searched for data relating to historic storage patterns for grains. Literature will also be searched for economic variables that can be guantified and showed to influence storage patterns. Connect the identify variables in a quantitative system that will simulate the food and feed grains distribution system. Use the model to estimate the impact of changes in policy or the system on related parts of the system.

PERFORMING AGENCY: Georgia Agricultural Experiment Station, Agricultural Economics Department, GEO01185
INVESTIGATOR: Bateman, WL
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1974

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0065175)

22 138379
SYSTEMS ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING
Determine the effects of changing farm programs on the grain marketing, utilization, and distribution system and investigate the impact these changes will have on the operation of the grain marketing system. A two pronged approach will be used whereby one group will study the impact of changes on the institutional structure of the grain marketing systems from the operational side and the other group will investigate the impact from the policy side. Cause and effect relationships will be determined by each group with the utilimate objective of integrating the results of the two approaches. One aspect is concerned with the effects of railroad abandonment in country elevators and farmers in Ohio. A seven county area will selected in northwest Ohio where data on methods of grain shipments, destinations of shipments, elevator storage capacities, and car siding capacity was obtained for all elevators in the seven counties.

PERFORMING AGENCY: Ohio Agriculture Research and Development Center, Agricultural Economics and Rural Sociology Department, OHO00419
INVESTIGATOR: Sharp, JW
SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1976 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information Service (CRIS-006003)

22 138400

REDUCING PHYSICAL AND QUALITY LOSSES OF WHOLE SOYBEANS IN TRANSPORTATION AND HANDLING

The objective is to reduce physical and quality losses, handling and transportation costs for seed, food and processing grade soybeans shipped to domestic and world markets. The type, extent, and causes of physical losses and damage and quality deterioration in the whole beans in the various handling, processing, and transport modes will be identified by shipping and handling surveys and experiments. Alternative handling techniques and improvements in transport and handling equipment and transport and storage environments which may reduce such losses will be identified and developed. This will include single mode and multi-modal transport by truck, railroad, van containers, and barge-ship-barge shipments. These innovations will be evaluated in shipping and handling experiments to develop cost and performance data and appropriate recommendations for improving the handling and transport of the products.

PERFORMING AGENCY: Agricultural Marketing Research Institute, Transportation and Packaging Research Laboratory, ARS 1104
INVESTIGATOR: Nicholas, CJ Bailey, WA
SPONSORING AGENCY: Department of Agriculture, 1104-15881-004

STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1976 COMPLETION DATE: Apr. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0043052)

22 138481

RAIL WHEAT TRANSPORT EFFICIENCY STUDY

To enhance and improve the physical efficiency of the marketing/transportation distribution system for grains in the hard winter wheat belt moving to domestic or export points, recognizing and utilizing the inherent advantages of rail transportation. Physical distribution study of alternative marketing/-transportation systems.

PERFORMING AGENCY: Texas Transportation Institute
INVESTIGATOR: Richards, HA (Tel (713) 749-1579)
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Hardesty, F (Tel (202) 426-9682) Boone, JW

Contract DOT-FR-65104
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1976 COMPLETION DATE: Aug. 1978 TOTAL FUNDS: $630,000

ACKNOWLEDGMENT: FRA

23 048959
CONFERENCE ON THE ADAPTIVE USE OF RAILROAD STATIONS
The objectives of the symposium are: (1) the establishment of guidelines for the adaptive use of railroad stations; (2) determining whether and what additional Federal, state, or municipal legislation or authority would provide incentives to make adaptive use of stations more attractive to the state, the municipality, the private developer and the local or regional transportation or transit authority; and(3) the establishment of a clearinghouse of information on questions relating to the adaptive use of such railroad stations.
The film "STATIONS", 28 minutes, 16 mm, is available on loan from DOT, RM 9422, Tel:(202)426-4298. Film may be purchased from Roger Hagen Associates, 1019 Belmont Place, Seattle, Washington 98102. 28 min Version, $300.00; rent, $40. 63 min version, $600.00; rent $100.
Reusing Railroad Stations Vols. I and II, $4.00 each

PERFORMING AGENCY: National Endowment for the Arts
INVESTIGATOR: Freeland, J
SPONSORING AGENCY: Office of Environment, Safety and Consumer Affairs
RESPONSIBLE INDIVIDUAL: Crecco, RF (Tel (202)426-4298)

IA AS-40066
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1974 TOTAL FUNDS: $2,000

ACKNOWLEDGMENT: Office of Environment, Safety and Consumer Affairs

23 055975
EVALUATION OF URBAN MASS TRANSPORTATION
Objective of this program is to make an evaluation of urban mass transportation based on the 1974 National Transportation Study data, the 1972 National Transportation Report and other data that will be obtained. This shall include a study of revenue mechanisms including taxes on fuels. The information is to be presented to Congress in such a way that they can assimilate it and use it in future deliberation on policy affecting urban public transportation.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company
SPONSORING AGENCY: Office of Policy, Plans and International Affairs
RESPONSIBLE INDIVIDUAL: Weiner, E (Tel 202-4264168)

Contract DOT-OS-40064 (CPFF)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Mar. 1974 TOTAL FUNDS: $260,564

ACKNOWLEDGMENT: TRAIS

23 058345
MANUAL ON CONSUMER MOTIVATION AND PARTICIPATION IN PLANNING AND USE OF TRANSPORTATION SERVICES
1. A search of the behavioral science literature will be conducted for relevant principles that can be applied to transportation needs. Transportation successes and failures will be explored for valuable principles concerning user behavior and motivation. 2. Transportation strategies will be developed, evaluated, and refined according to scientific and social criteria.

PERFORMING AGENCY: George Washington University
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Williams, W

Contract DOT-OS-40083 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Feb. 1974 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: $52,746

ACKNOWLEDGMENT: TRAIS

23 058364
REESTABLISHING RAIL SERVICE IN CONJUNCTION WITH NEW FEEDER SYSTEMS
There is a need in many metropolitan regions, as manifested in northern New Jersey, for a long haul transit and feeder system for a many-to-one and one-to-many distribution. The possibility of utilizing the existing rail right-of-ways, within the framework of federal regulations, to establish a coordinated mass transit system will be determined. Data on population, employment, traffic volume, existing rail right-of-ways and equipment, operating costs, and passenger volume will be collected to formulate and test a demand model with splits for the line-haul system. Alternative feeder systems will be analyzed & a model set up & applied. Institutional and legal restraints will be assessed. Finally, a line-haul network will be conceived that includes the demand model and modal mix, the alternatives and their costs, and the environmental and energy effects, within legal and institutional constraints. The analysis of problems of rededication of underused rail right-of-ways will be conducted with consideration of the Rail Reorganization Act of 1973.

PERFORMING AGENCY: Princeton University, Department of Civil Engineering
INVESTIGATOR: Lion, PM
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Weil, RW

Contract DOT-OS-40095
STATUS: Completed NOTICE DATE: Aug. 1976 START DATE: Mar. 1974 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: $297,095

ACKNOWLEDGMENT: TRAIS (PUR-1-40145)

23 058390
URBAN TRAVEL DEMAND ELASTICITIES STUDY
Specify and estimate a behavioral travel demand model capable of determining the effects of policy instruments related to pricing, service, and the availability of limited resources, such as parking space and fuel on numbers of urban person trips by mode, purpose and zone. The model will be capable of being easily transformed so as to be applicable to aggregated urban data and to determining the effects of the above policy instruments on lengths of urban person trips. The specific modes will include: 1) Auto 2) Transit and taxi. The purposes will include, but not be limited to: 1) Home-work round trips, 2) Other home-based round trips, 3) Non home-based trips.

PERFORMING AGENCY: Charles River Associates, Incorporated
SPONSORING AGENCY: Transportation Systems Center, Department of Transportation, OS-443
RESPONSIBLE INDIVIDUAL: Ward, DE (Tel (617) 494-2512)

Contract TSC-964 (CPFF)
STATUS: Active NOTICE DATE: July 1976 START DATE: Feb. 1975 TOTAL FUNDS: $64,670

ACKNOWLEDGMENT: TRAIS

23 058440
DEVELOP AN AGGREGATE MODEL OF URBANIZED AREA TRAVEL BEHAVIOR
The object of this research is to develop a travel demand model capable of predicting the consequences of alternative transportation actions including investment, operating and pricing changes in the urbanized areas.
REFERENCES:
Travel Prediction with Models of Individual Choice Behavior Koppelman, FS, CTS Rept. #75-7, 322 pp, Sept. 1975
Criteria and Issues in the Evaluation of Models for Aggregate Prediction, Koppelman, FS; Roberts, PO, CTS Rept. #75-9, 16 pp, Sept. 1975
Alternate Aggregate Procedures Koppelman, FS, CTS Rept. #75-10, 58 pp, Sept. 1975
Disaggregate Three-Mode Choice Model for Aggregate Forecast Testing, Koppelman, FS; Watanatada, T, CTS Rept. #75-11, 23 pp, Sept. 1975
Develop Alternative Aggregate Models for Testing Purposes & Select Procedure for Use with Trans, Koppelman, FS, CTS Rept. #75-12, 38 pp, Sept. 1975
Trans Model Requirements Watanatada, T; Roberts, PO; Ben-Akiva, ME, CTS Rept. #75-13, 30 pp, Sept. 1975
Evaluation of Disaggregate Data Sets for Use in Phase II Koppelman, FS; Ben-Akiva, ME, CTS Rept. #75-14, 11 pp, Sept. 1975

PERFORMING AGENCY: Massachusetts Institute of Technology, Center for Transportation Studies, 82487
INVESTIGATOR: Roberts, PO (Tel (617) 253-7123)
SPONSORING AGENCY: Office of Policy, Plans and International Affairs

Contract DOT-OS-50001 (CR)
STATUS: Active NOTICE DATE: Mar. 1976 START DATE: Feb. 1975 COMPLETION DATE: Oct. 1976 TOTAL FUNDS: $99,695

ACKNOWLEDGMENT: TRAIS, Massachusetts Institute of Technology

23 058544
DEVELOPMENT OF A DISAGGREGATE BEHAVIORAL DEMAND MODEL
Special emphasis will be placed on variables which are likely to result in variations in the demand for urban transportation services either in total or among modes, and which are likely to be affected by the response to impending issues, such as air quality strategies, energy shortage, urban congestion or land use policy. Subcases under these broad categories shall include such considerations as auto control strategies (i.e. parking changes, road tolls), variations in fuel costs (including taxations and/or price increases), and improvements in public transportation development. Extension of the model to include carpooling will receive special attention.

PERFORMING AGENCY: Charles River Associates, Incorporated
SPONSORING AGENCY: Office of Policy, Plans and International Affairs

Contract DOT-OS-50161 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: $78,586

ACKNOWLEDGMENT: TRAIS (OS-40202)

23 058624
STUDY OF SUBWAY STATION DESIGN AND CONSTRUCTION
The objective is to develop a set of recommended subway station designs for specific urban conditions in order to provide guidelines for more economical subway station construction. The recommended designs will be based on case studies of experience in underground urban rapid transit systems in the United States and in foreign countries. At the conclusion of the study a workshop will be conducted for transit planners, engineers, contractors and operators with the intent of disseminating the information gathered in this study to the tunneling community.

PERFORMING AGENCY: De Leuw, Cather and Company, Incorporated
SPONSORING AGENCY: Transportation Systems Center, UM-504
RESPONSIBLE INDIVIDUAL: Knoop, P (Tel 617-4942128)

Contract DOT-TSC-1027 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $223,838

ACKNOWLEDGMENT: TRAIS (UM-504)

23 058757
METHODOLOGY FOR THE DESIGN OF URBAN TRANSPORTATION INTERFACE FACILITIES
The purpose of this research is to: 1. develop a set of flexible criteria for the evaluation of alternative station designs, with emphasis on potential implementation constraints and operational efficiency, 2. develop a standard methodology for the design of the layout of urban transportation terminals, 3. apply the methodology developed to a real world situation as a test of the procedures developed, 4. disseminate this methodology to the transit user community for application.

PERFORMING AGENCY: Virginia University, Department of Civil Engineering
INVESTIGATOR: Hoel, LA
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Paulhus, NG (Tel 202-4264208)

Contract DOT-OS-50233 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Aug. 1975 COMPLETION DATE: Nov. 1976 TOTAL FUNDS: $66,241

ACKNOWLEDGMENT: TRAIS, OST

23 058761
STUDY TO IDENTIFY THE PROBLEMS THAT DEAF PEOPLE MAY ENCOUNTER WITH METRO AND DIAL-A-BUS IN METROPOLITAN WASHINGTON
The objectives are: 1. To identify and study the problems that hearing impaired people in the metropolitan Washington, D.C., area encounter or are likely to encounter in attempting to interact with existing Dial-a-Bus transportation services and with subway transportation services when Metro is put into operation. 2. To identify possible alternative solutions to these problems. 3. To project costs of implementing proposed solutions. 4. To identify potential for transferability of findings to other metropolitan transit systems.

PERFORMING AGENCY: Gallaudet College
INVESTIGATOR: Winakur, I
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Laster, I (Tel 202-4264380)

Contract DOT-OS-500110 (CS) TOTAL FUNDS: $72,040

ACKNOWLEDGMENT: TRAIS, OST

23 058815
CONTINUED SUPPORT BY THE BART IMPACT ADVISORY COMMITTEE
The BART Impact Program review effort to be conducted by the Advisory Committee is an extension of the provision of advice and assistance to the Departments during the implementation phase of the program. The Committee shall review and provide consultation in all areas of the program to determine what impacts occur, which are attributable to BART, why they occur, and how this information may best be used by the Bay Area as well as by other metropolitan areas contemplating construction of a rapid transit system.

PERFORMING AGENCY: National Academy of Sciences; Department of Housing and Urban Development
SPONSORING AGENCY: Office of the Secretary of Transportation, Department of Transportation; Department of Housing and Urban Development
RESPONSIBLE INDIVIDUAL: Bouchard, RJ

Contract OS-40022/2
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Oct. 1973 TOTAL FUNDS: $154,190

ACKNOWLEDGMENT: TRAIS

23 058832
PRIMARY SERVICES VERSUS SUPPORT FUNCTIONS IN URBAN TRANSIT
This project will compare and analyze various measures of transportation system productivity and the efficiencies of its various components. The specific objectives are: 1. To analyze and compare the efficiencies of various aspects of public transportation and its total productivity, e.g., passenger miles per employee, revenues per total man hour. 2. To explore in detail the relationships between the quality and quantity of transit service supplied or consumed and the quality and quantity of support functions (organizational structure, maintenance facilities, marketing facilities, etc.).

PERFORMING AGENCY: Pennsylvania University
INVESTIGATOR: Tomazinis, AR
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Gerleman, PD

Contract DOT-OS-50228 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $84,461

ACKNOWLEDGMENT: TRAIS (PUR-50194), OST

23 099391
IMPROVED PASSENGER SERVICE PROGRAM
Provide near and long-term technology to permit maximum effective use of the rail passenger systems. Provide technological data and advice to the Secretary of Transportation for use in his responsibility in connection with Amtrak. Provide support to Amtrak in developing new rail passenger

equipment. Provide direct R&D support to Northeast Corridor Project. Formal coordination with Amtrak is being developed. Components on which R&D efforts are directed: Suspension support and guidance; signal, control and communications; braking/adhesion; energy management; propulsion; creature comforts; improved passenger train.

PERFORMING AGENCY: Federal Railroad Administration, Office of Passenger Systems Research and Development
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Mitchell, MB (Tel 202-426-0966)

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: 1966

ACKNOWLEDGMENT: FRA

23 099416
STUDY OF TRANSIT FARE POLICIES AND IMPLICATIONS
This project will develop information on transit fares and fare structures that can (1) identify promising techniques for increasing ridership, (2) assess effects of fare policies on operations, (3) instruct public policy regarding transit pricing, and (4) guide management decision-making by transit properties with regard to fare policies. Attention will be given to existing pricing policies in urban transit, alternative fare structures and packaging techniques, (including the extent of no-fare transit operations), the potential for fare modification as a marketing tool, the effects of alternative fare and service packages on transit ridership and revenue (i.e., the price elasticity of transit demand), the institutional constraints affecting fare and service change, the implications for public policy, and the need for further research. In addition to a final report covering all data, analysis, methodology, findings and recommendations, a Transit Pricing Manual will be prepared for transit operators and other interested public agencies responsibile for transit operations.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company
SPONSORING AGENCY: Urban Mass Transportation Administration

Contract IT-06-0095
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Sept. 1974 COMPLETION DATE: June 1976 TOTAL FUNDS: $120,000

ACKNOWLEDGMENT: UMTA

23 099421
ENVIRONMENTAL CONTROL IN UNDERGROUND RAPID TRANSIT SYSTEMS
This project was developed to fill a gap in subway environmental design. Since the first subway systems were built, "guesstimation" has been the principal ingredient of subway environmental criteria, analysis and control. Ventilation and station air conditioning represent 8 to 10 percent of the total cost of underground construction. Not only is there uncertainty in the size, configuration and spacing of vent shafts, but there are also many unknowns about the interaction between vent shafts and other elements of the total underground environmental system such as air flow, heat dissipation, and requirements for station air conditioning. This project has produced a Subway Environmental Simulation (SES) computer program which has been partially validated by full scale tests. An engineering handbook in two volumes has been produced. Volume I is entitled Subway Environmental Design Handbook: Principles and Applications. Volume II is a users' and a programmers' manual for the SES computer program. The fourth phase of the project, approved in June 1974, completes validation of the SES program, tests a new concept of removing heat from the stations and revises and updates Volume I of the Handbook.
A total of 42 technical reports have been issued, starting in May 1971. All are available from the National Technical Information Service.

PERFORMING AGENCY: Transit Development Corporation, Incorporated
SPONSORING AGENCY: Urban Mass Transportation Administration

Contract DC-06-0010
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1970 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: $4,023,064

ACKNOWLEDGMENT: UMTA

23 115953
APPLICATIONS OF MATHEMATICS TO TRANSPORTATION STUDIES
This is a continuation of research previously supported under GP 24617. G. Newell will continue his work on the application of mathematics to transportation system analysis. Specific topics include: 1. Optimization in public transportation systems (route location, station spacing, zoning, scheduling, and control). 2. Transportation planning (continuum approximations on networks, queueing in networks, optimal scheduling and location of facilities). 3. Queueing theory and stochastic properties of traffic.

PERFORMING AGENCY: California University, Berkeley, School of Engineering
INVESTIGATOR: Newell, GF
SPONSORING AGENCY: National Science Foundation, Division of Mathematics and Physical Science, MPS72-05068 A02

STATUS: Completed NOTICE DATE: July 1976 START DATE: Aug. 1974 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: $25,000

ACKNOWLEDGMENT: Science Information Exchange (GSP 5015 6)

23 129702
PASSENGER SERVICE ANALYSIS
This program involves a study to determine criteria for establishment of rail-bus through rates and routes in specific areas. Such integration will provide service to areas lacking passenger rail facilities. The program provides input into the proper role of rail in overall passenger transportation policy.
Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Policy and Program Development
RESPONSIBLE INDIVIDUAL: Cantey, W

STATUS: Proposed NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

23 129706
JOINT NASA/DOT INTERCITY TRANSPORTATION TECHNOLOGY ASSESSMENT STUDY
The study will assess the technical, economic, environmental, and socio-political issues associated with intercity transportation system options, and will determine research and technology (R&T) directions that appear most promising. Emphasis will be on domestic passenger transportation, although freight and international transportation will be considered. In the early months of the 13-month study, the study team members will be conducting a broad scale evaluation of intercity transportation system options to the year 2000, with a further look to 2025. This evaluation will be carried out within the framework of a number of scenarios describing the future state of the nation. Roughly 40 nationally recognized "Study Participants" will be asked to take part in the project, representing a variety of interests, including technology, transportation policy, economics, consumer interests, environment and resource consumption, operators and unions, and governmental institutions.
Technology Assessment of Future Intercity Passenger Transportation, 7 Volumes

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company; California University, Berkeley; Stanford University; Gellman Research Associates, Incorporated; Department of Transportation
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Bartholow, B

STATUS: Completed NOTICE DATE: July 1976 COMPLETION DATE: Mar. 1976

ACKNOWLEDGMENT: FRA

23 135232
DEVELOPMENT AND EVALUATION OF METHODS FOR THE FORECASTING OF DEMAND FOR NON-MANDATORY PUBLIC SERVICES
The objective of this research project is to provide urban transportation planners with the information necessary to select, use, and evaluate policy-oriented "causal" behavioral models for forecasting urban travel

demand. Specific applications are the "fine tuning" of existing public transit operation and estimation of demand for new transportation modes. The study will use the introduction of rapid transit service in the San Francisco Bay Area (BART). A "before-BART" household survey will be used to provide base-line data for calibration of a variety of alternative behavioral models. These models will then be used to forecast "after BART" transportation demand. The forecasting models will be validated by comparison with actual "after-Bart" behavior determined in a reinterview of the household survey, and by comparison of policy conclusions from the forecasting models with actual experience. The results of the study will be reported in a handbook for travel demand forecasting.

PERFORMING AGENCY: California University, Berkeley, Institute of Transportation Studies
INVESTIGATOR: McFadden, D
SPONSORING AGENCY: National Science Foundation, Division of Environmental Systems and Resources, GI-43740

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1974 COMPLETION DATE: Nov. 1975 TOTAL FUNDS: $422,000

ACKNOWLEDGMENT: Science Information Exchange (GSQ 986)

23 135422
COMMUTING PATTERNS IN U. S. METROPOLITAN AREAS
The prominence of the automobile has caused central city-bound commuting patterns to be increasingly replaced by lateral movements with many suburban residents traveling to suburban work-places. Our proposed research focuses on the nature and implications of contemporary commuting patterns, both lateral (origin and destination within the ring) and centripetal/ centrifugal (ring to central city) in metropolitan areas of the conterminous U.S. Previous research suggests the thesis that these patterns can be best understood within the context of their relationship to population distribution, decentralization of employment, and transportation technology. The objectives of the study are threefold: (1) To identify the nature and extent of lateral as compared to centripetal/centrifugal commuting in U.S. metropolitan areas; (2) To develop a theoretical rationale for observed commuting patterns in terms of metropolitan population and employment distribution, and transportation usage; (3) To examine the implications of lateral commuting patterns and their determinants for future growth and spatial organization of smaller, developing metropolitan areas. The research will be carried out in three phases, using 1970 Census data on metropolitan characteristics and the journey-to-work, as well as data from the 1967 Census of Manufactures. First, lateral commuting rates will be calculated for each U.S. metropolitan area. Then, using these rates as a basis for comparision of areas, an initial analysis will be undertaken by population size, age, Census region, economic function, and proximity to other metropolitan areas. In the second phase, we will attempt to explain the variation in commuting rates with demographic, socioeconomic, and industrial characteristics in a multiple regression analysis. Finally, we will examine the commuting streams in U.S. metropolitan areas in respect to mode of transportation used and the characteristics of commuters.

PERFORMING AGENCY: Michigan State University, East Lansing, School of Social Science, Department of Sociology
INVESTIGATOR: Zuiches, JJ Fulton, PN
SPONSORING AGENCY: Public Health Service, Department of Health, Education and Welfare, HD 08947-01; National Institute of Community Hlth & Human Devlp, Department of Health, Education and Welfare

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Sept. 1974 TOTAL FUNDS: $13,001

ACKNOWLEDGMENT: Science Information Exchange (1HD 8947 1)

23 136343
TECHNOLOGY ASSESSMENT OF INTERCITY TRANSPORTATION SYSTEMS
The objectives of this RTOP are to enhance NASA's contribution to our nation's ability to provide adequately for its future transportation needs, including model systems and their energy requirements; and to determine the possible impacts on the timeframe and goals of aviation and air transportation R&T of the more promising future intercity transportation systems and corresponding urban structures. The approach will be based on extending the NASA/DOT joint agency Technology Assessment of Intercity Transportation Systems into Phase 2 activities. Phase 2 shall include the selection of initiation of follow-on studies of critical issues, constraints, barriers (identified in the Phase 1 technology assessment) which require further definition toward future objectives of the NASA aeronautics program. The follow-on activities emanating from Phase 1 which are of mutual interest to both NASA and DOT will be jointly funded by the two agencies, and those tasks of sole interest to each agency will be independently funded.

PERFORMING AGENCY: National Aeronautics and Space Administration, Ames Research Center
INVESTIGATOR: Hornby, H
SPONSORING AGENCY: National Aeronautics and Space Administration, Aeronautics and Space Technology Office, 791-40 7670169

STATUS: Active NOTICE DATE: Mar. 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZH 40922 2)

23 138473
PASSENGER RAIL SERVICE AND THE HIERARCHY OF COMMUNICATIONS EFFECTS
The general research objective is to appraise the effects of a change in rail passenger service and its attendant promotion upon the awareness, attitudes, and intentions of certain rail users in the Kingston market.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport
INVESTIGATOR: Turner, RE
SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1976 COMPLETION DATE: Dec. 1976

ACKNOWLEDGMENT: CIGGT

23 138530
LIGHT RAIL PROGRAM
Development improved LRT elements such as aesthetic catenary design, joint use of associated structures, power collection and self-propelled LRT vehicles. Develop vehicle device for getting elderly and handicapped persons on and off.
Contract not yet awarded.

SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Silien, JS (Tel (202)426-0090)

STATUS: Proposed NOTICE DATE: July 1976

ACKNOWLEDGMENT: UMTA

23 138540
LIGHT RAIL TRANSIT SYSTEMS DEPLOYMENT
Although some Light Rail Transit Systems exist as a result of Street Railway modernization, there has been no urban deployment of new LRT systems in the U.S. Because of lack of current knowledge about such systems, there has been a great hesitancy for the public transit sector to consider LRT as a practical transit alternative. The objective of this program is to demonstrate the practicability of constructing, operating and maintaining a low-cost, reliable and safe LRT system. A site for demonstration in an urban area not associated with street railway operation will be chosen.
Contract not yet awarded.

SPONSORING AGENCY: Urban Mass Transportation Administration, Department of Transportation

STATUS: Proposed NOTICE DATE: July 1976

ACKNOWLEDGMENT: UMTA

23 138794
A STUDY OF EXISTING RIGHTS OF WAY FOR INTERMEDIATE CAPACITY TRANSIT APPLICATION IN CANADIAN CITIES
The extreme cost and community disruption associated with acquiring rights of way for new urban transportation systems, coupled with the increasing need to separate surface transit from the general traffic stream, has produced increased interest in making more efficient utilization of existing surface

transportation rights of way, particularly the urban rail systems. This study examines the correspondence of existing rail lines in Canada's largest cities with major desire lines of travel and estimates for intermediate capacity transit systems operating along these lines in 1985.

PERFORMING AGENCY: De Leuw Cather Canada Limited
INVESTIGATOR: McCorquodale, D (Tel (613) 733-4160)
SPONSORING AGENCY: Transportation Development Agency; Canadian Transport Commission; Ministry of State for Urban Affairs
RESPONSIBLE INDIVIDUAL: McCoombs, LA (Tel (514) 283-3210)

STATUS: Active NOTICE DATE: July 1976 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $100,000

ACKNOWLEDGMENT: Transportation Development Agency

23 138795
AN EVALUATION OF URBAN RAIL FACILITIES
The extreme cost and community disruption associated with acquiring rights of way for new urban transportation systems, coupled with the increasing need to separate surface transit from the general traffic stream, has produced increased interest in making more efficient utilization of existing surface transportation rights of way, particularly the urban rail systems. This study examines the urban rail lines in Canada's 12 largest cities, excluding Toronto, in terms of their physical characteristics (rights of way, obstacles, geometrics, etc.) and operational characteristics (train movements, level crossings, signal systems, etc.) as these might affect the use of these rights of way for public transit use.

PERFORMING AGENCY: Canadian Pacific Consulting Services Limited
INVESTIGATOR: Stavrou, G (Tel (303) 861-6811)
SPONSORING AGENCY: Transportation Development Agency
RESPONSIBLE INDIVIDUAL: McCoombs, LA (Tel (514) 283-3210)

STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $150,000

ACKNOWLEDGMENT: Transportation Development Agency

24 058509
STUDY OF UNIONS, MANAGEMENT RIGHTS, AND THE PUBLIC INTEREST IN MASS TRANSIT
This research proposes to determine the extent of collective bargaining, its effect, the variables relating to public interest that are common to most negotiations, and the adequacy of transit management to effect stable, reliable, efficient, and economical transit service. Through a better understanding of union-management relations, the research will assist the transit management in reaching settlements without interruptions of service and provide economically realistic settlements for management and the public.

PERFORMING AGENCY: University of North Florida
INVESTIGATOR: Smith, JA
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Forrester, MW (Tel 202-4262888)

Contract DOT-OS-50116 (CS)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: $59,847

ACKNOWLEDGMENT: TRAIS (PUR-50046), OST

24 099402
FREIGHT CAR UTILIZATION RESEARCH PROGRAM. PHASE I. TASK 5--IMPACT OF AAR AND ICC RULES, DIRECTIVES AND ORDERS ON CAR UTILIZATION
Continue the evaluation of activity currently supporting the Clearinghouse experiment. This evaluation will include utilization comparisons of Railbox with comparable railroad-owned car groups. Assist in revising the Clearinghouse ground rules to improve the efficiency of the Clearinghouse alternative to Car Service Rules 1 and 2. Attempt to set up demonstrations to evaluate alternatives to industry rules and practices in the areas of per diem, demurrage and car service rules and orders.

For further information on related studies see also RRIS 099398 Section 26A, 099399 17A, 099400 17A, 099401 17A, 099403 21A.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: Metz, HW (Tel 312-435-7327)
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Leilich, GM (Tel 202-293-5018)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: AAR

24 129703
FREIGHT CAR MANAGEMENT SYSTEMS ANALYSIS
These analyses are designed to solve problems using short- term, coventional strategies. The program provides for analysis of railroad operations management, problem definition, and research into short-run policy alternatives and strategies for improvement that can be implemented using existing management capabilities.

Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Policy and Program Development
RESPONSIBLE INDIVIDUAL: Cantey, W

STATUS: Proposed NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

24 129733
EMPLOYEE-MANAGER COMMUNICATIONS IMPROVEMENT
Improve the communication between employees and management. Sponsor conferences which bring both parties together to discuss selected items such as alcoholism, safety, uniform rule books, etc. through a survey of methods adopted in other industries and by employee questionnaires, prepare documentation on practical methods, etc., railroad industry can adopt to improve communications between employees and management.

This project is performed by various academic institutes.

Proceedings 1975--Conf on the Detection, Prevention and Rehab of the Problem Drinking Employee in the RR Industry, Cornell University, Jan. 1976, PB-248906

SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development
RESPONSIBLE INDIVIDUAL: Collins, DM (Tel (202)426-2608)

STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1975 COMPLETION DATE: 1976

ACKNOWLEDGMENT: FRA

24 129734
STRIKE IMPACT MODEL ANALYSIS
To evaluate the ramifications of a strike by workers against a railroad or related industry and to further develop and refine a model used to analyze the impact on railroads of a strike action against companies or industries on which the railroads are heavily dependent for revenue.

PERFORMING AGENCY: Gellman Research Associates, Incorporated
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development
RESPONSIBLE INDIVIDUAL: Vass, T (Tel (202)426-2608)

Contract DOT-FR-65090
STATUS: Active NOTICE DATE: July 1976 TOTAL FUNDS: $113,510

ACKNOWLEDGMENT: FRA

24 136340
THE JAPANESE NATIONAL RAILWAY CORPORATION-THE ECONOMICS OF A PUBLIC CORPORATION IN ADVERSITY
No Abstract.

PERFORMING AGENCY: Yale University, Graduate School
INVESTIGATOR: Lincoln, EJ
SPONSORING AGENCY: Department of Health, Education and Welfare, Office of Education, G007502245; Social Science Research Council

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: July 1974 TOTAL FUNDS: $15,680

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GV 7720)

24 138479
ANALYSIS OF THE ACQUISITION OF A BANKRUPT RAILROAD BY A SOLVENT RAILROAD
Analyze the impact of the acquisition of a marginal railroad by a connecting solvent to determine the impact of the transfer upon the service and economic elements in the post acquisition period.

Sponsored by the Office of Rail Economics and Policy Development of FRA.

PERFORMING AGENCY: Gellman Research Associates, Incorporated
INVESTIGATOR: Strock, J (Tel (215) 884-7500)
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Anderson, EW

Contract DOT-FR-65149
STATUS: Active NOTICE DATE: July 1976 START DATE: Oct. 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $10,000

ACKNOWLEDGMENT: FRA

24 138503
CLASSIFICATION AND DESIGNATION OF RAIL LINES
On August 3, 1976, the Railroad Revitalization and Regulatory Reform Act of 1976 required the Secretary of Transportation to develop and publish: 1. The preliminary standards for classification of main and branchlines according to the degree to which they are essential to the rail transportation system. 2. The preliminary designations with respect to each main and branchline in accordance with the classification standards.

PERFORMING AGENCY: Federal Railroad Administration, Department of Transportation
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Newkirk, JL (Tel (202) 426-0771)

STATUS: Active NOTICE DATE: July 1976 START DATE: Feb. 1976 COMPLETION DATE: Aug. 1976

25 058082
IOWA STATE RAIL TRANSPORTATION STUDY
Tasks include: (1) The state shall be geographically subdivided into several zones, to allow for the collection and analysis of data. (2) Describe and document, for each zone, excluding the SMSA within a zone, the transportation and logisitics system for major commodities in effect. (3) Using available data prepare a forecast of state economic activity for the five largest commodities currently moved by rail in Iowa. Estimate the effect on shipments into and out of each zone by mode, based upon the data collected from participating carriers and such surveys as may be required. (4) Develop, analyze, and evaluate a series of rail based transportation systems and storage and/or processing alternatives for the major products for each zone.

PERFORMING AGENCY: Iowa Department of Transportation
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation

Contract FR-55045 (CR)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Oct. 1974 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: $281,974

ACKNOWLEDGMENT: TRAIS

25 058293
TRANSPORTATION INVESTMENT REQUIREMENTS AND GROWTH PATTERNS IN MICHIGAN
Since the State government of Michigan is formulating land use policies, an evaluation of the differential transportation costs associated with each of the growth patterns would show the way to effect savings to produce a balance in the Michigan transportation budget. Specifically, a model for use in Statewide planning will be produced. It will simulate the relationships between population growth and interzonal transportation costs for the state, and in addition, the social and environmental impacts will be evaluated. The technique developed for the State of Michigan will be useful for the development of transportation planning for other states.

PERFORMING AGENCY: Michigan State University, East Lansing, Department of Civil Engineering
INVESTIGATOR: Taylor, WC (Tel (517) 353-7224) McKelvey, FX
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Williams, W

Contract DOT-OS-50044 (CS)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Jan. 1975 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: $90,000

ACKNOWLEDGMENT: TRAIS, Michigan State University, East Lansing

25 058351
ANALYSIS OF A STATE-WIDE INTEGRATED TRANSPORTATION SYSTEM
Tasks include: 1) Analysis of current status and changing character of transportation modes in Mississippi. 2) Analysis of population characteristics and availability of population to transportation modes. 3) Examine the relationship between the transportation system and views of users and nonusers. 4) Analyze the flow of commodities within and through the state. 5) Analyze present transportation planning processes and develop procedures for implementing new planning processes.

PERFORMING AGENCY: University of Southern Mississippi; Mississippi Research and Development Center; Jackson State University; Mississippi State University; Mississippi University
INVESTIGATOR: Peterson, JR Mississippi Research and Development Center Benjamin, R Jackson State University Smith, R Jackson State University DeLeeuw, SL Mississippi University Hearn, H Mississippi University McArthur, RE Mississippi University Crosslin, RL Mississippi State University Rush, JW Mississippi State University Peden, GT, Jr Mississippi State University Gladden, JW, Jr University of Southern Mississippi McKee, JO University of Southern Mississippi Mealor, WT, Jr University of Southern Mississippi
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: MacRae, NK (Tel (202) 426-9561)

Contract DOT-OS-40089
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1974 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $195,000

ACKNOWLEDGMENT: TRAIS, Mississippi University

25 058490
TRANSPORTATION ENERGY CONSUMPTION AND URBAN FORM RELATIONSHIP
Specific objectives are: a. Develop an analytical tool capable of assessing the relationship between urban land form and energy consumed to satisfy travel requirements. b. Establish the validity of the analytical tool. c. Utilizing the analytical tool, examine the relationship between urban land form and energy consumption for a number of abstracted existing land use patterns as well as a number of proposed or hypothetical land use patterns. d. Identify the policy options that may be realistically implemented to affect land use and the transportation system. e. Explore the impacts of implementing the different policy options and identify their effect on energy consumption.

PERFORMING AGENCY: Northwestern University, Evanston
INVESTIGATOR: Schofer, JL
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Swerdloff, CN (Tel (202)426-4163)

Contract DOT-OS-50118 (CS)
STATUS: Active NOTICE DATE: July 1976 START DATE: June 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $89,800

ACKNOWLEDGMENT: TRAIS (PUR-50032), OST

25 058507
DEVELOPING LOCAL STRATEGIES AS ALTERNATIVES TO ABANDONMENT OF LIGHT DENSITY RAILROAD LINES
It is estimated that one-third of the U.S. railroad track system is redundant and/or unprofitable due to intense intermodal competition and rising costs. Abandonment of rail lines can be harmful to communities previously served; however, the bankrupt conditions of many railroads makes cross-subsidization of unprofitable freight lines no longer possible. The project is to develop a handbook to assist shippers, local and state governmental units, and planners in their efforts to preserve adequate rail service or to ease the transition to alternative transportation services on a long-run, sound financial basis. Federal and state abandonment laws will be surveyed and innovations for preserving rail service or starting new transportation services will be identified and described. Methods for a smooth and orderly transition will be stressed. The advantages, disadvantages, barriers, constraints, issues, and impacts of implementing the innovations will be analyzed and evaluated with respect to safety, economics, taxes, environmental, etc., considerations. A methodology for evaluating and ranking the alternative courses of action by order of priority is to be developed.

PERFORMING AGENCY: Tennessee University, College of Business Administration, 142510/6297 R95
INVESTIGATOR: Patton, EP (Tel (615) 974-5311)
SPONSORING AGENCY: Office of University Research, Department of Transportation
RESPONSIBLE INDIVIDUAL: Murphy, T (Tel (202) 426-4416)

Contract DOT-OS-50125 (CS)
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $85,420

ACKNOWLEDGMENT: Tennessee University, Knoxville (PUR-50164)

25 058699
DEVELOPMENT OF A REPORT ON RAILROAD RESEARCH NEEDS
To provide input for this report, the Transportation Research Board will organize a railroad research conference in which qualified persons from the railroad and associated communities will participate. The conference will review the needs for railroad research, will review current and recent efforts in railroad research, and will define needed railroad research for the next five to ten years.

PERFORMING AGENCY: National Academy Of Sciences, Transportation Research Board
SPONSORING AGENCY: Federal Railroad Administration, Department of Transportation

RESPONSIBLE INDIVIDUAL: Ahmed, N
Contract OS-40022/23
STATUS: Active NOTICE DATE: Aug. 1976 START DATE: June 1975 COMPLETION DATE: 1976 Total Funds: $50,000

ACKNOWLEDGMENT: TRAIS

25 058753
SCENARIOS FOR ALTERNATIVE ROLES OF THE FEDERAL GOVERNMENT IN TRANSPORTATION
The research shall evaluate the economic effects of existing and prospective Federal policies governing intercity and international freight and passenger transportation enterprises in the economy of the United States. All modes of transportation shall be encompassed intermodal coordinative institutions, and Federal policies affecting domestic intercity transportation in all phases. Economic evaluation shall include the study of efficient resource allocation and distributional effects of alternative policies together with consideration of both partial and general equilibrium effects. The research shall be interdisciplinary in scope, drawing upon engineering, economic, statistics, law, and administration.

PERFORMING AGENCY: Massachusetts Institute of Technology
INVESTIGATOR: Friedlaender, AF
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Nupp, BL (Tel 202-4264447)

Contract DOT-OS-50239 (FFP)
STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: $240,000

ACKNOWLEDGMENT: TRAIS

25 099364
INTEGRATED ANALYSIS OF SMALL CITIES INTERCITY TRANSPORTATION TO FACILITATE THE ACHIEVEMENT OF REGIONAL GOALS
The goal is to determine the conditions that should be obtained by planning, regulations, policies, and programs to help the small cities-those with less than 50,000 population-attract and attain economic growth by enhancing their environments, especially in regard to transportation. There will be intrastate, interregional, and intercity analysis of the ability of the cities to provide gainful employment, health services, and welfare services in both the local cities and the larger ones. Access by transportation is the vital link. The nine non-SMSA cities that are centers for the state planning region are being studied in depth. Both personal and freight transport and their demands are considered with each region analyzed with respect to present and future growth patterns. Recommendations in three forms have been made: 1) mode modification transcending regional development, 2) general system improvements and innovation, and 3) those associated with regional typological structure and integrated goal analysis.
Two reports have been issued: 1st year report, June 1975; 2nd year report, Vol. 1, Dec. 1975 and Vol. 2, May 1976.

PERFORMING AGENCY: Iowa State University, Department of Civil Engineering
INVESTIGATOR: Carstens, RL
SPONSORING AGENCY: Office of the Secretary of Transportation
RESPONSIBLE INDIVIDUAL: Meck, JP

Contract DOT-OS-30106
STATUS: Completed NOTICE DATE: July 1976 TOTAL FUNDS: $294,644

ACKNOWLEDGMENT: DOT

25 099365
VALUE CAPTURE POLICY RESEARCH-THE ECONOMIC, LEGAL, AND COMMUNITY DESIGN IMPLICATIONS OF CAPTURING LAND VALUE ESCALATION RESULTING FROM PUBLIC INVESTMENT IN TRANSIT FACILITIES
Land values are usually greatly increased by the installation of urban transportation facilities. It has suggested that Value Capture Policy be utilized whereby more land than is needed imediately for the facilities to be purchased at market price. Selling and leasing of the surrounding land can be done eventually to provide a form of financing and to provide a positive control over the areas development. This research and seminar program is to explore the legal implementation, community enhancement, and economic feasibility aspects of capturing land value. Existing constraints, problems, and possiblities will be analyzed and described utilizing the Houston Transit Action Program. Alternative strategies for implementation will be developed with an evaluation of the feasibility of the program and the specification of guidelines. Seminars will provide input from public officials, transportation professionals, and civic leaders.

PERFORMING AGENCY: Rice University, School of Architecture
INVESTIGATOR: Sharpe, CP
SPONSORING AGENCY: Office of the Secretary of Transportation
RESPONSIBLE INDIVIDUAL: Nupp, BL

Contract DOT-OS-40007
STATUS: Active NOTICE DATE: Aug. 1975 TOTAL FUNDS: $150,000

ACKNOWLEDGMENT: DOT

25 128851
UPGRADING OF RAIL PASSENGER AND FREIGHT SERVICE IN TEXAS
Feasibility study of upgrading railroad service in Texas, identifying problem areas, evaluating alternatives and making recommendations regarding the future role that the state should play to assure adequate rail transportation for people and goods. Phase I is an inventory of rail facilities, operations and services with lines categorized by train speed, volume and functional classification. Railroad operating conflicts, such as grade crossings, local speed restrictions, size restrictions and right-of-way widths, will be identified. Rail services will be identified also by urban areas.

PERFORMING AGENCY: Texas Transportation Institute, Texas A&M University
INVESTIGATOR: Bridges, GS
SPONSORING AGENCY: Texas State Government

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Oct. 1975

ACKNOWLEDGMENT: Texas Transportation Institute

25 128852
PRODUCTIVITY IN TRANSPORTATION AND PIECEMEAL DEREGULATION OF THE INDUSTRY
The position taken in this proposal is that technological and other changes have significantly altered the competitive situation in transportation. These changes raise the possibility of increasing productivity in transportation by returning to market forces at least partial responsibility for determining prices and outputs. Our specific area of interest is the exempt agricultural commodities. The research will provide useful results on the effects of extending these regulatory exemptions to railroads, including effects on energy consumption, car utilization, and other aspects of productivity. The research will examine the implications of deregulation on the future functioning of railroad rate bureaus and investigate the effects of user charges and subsidies on intermodel competition. A major benefit of the research will be a usable methodology for examining partial deregulation questions. The methodology will consist of a quantitative model of intermodal freight competition and a "users manual". The users' manual will consist of a series of model applications, representing the range of alternative regulatory instruments from direct regulation to subsidies and taxes. We will also publish the methodology and the results as articles in both professional and trade journals. Testimony will be presented to the appropriate committees of Congress.

PERFORMING AGENCY: Northwestern University, Evanston, Transportation Center
INVESTIGATOR: Moses, LN
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology

STATUS: Active NOTICE DATE: May 1976 START DATE: 1975 COMPLETION DATE: Dec. 1977 TOTAL FUNDS: $110,000

ACKNOWLEDGMENT: Northwestern University, Evanston, Smithsonian Science Information Exchange (GSQ 1407)

25 129698
TECHNIQUES FOR EVALUATING OPTIONS IN STATEWIDE TRANSPORTATION PLANNING/PROGRAMMING
The objective is to provide transportation planning methodologies that will be policy-sensitive, allowing the testing and evaluation of options in in a fashion that will produce timely results for decision making. Unified transportation funds, multimodal financial programming and Federal interest in "low-capital intensive" options are among the reasons for identifying major transportation issues facing state decision makers. Policy issues include transit operating subsides, public acquisition of railroad rights of way, study of rail service versus highway construction and impact analyses of various options.

PERFORMING AGENCY: Voorhees (Alan M) and Associates, Incorporated, PEI Division
INVESTIGATOR: Bellomo, SJ (Tel 703-893-4310) Stowers, JR
SPONSORING AGENCY: American Assn of State Hwy and Transp Officials; Federal Highway Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Spicher, RE (Tel 202-389-6741)

NCHRP 8-18
STATUS: Active NOTICE DATE: July 1976 START DATE: Sept. 1975 COMPLETION DATE: Feb. 1978 TOTAL FUNDS: $300,000

ACKNOWLEDGMENT: National Cooperation Highway Research Program

25 129699
FREIGHT DATA REQUIREMENTS FOR STATEWIDE TRANSPORTATION
Many state departments of transportation (and other state and regional agencies) are now concerned with preparing, or assisting in preparation of statewide "master plans" for highway, rail, air, pipeline and water facilities to serve existing and future freight flows. The objective is first to develop the type, amount and relative importance of freight data required to develop statewide transportation system plans and then to design and develop techniques, methods and procedures for assembling these data. Finally a manual describing in detail appropriate techniques for data acquisition, processing, verification and maintenance will be prepared.

PERFORMING AGENCY: Creighton (Roger) Associates, Incorporated
INVESTIGATOR: Memmott, FW Blackwell, RB
SPONSORING AGENCY: American Assn of State Hwy and Transp Officials; Federal Highway Administration, Department of Transportation
RESPONSIBLE INDIVIDUAL: Spicher, RE (Tel 202-389-6741)

NCHRP 8-17
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: Feb. 1977 TOTAL FUNDS: $250,000

ACKNOWLEDGMENT: National Cooperative Highway Research Program

25 129735
IOWA COMMODITY SERVICE STUDY
Conduct a state-wide study to analyze all commodity flows simultaneously; address the total rail transportation needs of the state in a coordinated, systematic manner. Provide basis for coordinated state rail planning and assistance.
An Economic Analysis of Upgrading Rail Branch Lines: A Study of 71 Lines in Iowa

PERFORMING AGENCY: Iowa Department of Transportation
SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development
RESPONSIBLE INDIVIDUAL: Boone, JW (Tel 202-426-9682)

Contract DOT-FR-55045
STATUS: Completed NOTICE DATE: July 1976 START DATE: 1974 TOTAL FUNDS: $281,000

ACKNOWLEDGMENT: FRA

25 129736
RAIL LINE ABANDONMENT-CURTAILMENT AND RURAL DEVELOPMENT
To assist State Governments in establishment and determination of state rail transportation planning and decision making. The project report emphasizes the options and alternate strategies open to state government when faced with rural rail abandonments or rail service curtailment. The impacts on rural communities and their future development are also investigated.
REFERENCES:
The Northeast and Midwest Rail Crisis: A Bibliography of Current Literature, Black, WR; Runke, JF, Aug. 1975
The States and Rurual Rail Preservation: Alternative Strategies, Black, WR; Runke, JF, Jan. 1975

PERFORMING AGENCY: Council of State Governments
INVESTIGATOR: Runke, JF (Tel 606-252-2291) Black, WR
SPONSORING AGENCY: Department of Commerce
RESPONSIBLE INDIVIDUAL: Rendahl, R (Tel 202-967-2816)

Contract 99-6-9383
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Nov. 1974 COMPLETION DATE: Nov. 1976 TOTAL FUNDS: $167,000

ACKNOWLEDGMENT: Department of Commerce

25 129737
URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES-RD&D NEEDS DETERMINATION
Public Technology, Inc. serves as secretariat for the Urban Consortium for Technology Initiatives, a body composed of the 27 largest cities (in population) and 6 large urban counties. Under this project, the Consortium members are developing a prioritized list of problem areas in large cities which might be addressed by research or research utilization activities in the Federal Government or the private sector.

PERFORMING AGENCY: Public Technology, Incorporated
INVESTIGATOR: Havlick, R (Tel 202-452-7756)
SPONSORING AGENCY: Department of Transportation, Office of Systems Development and Technology
RESPONSIBLE INDIVIDUAL: Linhares, AB (Tel 202-426-4208)

Contract DOT-AS-40063
STATUS: Active NOTICE DATE: July 1976 START DATE: May 1974 TOTAL FUNDS: $50,000

ACKNOWLEDGMENT: DOT

25 129738
URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES-TRANSPORTATION NEEDS ANALYSIS AND INFORMATION PACKAGE DEVELOPMENT
Based on previous needs assessment work the Consortium will conduct an analysis of the transportation-related needs, attempting to determine those for which technological solutions have been developed and need only to be applied, and those for which research is necessary. Project specifications and technical information packages will then be developed, based on these analyses.

PERFORMING AGENCY: Public Technology, Incorporated
INVESTIGATOR: Havlick, R (Tel 202-452-7756)
SPONSORING AGENCY: Department of Transportation, Office of Systems Development and Technology; Federal Highway Administration; Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Linhares, AB (Tel 202-426-4208)

Contract DOT-OS-60076
STATUS: Active NOTICE DATE: July 1976 START DATE: Jan. 1976 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $300,000

ACKNOWLEDGMENT: DOT

25 129739
DEVELOPMENT AND DOCUMENTATION OF A METHODOLOGY ON STATE RAIL PLANNING
Wisconsion DOT was to develop and test a State Rail Planning methodology as part of its effort in establishing a State Rail Plan in conjunction with requirements of the Regional Rail Reorganization Act of 1973 (P.L. 93-236). In addition, Wisconsin was to document in one volume both its methodology and that developed by the State of Michigan under a similar contract.
Rail Planning Procedures Report State Governments of Wisconsin and Michigan, Sept. 1975, PB-245729
Wisconsin State Rail Plan: The Future of Wisconsin Rail Passenger Service, Jan. 1976, PB-248620

PERFORMING AGENCY: Wisconsin Department of Transportation, Division of Highways
INVESTIGATOR: Fuller, JW (Tel 608-266-0252)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Zucker, NY (Tel 202-426-1568)

Contract DOT-FR-40025
STATUS: Completed NOTICE DATE: July 1976 START DATE: July 1974 TOTAL FUNDS: $120,000

ACKNOWLEDGMENT: FRA

25 129740
DEVELOPMENT OF A METHODOLOGY ON STATE RAIL PLANNING
Michigan DSHT was to develop and test a state rail planning methodology as part of its effort in establishing a State Rail Plan in conjunction with requirements under the Regional Rail Reorganization Act of 1973 (P.L. 93-236) as amended. Under a separate contract with Wisconsin, Michigan's efforts were to be incorporated into a single document with Wisconsin's rail planning methodology.

Rail Planning Procedures Report State Governments of Wisconsin and Michigan, Sept. 1975, PB-245729

PERFORMING AGENCY: Michigan Department of State Highways & Transport
INVESTIGATOR: Bailey, EW (Tel 517-373-8418)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Zucker, NY (Tel 202-426-1568)

Contract DOT-FR-43020
STATUS: Completed NOTICE DATE: July 1976 START DATE: July 1974 TOTAL FUNDS: $90,000

ACKNOWLEDGMENT: FRA

25 129741
EVALUATION OF GOVERNMENT TRANSPORTATION SUBSIDIES
Develop a set of methodologies and procedures to analyze and evaluate transportation subsidy programs.

PERFORMING AGENCY: International Business Services, Incorporated
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel 202-426-0771)

Contract DOT-FR-65118
STATUS: Active NOTICE DATE: July 1976 START DATE: Apr. 1976 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $150,000

ACKNOWLEDGMENT: FRA

25 130497
SECONDARY IMPACTS OF ESTABLISHING A CORE RAILROAD SYSTEM- RAIL ABANDONMENT AND PROPERTY TAXES
The study will examine the secondary effects of ownership or abandonment of rail-right-of-way, primarily in the Northeastern and Mid-western regions of the U.S. covered the Railway Reorganization Act of 1974 with some study in other areas. The study is divided into three parts (1) examining the impact of tax loss upon state and local govenment as a result of government ownership or abandonment of railroad beds; (2) determining the pattern and extent of property taxation of railroad beds; (3) identifying the extent of other secondary effects of rail abandonment, particularly the inequitable tax of railroads as compared to other modes of transportation.

PERFORMING AGENCY: State University of New York, Binghamton, Graduate School
INVESTIGATOR: Chinitz, B Thompson, DL
SPONSORING AGENCY: National Science Foundation, Office of Science and Technology Policy, STP75-22353

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: $50,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (BK 689)

25 135615
GOVERNMENT POLICIES AND R&D INVESTMENTS
A study which aims to uncover interactive effects of government policies and instruments on R&D activity in the private sector is being undertaken. The research focuses on a set of industries and associated government policies that influence innovation at the interface of environmental, energy and transportation concerns. Specifically, the impacts of environmental, energy and transportation-related government policies which have both direct and indirect effects on R&D expenditure levels and patterns in transportation and related industrial sectors such as the pollution-control, oil and petroleum products and steel industries are being examined. Federal government units whose policies taken separately and in combination influence R&D decisions in the above industrial sectors include the Environmental Protection Agency, the Department of Transportation, and the Federal Energy Office. The principal purpose of this project is to develop quantitative relationships between the policies of these governmental units and the R&D that is undertaken in the affected industries.

PERFORMING AGENCY: Cornell University, Center for Urban Development Research
INVESTIGATOR: Cesario, FJ Isard, W
SPONSORING AGENCY: National Science Foundation, Office of National Research and Development Assessment, DA-44042

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1974 TOTAL FUNDS: $115,900

ACKNOWLEDGMENT: Science Information Exchange (GSZ 32)

25 135744
DEVELOPMENT OF AN IMPROVED TRANSPORTATION AND LAND USE MODEL PACKAGE
This project will improve the existing Integrated Transportation and Land Use Model Package (ITLUP) developed previously by a team headed by the present principal investigator. Several existing models will be incorporated into ITLUP, including a basic employment model, a nonbasic employment model based on the Harris model, and a residential model disaggregated by income class based on the DRAM model, a derivative of IPLUM developed by the principal investigator under a previous grant. Several other existing models will be evaluated for possible integration, including modal split models, multipath assignment procedures, and air pollution emission and diffusion models. In addition, an attempt will be made to develop an operational housing characteristics model, and to incorporate simple models to investigate the energy consequences of different urban forms and transportation networks. Finally, the improved package will be used to test the impact of several policy options: Several low capital options in urban transportation will be tested such as gasoline taxes or quotas, parking taxes, parking space restrictions, and commuter taxes. The difference in the land use impacts of rail transit lines and busways will also be tested.

PERFORMING AGENCY: Pennsylvania University, Philadelphia, Department of City and Regional Planning
INVESTIGATOR: Putman, SH
SPONSORING AGENCY: National Science Foundation, Division of Advanced Product Research and Technology, APR73-07840 A02

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: June 1975 COMPLETION DATE: Nov. 1977 TOTAL FUNDS: $193,900

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1344)

25 136128
DEPARTMENT OF COMMERCE REGIONAL TRANSPORTATION PLANNING
Progress: Updated freight tariff functions to common base use by Bureau of Economic Analysis, DOC in interregional Economic Studies and I/O models. Relate and interface the impact of existing and proposed transport capabilities to the national economy. Objective: Update regional freight transportation impedances to a specified base year. Prepare national networks model for use in evaluating alternative policy and investments. Motivation: Determine the impact of freight transportation characteristics on regional economic flows. Will the rising cost of fuel likely result in a shift in shipment mode? If so, will subject mode(s) have sufficient capacity to carry additional demand? Approach: Examine existing data base and update as required. Examine coding of modes of major importance for correctness.

Exercise modeling system to verify operation. Test specified alternative policy options.

PERFORMING AGENCY: National Bureau of Standards, Department of Commerce
INVESTIGATOR: Schofer, RE
SPONSORING AGENCY: National Bureau of Standards, Department of Commerce, 4314558

STATUS: Active NOTICE DATE: Dec. 1975 START DATE: July 1974 TOTAL FUNDS: $60,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZBA 6325)

25 136341
MICHIGAN RAILWAYS AND THE RURAL COMMUNITY
OBJECTIVE: Develop a railroad firm long-run investment-disinvestment criterion for railroad line segments to reveal limits to conventional private market provision of rail service. Develop State, community and shipper long-run investment-disinvestment criteria for railroad line segments to reveal limits to public and private-collection provision of rail service. Determine market forces inherent in cumulative quality deterioration of transport services, which apparently cause a downward service-demand spiral. APPROACH: Development of a return-on-investment criterion considering fixed and variable costs, revenue, minimun length of train, frequency of service, and structure of demand. Development of a benefit-cost accounting, in operational form, measuring community impacts of abandonment and service discontinuance. Both monetary and non-monetary benefits and costs will be treated. A demand and supply analysis with simultaneity, specifying numerous qualitative variables will be made. Estimates of demand response with respect to various quantitative and qualitative variable will be attempted. The trucking alternative will be integrally considered. PROGRESS: Research has centered on the analysis relevant to the decision for abandonment or subsidization of service on branch railway lines. More than half of the grain elevators in Michigan are located on rail lines identified as potentially excess by a U.S. Secretary of Transportation report. Analysis of data from a limited number of rail abandonment applications gives some tentative indications of the level of subsidy which will be required to maintain service on branch lines. The data indicate the level of subsidy varies greatly from line to line. The range of annual subsidy per mile required to cover opportunity losses of maintaining a rail roadway (assuming an 8% return on investment) ranged from $905 to $7,107 with a median of $4,631 at 1973 prices. Relevant prices have increased substantially in 1974. Analysis of 22 abandonment applications indicated the required expenditures for rehabilitation ranged from $11,669 to $77,586 per mile of reconstruction, with a mean of $23,805 per mile. Many of the lines in the potentially excess category have not been maintained and would require reconstruction to provide an effective level of service. This will, as these data indicate, require substantial capital investment.

PERFORMING AGENCY: Michigan State University, Agricultural Experiment Station
INVESTIGATOR: Shaffer, JD
SPONSORING AGENCY: Michigan, State Government of, 0065162 MICL03148

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1975 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 65162 1)

25 138476
RE-USE OF ABANDONED RAILROAD RIGHTS-OF-WAY
The purposes of thsi project are to develop information concerning (1) the availability of past and prospective abandoned railroad rights-of-way for conversion to alternate public pruposes and (2) the advantages of establishing a rail bank to assure the availability of certain railroad rights-of-way for future railroad use, and to make recommendations as to appropriate public policy with regard to these rights-of-way. This research project will form the basis for the report to the Congress and the President which is required by section 809(a) of the Railroad Revitalization and Regulatory Reform Act of 1976.
Contract not yet awarded.
SPONSORING AGENCY: Office of Environment, Safety and Consumer Affairs
RESPONSIBLE INDIVIDUAL: Wilson, K (Tel (202) 426-4388)

Contract DOT-OS-049
STATUS: Programmed NOTICE DATE: July 1976 START DATE: July 1976 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: $250,000

ACKNOWLEDGMENT: Office of Environment, Safety and Consumer Affairs

25 139174
ECONOMICS AND REGULATION OF TRANSPORTATION
To aid DOT in evaluating the effects of regulation in order to propose changes, the economics of scale, the effects of regulatory change and the costs of transition from the present levels of regulation are to be investigated with particular emphasis on the rail and motor carrier industries.
Contract not yet awarded.

SPONSORING AGENCY: Office of the Secretary of Transportation
RESPONSIBLE INDIVIDUAL: Nupp, B (Tel (202) 426-4447)

STATUS: Proposed NOTICE DATE: July 1976 START DATE: 1977

ACKNOWLEDGMENT: OST

25 139175
INVESTMENT CRITERIA AND USER CHARGES
Research is to aid DOT in proposing appropriate changes in investment and user charge policy. With the heavy government investment in transportation and because of the effect of this on the efficiency of the entire transportation system, user charge policy must be identified. The impact of user charges on competing modes must be considered, with possible misallocation of funds tending to subsidize or cross subsidize.
Contract not yet awarded.

SPONSORING AGENCY: Office of the Secretary of Transportation
RESPONSIBLE INDIVIDUAL: Nupp, B (Tel (202) 426-4447)

STATUS: Proposed NOTICE DATE: July 1976 START DATE: 1977

ACKNOWLEDGMENT: OST

26 058298
RAIL TECHNOLOGY REVIEW
Bibliography shall contain an index based on the RRIS thesaurus, descriptive English language abstracts and the necessary bibliographic information required for input along with copies of selected documents and translations of important works in the foreign literature.

PERFORMING AGENCY: Defense Electronics Supply Center, Department of Defense; Battelle Columbus Laboratories
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Steele, RK (Tel 617-4942476)

IA RA-75-19
STATUS: Active NOTICE DATE: July 1976 START DATE: July 1975 COMPLETION DATE: 1976 TOTAL FUNDS: $200,000

ACKNOWLEDGMENT: TSC (611-0186)

26 058329
RAILROAD RESEARCH INFORMATION SERVICE (RRIS)
Aquisition, selection, storage, retrieval and dissemination of research information that is generated by and/or that is useful to administrators, researchers, and other specialists in the railroad and related fields of transportation research. To provide a central point for industry, academia, government and others to disseminate technical information to the interested railroad related community-at-large or research results as well as on-going research efforts in the interest of obtaining technology ultilization in an efficient manner. To provide a service to the research community in maintaining a current awareness of technological and economic research findings and developments.

PERFORMING AGENCY: Transportation Research Board
INVESTIGATOR: Houser, F (Tel 202-389-6611)
SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
RESPONSIBLE INDIVIDUAL: Ahmed, N (Tel 202-4260955)

Contract DOT-OS-40022/10
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1974 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: $499,500

ACKNOWLEDGMENT: FRA

26 058511
AN ELUSIVE DIMENSION OF THE URBAN TRANSPORTATION PROBLEM: THE LAND USE-TRANSPORTATION INTERFACE
The objective is to examine available literature concerning the land use-transportation interface which relate to the overall goal of maximizing transport efficiency in urban areas, and to write a state-of-the-art paper with recommendations for future research. This research shall identify both what is and is not known about the guidance of urban form and land development activities in order to minimize travel in urban areas and the attendant need for new transport facilities.

PERFORMING AGENCY: Kentucky University, Department of Civil Engineering
INVESTIGATOR: Deacon, JA
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Cooper, N (Tel 202-4264380)

Contract DOT-OS-50111 (CS)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: July 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: $32,206

ACKNOWLEDGMENT: TRAIS (PUR-50147), OST

26 099398
FREIGHT CAR UTILIZATION RESEARCH PROGRAM. PHASE I. TASK 1--ANALYSIS OF CURRENT PRACTICES AND PROBLEMS
Identify, analyze and document car utilization problems and the various approaches to these problems that have been undertaken. This identification and documentation will include a limited literature search, an extensive survey of the industry and shippers, the compliation of a manual of practices and the dissemination of that manual to the industry.

For further information on related studies see also RRIS 099399 Section 17A, 099400 17A, 099401 17A, 099402 24A, 099403 21A.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: Steele, RN (Tel 703-981-5284)
SPONSORING AGENCY: Association of American Railroads
RESPONSIBLE INDIVIDUAL: Leilich, GM (Tel 202-293-5018)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1975 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: AAR

26 099429
RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT, PHASE 4-LITERATURE REVIEW
Background experience and literature in the various technical areas of interest under the Project are continually under review. A reference library has been established and maintained under this Phase.

See also RRIS 12A 081788.

PERFORMING AGENCY: Association of American Railroads Technical Center
SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute
RESPONSIBLE INDIVIDUAL: Phillips, EA (Tel 312-5673607)

STATUS: Active NOTICE DATE: July 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

26 135521
SCIENTIFIC AND TECHNICAL INFORMATION CENTER FOR SOIL MECHANICS
Purpose of study/investigation: To establish and operate a Soil Mechanics Information Analysis Center. Approach or plan: Center will acquire, analyze, evaluate, and condense the world's literature in the area of soil mechanics. Information is screened, filtered, and reduced to meet user requirements for management and for bench scientists and engineers throughout the DOD. Services include specific items of evaluated data, current summaries of technical trends, comprehensive state-of-the-art analyses, and specialized advisory services.

PERFORMING AGENCY: Waterways Experiment Station, Army Crops of Engineers
INVESTIGATOR: Cunny, RW
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1973

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 144 1)

Source Index

This index serves not only as the reference for the publications and the corporate affiliations of authors of documents appearing in this Bulletin but also as the source for addresses of organizations that do not appear on pages vii and viii. In general, if no address is listed after the name of an organization, the entry involves an author affiliation rather than a publication. Consequently, there are multiple listings for many organizations, and all the document numbers should be checked. Some organizations have more than one office, and again there will be more than one listing of document numbers of possible interest. Each summary of ongoing research is indicated not only by the *A* in the document number but also by the use of italics for the entire number.

C

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Author and Investigator Index

The document number for each summary of ongoing research includes an *A* and is typed entirely in italics.

C

Subject Term Index

The document number for each summary of ongoing research includes an *A* and is typed entirely in italics.

A

The Transportation Research Board is an agency of the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering. The Board's purpose is to stimulate research concerning the nature and performance of transportation systems, to disseminate information that the research produces, and to encourage the application of appropriate research findings. The Board's program is carried out by more than 150 committees and task forces composed of more than 1,800 administrators, engineers, social scientists, and educators who serve without compensation. The program is supported by state transportation and highway departments, the U.S. Department of Transportation, and other organizations interested in the development of transportation.

The Transportation Research Board operates within the Commission on Sociotechnical Systems of the National Research Council. The Council was organized in 1916 at the request of President Woodrow Wilson as an agency of the National Academy of Sciences to enable the broad community of scientists and engineers to associate their efforts with those of the Academy membership. Members of the Council are appointed by the president of the Academy and are drawn from academic, industrial, and governmental organizations throughout the United States.

The National Academy of Sciences was established by a congressional act of incorporation signed by President Abraham Lincoln on March 3, 1863, to further science and its use for the general welfare by bringing together the most qualified individuals to deal with scientific and technological problems of broad significance. It is a private, honorary organization of more than 1,000 scientists elected on the basis of outstanding contributions to knowledge and is supported by private and public funds. Under the terms of its congressional charter, the Academy is called upon to act as an official–yet independent–advisor to the federal government in any matter of science and technology, although it is not a government agency and its activities are not limited to those on behalf of the government.

To share in the task of furthering science and engineering and of advising the federal government, the National Academy of Engineering was established on December 5, 1964, under the authority of the act of incorporation of the National Academy of Sciences. Its advisory activities are closely coordinated with those of the National Academy of Sciences, but it is independent and autonomous in its organization and election of members.