

N4-55
Reference



RAILROAD RESEARCH BULLETIN

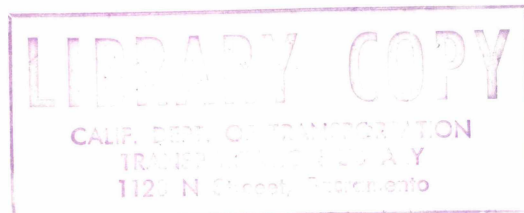


Spring 1976
Volume 3 Number 1

Covering RRIS accessions between
August 1975 and January 1976



U.S. DEPARTMENT OF TRANSPORTATION
Federal Railroad Administration



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Railroad Research Information Service
Transportation Research Board

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16. Abstract This publication contains 1,110 abstracts of journal articles and research reports selected by RRIS from current railroad literature and 418 summaries of ongoing research activities in the railroad field. The 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. This publication supplements material in the six prior Railroad Research Bulletins which should be retained for a complete file of RRIS data. The material in the six previous Bulletins can be searched through the RRIS Cumulative Subject Index, 1973-1975, PB-249716, which also gives information about the individual publications. The 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 and manual file searches of specific subject areas are available directly from RRIS.					
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RAILROAD RESEARCH BULLETIN

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RAILROAD RESEARCH BULLETIN

Spring 1976
Volume 3 Number 1
Publication 7601

This Bulletin, containing 1,110 abstracts of journal articles and research reports and 418 summaries of ongoing research activities in the railroad field, covers material accessioned by the Railroad Research Information Service between August 1975 and January 1976. Publication and RRIS operation within the Transportation Research Board is 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 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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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	NRC*	National Research Council
AIAA*	American Institute of Aeronautics and Astronautics	NTIS*	National Technical Information Service
AREA*	American Railway Engineering Association	OECD*	Organization for Economic Cooperation and Development
ASCE*	American Society of Civil Engineers	ORE*	Office for Research and Experiments, UIC
ASME*	American Society of Mechanical Engineers	OST*	Office of the Secretary of Transportation
CIGGT*	Canadian Institute of Guided Ground Transport	PB	Prefix identifying an NTIS accession number
CNR	Canadian National Railways HQ Library	Phot	Photographs
DOT*	U.S. Department of Transportation	Ref	References
DOTL	U.S. Department of Transportation Library, Washington, D.C.	Repr PC	Paper copy of original document
ECMT*	European Conference of Ministers of Transport	RP	RRIS Repository (DOTL)
EI	Engineering Index	RPI*	Railway Progress Institute
ESL*	Engineering Societies Library	Rpt	Report
Fig	Figures	RTAC*	Roads and Transportation Association of Canada
FRA*	Federal Railroad Administration	SAE*	Society of Automotive Engineers
FY	Fiscal year	Shaw	Shaw Publishing Company Ltd.
GPO*	U.S. Government Printing Office	SNAME*	Society of Naval Architects and Marine Engineers
IEEE*	Institute of Electrical and Electronics Engineers	Tab	Tables
IPC*	IPC Transport Press Ltd.	TRB*	Transportation Research Board
IRCA	International Railway Congress Association	TRRL*	Transport and Road Research Laboratory
IRF	International Road Federation	TSC	Transportation Systems Center
IRRD	International Road Research Documentation	UIC*	International Union of Railways
JC	Journal Collection (DOTL)	UITP*	International Union of Public Transport
NAE*	National Academy of Engineering	UMTA*	Urban Mass Transportation Administration
NAS*	National Academy of Sciences	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 Infor-

mation 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. 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

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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.

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.

Document Record Number
 TRIS Accession Number
 RRIS Subject Area Number

01 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. Sponsorship was from FRA, DOT.

Supplementary Notes →

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 →

Source of Abstract →

Availability → Contract DOT-FR-20032

NTIS Accession Number →

Washington, D.C., availability with RP, JC, or call number → PB-247084/AS, DOTL NTIS

ACKNOWLEDGMENT: FRA
 PURCHASE FROM: ESL Repr. PC, Microfiche

Document Record Number
 TRIS Accession Number
 RRIS Subject Area Number

18 125797

Title → **RAIL TRANSIT OPERATING COST GUIDELINES**

Journal Article Abstract → Operating costs may be estimated at several levels of detail, ranging from the simple application of unit costs per car-mile or car-hour, to the preparation of a complete manning table and other refinements, depending on the level of accuracy required for the individual application. The need for this type of estimate prompted the development of the set of guidelines that forms the subject of this paper. The so-called "yardstick concept" that evolves utilizes unit measures of work and cost derived from actual operating systems to estimate generalized manpower requirements and operating costs for planned urban rail systems. Following an analysis of present transit accounting practices, factors affecting operating costs, and the development of the yardstick concept, an estimate prepared for Atlanta with the aid of the guidelines is presented.

Author, Publication Data, Document Data → Gilcrease, EE, Jr (Metropolitan Atlanta Rapid Transit Authority);
 Kudlick, W Padron, M *ASCE Journal of Transportation Engineering*
 Vol. 101 No. 2, May 1975, pp 365-381, 3 Ref.

Source of Abstract →

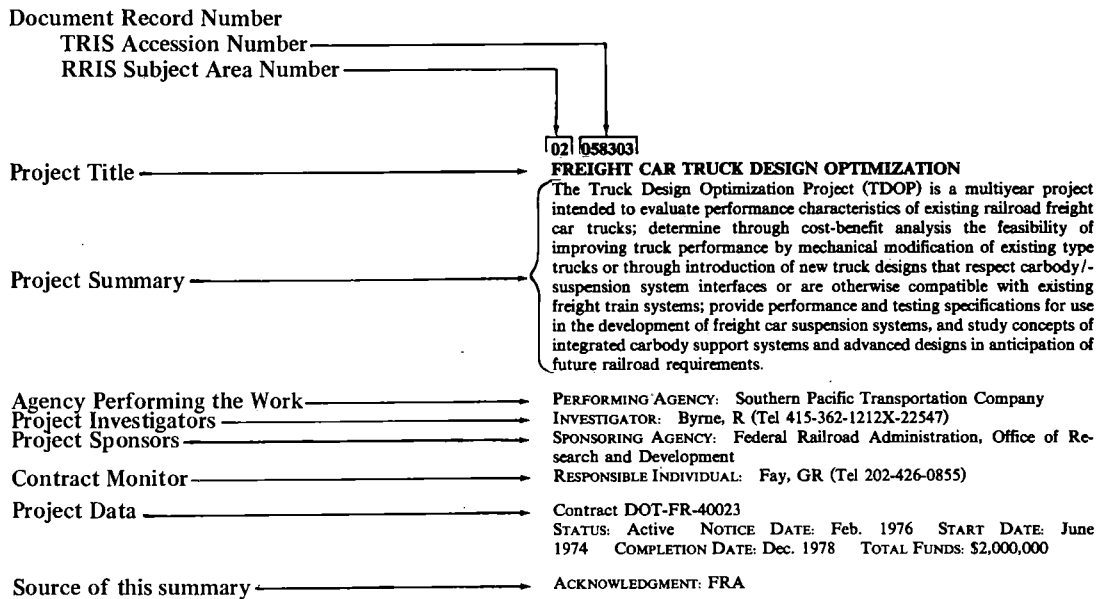
Availability → ACKNOWLEDGMENT: EI
 PURCHASE FROM: ESL Repr. PC, Microfilm

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

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.



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.

Abstracts of Reports and Journal Articles

00 090564

SUMMARY OF GEOLOGIC AND HYDROLOGIC INFORMATION PERTINENT TO TUNNELING IN SELECTED URBAN AREAS

A summary of the available geologic and hydrologic information pertinent to tunneling technology and underground construction for 34 U.S. urban areas is presented. Each summary includes a map showing the area of coverage, the geologic and ground water situation to a depth of 200 feet, special features related to tunneling, and a list of sources. Selected urban areas surveyed were: Atlanta, Baltimore, Boston, Providence, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Fort Lauderdale, Fort Worth, Houston, Indianapolis, Kansas City, Los Angeles, Louisville, Memphis, Miami, Milwaukee, Minneapolis, St. Paul, New Orleans, New York City, Philadelphia, Trenton, Phoenix, Pittsburgh, Portland, St. Louis, San Antonio, San Diego, San Francisco, Seattle, Washington, D.C.

Cushing, EM Barker, RM
Geological Survey, Office of the Secretary of Transportation Nov. 1974,
375 pp

Contract DOT-AS-40047

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-240715/3ST, DOTL NTIS

00 090813

PROTECTIVE SURFACES OR LINERS FOR SUBAQUEOUS STRUCTURES

In the patent a concrete slab or a tubular concrete pipe is provided with a wall surface or liner to protect the concrete member from marine-fouling organisms. The surface or liner incorporates an expanded shale aggregate, which has been impregnated with chemicals toxic to marine organisms. The toxic material will leach out very slowly over a long period to provide the desired protection. Such protective surfaces or liners are readily removable and can easily be replaced when the toxic chemicals are completely leached out.

NTIS #AD-D-000128/9ST. Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 \$0.50.

Muraoka, JS
Department of the Navy, (PATENT-3 784 357) Patent PAT-APPL-217
501, 4 pp

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

00 091752

A PROBABILISTIC APPROACH TO GEOLOGY IN HARD-ROCK TUNNELING

The report presents an approach for evaluating alternative strategies for construction of hard-rock tunnels on the basis of expected cost. Central to the proposed approach is the use of subjective degree-of-belief probability in the evaluation of geologic conditions. Subjective probability is used as a quantitative measure of a geologist's uncertainty about the existence of various geologic conditions along the tunnel alignment. The general conclusion of the report is that the proposed approach will lead to a more thorough analysis of the uncertainties involved in predicting geologic

conditions, and of the costs of employing various construction strategies in various geologic settings. The approach will not reduce the uncertainties in tunneling, but will lead to the selection of that construction strategy which is most likely to perform successfully and economically in any given hard-rock tunnel.

Vick, SG
Massachusetts Institute of Technology, National Science Foundation Tech.
Rpt. R75-11, June 1974, 236 pp

Grant NSF-GI-34029

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242598/1ST, DOTL NTIS

00 091757

TUNNEL COST ESTIMATING UNDER CONDITIONS OF UNCERTAINTY

Of all areas of heavy construction, tunnel projects are subject to perhaps the greatest degree of uncertainty from the standpoint of predicting cost and progress. Sources of uncertainty include the unknown nature of geologic conditions along the tunnel alignment, and the difficulty of estimating the performance of men and equipment within the narrow confines of the tunnel. In this report a method is presented for explicitly reflecting these uncertainties in estimates of the time and cost of tunnel construction.

Also pub. as Tunnel Construction-5.

Wyatt, RD
Massachusetts Institute of Technology, National Science Foundation Tech.
Rpt. R75-13, Sept. 1974, 211 pp

Grant NSF-GI-34029

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242428/1ST, DOTL NTIS

00 091758

THE PROBABILISTIC ESTIMATION OF CONSTRUCTION PERFORMANCE IN HARD ROCK TUNNELS

This report concerns the development of a computer-based simulation model which can be used to evaluate costs and risks associated with hard rock tunneling. This report is the 4th in a series of reports dealing with this subject. The report examines conventional cost estimating procedures and concludes that there are two major inadequacies which exist: (1) the inability to account for the uncertainty in suspected geologic conditions at the tunnel depth; and (2) the inability to quantify the effect of uncertain geology and the effect of the additional uncertainty in productivity of men and equipment on the performance of a construction strategy. The model employs techniques of probability and simulation to avoid these two shortcomings.

Also pub. as Tunnel Construction-4.

Minott, CH
Massachusetts Institute of Technology, National Science Foundation Tech.
Rpt. R74-47, July 1974, 198 pp

Grant NSF-GI-34029

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242427/3ST, DOTL NTIS

00 091760

TUNNEL CONSTRUCTION (A BIBLIOGRAPHY WITH ABSTRACTS)

Unique tunneling methods, cost studies, tunnel support innovations, patents relative to tunneling machines, and finite element analyses of rock encountered in tunneling processes are included in these Government-sponsored research reports. (Contains 180 abstracts).

Supersedes NTIS/PS-74/096.

Habercom, GEJ

National Technical Information Service July 1975, 185 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PS-75550/4ST, DOTL NTIS

00 092027

NUMERICAL ANALYSIS OF EMBANKMENTS OVER SOFT SOILS

A computer program, SSOILS, for analyzing displacements of embankments over soft soils is presented. Background development research and experimentation is discussed in the early chapters of the study. The final chapter (7) of the study is essentially self contained and is written for the user who must rely on standard soil tests to obtain input data for the computer program. Immediate (or initial) displacement, and time dependent displacement of settlement due to 2-D consolidation and creep can be accounted for by the program; however, users must become familiar with the program and interpretation of soil test data (for input data) in order to make good use of the program as an aid to the engineering analysis of embankment behavior over soft soils.

Prepared in cooperation with Louisiana Dept. of Highways, Baton Rouge.

Thoms, RL Pecquet, RA Arman, A

Louisiana State University, Baton Rouge, Federal Highway Administration, Louisiana Department of Highways, (LHD-69-3S) Final Rpt. Bull-112, June 1975, 212 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242420/8ST, DOTL NTIS

00 092035

DETERMINATION OF THE IN-SITU STATE OF STRESS IN SOIL MASSES

The mass behavior of soil and the loadings imparted to civil engineering works by soil masses are strongly influenced by the naturally existing in-situ soil stresses. The determination of in-situ stresses in soil masses is a difficult problem which, in some cases, requires extensive and subtle evaluation if even an approximate determination is to be made. These studies were conducted to review and assess techniques. Methods for estimating in-situ stress from a knowledge of the soil and assumed stress history, as well as direct measurement methods are identified and described. All known methods for determining in-situ stresses are summarized. Recommendations are made for the development of more sophisticated hardware, transfer and development of fabric analysis technology to soil mechanics, and long range development of magnetic resonance techniques.

Huck, PJ Pincus, HJ Singh, MM Chugh, YP

IIT Research Institute, Federal Highway Administration Final Rpt. IITRI-D6083-FR, FHWA/RD-74-68, Sept. 1974, 336 pp

Contract DOT-FH-11-8082

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242710/2ST, DOTL NTIS

00 092288

DYNAMIC SOIL PROPERTIES REQUIRED TO PREDICT THE DYNAMIC BEHAVIOR OF ELEVATED TRANSPORTATION STRUCTURES

In this investigation, dynamic triaxial tests were performed (1) to provide additional data on the dynamic properties of soils at the range of strain amplitudes generated under the foundations of poorly performing transportation structures, (2) to justify that dynamic soil properties determined by triaxial tests are appropriate to represent field conditions, and (3) to

investigate the effect of testing procedures on dynamic soil properties, soil volume changes, and induced pore water pressures which influence the performance of elevated transportation structure foundations.

Park, T Silver, ML

Illinois University, Chicago, Department of Transportation Intrm Rpt. DOT/TST-75/44, May 1975, 161p

Contract DOT-OS-30092

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244069/1ST, DOTL NTIS

00 092430

RAPID TRANSIT TUNNEL DIMENSIONS IN THE UNITED STATES: A BRIEF SUMMARY

Inside dimensions and shapes of existing and planned rapid transit tunnels in the United States are identified. Included is a discussion of the factors involved in deriving the inside dimensions of a tunnel and methods of calculating circular tunnel diameters. Background information is provided for use in discussions concerning the need for standardization of tunnel dimensions.

Saulnier, G

Transportation Systems Center Final Rpt. DOT-TSC-OST-75-24, July 1975, 36 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244585/6ST, DOTL NTIS

00 092551

TUNNEL COST MODEL: PROFESSIONAL PAPERS, 1974

This collection of four papers describes the completed first phase of the research project--the organization and scope of the model; its technical content, assumptions, capabilities; and directions for its future development and use. These papers draw upon several reports and theses produced over the last year, and highlight the important characteristics of the model and its potential applications.

Report no. 3 in a series on 'Tunnel Construction.' See also report dated Jun 74, PB-242 598.

Moavenzadeh, F Einstein, HH Markow, MJ Wyatt, RD Vick, SG

Massachusetts Institute of Technology, National Science Foundation Tech. Rpt. P74-4, P74-5, July 1974, 121 pp

Grant NSF-GI-34029

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243253/2ST, DOTL NTIS

00 092552

TUNNEL COST MODEL: A STOCHASTIC SIMULATION MODEL OF HARD ROCK TUNNELING. VOLUME 1. SUMMARY REPORT

This report describes the completed 1st phase in a project to develop a tunnel cost model--the organization and scope of the model; its technical content, assumptions, and capabilities; and the relation of the model to various exploratory and tunneling practices. The report consists of three volumes; a Summary Report, a Technical Report, and the Appendices. The tunnel cost model was developed in an attempt to improve the assessment of uncertainty in tunnel cost estimates, with enough detail and accuracy to aid in preparing estimates or bids. The scope of the model is limited to hard rock tunneling. A working version of the model has been obtained and trial runs of selected example problems have been run and are discussed in this report. This report is the 1st in a series relating to the tunnel cost model to document the work continuing under the research project mentioned.

Report no. 1 in a series on 'Tunnel Construction.' See also report dated Jun 74, PB-242 598.

Moavenzadeh, F Einstein, HH Markow, MJ Lindner, EN Minott, CH

Massachusetts Institute of Technology, National Science Foundation Tech. Rpt. R74-22, NSF/RA/T-74-080, May 1974, 124 pp

Grant NSF-GI-34029

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243252/4ST, DOTL NTIS

00 092596

RESEARCH PROGRAM PLAN FOR MEETING TOMORROW'S NEEDS IN TUNNELING AND EXCAVATION

This report presents the results of a study performed by Bechtel Corporation for the National Science Foundation, Research Applied to National Needs (RANN). The purpose of the study is to develop a recommended long range research program plan in tunneling and excavation for RANN. The objective of the RANN tunneling and underground excavation research program is to achieve technological improvements that would enhance the quality of life in urban areas through more economic and effective utilization of the underground space.

See also PB-242 742.

Bechtel Corporation, National Science Foundation Final Rpt.
NSF/RA/T-74-087, Aug. 1974, 357 pp

Grant NSF-C841

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242777/1ST, DOTL NTIS

00 092597

RESEARCH PROGRAM PLAN FOR MEETING TOMORROW'S NEEDS IN TUNNELING AND EXCAVATION. EXECUTIVE SUMMARY

This report presents the summary of a study performed by Bechtel Corporation for the National Science Foundation, Research Applied to National Needs (RANN). The purpose of the study is to develop a recommended long range research program plan in tunneling and excavation. The results of the study, which are delineated in the main report and accompanying appendices, contain supporting evaluations.

See also PB-242 777.

Bechtel Corporation, National Science Foundation NSF/RA/T-74-086,
Feb. 1974, 34 pp

Grant NSF-C841

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242742/5ST, DOTL NTIS

00 092598

CORRELATION OF DATA ON LIQUID JET CUTTING OF ROCKS AND OTHER MATERIALS

A method has been developed using dimensionless parameters to correlate data on the depth of slots cut in materials by traversing high-pressure continuous liquid jets. It is a generalization of an equation presented by Nikonov and Goldin for application to rocks and coal. In addition to the effect of jet pressure and traverse velocity, it permits taking account of the jet and material densities, standoff distance from the nozzle to the material surface, and the nozzle discharge coefficient. The effect on jet coherence of nozzle Reynolds number and the effect of turbulence and vorticity produced by the feed system at the inlet of experimental nozzles have not been included, although they are believed to be significant factors.

Cooley, WC

Terrespace, Incorporated, National Science Foundation Final Rpt.
TR-407-1, NSF/RA/T-74-088, Jan. 1975, 57 pp

Grant NSF-GI-37194

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242733/4ST, DOTL NTIS

00 092808

SUBSURFACE INVESTIGATION, SECTION C009, HUNTINGTON ROUTE

Results are presented of 41 test borings made along the line of Section C009 of Huntington Route between Braddock Road on the south and Four Mile

Run on the north in Alexandria, Virginia of the Washington Metropolitan Area Metro System. The purpose of the work was to provide information for design of surface trackage, cut-and-cover construction, retaining walls and the planned Braddock Road Station. The report contains logs of the test borings, results of laboratory tests on undisturbed samples, a continuous geological section along the line of METRO trackage, sections through the station parking areas and comments regarding anticipated design and construction problems.

Meuser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Commission, De Leuw, Cather and Company, Incorporated, (MRWI-75-133) Report No. 133, May 1975, 96 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242963/7ST, DOTL NTIS

00 093092

SUBSURFACE INVESTIGATION, SECTION E-002, GREENBELT ROUTE

Results are presented of 14 test pits made adjacent to the line of Section E002, on U Street and 14th Street N.W. in Northwest Washington, D.C., of the Washington Metropolitan Area Metro System. The purpose of the work was to provide information on the characteristics of existing building foundations for the design of underpinning or building protection in preparation for excavation of the subway in the streets. The report contains sketches illustrating the test pits, results of laboratory tests on hand-cut undisturbed samples, and a discussion of the general subsurface and foundation conditions.

Sponsored in part by Washington Metropolitan Area Transit Authority, D.C.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-138, #14, Aug. 1975, 32 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244472/7ST, DOTL NTIS

00 093291

ACCOMODATION OF UTILITY PLANT WITHIN THE RIGHTS OF WAY OF URBAN STREETS AND HIGHWAYS

No abstract available.

Set includes PB-245 199 thru PB-245 200.

American Public Works Association, Federal Highway Administration
July 1974, 283p-in 2V

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC

PB-245198-SET/ST, DOTL NTIS

00 093292

ACCOMODATION OF UTILITY PLANT WITHIN THE RIGHTS OF WAY OF URBAN STREETS AND HIGHWAYS. STATE OF THE ART

The report presents a technological background and factual practices upon which local agencies could build an effective, workable utility location program. Findings are based on in-depth, on-site interviews of 40 communities in the U.S. and Canada, a mail survey of 500 local agencies, of which 222 submitted replies, and the assistance and cooperation of representatives of all major utility associations, the American Society of Civil Engineers, and the Institute for Municipal Engineering of the American Public Works Association. It was found to be infeasible to recommend national standards for location of utilities due to the very large number of local and physical factors which influence location practices. Many examples of local standards are given. The report and the companion manual should be of valuable assistance to state and local highway agencies in cooperation with utility companies for making improvements to utility accommodation policies and practices.

Paper copy also available in set of 2 reports as PB-245 198-SET, PC\$10.00.

Bert, KE Cohn, MM Hurst, WD Kuykendall, CR Sullivan, RH American Public Works Association, Federal Highway Administration
Final Rpt. SR-44, FHWA-RD-75-8, July 1974, 169 pp

Contract DOT-FH-11-7850

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-245199/5ST, DOTL NTIS

00 096372

STATE OF THE ART OF SLURRY TRENCH WALL TECHNOLOGY [Der Stand Der Schlitzwandtechnik]

The large area of application of slurry trench wall technology is described with reference to several large-scale construction sites (high-rise buildings, underground railways, nuclear reactors). Constant progress, particularly in drilling technology, in supporting liquids and in precast construction, has made possible a reduction in costs and rationalisation of the working method. Efforts are currently being made to allow the building of a whole construction pit to be undertaken by one contractor in order to attain maximum safety. The paper was presented at the meeting of the Austrian architectural and engineering association held in Vienna on 18th January 1972. /TRRL/ [German]

Hoffen, M *Oesterreichische Ingenieur Zeitschrift* Vol. 16 No. 10, Oct. 1973, pp 321-301, 7 Fig., 10 Phot.

ACKNOWLEDGMENT: Road Safety Board, Austria, Federal Institute of Road Research, Inzel, W Ger, Transport and Road Research Laboratory (IRRD 30176)

PURCHASE FROM: ESL Repr. PC, Microfilm

00 096876

NEW RAILWAY BRIDGES OVER LONDON'S EAST CROSS ROUTE

The east cross route, or London Inner Ring Road System, affects the eastern region of British Railways at Victoria Park and Old Ford. Two under-line bridges are required at Hackney Depot, and three in the Victoria Park area including a 7 span box girder viaduct. A major under-line bridge is required at Old Ford. Site problems required differing forms of structure and different modes of erection. Problems with respect to the demolition of the old railway arch arose at the bridge over Wick Road. Special consideration was given to temperature effects on the Victoria Park viaduct which is on a curve. Old Ford bridge was a particularly difficult problem due to the high density electrified rail traffic and the presence of London transport tunnels and sub-station. This governed the choice of thrust bored abutments under the seven tracks. Superstructure design of all bridges was based on steel box girders, some strong enough to support a single track and others used as a beam group. Plated or concrete decks were used, and some of the parapet girders were clad. Waterproofing was by membrane or epoxy resin. Abutments were generally of reinforced concrete, sometimes on bored piles. /TRRL/

Jenkins, AH Holloway, BGR *Institution of Civil Engineers, Proceedings* Vol. 56 Nov. 1974, pp 537-557, 9 Fig., 8 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212094)

PURCHASE FROM: Institution of Civil Engineers 26-34 Old Street, London EC1V 9AD, England Orig. PC

DOTL JC

00 097834

ELASTIC SOILS WITH TWO AND THREE PARAMETERS [DWU-I Trojparametrowe Podloze Sprezyste]

Different models were proposed for non-homogeneous anisotropic soil; these models were adopted to express its behaviour under load. The winkler medium has one disadvantage: it does not take account of the deformations sustained by the soil outside the limits of the foundation. Because of this, the authors have conceived a medium, also based on the winkler principle, which is influenced in the first case by two moduli of subgrade reaction k and s and in the second case by three moduli: k , s and r . The two models facilitate the integration of deformations occurring in the immediate vicinity of a foundation. Attention is drawn to the practical difficulty of measuring these moduli. /TRRL/ [Polish]

Palka, J Lisowski, A *Czasopismo Techniczne* No. 125, 1969, pp 9-13, 7 Fig., 2 Tab., 8 Ref.

AVAILABILITY: Politechnika Krakowska; Warszawska 24; Krakow, Poland.

00 097850

STATIC PENETROMETER AND COMPRESSIBILITY OF SOIL [Le penetrometre statique et la compressibilite des sols]

The object of the article is to forecast settlement of compressible soil using the results of in-situ static penetration tests. The study is based on the analysis of results of the laboratory test on samples taken from soil located in the immediate vicinity of the place where the corresponding static penetration tests were being carried out. 600 double samples were examined. Tables show correlations which facilitate the determination of the maximum compression index from end-bearing resistance and moisture content measurements. The tables also enable the buisman relation to be applied to different categories of soil. /TRRL/ [French]

Sanglerat, G (Socotec); Gielly, J Lareal, P Chapeau, C *Annales de l'Institut Tech du Batiment Travaux Pub* No. 298, Oct. 1972, pp 1-10, 3 Fig., 5 Tab., 13 Ref.

AVAILABILITY: Societe de Diffusion de Tech du Bat et Trav Pub; 9 rue la Perouse; Paris 16E, France.

00 098087

ACCOMMODATION OF UTILITY PLANT WITH THE RIGHTS-OF-WAY OF URBAN STREETS AND HIGHWAYS: MANUAL OF IMPROVED PRACTICE

This manual sets forth principles and practices under which utility facilities can be successfully accommodated within urban rights-of-way. These principles and practices can be characterized by five steps. 1. Enabling legislation to establish rights of local agencies to control use of the right-of-way; 2. Provision of adequate staff and budget to protect the public's investment in its streets and highways; 3. Establishment and implementation of adequate permit, inspection, and pavement restoration controls; 4. Implementation of cooperation and coordination mechanisms and record systems among all major utilities; and 5. Provision of accurate information to the field forces who excavate in the rights-of-way to allow them to work safely and protect existing utility plant. This manual and the companion report should be of valuable assistance to State and local highway agencies in cooperation with utility companies for making improvements to utility accommodation policies and practices.

This is a companion report to, "Accommodation of Utility Plant Within the Rights-of-way of Urban Streets and Highways: State-of-the-Art." FHWA-RD-75-8.

Bert, KE Cohn, PE Hurst, WD Kuykendall, CR Sullivan, RH American Public Works Association, American Society of Civil Engineers Final Rpt. FHWA-RD-75-9, July 1974, 114 pp, 15 Fig., Apps.

Contract DOT-FH-11-7850

ACKNOWLEDGMENT: Federal Highway Administration (E0110)

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-245199/AS, DOTL NTIS

00 099600

REINFORCED EARTH-RESEARCH AND APPLICATIONS [La terre arme-Recherches et Realisations]

The author summarises the main investigations into reinforced earth carried out by the Laboratoire des Ponts et Chaussées. A brief outline is given of the development of the research and different technological stages of the process, in particular the recent development of the skins (peaux) consisting of concrete plates called scales (escailles). The article deals with three aspects: behaviour of the reinforced earth material, behaviour of the structure, design of the walls. Results of laboratory and in situ tests on full-scale structures give a better understanding of the reinforced earth process mechanism. Some typical examples illustrate the main characteristics of a reinforced earth structure: flexibility, speed of construction, possibility of stage construction, ability to be built on low-bearing capacity soil. This article was also published in the *Ann T P*, Belgium, No. 3, Vol. 17, September 1972, pp 15 to 45. /TRRL/ [French]

Schlosser, F *Bulletin de Liaison des Lab des Ponts et Chaussées* No. 62, Nov. 1972, pp 79-92, Figs., 2 Tab., 6 Phot., 15 Ref.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 100787)

PURCHASE FROM: ESL Repr. PC, Microfilm, Laboratoire Central des Ponts et Chaussées 58 Boulevard Lefebvre, 75732 Paris Cedex 15, France Orig. PC

00 099743

TREATMENT OF SOFT FOUNDATIONS FOR HIGHWAY EMBANKMENTS

For the objective appraisal of all applicable construction alternatives, the preliminary planning studies must include special foundation investigations. Right-of-way for some soft foundation construction alternatives may exceed usual requirements, and construction alternatives involving subsoil stabilization by consolidation require surcharge loading periods. The high costs of such additional investigations are, however, offset by the potential savings in construction costs. The applicable construction alternatives include (a) elevated structure, (b) embankment fill supported by piles, (c) excavation of soft soils and replacement by suitable fill materials, (d) subsoil stabilization with or without sand drains, and (e) no treatment whatsoever relying instead on specially detailed field investigations and design studies to achieve uniform settlements. Each alternative can be evaluated based on factors such as construction cost, maintenance, ecological and environmental effects, fill availability, and disposal area availability. Where subsoil stabilization involves vertical sand drains, the type of drain influences the design procedures. Where nondisplacement drains are used, field permeability tests are desirable because they result in a somewhat higher field coefficient of consolidation that will reduce the estimated consolidation time. Field permeability values should be reduced to account for effects of embankment loading. Extensive field instrumentation should be required where subsoil stabilization by consolidation is used. Where subsoil consolidation techniques are used, field test sections are desirable to achieve maximum economy. Field test sections are also useful in assuring the technical feasibility of consolidation techniques where elevated structures or other techniques were preferred. The quality and amount of field inspection are especially important and can be related to the post construction behavior of the types of construction discussed.

Transportation Research Board NCHRP Synthesis No. 29, 1975, 25 pp, 19 Fig., 10 Tab., Photos., Refs., 2 App.

PURCHASE FROM: TRB Publications Off Orig. PC

DOTL RP

00 099768

GEOTECHNICS AND MECHANIZED TUNNEL BORING--THE ECHAILLON EXPERIENCE [La geotechnique et le creusement mecanise des tunnels-Experience d'Echaillon]

Report on the experience gained with the boring of a road tunnel in the Alpine crystalline range at Echaillon (Dauphine Alps). The 4.7 km tunnel (diameter: 5.8 m) was bored with a WIRTH machine in 4150 hours of work. This operation was monitored by the Technical Division of the French Electricity Board and the Toulouse Mineralogical Laboratory. [French]

Cordel, R. *Annales de l'Institut Tech du Batiment Travaux Pub* No. 322, Nov. 1974, pp 73-87, 8 Fig., 8 Tab., 8 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Societe de Diffusion de Tech du Bat et de Trav Pub 9 rue la Perouse, Paris 16E, France Repr. PC

00 099769

WATERPROOFING TUNNELS AND SHAFTS WITH POLYVINYL CHLORIDE SHEETING [Tunnel-und Schacht-Abdichtungsverfahren mit PCV-Folien]

No Abstract. [German]

Peduzzi, A. *Oesterreichische Ingenieur-Zeitschrift* Vol. 17 No. 11, 1974, pp 386-388, 2 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Springer Verlag 175 Fifth Avenue, New York, New York, 10010 Repr. PC

00 099775

MODERN METHODS FOR PLOTTING NEW LINES. AUTOMATIC CALCULATION AND DRAWING IN RESEARCH [Les methodes modernes de trace de lignes nouvelles. Le calcul et le dessin automatiques dans les etudes]

The authors explain the reasons behind the creation of a specialist body to study the plotting of a new line. The various operations of the scheme imply heavy reliance on computers for processing the topographical and geological data, calculating and plotting of profiles, and siting of structures. Stress is

placed on the importance and diversity of techniques employed, and on the advantages accruing from this mechanisation. [French]

Verrier, G Pronost, JP *Informations Techniques-SNCF-Direct de L'Equip* No. 14, Dec. 1974, 27 pp, 13 Fig., 2 Tab.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

00 125074

CHANNEL: FRENCH MINERS FIGHT CASCADE AS BRITISH MOLE BARES TEETH FOR PILOT

The author gives an account of progress that has been made (up to the end of 1974) with the channel tunnel. Progress that has been made by the French near Calais, where trouble has been encountered in the access tunnel (descenderie) through the ingress of 120 litres of water per second is described. Extensive grouting with bentonite and cement has failed to waterproof the tunnel and neither a small alpine roadheader nor a large Demag roadheader has been able to perform satisfactorily. A Robbins mole is now being tested and in order to bring it into use as soon as possible, an additional tunnel is being planned. Details are given of the progress made by the British near Dover, where both access tunnels (one 400m and the other 287m plus a 100m viaduct) and a 180m long assembly chamber have been driven, the latter 40m beneath the channel. The priestley 50m long tunnelling machine has also been assembled ready to commence work. Brief details are given of the proposed 3 phases of construction of the tunnel and the article includes information on the different conditions and policies in France and Britain. /TRRL/

Hayward, D *New Civil Engineer* No. 126, Jan. 1975, pp 19-22, 2 Fig., 6 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212673)

PURCHASE FROM: Institution of Civil Engineers 26-34 Old Street, London EC1V 9AD, England Repr. PC

00 125099

CRYOGENIC TREATMENT OF SHAFTS AND TUNNELS

One of the geotechnical processes able to contend with unstable or saturated soil conditions in civil or mining engineering, is that of soil-freezing. In this technique, a temporary conversion of the interstitial soil moisture forms a strong and impermeable frozen soil membrane around the excavation zone. With the development of cryogenic techniques, nitrogen is available in liquid form offering a rapid means of soil freezing. Typical applications of the technique include shaft deepening tunnel faces, sealing gaps in cofferdams and wherever temporary structural support is needed. Two examples are given of the use of soil freezing on a sewer tunnelling project in Edinburgh. /TRRL/

Harris, GP (Foraky Limited) *Tunnels and Tunnelling* Vol. 6 No. 5, Sept. 1974, pp 69-70, 2 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212703)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 125172

EMBANKMENTS ON COMPRESSIBLE SOIL [Remblais sur sols compressibles]

This bulletin describes the work of a group of engineers from the Laboratoire des Ponts et Chaussées, who studied in the laboratory and in situ the behaviour of high embankments on compressible soil. This publication is in five parts. Part (1) contains three general articles outlining the problems encountered. The first, in the form of recommendations, deals with the method of conducting the study and building an embankment on compressible soil. The second article reviews current theories, hypotheses and possibilities of application. The third article describes general study methods, types of site investigation used, laboratory tests for compressible soil, methods of calculating stability and settlement. Part (2) deals with embankments on peat and soft clay. A summary is given of the studies conducted on different experimental high embankments built on these types of soil. In part (3) measurements are given which were taken on 4 embankments on peaty soil. Part (4) details the special equipment developed

to obtain undisturbed samples and measurements in embankment subgrades. Special mention is made of a fixed piston sampler and a vane, which both operate from the same lightweight frame on the surface. Other measuring apparatus (settlement meter, piezometer, inclinometer) are described. Part (5) is concerned with specific problems studied in the laboratory. Only the first results obtained are included. Consolidation under variable load was studied theoretically and experimentally. Details are given of a special odometer developed and of the beginning of a study of settlement on peat samples by means of a triaxial apparatus. Some observations are made on creep conditions in samples in undrained phase. /TRRL/ [French]

Laboratoire Central des Ponts et Chaussées Bulletin May 1973, 361 pp, Figs., Tabs., Photos., Refs.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 101119)

PURCHASE FROM: Laboratoire Central des Ponts et Chaussées 58 Boulevard Lefebvre, 75732 Paris Cedex 15, France Orig. PC

00 125173

DRAINAGE IN FISSURED ROCK [Les drainages dans les roches fissurées]

The author recalls recent results obtained in the field of rock hydraulics, especially as regards the problem of the drainage of rocks. The rock medium is assimilated to a fissured medium with a matrix of low permeability. Flows in the vicinity of a drain (cylindrical drain and drain in a draining trench) are analysed, taking cracking into account. A basic distinction is made between the drainage of the cracks and the drainage of the rock matrix. With the help of practical examples, it is shown that the optimum direction of a drainage system depends mainly on the distribution of the cracks. For a given drainage operation, the cost of the drainage system can be markedly reduced if the direction and depth of the drains are judiciously selected. The problem of drainage efficiency in rock is examined, and it is concluded that the drainage capacity of rocks is first and foremost related to the geometry of the cracks. /TRRL/ [French]

Louis, C *Bureau de Recherches Geolog & Mini, Sect III, Bln* Vol. 2 No. 1, 1972, pp 3-11, 11 Fig., Refs.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 101122)

PURCHASE FROM: Bureau de Recherches Geologiques et Minières Department Documentation, B.P. 6009, 45018 Orleans, France Repr. PC

00 125198

ENGINEERING CLASSIFICATION OF ROCK MASSES FOR THE DESIGN OF TUNNEL SUPPORT

An analysis of some 200 tunnel case records has revealed a useful correlation between the amount and type of permanent support and the rock mass quality q , with respect to tunnel stability. The numerical value of q ranges from 0.001 (for exceptionally poor quality squeezing-ground) up to 1000 (for exceptionally good quality rock which is practically unjointed). The rock mass quality q is a function of six parameters, each of which has a rating of importance, which can be estimated from surface mapping and can be updated during subsequent excavation. The six parameters are as follows: the rqd index, the number of joint sets, the roughness of the weakest joints, the degree of alteration or filling along the weakest joints, and two further parameters which account for the rock load and water inflow. In combination these parameters represent the rock block-size, the inter-block shear strength, and the active stress. The proposed classification is illustrated by means of field examples and selected case records. Detailed analysis of the rock mass quality and corresponding support practice has shown that suitable permanent support can be estimated for the whole spectrum of rock qualities. This estimate is based on the rock mass quality q , the support pressure, and the dimensions and purpose of the excavation. The support pressure appears to be a function of q , the joint roughness, and the number of joint sets. The latter two determine the dilatancy and the degree of freedom of the rock mass. Detailed recommendations for support measures include various combinations of shotcrete, bolting, and cast concrete arches together with the appropriate bolt spacings and lengths, and the requisite thickness of shotcrete or concrete. The boundary between self supporting tunnels and those requiring some form of permanent support can be determined from the rock mass quality q . /TRRL/

Barton, N Lien, R Lunde, J *Rock Mechanics* Vol. 6 No. 4, Dec. 1974, pp 189-236, 8 Fig., 14 Tab., 6 Phot., 23 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213057)

PURCHASE FROM: ESL Repr. PC, Microfilm

00 125272

SETTLEMENT IN THE VICINITY OF SHIELD-DRIVEN TUNNELS [Asentamientos en la vecindad de tuneles perforados con escudo]

Results are given of measurements of settlement taken in the proximity of shield-driven tunnels. A relation is established between settlement and the nature of the terrain, the driving process and the tunnel lining used. Attention is drawn to the consequences of shield driving for neighbouring structures. /TRRL/ [Spanish]

Tinajero, J Vieitez, L *Ingenieria* No. 2, Apr. 1972, pp 209-220, 14 Fig., 3 Ref.

ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain, Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 100877)

PURCHASE FROM: Universidad Nacional Autonoma de Mexico Palacio de mineria, Apartado Postal M-6987, Mexico 1, D.F., Mexico Orig. PC

00 125273

TUNNELS AND TERRAIN [Los Tuneles y el Terreno]

The author recalls the necessity for preliminary geological investigations in all civil engineering projects. To supplement these investigations, it is recommended to use geophysical investigation techniques such as electrical and seismic methods. The problems of tunnel boring in different types of terrain are briefly reviewed, and several examples of tunnels in Spain are given: tunnels in granite, volcanic rock, metamorphic rock, slate, quartz, sand; pudding stone with a high content of siliceous materials, limestone and dolomite, limestone conglomerate and heterogeneous rock. /TRRL/ [Spanish]

Saez, A *Materials Maquinaria y Metodos para la Construc* No. 88, Jan. 1972, pp 7-14

ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain, Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 100817)

PURCHASE FROM: Materiales Maquinaria y Metodos para la Construc Maignon, 26 Barcelona 12, Spain Orig. PC

00 125297

EMBANKMENTS WITH LATERAL BERMS ON COMPRESSIBLE SOIL. DRAWING UP OF CHARTS FOR CALCULATING THEIR STABILITY [Remblais sur sols mous equipés de banquettes laterales-elaboration des abaques de calcul de stabilité]

This report presents charts developed with a view to rapidly calculating the stability of embankments with side berms built on compressible soil. The main aspects of the calculation of stability (safety factor, etc.) are discussed. This study deals with: an embankment with berm consisting of entirely frictional materials, the sides of which have a gradient of 1/2; the homogeneous subgrade is characterized by constant undrained cohesion. The calculations were carried out on a computer by means of the bishop method. They take into account the shear strength in the embankment. The graphs give a direct value of the safety coefficient as a function of the geometric parameters of the embankment and of the subsoil, and the mechanical characteristics of the materials (embankment and subgrade). These charts are presented so that they facilitate the selection of optimum dimensions for the stability berm. /TRRL/ [French]

Pilot, G Moreau, M

Laboratoire Central des Ponts et Chaussées R&D Rept. No. 25, Feb. 1973, 64 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 101058)

PURCHASE FROM: Laboratoire Central des Ponts et Chaussées 58 Boulevard Lefebvre, 75732 Paris Cedex 15, France Repr. PC

00 125298

STUDY OF THE FAILURE OF FIVE EMBANKMENTS ON COMPRESSIBLE SOIL [Etude de la rupture de cinq remblais sur sols mous]

This article summarizes five studies of the failure of embankments built on compressible soil observed over the last 10 years either on construction sites or during full-scale tests. The first part of the article consists of a brief bibliography, which deals with landslides observed during the last 20 years. The second part describes each failure in detail: nature of the subgrade, conditions of construction, description of the landslide, calculation of stability. The third part deals with the form of failure observed, the shear strength of the embankment, and values of the safety coefficient up to failure point. /TRRL/ [French]

Pilot, G *Bulletin de Liaison des Lab des Ponts et Chaussées* No. 64, Mar. 1973, pp 89-101, Figs., Tabs., Refs.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 101068)

PURCHASE FROM: Laboratoire Central des Ponts et Chaussées 58 Boulevard Lefebvre, 75732 Paris Cedex 15, France Orig. PC

00 125299

DETERMINATION OF THE HYDRAULIC CHARACTERISTICS OF SOILS FROM PIEZOMETRIC VARIATIONS [Détermination des caractéristiques hydrauliques des sols à partir des variations piézométriques]

The piezometric level of an alluvial water table, which is connected with a river, is a direct function of the level of the latter and any variation in the level of the river is reflected in the level of the alluvial water table. The study of the variations should facilitate the determination of the hydraulic properties of the water table. The first part of the article analyzes various cases: horizontal propagation in a free or captive water table, vertical propagation in compressible or non-compressible silt overlaying gravel. In each case formulae are derived for a homogeneous medium, which can be applied to the damping and dephasing of the water movement. It is shown that it is impossible to obtain the permeability coefficient value, for which it is necessary to measure the flow and coefficient of consolidation of compressible soil, because damping is too rapid. The second part of the article deals with the application of the above theories to the study of the properties of the subgrade of three embankments in the seine valley, the seine being subjected to marling and seasonal floods. The main conclusion is that, if it is not possible to obtain the value of the soil hydraulic parameters. The observation of the fluctuation in pressure in compressible media shows that the terrain is satisfactorily drained and that consolidation will be rapid. /TRRL/ [French]

Rat, M Vautran, J *Bulletin de Liaison des Lab des Ponts et Chaussées* No. 64, Mar. 1973, pp 103-119, Figs., Tabs., 1 Phot., Refs.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 101062)

PURCHASE FROM: Laboratoire Central des Ponts et Chaussées 58 Boulevard Lefebvre, 75732 Paris Cedex 15, France Orig. PC

00 125508

STABILITY OF EMBANKMENT ON CLAY

The paper describes the failure of an embankment on clay and the investigation sponsored by the Ohio DOT and the Federal Highway Administration, carried out to determine the mechanism of the failure. The slip surface passed through a thin layer of soft silty clay. Measured deformations and pore-water pressures are summarized. The shear strength of the silty clay was measured by unconfined compression tests, triaxial tests, and simple shear tests. Stability analyses using the undrained shear strength measured by the unconfined compression test and the simple shear test give safety factors between 1.1 and 1.4. The consolidated-undrained triaxial test was found to overestimate the undrained shear strength by a considerable amount. Stability analyses using effective stress and measured by triaxial and simple shear tests also overestimate the safety factor. Probability analysis was used to evaluate the effect of the various uncertainties on the computer safety factors. /HRIS/

Wu, TH Thayer, WB Lin, SS *ASCE Journal of the Geotechnical Engineering Div* Proceeding Vol. 101 No. GT9, ASCE #11584, Sept. 1975, pp 913-932

PURCHASE FROM: ASCE Repr. PC

DOTL JC

00 125531

INSTRUMENTS DEVELOPED BY THE TRRL FOR STUDYING THE BEHAVIOUR OF EARTHWORKS

A description is given of instruments which have been developed by the earthworks and foundations division of the Transport and Road Research Laboratory for measuring settlement, porewater pressure and total pressures in soil masses. In addition a recently developed apparatus for recording automatically the data from in-situ permeability tests is described. The instruments have been employed at a number of full-scale investigations of the settlement and stability of road embankments and the performance of the gauges in these studies is briefly described. (a). The covering abstracts for the symposium are IRRD Nos. 213000 and 213001. /TRRL/

Presented at the conference-Field Instrumentation in Geotechnical Engineering.

Irwin, MJ (Transport and Road Research Laboratory)
Butterworths & Company, Limited Conf Paper 1974, 13 pp, 6 Fig., 3 Phot., 6 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213002)

PURCHASE FROM: Butterworths & Company, Limited 88 Kingsway, London WC2B 6AB, England Repr. PC

00 125556

FORCES ON RETAINING WALLS: USING THE METHOD OF SLICES

This article gives an account of the use of "the method of slices" to calculate the magnitude of a force on a retaining wall, together with its position and overturning moment. After giving details of the method and the derivation of the appropriate formulae, the author gives an account of two computer programs used to solve retaining wall problems. One program gives a detailed solution including the value of each inter-slice force in addition to the magnitude and position of the force on the wall, the other determines values of the magnitude of the force for a large number of centres forming a grid pattern. Details are given of the application of the method to the solution of typical problems which include factors of safety and the effect of water pressure. He also compares the results with those obtained by the wedge method of analysis. It was found that the solutions obtained indicate the two methods give similar values for the force on a retaining wall and that the value is not much affected by the range of values selected for the slope of the inter-slice forces. It was also found that the position point of application is appreciably affected by the slope of the inter-slice forces, that if the failure surface is circular in cross-section the slice method gives a higher value than the wedge method in the case of cohesive soils, and that the force may be increased by water pressure in the soil, even when not applied directly against the surface of the wall. /TRRL/

Spencer, E *Civil Engineering* pp 18-23, 3 Fig., 2 Tab., 6 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212629)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 125583

DESIGN OF BOX GIRDER BRIDGES

This report reviews progress in the design of box girder bridges and gives clear recommendation wherever possible on preferred methods of design. All phases of design are considered, from initial sizing through to final design and detailing. Points of particular significance are covered in the detailed references appended. The following particular aspects of box girder design are considered: dead and live loading, methods of analysis, miscellaneous points on live load analysis, differential temperatures, prestressing, working stress design, overload and ultimate load, cable layout, duct curvature problems, construction joints, anchor blocks, formwork and falsework, concrete, erection and grouting. /TRRL/

Donald, RAH
National Roads Board, New Zealand R&D Rept. Bulletin 24, 1974, 34 pp, Figs., Tabs., Photos., 52 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212864)

PURCHASE FROM: National Roads Board, New Zealand Road Research Unit, Wellington North, New Zealand Repr. PC

00 125606

PRINCIPLES OF ANALYSIS AND DESIGN OF REINFORCED EARTH RETAINING WALLS

The paper describes a method of design of retaining walls wherein the material forming the retaining wall is earth containing horizontal reinforcement. The reinforcing members develop their tension through the behaviour described by mohr-coulomb equation. It is shown that the sum of these tensions and their centre of action opposes the pressure from the retained earth maintaining equilibrium. It appears that the type of construction is cheaper and can be constructed more quickly than conventional gravity retaining walls. The simple explanation adopted for the behaviour of the structure differs from that proposed by M. Henri Vidal for the reinforced earth method, and the rules developed will give a different disposition of reinforcing material. /TRRL/

Banerjee, PK (University College, Wales) *Highway Engineer* Vol. 22 No. 1, Jan. 1975, pp 13-18, 13 Fig., 11 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213307)

PURCHASE FROM: ESL Repr. PC, Microfilm

00 125608

CALCULATION OF ROCK PRESSURES ON TUNNEL SUPPORTS

Formulae are derived for the magnitude of rock pressures on roadway supports, making use of flamant's and melan's principle of "the propagation of forces from a loaded point". Flamant's principle was adopted to derive formulae for pressures in loose rocks, while the formulae for pressures in cohesive rocks were based on melan's principle. It was assumed that the supports are subjected to loading from the section of rock body contained between two vertical limiting planes. Vertical pressures were determined as the sums of the effects of elementary volume forces over the section defined by the limiting planes and the roof of the workings, assuming that the rock body exhibits isotropic properties, that hooke's law is true in this medium, and that the rocks and supports have the same elastic constants. The value of vertical pressures is expressed by the equations (4) and (8). Next formulae were derived for pressure values, treating the rock body as a rheological kelvin medium and assuming an elastic model for the supports. A semi-plane was considered as being in a state of primary stress due to the weight of the overlying strata. The pressure values may be expressed by the equation (27). From the analysis of the formulae derived it may be concluded that the pressure value depends on the width of the workings, poisson's number, the shear modulus of the rock body, the rigidity of the supports, and the depth at which the workings are excavated. The relation between rock pressure and depth is not linear because as the depth increases the pressure decreases. /TRRL/

Chudek, M Swist, E *Studia Geotechnica* Vol. 3 No. 1, 1973, pp 3-11, 9 Fig., 11 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213020)

PURCHASE FROM: Technical University, Poland Warsaw, Poland Repr. PC

00 125827

SUBSURFACE EXPLORATION FOR UNDERGROUND EXCAVATION AND HEAVY CONSTRUCTION

Proceedings include 27 papers that cover various aspects of subsurface exploration for tunneling, highways, dams, and other heavy construction. Following is a list of titles and authors of the paper presented: Engineering Measurements. By Eugene L. Foster, State of Practice-Subsurface Investigation for Highway Tunnels. By David S. Gedney. Important Ground Parameters in Soft Ground Tunneling. By Ronald E. Hower. Underground Excavation: Geologic Problems and Exploration Methods. By Andrew H. Merritt. Exploration and Geologic Prediction for Underground Works. By Lloyd B. Underwood. Exploration for Soft Ground Tunnels-A New Approach. By Birger Schmidt. Subsurface Investigation System Planning for Highway Tunnels. By James L. Ash, Bruce E. Russell and Robert R. Rommel. Recommended Borehole Investigation System for Soft Ground.

By Stephen Alsup. Engineering Applications of Electrical Geophysical Methods. By George V. Keller. New Applications of Seismic Investigations of Engineering Problems. By Phillip Roming. Acoustic Techniques Suitable for Use in Soil. By D.L. Hipkins and L.A. Whitney. Acoustical Holography as a Tool for Geologic Prediction. By Ted O. Price. Status of Ground-Probing Radar and Some Recent Experience. By John C. Cook. Subsurface Video Pulse Radars. By David L. Moffatt. Continuous Subsurface Profiling by Impulse Radar. By Rexford M. Morey. Overview of Horizontal Borehole Geophysical Techniques (Applicable in Subsurface Exploration for Underground Excavation and Heavy Construction). By Llewellyn A. Rubin. Recent Developments in Earthwork Instrumentation. By Raymond A. Forsyth and Kenneth Jackura. Measurement of In-Situ Stress in Soils. By Peter J. Huck and Madan M. Singh. Development of a Special Instrument for the In-Situ Measurement of the Strength and Stiffness of Soils. By B. Peter Wroth and John M.O. Hughes. Self-Boring Placement Method of Soil Characteristics Measurement. By Francois Baguelin, Jean Francois Jezequel and Alan Le Mehaute. Minor Principal Stress Measurements in Marine Clay with Hydraulic Fracture Tests. By Michael Bozozuk. Indirect Determination of In-Situ Stress Ratios in Particulate Materials. By Geoffrey E. Blight. Benefits of Tunnel Measurements. By Larry H. Heflin. Identification of R&D Needs for Subsurface Explorations in the Coal Mining Industry. By Alphonse of Earth Dam Foundations. By John P. Bara. Subsurface Explorations in the Coal Mining Industry. By Alphonse C. Van Besien. What's Ahead in Subsurface Exploration. By Madan M. Singh.

Subsurf Explor for Underground Excavation and Heavy Constr, Spec Conf, Proc, Pap, New Engl Coll, Henniker, NH, 11-16 August 1974.

American Society of Civil Engineers 1974, 404 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ASCE Repr. PC

00 125870

FACTORS INFLUENCING THE STABILITY OF SOIL SLOPES

The knowledge of factors influencing the stability should be regarded as a prerequisite for expert estimate of stability of soil slopes and of causes of damages done to them. The ten most important influences are briefly discussed and their mode of operation and interdependencies are given in table form. [German]

Schmidt, M *DET Eisenbahntechnik* Vol. 23 No. 2, Feb. 1975, pp 80-84

ACKNOWLEDGMENT: British Railways

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

00 125875

ARPA-BUREAU OF MINES ROCK MECHANICS AND RAPID EXCAVATION PROGRAM, A RESEARCH PROJECT SUMMARY

This Bureau of Mines publication reviews the research conducted under a 3-year, \$6.6 million program in rock mechanics and rapid excavation. The program was sponsored by the Defense Department's Advanced Research Projects Agency and was managed by the Bureau. In addition to the rock mechanics investigations, projects were funded in the following general areas of rapid excavation: System analysis, geologic prediction, rock disintegration, ground support, and materials handling. This report briefly summarizes the significant technical accomplishments of the contract reports and other publications where more detailed descriptions of the research can be obtained.

Olson, JJ Olson, KS

Bureau of Mines 1975, 191 pp, 73 Fig.

ACKNOWLEDGMENT: Bureau of Mines

PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

GPO-I28.27:8674

00 125878

DESIGN AND CONSTRUCTION OF LONG-SPAN BRIDGES AND SPECIAL TYPE BRIDGES

In the construction of the Shin Kansen and improvement of narrow gauge lines it has been increasingly necessary to design long span bridges or special type bridges because of numerous and complex factors. Most of the bridges constructed are now made of concrete or prestressed concrete. However, in an earthquake-prone country like Japan, a heavy concrete bridge has been

found disadvantageous, and accordingly, research for weight reduction and aseismic structure of bridges has been undertaken. This article outlines Japan's new bridge technology which aims to resolve problems such as aseismic long span bridge structures, special type bridges, and measures taken to alleviate noise.

Noguchi, T (Japanese National Railways) *Japanese Railway Engineering* Vol. 15 No. 2, 1974, pp 19-22, 5 Fig., 1 Tab., 5 Phot.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

00 126057

THE DESIGN OF THE CHANNEL TUNNEL

This paper touches on the history of the channel tunnel from the re-awakening of interest in the project, in 1957, to the present day. Reference is made to the agreements between the British and French governments and the companies responsible for studies, financing and construction. The project is described and the characteristics of the traffic and rolling stock examined. The factors which determined the route and dimensions of the tunnel are mentioned, as well as some of the operational effects and installations. The geology and the considerations leading to the design of the linings are described. The design process, the testing of lining joints and the verification of design assumptions are outlined. /Author/TRRL/

Gould, HB (Department of the Environment, England); Jackson, GO (Rio Jinto Zinc Development Enterprises Limited); Tough, SG (Mott, Hay Anderson) *Structural Engineer* Vol. 53 No. 2, Feb. 1975, pp 45-62, 5 Fig., 7 Tab., 12 Phot., 27 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213508)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 126058

DESIGN OF DEFLECTION WALL AGAINST ROLLING STONES ON A HILL SLOPE

The authors propose building an intercepting wall on a hill for absorbing impact from boulders rolling down from a height of 200 metres and damaging the national highway from Jammu to Srinagar in India. The boulders weigh up to 20 tonnes. The relative merits of building a retaining wall or a deflecting wall are discussed. Results of site tests of loss of energy of rolling stones are given. A 38.4 percent loss is adopted in the design calculations based on these tests. Results of impact resistance and energy absorption tests on a reinforced concrete deflection wall model are also given. Different materials are placed on the cantilever slab to cushion the effect. Wired stone crates are suggested as the best form of cushioning on the basis of energy absorption tests. /TRRL/

Arya, AS Thakkar, SK (Roorkee University, India) *Indian Highways* Vol. 2 No. 9, Sept. 1974, pp 22-36, 7 Fig., 2 Tab., 3 Phot., 6 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213505)

PURCHASE FROM: Indian Roads Congress Jamnagar House, Shanjahan Road, New Delhi 110011, India Repr. PC

00 126060

GROUTING HEATHROW'S NEW TUBE

This short article describes the stabilization of the sandy gravel above the new Piccadilly Line station tunnels at Heathrow Airport. The soil formation comprises 5m of water-bearing sandy gravel overlying clay, the crown of the twin 7.5 diameter tunnels coinciding approximately with the top of the clay. A series of 80 grout holes were drilled in a fan-shaped arc across the entire width of the twin tunnels. A multi-sleeved grout tube was fitted in each hole for the two-stage grouting operation, the tube being sealed into the ground with a bentonite/cement sleeve grout. Primary injections of a cement/bentonite grout were followed by a chemical-solution grout consisting of sodium silicate and mixed esters, which filled the remaining pores and provided an impermeable mass of high strength. /TRRL/

Contract Journal Vol. 264 No. 4986, Mar. 1975, p 35, 1 Fig.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213494)

PURCHASE FROM: IPC Building and Contract Journals, Limited 32 Southwark Bridge, London SE1, England Repr. PC

00 126128

FIFTY-YEAR DEVELOPMENT CONSTRUCTION OF STEEL GIRDER BRIDGES

Steel girder bridge construction has evolved from standard to customized design with curved girders, box girders, and combinations thereof becoming more common. Refined designs require increased man-hours to maintain quality assurance and the safety with efficiency necessary to offset additional costs. Erection procedures basically remain the same with the trend toward erection in longer and heavier sections. Procedures are illustrated by representative structures. /ASCE/

Burroughs, EA (United States Steel Corporation) *ASCE Journal of the Construction Division* Proceeding Vol. 101 No. C03, ASCE #11549, Sept. 1975, pp 463-476, 19 Fig., 3 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 126130

FIFTY-YEAR HISTORY OF MOVABLE BRIDGE CONSTRUCTION--PART I

Part I of this three-paper series reviews the history of movable bridges and follows the development of the construction of this type of structure during the past half century. In recent years, however, there has been a preponderant tendency to build high level fixed bridges to avoid the inconvenience caused by an open drawbridge. As the railroads of the country are rebuilt, there will be large numbers of movable railroad bridges constructed. As existing drawbridges in inner cities become obsolete, many will be rebuilt in kind or with increased vertical and horizontal clearances to minimize delays to ground and waterway transport. /ASCE/

Hardesty, ER Fischer, HW Christie, RW (Hardesty and Hanover) *ASCE Journal of the Construction Division* Proceeding Vol. 101 No. C03, ASCE #11565, Sept. 1975, pp 511-527, 12 Fig., 1 Tab., 3 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 126131

FIFTY-YEAR HISTORY OF MOVABLE BRIDGE CONSTRUCTION--PART II

Part II in this series of three papers describes the construction of representative movable bridges built in United States during the past half century, amplifying these remarks with illustrations. It also illustrates past and present concepts and installation of bridge machinery. The firms of Parsons, Brinckerhoff, Quade and Douglas, Hazelet and Erdal, and Earle Gear and Machine Co. collaborated in presenting the examples. /ASCE/

Hardesty, ER Fischer, HW Christie, RW (Hardesty and Hanover) *ASCE Journal of the Construction Division* Proceeding Vol. 101 No. C03, ASCE #11594, Sept. 1975, pp 529-543, 19 Fig., 5 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 126132

FIFTY-YEAR HISTORY OF MOVABLE BRIDGE CONSTRUCTION--PART III

Part III in this series of three papers, describes Chicago's movable bridges, their history and importance in the development of a great metropolitan complex. Bridges are vital to the development of urban areas containing navigable waterways. Chicago's concentrated urban development required low level and consequently movable bridges to avoid introduction of "Chinese Walls" throughout the city. As the replacement of obsolete bridges becomes necessary, severe problems will be developed in trying to undertake the reconstruction without causing disruption to vital traffic movements. /ASCE/

Wengenroth, RH Mix, HA (Westenhoff and Novick, Incorporated) *ASCE Journal of the Construction Division* Proceeding Vol. 101 No. C03, ASCE #11555, Sept. 1975, pp 545-557, 14 Fig., 3 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 126356

STUDY OF PREVENTION OF SLOPE EROSION

Mechanism of slope erosion and surface failure occurrences has been clarified and classified through a series of indoor experiments and influence of grass on the slope has been studied chiefly from a viewpoint of variation in water balance of rainfall. On the assumption that seeding is employed as the method of prevention of slope erosion, the effects and limits of various types of chemicals adapted to prevent erosion seemed to have been made clear immediately after seeding procedure was determined through a series of indoor experiments and field tests, and thereby some typical practical standards have been obtained. The procedures of these tests themselves have been also examined. Typical practical standards have been obtained also in connection with seeding from consideration and investigation of various problems remaining to be solved.

Kobashi, S Kurosawa, A Sakazaki, K Kusano, K *Railway Technical Research Institute* Vol. 16 No. 2, June 1975, pp 54-59, 8 Fig., 4 Tab.

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

00 126441

SHOTCRETE FOR TUNNEL LINING

The growing use of shotcrete in tunnels and shafts requires engineers to look closely at ways for ensuring that the applied lining meets specifications. Some control techniques, based on extensive experience, are listed. Suggested are methods for further improvements in the shotcrete process.

Gullan, GT *Tunnels and Tunnelling* Vol. 7 No. 5, Sept. 1975, 7 pp, 6 Fig., 1 Phot., 13 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 126442

REFLECTIONS ON THE BUDAPEST SUBWAY CONFERENCE

This report of the 1975 conference included descriptions of general problems of tube metros, construction problems in tunneling and methods used for cut-and-cover tunnels. Since the Budapest Metro is being extended, there were descriptions of station construction methods there. Russian station construction methods were discussed.

Jacomb-Hood, EW *Tunnels and Tunnelling* Vol. 7 No. 5, Sept. 1975, pp 31-33, 4 Fig., 1 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 126970

STRESS OF THE SUBGRADE BY DIFFERENT TYPES OF SLEEPERS

The stress of the subgrade by prestressed-concrete sleepers BS 65 and BS 66 mainly used by the German Railways is different. Early measurements obtained with tests of the prestressed-concrete sleeper BS 72 showed that subgrade stresses are lower than for BS 62, BS 65 and for the timber sleeper, and are of the order of the values calculated. However, for a statistically safe statement the number of measurements is still insufficient. Therefore trials will be made in tests sections to obtain early results. [German]

Just, H Schmidt, E *DET Eisenbahntechnik* Vol. 23 No. 7, July 1975, pp 298-302

ACKNOWLEDGMENT: British Railways

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

00 126971

EPOXY-REPAIRED REINFORCED CONCRETE BEAMS

Tests were carried out on reinforced concrete beams which were severely damaged and then repaired by epoxy injection. The test results illustrate the effectiveness of the repair process.

Chung, HW *American Concrete Institute, Journal of* Vol. 72 No. 5, May 1975, pp 233-234

00 126972

INDUCTIVE DETECTION OF UNDERGROUND METALLIC PIPES

A widely used instrument for locating underground metallic pipes consists of two coils: one of which (the transmitting coil) excites eddy currents in the pipe, and the other (the receiving coil) detects the magnetic field of these eddy currents. Irregularities in the response of this type of instrument appear during certain search operations. These irregularities cause uncertainty about the position of the line of the pipe. They are explained quantitatively in this paper. The analysis shows how the reaction field of the pipe varies with the depth and diameter of the pipe, and with its electrical and magnetic properties. A theoretical estimate of the diameter of the smallest pipe that can be detected is given.

Glennie, EB Miller, TJE *Institution of Electrical Engineers, Proceedings* Vol. 122 No. 4, Apr. 1975, pp 345-348

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 126995

THE CONSTRUCTION OF TUNNELS FOR THE NEW LINES TO BE BUILT BY THE DB [Der Tunnelban im Zuge der Neubaustrecken der Deutschen Bundesbahn]

The difficult problem of the layout of tunnels to be constructed, for new DB lines, is dealt with from the engineer consultant standpoint. The author highlights the details of mechanised boring and considers all its aspects, account being taken of the dimensions of the transversal section, the equipment used and protection procedures. In conclusion, he proposes tunnel borings for single and double line traffic working for speeds in the region of 300 km/h. [German]

Berger, H *Eisenbahntechnische Rundschau* Vol. 24 No. 1-2, Jan. 1975, pp 21-25, 1 Fig., 7 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

00 126997

LAYOUT OF THE NEW MANNHEIM-STUTTGART LINE [Die Planung der Neubaustrecke Mannheim-Stuttgart]

For this new line (108 km), which links population centres of 520 and 610 persons/km square, the calculated benefit-cost coefficient is 10.3. In order to reach the 300 km/h over the longest possible sections, 81% of the line has a minimum radius curve of 7 km and a maximum gradient of 1.25%. This explains why 25% of the line is in tunnels and 8% over viaducts. There are 4 junctions and 3 branches which make connection with the present rail network. It is planned to provide for a clearance gauge of 5.8 m in height and 5.3 m in width. The passing sidings will be positioned at approximately 7 km distance intervals. The line will have its own 110 kV power supply. This new line will give a 41 min. reduction in journey time for intercity trains, and of 50 min. for fast goods trains. [German]

Wegel, H Jakob, P *Eisenbahntechnische Rundschau* Vol. 24 No. 1-2, Jan. 1975, pp 11-15, 5 Fig., 5 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

00 127000

RESEARCH AND DEVELOPMENT ON TUNNEL LININGS IN THE UNITED STATES [Versuchs-und Entwicklungsarbeiten mit Tunnelauskleidungen in den USA]

Research has been carried out on polymer concrete which has 4 to 5 times the strength of conventional concrete and greater resistance to fire (fires in tunnels, prefabricated tunnel lining segments). Regulated-set cement is used and handling time is from 10 to 40 minutes. (70 km/cm square compressive

strength and 20 km/cm square flexural strength 90 minutes after mixing). Steel fibre reinforced concrete is used as pumped or projected concrete for structural support (115 kg of 0.025/0, 55/25 mm fibre per cubic meter of concrete, or 5% of total weight, 10 mm maximum granulation and 120 kp/cm square flexural strength). Tests have been carried out on tunnel lining on a 1/1 scale. [German]

Lucke, WN *Bau und Betrieb von Verkehrstunneln* 1974, pp 41-48, 18 Fig., 1 Tab.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Bau und Betrieb von Verkehrstunneln Cologne, West Germany Repr. PC

00 127352

INVESTIGATION ON THE CORROSION OF STEEL BRIDGES AND THE METHOD OF MAINTENANCE PAINTING

The degree of rust and of the degradation of paint films was investigated on two hundred and seventy railway bridges in various kinds of corrosive environments. Based on the results of the investigation, proper repainting cycles were estimated at 6.9 years in rural zone, 7.8 years in mountainous zone, 6.0 years in industrial zone and 3.9 years in seaside zone. The degree of rust was found to be quite different on the various structural parts of railway bridges.

Sato, Y Hashimoto, T *Railway Technical Research Institute* Vol. 16 No. 2, June 1975, pp 90-93, 4 Fig.

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

00 127602

DETERMINATION OF THE IN-SITU STATE OF STRESS IN SOIL MASSES

Methods for estimating in situ stress from a knowledge of soil, assumed stress history, and direct measurement are identified and described. All known methods for determining in situ stresses are summarized. This information is needed, as an input, for sophisticated computer programs that evaluate stability conditions, estimate ground movements around excavations, and predict loads of tunnels and retaining-wall structures. Recommendations are made for the development of a more sophisticated hardware, transfer and development of fabric analysis technology to soil mechanics, and long-range development of magnetic resonance techniques.

Huck, PJ
IIT Research Institute Sept. 1974, 316 pp

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242710, DOTL NTIS

00 127758

DAMAGE DUE TO VIBRATION [Skadlig Inverkan av Vibrationer]

The report contains six lectures held at a symposium arranged by the Swedish Geotechnical Institute. The items are: 1. Ground vibrations and their harmful effects- influence of vibratory compaction equipment. 2. Ground vibrations generated by trains-their influence on buildings and people. 3. Road traffic-induced vibrations. 4. Safe rock blasting. 5. Vibrations-damage and responsibility. 6. Relation between traffic-generated vibrations, their frequencies, particle motion displacements, velocities and vehicle speeds. See IRRD Abstracts Nos. 214778 to 214782 for summaries. /TRRL/ [Swedish/English]

Swedish Geotechnical Institute Conf Paper No. 56, 1974, 95 pp, Figs., 5 Tab., 14 Phot., Refs.

ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, 7

PURCHASE FROM: Swedish Geotechnical Institute Banergatan 16, S-115-26 Stockholm, Sweden Repr. PC

00 127843

CONCRETE FOR TUNNEL LINERS: BEHAVIOR OF FIBER REINFORCED QUICK SETTING CEMENT CONCRETE

This study was undertaken to determine the behavior of steel fiber reinforced, quick-setting cement concrete and provide information on these materials for application in tunnel liners. The use of expansive cement,

special fiber geometries, fiber orientation by vibration and postcracking behavior in compression as related to tunnels are briefly discussed. A Catalog of Standard Mixes for tunnel liner concretes is introduced. Strength, handling time and elastic properties are reported for pumpable mix designs with 3/8-in. (10-mm) maximum-sized aggregate with regulated-set cement and 0.9, 1.2 and 1.5 volume percent steel fiber reinforcement. Durability studies show that low void volume, pumpable mix designs are less permeable than mix designs proportioned by conventional methods. Sulfate resistance studies indicate that the quick-setting cement concrete studied to date deteriorates sooner than type 1 cement concrete in a particular sulfate environment. Regulated-set cement concrete heated to 660 F (350 C) retain 30 to 40 percent of their original strength after cooling. Available research on corrosion of fiber reinforced concrete is reported and a research program is suggested.

This study was sponsored by FRA.

Halvorsen, GT Keske, WG Stout, JA Kesler, CE
Illinois University, Urbana, (UIIU-ENG-75-0008) FRA OR&D 75-87, Aug. 1975, 93 pp, Figs., Tabs., Refs.

Contract DOT FR 30022

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

DOTL NTIS

00 127846

CONCRETE FOR TUNNEL LINERS: PUMPABLE FIBER REINFORCED CONCRETE

This study was undertaken to develop a procedure for designing fiber reinforced concrete mixes that may be delivered by pumping and to provide information on this method for applications in tunnel liners. The presence of fibrous reinforcement in the concrete increases the harshness of the mix and, therefore increases the complexity of pumping problems. However, by selecting combinations of fine aggregates, coarse aggregates and fibers which results in minimum volume of voids and providing a paste content slightly in excess of the voids, fiber reinforced concretes can be pumped. Mixes with four different maximum sizes of aggregate were found to be pumpable when evaluated in the laboratory.

This study was sponsored by Federal Railroad Administration, DOT.

Ounanian, DW Halvorsen, GT Kesler, CE
Illinois University, Urbana, (UIIU-ENG-75-2009) Final Rpt. FRA OR&D 75-88, Aug. 1975, 45 pp

Contract DOT FR 30022

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

DOTL NTIS

00 127848

CONCRETE FOR TUNNEL LINERS: MIX DESIGN RECOMMENDATIONS FOR PROTOTYPE EXTRUDED LINER SYSTEM

Fiber reinforced, quick-setting cement concrete mix designs are suggested for use in the development of a prototype liner system. These mix designs can meet the structural and durability requirements of the tunnel liner and can be placed in a slipform by pumping. The mix designs are governed mainly by the fact that the mix must be pumpable. Aggregate shape and gradation are critical. A mix with a high likelihood of pumpability can be formulated by adherence to a procedure based on prevention of segregation failure, the most common pumping failure mode of fiber reinforced concrete. Fiber reinforced concrete mixes proportioned for pumping are of high strength, by normal standards, because of the paste content necessary for workability. Conventional pumping equipment is believed adequate for placing properly designed fiber reinforced concrete mixes if components are selected to minimize line head losses and minimize remodeling of the concrete. Mixes for a specific field application should be tested for set times, pumpability and strength, using field procedures for batching, mixing, and placing, prior to actual field use.

This project was sponsored by FRA.

Halvorsen, GT Kesler, CE Paul, SL
Illinois University, Urbana, (UIIU-ENG-75-2010) Final Rpt. FRA OR&D 75-89, Aug. 1975, 29 pp, Figs., Tabs., Refs.

Contract DOT FR 30022
ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

00 127872

**BR GREAT NORTHERN SUBURBAN
ELECTRIFICATION-TRACK REMODELING AND ASSOCIATED
CIVIL ENGINEERING**

Extensive track realignment and the rebuilding of stations and bridges are involved in electrification of 110 km of British Rail lines used for suburban service into Kings Cross and Moorgate stations. Multi-span brick arch road overpasses had to be replaced completely using explosive and hydraulic jacks for demolition. Details of track changes to permit express speeds of up to 200 kph and local and branch line speeds of 120 kph are discussed. The lines' inner areas will have both 750-V third rail and 25-kV catenary for power distribution.

O'Loughlin, TB (British Railways Board) *Rail Engineering International* Vol. 5 No. 5, Aug. 1975, pp 201-206, 2 Fig., Photos.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

00 127897

TUNNELLING AND FALSEWORK HAZARDS

Extracts from some of the papers presented at the conference "Tunnelling and Falsework Hazards" held at the Institution of Civil Engineers in London in March 1975 are given. The papers include: Structural Safety and the Doe, Bridle, RJ; Tunnel Hazards-UK Experience, Muir Wood, AM, Unforeseen Loads on Falsework, Mott, JCS; Making Falsework Safer, Bragg, SL. /TRRL/

Bridle, RJ Buirle, RJ Mott, JCS Bragg, SL *Surveyor - Public Authority Technology* Vol. 145 No. 4319, Mar. 1975, 3 pp, 1 Fig.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215057)

PURCHASE FROM: IPC Building and Control Journals Limited 32 Southwark Bridge, London SE1, England Repr. PC

00 127898

**WATERPROOFING OF THE AUBER STATION BY MEANS OF
EPOXY RESINS [Execution de l'étanchéité à la station auber au
moyen de résines époxydes]**

One of the main problems during the construction of the Auber underground station was that of the adhesion of the waterproofing lining to the walls. A continuous resin film with high mechanical strength was used. A cement coating was also necessary to protect the resin coating and to be used as a support for later finishing processes (tiles, paint, etc). Because of the high level of humidity in the tunnel, polyester and polyurethane could not be utilized. The waterproofing of the tunnel proceeded as follows: (1) treatment of joints by means of injection; (2) treatment of isolated points and cleaning of the surface; (3) application of two coats of resin on dried surfaces; (4) application of cement coating. /TRRL/ [French]

Construction No. 5, May 1973, pp 152-153, 2 Phot.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussées, Transport and Road Research Laboratory (IRRD 102020)

PURCHASE FROM: Editeur Dunod 26 Boulevard de l'Hopital, Paris 5e, France Repr. PC

00 127899

STEPPING OUT ACROSS SIBERIA

This article draws attention to the special problems of construction in arctic conditions, particularly the problem of summer thawing of the permafrost which leads to ground heave and displaces piled foundations. An outline is presented of the method used to form structural foundations for the railway which was begun in December 1974. A deep hole is drilled into the ground, a prefabricated ferro-concrete pile is lowered into it, and concrete is poured into the narrow free space remaining inbetween. The concrete forms a strong bond between the pile and the surrounding, still-frozen soil. However, larger structures require far more extensive foundation works with subsequent subsidence problems if undertaken during the summer season. Mention is made of the use of refrigeration piles, and of the hydraulic method of transport of the ballast required for the project. /TRRL/

Contract Journal Vol. 266 No. 5008, Aug. 1975, pp 22-23, 2 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215164)

PURCHASE FROM: IPC Building and Contract Journals, Limited 32 Southwark Bridge, London SE1, England Repr. PC

00 127910

PRESTRESSING OF STEEL STRUCTURES

In addition to the roof structures of a large stadium and a television studio, this article describes the erection over the Olifants River in South Africa, of a continuous steel girder railway bridge which required the post tensioning of the concrete deck over the whole length of the bridge, with concentrated post tensioning over the piers. Also described is a steel road bridge over the Nagagane river, where the precast concrete deck slabs were post tensioned and then connected to the steel girders to form a continuous structure. /TRRL/

Bruinette, K Pretorius, PC (Bruinette, Kruger, Stoffberg and Hugo) *Civil Engineer in South Africa* Vol. 17 No. 5, May 1975, pp 105-113, 10 Fig.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 214479)

PURCHASE FROM: ESL Repr. PC, Microfilm

00 128126

SAFE ROCK BLASTING [Forsiktig Sprængning]

The technique of blasting rock without causing harmful effects on surrounding buildings or other objects is described. The theory of wave propagations in rock is presented briefly. Tables are given showing: 1. The risk of damage in ordinary housing areas with reference to particle-motion velocity and type of rock. 2. Reducing factors for different types of detonators. 3. Recommended charge depending on distance to endangered object. Buildings with electrical installations such as relay devices, computers and automatic switchboards must be particularly considered. These devices are extremely sensitive to the acceleration of vibrations. Recommended maximum amplitudes and accelerations for continuous or intermittent vibrations are given for IBM computers. These restrictions necessitate a maximum charge of 250 times less than that permissible for the building itself. For economic reasons this cannot be done. As an alternative a method of moderating the vibrations reaching the computers has been developed. These are put on rubber dampers and thereafter will withstand the same vibrations as the building. The planning and execution of a pilot project is described and also the measuring equipment used. See also IRRD abstract no. 214777. /TRRL/ [Swedish]

Ljung, B

Swedish Geotechnical Institute Conf Paper No. 56, 1974, 18 pp, 5 Fig., 3 Tab., 8 Phot.

ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, Transport and Road Research Laboratory (IRRD 214781)

PURCHASE FROM: Swedish Geotechnical Institute Banergatan 16, S-115-26 Stockholm, Sweden Repr. PC

00 128127

**THE ROLE OF STRUCTURE AND SOLID MECHANICS IN THE
DESIGN OF SURFACE AND UNDERGROUND EXCAVATIONS
IN ROCK**

This paper studies the effect, on the design of surface and underground excavations, of the characteristics of the rock in which they are made, and investigates in detail three techniques in evaluating these characteristics. These are an empirical approach, based entirely on experience, a limit equilibrium approach based on the strength characteristics of the rock mass, and a stress analysis approach based on both the deformation and strength characteristics of the rock mass. Subsequent sections of the paper comprise a brief review of the state of the art of engineering for excavations in rock including the characteristics of rock masses geological investigations for excavations and rock classification systems. It is shown that, provided sufficient geological and engineering data about the rock are obtained, it is possible to estimate the behaviour of an excavation under given loading conditions. /TRRL/

Goodman, RE Duncan, Jm

Wiley (John) and Sons, Incorporated Conf Paper No. 112, 1969, 25 pp, 9 Fig., 5 Tab., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 214496)

PURCHASE FROM: Wiley (John) and Sons, Incorporated 605 Third Avenue, New York, New York, 10016 Repr. PC

00 128185

STANDARDIZATION AND METRIC CONVERSION FOR TUNNELING, UNDERGROUND CONSTRUCTION AND MINING
Improvements in tunneling and underground construction and increased access to the underground have followed the first successful use of a tunnel-boring machine. Research programs have been initiated to develop faster and less expensive methods for excavation and tunneling. This symposium discussed the potential benefits of standardization in manufacture of equipment and in construction and mining operations. Because metric conversion should be planned concurrently, particularly in areas of new development such as mechanized tunneling, the subject of metric conversion was included.

These papers were presented and discussed at the Symposium held on May 21-22, 1974, Washington, D.C., sponsored by US National Committee on Tunneling Technology. This project was financially supported under contact NSF-C310-294-000, by The National Science Foundation Research Applied to National Needs (RANN).

National Academy of Sciences-Natl Research Council 1975, 170 pp, Tabs., 2 App.

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243754, DOTL NTIS

00 129089

COMPUTER PROGRAM FOR ESTIMATING COSTS OF TUNNELING

The paper describes a computer program that performs all logic and computations customarily done by hand in preparation of engineers' estimates or contractors' bids on tunnel-shaft systems. The program is based on construction methods, work forces and equipment selections corresponding to the current state-of-the-art of rock, soft ground and cut-and-cover tunnelling. The program contains logic to permit estimates of cost of complicated tunnel-shaft systems, as well as quantities. Cost computations are based on user-input requirements and site conditions, such as tunnel shape and size, shaft depth, ground characteristics, construction methods, and other factors. The user of the program is provided with options for accepting designs built into the program or overriding these designs by his own inputs.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Wheby, FT Cikanck, EM

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 185-206

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129103

RAPID MUCK HAULAGE

The paper discusses various ways of moving muck from the face of an underground excavation to the portal or shaft. Among the methods and equipment reviewed are rail haulage, cars and locomotives, rubber tired haulage, belt conveyors, pumped slurry, and compressed air. The paper concludes that rail haulage is capable of keeping up with the progress of the present generation of moles. It is simple low in first cost and has high resale value. Its present capacity can be increased by speeding up the locomotives. Pumping of hydraulic slurry should have a bright future on long tunnels.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Mayo, RS

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 419-426

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129109

MANAGEMENT OF RISK

There are many risks involved with subsurface construction, but most of them can be identified. By thoughtful management, some can be overcome, others reduced and still others shared in such a manner that their overall cost to the owner is minimized. When innovative methods, equipment, or materials are introduced, certain risks may increase to the point that advancement of the state-of-the-art is discouraged. In such cases, the owner, and society in general, may benefit from a reallocation of these risks. By recognizing the various classes of risk and deliberately setting out to manage them effectively, the mining and construction industries can optimize their service to society.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Mathews, AA (Mathews (AA) Incorporated)

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1167-76

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129110

TUNNEL CONSTRUCTION FOR THE SAO PAULO SUBWAY

Careful planning and execution of tunneling procedures kept surface settlement over the tunnels below a magnitude of .05 feet, allowing tunneling adjacent and under high rise buildings without large expenditures for building protection by under-pinning or chemical grouting. The strict requirements of the adopted tunneling procedures were responsible for many delays, reducing tunnel system utilization to 55%. When shields or tunneling machines are to be used for several headings or have to be transferred through subway station construction, provisions for easy assembly should be incorporated into the basic design concept of the equipment. Descriptions are included of soil and groundwater conditions, tunneling equipment and methods, lining, settlement and underpinning.

Presented at the Rapid Excavating and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Amaral, L

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1213-32

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129111

ROSSLYN STATION, VIRGINIA: GEOLOGY, EXCAVATION AND SUPPORT OF A LARGE, NEAR SURFACE, HARD ROCK CHAMBER

The large chamber was excavated in hard rock by conventional drill-and-shoot methods and supported with steel ribs and shotcrete. The station design, based on a moderate amount of subsurface information, was proven well suited to the actual rock conditions encountered. Although some problems were anticipated with jointed, large rock blocks, these problems were minimized by using drilled-in-spile bars in the crown and rock bolting in the sidewalls. It can only be concluded that the station design was compatible with the geologic conditions expected which were hard, blocky rock and tight joints. These factors permitted excavation and support of the opening without serious loss of ground, settlement of the surface street, or other adverse incident.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Bock, CG

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1373-91

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129112

TUNNELING AND UNDERGROUND EXCAVATION-GENERATOR OF LITIGATION

Contractors, in the present climate of cost escalation of labor, materials and equipment, general inflation and oppressive contract provisions are showing increasing reluctance to bid either a firm lump sum price or firm unit prices for major projects that will require more than a year or two to complete. But public agencies generally are forced by policy, regulations or legal authority to award contracts on competitive bids that call for a firm price commitment. One possible way of reducing litigation in such risky work as tunneling would be to include in firm price bid invitations bid items for specific changed conditions or other foreseeable contingencies. The prices quoted for these items would be paid only to the extent the changed conditions were encountered or the contingencies occurred.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Matthias, FT

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1163-66

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129113

PLANNING UNDERGROUND CONSTRUCTION OPERATIONS

The modern under ground constructor faces economic and competitive conditions which demand exacting planning, logistics and scheduling; the most efficient operation methods and equipment known; and realistic, comprehensive; analytical risk evaluation with adequate contingencies or other protection. Planning can usually be separated into two phases: preconstruction and during construction. Preconstruction work includes a thorough review and familiarization with engineering and contract documents, site investigations, evaluating such local conditions as weather and labor supply, selection of construction methods and equipment, and preparation of detailed cost estimates. During construction, planning encompasses preparation of detailed work schedules, cost controls, and contingency plans.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Eberhardt, FC (Dravo Corporation)

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 143-151

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129114

UNDERGROUND EXCAVATION-STATUS AND POTENTIAL

Paper traces the development of tunneling methods up to the present day machines that can excavate up to 1,000 ft per week. Today the problems and the timeframe in which to reach solutions are different, and there is an urgency that is far greater than in the past. Some research and development projects of special promise include large-scale material handling systems including transport of tunnel muck hydraulically as a slurry, excavation by water cannon and by thermal-mechanical fragmentation, rock melting, pumpable, liquid rock bolts, continuous lining operations, and various kinds of stress measurement and analysis and roof deformation studies.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Armstrong, EL (URS Corporation)

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 17-27

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129115

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY'S EXPERIENCE WITH CONTRACTUAL RELATIONSHIPS IN TUNNELING CONTRACTS

Each subsurface project must be given intense study, more subsurface data must be collected, and made available to bidders and ample time for design and review should be available. The early determination that there is or is not a differing site condition should be made only after a complete study at the Contracting Officer level where all elements of expertise are available. Audits are of major assistance to negotiators and adequate audit staff to keep up with the workload is essential. Contractual relationships are improved when construction management and technical inspection services are provided by other than the designer. The owner and the contractor must establish and maintain good public relations, otherwise poor contractual relations might develop.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Allredge, WS (Washington Metropolitan Area Transit Authority)

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1137-62, 12 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129116

HENDERSON TUNNEL HAULAGE AND MATERIAL HANDLING

Paper describes the selection of basic methods and equipment involved in driving a large diameter, 10 mile tunnel for the Henderson Mine Project in Colorado. Major focus is on the equipment used to haul muck from the face and to keep the operation supplied with materials. The paper discusses the haulage equipment, locomotive and train size, track layout, the effect of schedule and cost factors on equipment selection, specialized equipment for combined tunnel drive and permanent facility installation, traffic control, and includes a roster of all rail equipment being used.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Opitz, EH (Dravo Corporation)

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 445-456

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129118

FORECASTING RAPID EXCAVATION DEMANDS IN THE URBAN SECTOR

The paper describes efforts made since the 1972 Rapid Excavation Conference in Chicago to generate more thoughtful and more robust estimates of urban sector demands, and to apply what has been learned to the most difficult category of predictions: those for urban mass transit systems. A modest sample survey has been undertaken of demands by major category in three key american Urban areas: New York, Los angels, and Minneapolis-St. Paul. This is the only empirical effort going on to establish comprehensive benchmarks for present and future activity in these major metropolitan areas. From the data collected it should be possible to estimate propensities to spend in other cities for the important urban utilities.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Newcomb, R (West Virginia University)

American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 325-330

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129126

PLANNING SUBWAYS BY TUNNEL OR CUT-AND-COVER. SOME COST- BENEFIT COMPARISONS

The largest single cost for any new transit system is construction, accounting for up to 70 percent of the total system cost. But intangible social costs,

borne by the affected neighborhood community, may add as much as 25 percent to the total system cost. When these intangibles are taken into account in terms of loss of local economy, decrease of social activities, and general community disruption, high speed and deep tunneling methods become more competitive with cut and cover construction.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Proctor, RJ Hoffman, GA
American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1
1974, pp 51-63, 26 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs
Society of Mining Engineers, New York, New York, 10017 Repr. PC

00 129127

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 and of hydraulic excavation by water jets and slurry pumps.

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

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

00 129128

KARL TERZAGHI AND THE CHICAGO SUBWAY

Terzaghi's engagement on the Chicago Subway, 1939-1941, influenced his decision to take up permanent residence in the United States and had a strong impact on the development of applied soil mechanics. So-called squeeze tests, in which the settlements and subsurface movements were correlated with construction procedures, permitted improvements in construction methods and decreases in lost ground. Measurement of loads in bracing of open cuts led to better understanding of behavior of soft clay in undrained shear. Full-scale test sections provided basis for more economical design of permanent tunnel lining. All these activities evolved under Terzaghi's stimulation and in turn helped formulate his conceptions of the ways in which soil mechanics should be applied in practice.

Peck, RB (Illinois University, Urbana) *ASCE Engineering Issues-J of Prof Activities* Vol. 101 No. 4, Oct. 1975, pp 477-484, 10 Ref.

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

00 129133

GENERAL PROBLEMS IN DESIGN AND CONSTRUCTION IN URBAN AREAS

The paper examines some of the existing policies and lack of policies on underground space as they pertain to rail rapid transit development projects in the United States. It discusses problems which have occurred during the development of both San Francisco's BART and the Washington, D.C. Metro project due to the conflict of interest in the use of such underground space. Several guidelines are offered for consideration and formulation of a national policy on the use of underground space.

Presented at the Engineering Foundation Conference on the Need for National Policy for the Use of Underground Space, Berwick Academy, South Berwick, Me., June 25-29, 1973.

Garrett, V
American Society of Civil Engineers Proc Paper 1973, pp 140-148

ACKNOWLEDGMENT: EI
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-236755/AS, DOTL NTIS

00 129139

SEMI-ANALYTIC SOLUTION OF SKEW BOX GIRDER BRIDGES

A semi-analytic procedure is presented for the analysis of simply supported skew box girder bridges. The structure is idealized as an assemblage of

parallelogrammic strips. The degree of accuracy of the method is shown by numerical examples and the results are compared with finite element analysis and model tests. The results obtained are generally as accurate as those obtained using the finite element methods, yet the finite strip method offers clear advantages in simplicity of use and preparation of data. In particular, the finite strip method gives complete continuity of results along the length of each strip.

Brown, TG (Montreal Engineering Company); Ghali, A *Institution of Civil Engineers, Proceedings* Vol. 59 No. t 2, Sept. 1975, pp 487-500, 10 Ref.

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

00 129194

THE FIRST AXIAL GIRDER RAILWAY BRIDGE, IN HAMBURG [Le premier pont de chemin de fer a poutre axiale, a Hambourg]

The author describes the new six-track rail bridge crossing the Southern reach of the Elbe in Hamburg. For this bridge, a continuous three span structure has been adopted, the spans being 107.40 m, 125.60 m and 107.40 m and made up of Warren lattice girders. According to present know-how, this is the best solution with lattice girders. Superstructures with a main axial girder have been chosen to reduce the number of conventional master girders to bear the weight of the six tracks, the structure will only have three such girders in the end. All the superstructure elements have been made using the box technique. All workshop assemblies and some of the work on site have involved welding; the actual structural joints are rivetted. The rail tracks have no ballast and sleepers are placed directly on top of the steel sheeting covering the side box-girders. [French]

Feige, A *Acier/Stahl/Steel* Vol. 9 Sept. 1975, pp 310-14, 7 Fig., 15 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

00 129289

HOW TO LIVE WITH OLD BRIDGE SUBSTRUCTURES ON INDIAN RAILWAYS

Most of the Indian Railway network was completed prior to 1903. The age of bridges raises questions about their safety and strengthening. The author tries, by means of a mathematical study, to provide an answer to this question.

Agrawal, SR *Indian Railway Technical Bulletin* Vol. 31 No. 192, Feb. 1974, pp 30-43, 6 Fig., 7 Tab., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Research Design and Standards Organization Alambagh, Lucknow 5, India Repr. PC

00 129300

RAILWAY BRIDGE MAINTENANCE

General survey of deterioration, inspection, maintenance processes, evaluation of permissible loads on bridges according to British Railways practice.

Turton, F
Hutchinson Educational Limited 1972, 152 pp, 79 Fig., 5 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Hutchinson Educational Limited London, England Repr. PC

00 129410

ELASTIC VERTICAL DEFORMATION OF COMPACT-SOIL RAILWAY EMBANKMENTS [Vertikal'ny uprugie deformaciu zeleznodoroznyh nasypej iz svjaznyh gruntor]

The article presents the results of experimental studies on the distribution of elastic deformations in embankments; determines the pattern of possible deformations of embankment slopes; shows the influence of loads per axle and per unit of length, on the variation in the values of the elastic deformations. With the same static load per axle, there occurs, for 8-axle wagons elastic vertical deformations 30% greater than those produced in the case of 4-axle wagons; this phenomenon must be borne in mind when designing the structures of 8-axle bogie wagons, and in track-bed and track-structure consolidation work on busy lines. A linear relationship has

been identified between the axleloads of a wagon with running-gear of current design, and the elastic deformations of the track bed. By extrapolating the data obtained to those used during the tests, possible values can be envisaged for elastic vertical deformations of the track bed. [Russian]

Titov, VP *Vestnik Vniizt* Vol. 34 No. 2, 1975, pp 37-40, 5 Fig., 1 Tab., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

00 129412

CONSIDERATIONS ON A MATHEMATICAL METHOD OF STUDYING DYNAMIC EFFECTS ON A GIRDER SUBJECTED TO A MOBILE LOAD [Note sur une methode mathematique d'etude des effets dynamiques dans une poutre soumise a une charge mobile]

Mathematical expansion on dynamic effects in a railway bridge as brought about by the displacement of a load at constant speed. The method of finite difference was applied to the case of a homogeneous girder, and the kinetic energy theorem used to assess the solution adopted. The aim of the study was to show that, by disregarding the mass of the wheels and of the vehicle axle, it is possible to have an approximation of the solution of the problem by means of the Galerkin method. [French]

Compte Rendu, Academie des Sciences.

Kammerer, JB
Academic des Sciences Vol. 279 Series A, Dec. 1974, pp 895-897

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Academie des Sciences 23 quai de Conti, Paris 6e, France Repr. PC

00 129414

STUDY OF THE VARIOUS PROTECTIVE LAYERS OF THE TRACK FORMATION FOR BALLAST TRACK [Untersuchung verschiedener Planumschutzschichten fuer den Schotteroberbau]

The authors apply several sub-soil deformation modules to calculate stress

for the following types of ballast track: without protective layer; with a 30 cm gravel layer; with a 20 cm or 25 cm cemented protective layer. Proposals are made for applications of the various types of protective layer. A cemented protective layer (with an elasticity module of 60,000 kp/sq cm) on ground of average hardness can account for a characteristic ballast coefficient of up to 30 kp/cu cm and a ballast pressure of 3.2 kp/sq cm which can be considered a maximum limit. Therefore, it is advisable to use cemented layers only when the elasticity module of the track formation is less than 500 kp/sq cm under 20 t axle loads. However, above 150 kp/sq cm, the ground must be stabilized and deep draining is necessary. [German]

Eisenmann, J Schneider, E *Eisenbahntechnische Rundschau* Vol. 24 No. 4, Apr. 1975, pp 111-116, 7 Fig., 12 Ref.

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

DOTL JC

00 129433

IN SEARCH OF OPTIMUM DIMENSIONS FOR LONG TUNNELS

Because world economic problems have forced a shelving of the Gotthard Base and Channel Tunnels, there is an opportunity to reexamine their basic designs relative to Japan's Seikan undersea tunnel which is due to be completed in 1979. The authors find that a double-track bore flanked by a service tunnel may offer a less expensive solution than the triple-bore tunnel planned to link England with France. The aerodynamic implications of various arrangements are not fully understood and require further investigation.

Seymer, N Stansby, P (W S Atkins Group) *Railway Gazette International* Vol. 131 No. 12, Dec. 1975, pp 464-468, 3 Fig., 3 Tab.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 052525

QUALITY OF RAILS AND MEANS OF GUARANTEEING IT. PROPOSALS CONCERNING THE 6TH EDITION OF TECHNICAL SPECIFICATION 860-0 GOVERNING THE SUPPLY OF VIGNOLE (FLAT-BOTTOM) RAILS OF NON-TREATED STEEL

At the request of the 7th UIC Commission, the D 45 Specialist Committee has been charged with studying the dimensional tolerances of rails with a metric weight greater than 60 kg. As the administrations made increasing use of heavy rails it became necessary to include in Technical Specification 860-0 for the supply of Vignole (flat-bottom) rails of non-treated steel, the maximum permissible dimensional tolerances for these heavy rails. Having regard to the results of the tests already carried out within the scope of its programme of work and the experience gained by its members, the D 45 Specialist Committee deemed it advisable not to limit its investigations merely to the problem of dimensional tolerances, but to examine the whole specification at the same time, and to group into one report all the amendments and additions which it intended making to the existing text. The most important amendments concern marking, freedom from defects, dimensional tolerances, and certain acceptance and guarantee conditions. The wording of the texts at present in force and of the texts proposed to the 7th UIC Commission have been completed by remarks explaining or justifying the decisions of the D 45 Specialist Committee.

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

International Union of Railways D45/RP 11/E, Apr. 1969, 29 pp, 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

01 052674

LAYING OF TRACK ON CROSS TIMBERS

Two methods of laying track, both appropriate when there is a shallow depth of construction, are outlined. In addition, the second method is used particularly in the case of lines containing long welded rails. The advantages and inconveniences inherent to both methods are discussed.

International Union of Railways DOC 16, Jan. 1967, 6 pp, 2 Fig., 3 Ref.

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

DOTL RP

01 099767

EXTENSIVE RESEARCH INTO THE NEW TRACK STRUCTURE WITH LS FASTENINGS [Der Grossversuch mit dem neuen Oberbau Ls]

On the DB network, extensive research with the new Ls fastening (set sole plates, sleeper screws and SKL1 tightening spike) has been carried out regularly as shown in Tables 1 and 2 during track laying in the second half of 1974. Experience has shown that it would be better to use nut-headed sleeper screws instead of normal screws. Despite the somewhat high cost involved, the overall result (assembly, laying, maintenance, annual costs) for the new rail fastening with nut headed sleeper screws could work out to be more economical. To reach a final conclusion on the use of the new sleeper screw, further extensive research should be carried out next year (1975). [German]

Kahn, F *Die Holzschwelle* Vol. 69 No. 78, Dec. 1974, pp 29-39, 4 Fig., 2 Tab., 5 Ref.

PURCHASE FROM: Studiengesellschaft fuer Holzschwellenoberbau e.V. Waldstrasse 11, 53 Bonn-Ippendorf, West Germany Repr. PC

01 099800

TRACK EVALUATION-UP STYLE

Annually the Union Pacific is measuring and recording 11 track structure parameters for all of its 5,851 miles of mainline and 4,128 miles of branch line track. The vehicle is a self-propelled unit built to UP's specification by Plasser American Corp. at a cost of \$350,000. The detection system is composed of three major elements: measuring sensors, transducers coupled with an electronic transmission system, and a recording and analyzing device. The car tests the entire mainline three or four times each year,

covering 200 miles daily. Strip charts indicate where immediate corrections should be made and also assist in long-range planning for tie renewals, track surfacing and lining in the future.

Progressive Railroading Vol. 18 No. 8, Aug. 1975, p 53, 2 Phot.

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

01 099802

CNR COURSE FOR ROADMASTERS INCLUDES "MODULE" ON MARKING TIES

Increased need for training track supervisors is met by establishing schools that are based on 23 instruction modules which include one on the identification of failed ties.

Railway Track and Structures Vol. 71 No. 7, July 1975, pp 14-15

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 099803

ICG FAVORS CORED-WIRE ELECTRODE FOR RAIL AND FROG MAINTENANCE

Small-diameter wire is said to avoid high heat input and subsequent underbead cracking. Automatic feeder is claimed to permit unskilled welder to weld continuously and to perform satisfactory work. The backlog of deferred frog maintenance was cleared up in three years because of the new equipment.

Railway Track and Structures Vol. 71 No. 7, July 1975, pp 18-19, 2 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 099804

THE BASICS OF TRACK INSPECTION-WHAT TO LOOK FOR AT SWITCHES WITH SAFETY THE MAIN CONSIDERATION

This is the third installment of a series and discusses switches which the author identifies as the weakest and most critical part of track structure. Inspections of switch lights, switch stands, ties, switch points, frogs, and track gauge are all described.

Railway Track and Structures Vol. 71 No. 7, July 1975, pp 24-26

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 099817

DESIGN OF A HIGH QUALITY INFRASTRUCTURE SYSTEM REQUIRING MINIMUM MAINTENANCE, EVEN UNDER CONDITIONS OF HIGH SPEEDS AND HEAVY LOADS

The paper is intended to demonstrate the limits of certain basic criteria generally accepted for the design and construction of a railway network, and to indicate some of the aspects from which it is possible to envisage the development of research relating to the following factors: infrastructure, alignment, engineering structures, together with the economic aspects of these elements.

Oliveros, F *Rail International* No. 6, June 1975, pp 475-487, 4 Fig., 15 Ref.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 099820

STRUCTURAL DESIGN CRITERIA FOR THE NEW LINES OF THE GERMAN FEDERAL RAILWAY CONFORMING TO THE OBJECTIVES OF THE EUROPEAN INFRASTRUCTURE MASTER PLAN

In 1971, the European railway administrations cooperating under the auspices of the UIC decided to initiate investigations into the possibilities of improving the European railway network on the basis of uniform standards on an international scale. The Planning Committee was asked to prepare a corresponding plan. The first result of this effort has been the draft of a "European Infrastructure Master Plan--First Preparatory Stage" which was

submitted to the UIC Management Committee in the summer of 1973 and unanimously adopted by it. Meanwhile, in the autumn of 1973, this plan was published and submitted to the Governments in the East and West so that the political objectives may also be included. The Master Plan is based on the recognition on the part of the European railway administrations that they are confronted with broadly the same problems. The railway network must be adapted to the economic and technical development which has occurred during the 20th century. Although the present financial situation of the German Federal Railway cannot be regarded as rosy, the construction of the new lines is essential to its improvement and therefore also to the future of the German Federal Railway. This assessment is also reflected in the thirteen objectives indicated by the Federal Minister of Transport to the Board of Management of the German Federal Railway at the end of 1974.

Zeuge, H *Rail International* No. 5, May 1975, pp 371-396, 19 Fig., Refs.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 099834

POLYETHYLENE TIE PLATES GAINING ACCEPTANCE

After six years of field testing, high density polyethylene tie plates are gaining acceptance from an increasing number of railroads for use on industrial and branchline track. Further evaluations are now being made of the plates possible use on heavy-load, high-speed mainlines. The tie plates were developed by Koppers Company, leading suppliers of creosoted ties, as part of a continuing program to extend tie life. The injection molded plate weighs up to 1 1/2 pounds.

Progressive Railroadng Vol. 18 No. 7, July 1975, pp 39-40, 2 Phot.

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

01 125824

CP RAIL PROJECTS NEW USES FOR TRACK GEOMETRY CAR

The graphs reproduced represent charting deterioration of track condition, track condition index for use by senior management, measuring track conditions under different cars, and developing an over-all information system. The process of developing the profile charts is represented by illustration.

Railway Age Vol. 176 No. 7, Apr. 1975, pp 38-40

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

DOTL JC

01 125854

A COMPUTER PROGRAM TO OPTIMISE CURVE ALIGNMENT

Where physical restraints are imposed by structures, manual calculation of optimum curve alignment can be a lengthy process; a newly-developed computer program introduced by British Rail does the job quickly and more effectively.

Ellis, JA *Railway Gazette International* Vol. 131 No. 3, Mar. 1975, pp 102-104

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 125869

PREVENTION AND CURE OF RAIL CORRUGATION

The author has discovered that corrugation is a function of track modulus and wheel loading. There is a critical range of shear and compressive stress within which rail corrugation takes places but below or above this range the phenomenon is absent, possibly because wear particles are either not generated or they are removed altogether. Not only will correct matching of track modulus, to axleloads carried avoid generation, but elimination of a mismatch will also cause existing corrugation to disappear without the need for grinding.

Srinivasan, M *Railway Gazette International* Vol. 131 No. 3, Mar. 1975, pp 97-101

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 126430

INVESTIGATING THE EFFECT OF THERMOMECHANICAL TREATMENT ON THE PROPERTIES OF RAILS

A new method has been worked out at Kuznetsk Metallurgical Combine for rolling rails, in which provision is made for a high degree of deformation of the section head in a universal pass, with subsequent hardening of the rolled surface of the rail head. The possibilities of the new method of strengthening are demonstrated. The rolling of rails in the universal pass with the application of thermomechanical treatment leads to an improvement (refining) of the structure and to enhanced mechanical properties. The strength properties of the rails are at the level of oil-quenched rails, tempered at 450 degrees C, and the plastic properties are higher.

Nekrasov, SG Chelyshev, NA Gossman, AA Kobyzev, VK Vorozhischev, VI *Steel USSR* Vol. 4 No. 10, Oct. 1974, pp 829-830, 4 Ref.

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

DOTL JC

01 126443

ISOLATED MINING LINE HAS 'BIG' RAILROAD FEATURES

A molybdenum mining project in Colorado has involved building of a 14.4-mile double-track automated narrow gauge ore-hauling railroad which includes a 9.6-mile tunnel under the continental divide, third-longest railroad tunnel in the world. Six electrically operated unit trains will shuttle between mine and ore processing plant. Laser beam guidance controlled tunnel construction. The welded rails are laid on wood cross ties on the surface and on a concrete slab in the tunnel. Three piece rubber fasteners are used for securing the rails to the slab.

Railway Track and Structures Vol. 71 No. 9, Sept. 1975, pp 18-20, 5 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 126444

CNR SETS POLICY ON USE OF CONCRETE TIES

Canadian National policy, at least for the next five years, calls for use of large numbers of concrete ties in curves, in existing main track in high-density, heavy- traffic territory. On curves of 4 degrees or more, these ties will permit rail to be transposed simply by removing and replacing the rail fastening clips. Wood tie life under heavy traffic has been shortened with gauge widening and rail overturning developing. Concrete tie used by CN conforms to British design, Type 23, but has more prestressing wires than the type which is standard on British railways.

Railway Track and Structures Vol. 71 No. 9, Sept. 1975, pp 21-23, 7 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 126446

FOR THOSE BRANCH-LINE BLUES--HELPFUL IDEAS AND POINTERS FROM A 49-YEAR VETERAN

Feeder and branch line tracks with medium rail and poor ballast can be sustained in operating condition with a minimum expenditure of money and manpower. This article discusses the temporary tamping, use of wing ties, importance of hardpan under ties and proper drainage which can maintain marginal track in safe operating condition.

Blanchard, LC *Railway Track and Structures* Vol. 71 No. 9, Sept. 1975, pp 24-25, 1 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 126448

SANTE FE ADAPTS LASER BEAM FOR BUILDING TRACKS IN BIG YARD

In constructing the new freight classification yard at Barstow, Calif., Santa Fe is using a laser beam in conjunction with the production tamper/liner for

raising and lining the tracks to engineers' stakes. Also in use is a rig developed by Santa Fe for distributing ties on the subgrade to the desired spacing. Details of the split laser beam system in conjunction with the Plasser equipment is described.

Railway Track and Structures Vol. 71 No. 9, Sept. 1975, pp 34-36, 5 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 126450

CONTROLLING TRACK SETTLEMENT AS AN INTEGRATED OPERATION OF THE LINING AND TAMPING-CYCLE

Despite consolidation of track, an immediate gradual settlement takes place once the line is opened to traffic. To minimize this, Plasser & Theurer's dynamic stabilizing group can make a substantial contribution when operated in conjunction with the lining and tamping machine to which it is coupled.

Rail Engineering International Vol. 5 No. 4, June 1975, pp 165-166, 3 Fig., 2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 126994

GENERAL CONSIDERATIONS ON PERFORMANCE CALCULATIONS FOR SWITCH-HEATING EQUIPMENT
[Allgemeine Betrachtungen zu den Effektivitaetsberechnungen fuer Weichenheizungen]

No Abstract. [German]

Wobst, W *Signal und Schiene* Vol. 18 No. 2, Dec. 1974, pp 402-404, 4 Tab., 3 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Transpress VEB Verlag Verkehrswesen Franzoesische Strasse 13-14, 108 Berlin, East Germany Repr. PC

01 126996

CONSTRUCTION OF BALLASTLESS TRACK ON SLABS FOR HIGH SPEEDS ON THE CSD [Konstrukce zelenicniho svrsku s deskami pro vysoke rychlosti v podminkach CSSR]

This construction method is extremely important, given the geographical situation of the country and transport development prospects in Czechoslovakia. The CSD are working on a 300 km/h electric locomotive. The author discusses 5 versions of the superstructure involved. [Czech]

Petrtyl, M Balihar, J *Zeleznicni Technika* Vol. 4 No. 4, 1974, pp 235-238, 4 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Zeleznicni Technika Prague, Czechoslovakia Repr. PC

01 126998

SUPERELEVATION RAMPS AND DESIGN CONSIDERATIONS
[Gestaltung der Ueberhoehungsrampen]

The author describes and compares various types of superelevation ramp design from the point of view of vehicle running dynamics and track construction. He concludes that the optimal solution is the "S" shaped ramp formed by 2-second degree parabolas and in use for some 40 years now. [German]

Schramm, G *Eisenbahningenieur* Vol. 26 No. 3, Mar. 1975, pp 95-104, 5 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

01 127349

BALLASTLESS TURNOUT TRACK WITH ELASTOMER

To develop maintenance-free turnouts, a study of fastening systems and materials was undertaken. With polyurethane elastomer vulcanized at room temperature, turnouts without ballast can be easily and firmly secured on a concrete base without embedding of ties. Such a track structure and the newly developed elastomeric packing methods have been utilized also for another track installation.

Shimizu, K Kakegawa, H *Railway Technical Research Institute* Vol. 16 No. 2, June 1975, pp 60-63, 5 Fig.

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

01 127384

OPERATING PROGRAMME AND PRACTICE FOR THE NEW LINES OF THE GERMAN FEDERAL RAILWAY, HAVING REGARD TO THE EXISTING RAILWAY NETWORK AND TO A EUROPEAN HIGH-SPEED NETWORK

In order to realize the corporate plan of the German Federal Railway, and this to stabilize their economic position, the fulfilment of the "Development programme for the network of the German Federal Railway" is an indispensable condition. This development programme has the objective of creating, in the German Federal Republic, a basic network for modern rail transport of quantitatively and qualitatively high capacity where land use aspects are also taken into account; the core of this network will be formed by the future new and reconstructed lines. In addition to the construction of new lines along the most heavily used traffic corridors, it is envisaged to reconstruct a number of existing lines where, having regard to the expected increase in traffic demand, such reconstruction is called for because of existing bottlenecks or topographical conditions. In addition to the increase in line capacity to match future demands, the qualitative improvement of the lines, too, has an important bearing on the realization of a homogeneous performance pattern. Among the measures involved in the reconstruction of existing lines are, e.g., improvements in the alignment and in the signalling equipment, two-way working between stations, the construction of additional main line tracks and of platform access subways. Other measures such as the reinforcement of the permanent way, the elimination of level crossings or the conversion to push-button signalling are the subject of separate programmes.

Sitzmann, E *Rail International* No. 8, Aug. 1975, pp 663-686, 22 Fig., 9 Ref.

ACKNOWLEDGMENT: Rail International PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 127389

THE QUADRUPLING OF THE ROME-FLORENCE LINE

In 1970 the FS undertook the construction of a new line about 260 km in length, for the quadrupling of the Rome-Florence link. After explaining the reasons and aims of this project, this paper will illustrate the criteria adopted for the infrastructure construction project, with a view to procuring the greatest capacity from the quadrupling, by mixed operation capable of development for specialization of the new track alignment for very high speeds. An outline is also given of the technical features and methodology adopted for the building of tunnels, viaducts and embankments, including details of the development of the work and the cost comparison factors.

Ruoppolo, G *Rail International* No. 7, July 1975, pp 565-580, 7 Fig., 5 Tab.

ACKNOWLEDGMENT: Rail International PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 127701

ALUMINO-THERMIC WELDING OF RAILS

Because of the improvements in alumino-thermic welding of rails in the past 15 years, it is important that a process be studied in relation to details such as economy, speed, ease of execution and assurance of the metallurgical quality of the assembly. Four processes are described, along with their advantages: Type C, Type C-2, Type C-A; and Type C-B.

Boutet, C *Rail International* No. 9-10, Sept. 1975, pp 801-804, 4 Fig.

ACKNOWLEDGMENT: Rail International PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 127709

TRACK TESTING FOR VALIDATION OF COMPUTER MODELS

The purpose of the track stiffness test was to obtain data to assist in validation of the L/V and Lateral Train Stability models as an extension of

earlier dynamic tests conducted at the Transportation Test Center. The first series of tests conducted was to obtain instrumented data on Vertical Track Modulus (VTM). The second series of tests were designed to collect data on rail to rail stiffness using various rail loads combined with and without static vertical loads. The third series of tests were conducted to measure lateral track stiffness with and without rail loads on a tangent segment of the track, on both left and right hand curves.

An International government-Industry Research Program on Train-Track Dynamics. Requests for this publication should be directed to J.G. Britton, Director of Operations, AAR.

Association of American Railroads AAR R-181, 1975, 20 pp, Photos.

ACKNOWLEDGMENT: AAR

PURCHASE FROM: Association of American Railroads Technical Center
3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

01 127856

TIE RENEWALS AND COSTS

This report of AREA Committee 3 involves statistics on tie renewals and average tie costs for 1974 as compiled by the Economics and Finance Department of AAR. The details are given in tabular form. Along with conclusions about the rates at which Eastern, Southern and Western railroads inserted ties, it is shown that the "indicated" wooden tie life for all U.S. Class I railroads is 47 years. The average cost of ties increased by 43% from 1973 to 1974. There was only an increase of 5% in tie renewals in 1974. The average number of concrete ties inserted was the same in both years but the tie cost went up 44%.

Advance Report of AREA Committee 3--Ties and Wood Preservation.

AREA Bulletin Bul 654 Proc V77, Sept. 1975, pp 13-23, 4 Tab.

ACKNOWLEDGMENT: AREA Bulletin

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 127857

WORK EQUIPMENT REPAIR ORGANIZATIONS OF NORTH AMERICAN RAILROADS

This report is the result of a survey which brought responses from 63 railroads which were divided in four categories according to length. Examined are factors such as whether automotive and maintenance of way equipment are repaired in company shops, whether work on m/w equipment is done in a single shop or in dispersed facilities and how road repairs are made to the equipment. It is noted that in developing or altering a repair organization, shop and field work each have unique advantages which are detailed.

Advance report of AREA Committee 27--Maintenance of Way Work Equipment.

AREA Bulletin Bul 654 Proc V77, Sept. 1975, pp 9-12

ACKNOWLEDGMENT: AREA Bulletin

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 127858

PRINCIPLES AND CRITERIA FOR THE DESIGN OF A RAILROAD TRACK TEST FACILITY

This paper discusses principles and criteria for design of a track test facility such as will be built by the Federal Railroad Administration to support various track research programs aimed at improving design and maintenance procedures. It is suggested the facility be as versatile as possible so that tests can include determination of stresses in rails due to vertical and horizontal loads, study of axial rail forces induced by moving trains and track buckling caused by temperature stresses and moving trains. Construction of permanent structures such as concrete piers should be avoided whenever mechanically possible.

Kerr, AD (Princeton University) AREA Bulletin Bul 654 Proc V77, Sept. 1975, pp 1-8, 6 Fig., 10 Ref.

ACKNOWLEDGMENT: AREA Bulletin

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 127871

SOLID-BED TRACK LAID FOR TRAIL SERVICE ON NETHERLANDS RAILWAYS

Initial design on a viaduct in Delft has been followed by trials under ORE Committee D87 auspices of solid-bed track on British Rail, German Federal Railway and at the Czechoslovakian Velim Test Track. All employ prefabricated blocks to carry rail laid on a concrete underbed. All tracks, including the new installation in the Netherlands use the DE spring rail fastener. Importance of a solid-bed track is emphasized for use with welded rail.

Eisses, JA (Netherlands Railways) Rail Engineering International Vol. 5 No. 5, Aug. 1975, pp 187-194, 22 Fig

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 127873

VELIM TEST CIRCUIT, RRI, PRAGUE

The Velim Railway Testing Circuit, located 50 km east of Prague is the test facility for the Institute which is engaged in technology relating to transport economics, track construction and maintenance, rolling stock and electric and diesel traction, communications and other areas. The 200-kph test loops are energized at 25 kV 50 Hz and they may be used for controlled service tests for ORE, OSShd and for European and Russian railways and suppliers. Slab and conventional track are being evaluated. Laboratories have computers which can be coordinated with dynamometer car activities.

Rail Engineering International Vol. 5 No. 5, Aug. 1975, pp 215-218, 1 Fig., Photos.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 128187

LARGE SCALE CONSTRUCTION WORK OF CONCRETE SLAB TRACKS FOR THE SAN-YO SHINKANSEN

The concrete slab track utilized by JNR (16 km on the Shin Kansen and 84 km on the narrow gauge line) has proved satisfactory and has shown the need for little maintenance. Therefore concrete slab track is used for 70% of the line between Okayama and Hakata. This article describes design requirements, construction methods and track details. JNR has two types--one with minimum provision for adjustment used only on straight track in tunnels and the other with larger adjustment margin used on all elevated sections (straight or curved) and on curves in tunnels. For the 393 km line 12 concrete slab production facilities were set up, 60 slab distribution points, 58 mortar plants and 25 depots for rail and fastenings. JNR is researching additional problems associated with the slab track.

Hiroi, I (Japanese National Railways) Japanese Railway Engineering Vol. 15 No. 3/4, 1974, pp 6-9, 6 Fig., 3 Phot.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

01 128608

CLASSIFYING TRACK BY POWER SPECTRAL DENSITY

Historically, the Power Spectral Density (PSD) has been used as a diagnostic tool and as a classifier in many disciplines. This paper illustrates how this valuable tool can be applied to railway track geometry data to assist in the understanding and management of the permanent way. The PSD can be used to diagnose random and periodic behavior in the track surface (profile). Three parameters are developed that are capable of describing this behavior. Furthermore, the PSD can be used to classify the track. Two of these parameters have a strong impact on the deviations of a 19-m (62-ft) midchord offset. Within prescribed confidence limits, these can be tied to the Federal Railroad Administration's track safety standards. This permits the assignment of the speed class at which the track may be economically maintained without major overhauling.

This paper was presented at the Winter Annual Meeting of ASME, Houston, Texas, Nov 30-Dec 5, 1975 and is from ASME Mechanics of Transportation Systems, RRIS 02 128605.

Corbin, JC Kaufman, WM (ENSCO, Incorporated)

American Society of Mechanical Engineers AMD-Vol. 15, 1975, pp 1-20, 11 Fig., 1 Tab., 16 Ref.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC

DOTL RP

01 128640

TEST TRAIN PROGRAM SIXTH PROGRESS REPORT

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. Sponsorship was from FRA, DOT.

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.

Contract DOT-FR-20032

ACKNOWLEDGMENT: FRA

PURCHASE FROM: ESL Repr. PC, Microfiche

PB-247084/AS, DOTL NTIS

01 128841

ICG RESTORES ELASTICITY TO ITS TRACK

Illinois Central Gulf is restoring elasticity and strength to sections of track damaged by the action of heavy high-speed traffic. Upward action of subgrade material reduces ability of ballast to distribute loads, causing deterioration of track quality. Problem is particularly severe on sections with poor drainage and abundance of mud. Three such sections are currently being rehabilitated. ICG is using new machines-Plasser combination undercutter and battast cleaner, and Tamper vibratory crib and shoulder compactor. Results have been good and an added feature is the relatively low cost.

Progressive Railroading Vol. 18 No. 9, Sept. 1975, 3 pp, 4 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

01 128845

THE TIES THAT BIND

After years of deferred maintenance, Norfolk and Western Railway has embarked on "rebuilding" policy, emphasizing plant as opposed to equipment improvement. The policy is evidenced by the increase in capital expenditures and maintenance programs, including track ballasting and surfacing, ballast cleaning, vegetation control, replacement of ties and switches. Other aspects of the program include yard rehabilitation, installation of microwave network, and modernization of communications system.

Roberts, R *Modern Railroads* Vol. 30 No. 8, Aug. 1975, pp 76-77, 2 Fig., 1 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

01 128850

CLOSE-UP OF SOUTHERN POLICIES AND PRACTICES

In a four-part feature, the Southern Railway policies in track maintenance are examined. Southern started early in mechanizing m/w operations and has achieved a high degree of efficiency in manpower use. It has always emphasized rail and tie renewals. In Part 1, The Strategy Behind the Progress, the development of a five-year plan, the acceptance of a high m/w ratio, and use of a track geometry car and rigid quality control are discussed. Part 2, Dual Method of Laying Highlights Rail Practices, tells how a 54-man

gang lays eight welded rail strings in a day and discusses welding, heat-treated rail and hardening of frogs. Part 3, Top Efficiency Is Goal in T&S Operations, tells how highly mechanized system gangs are organized around machines, including those which remove ties for possible reuse. Part 4, Innovations Feature Prefabrication of Turnouts, Track Panels, tells how turnouts are produced for rail relay programs and new industrial tracks. Track panels are used in building sidings and industry tracks and for reconstructing tracks damaged during derailments.

Railway Track and Structures Vol. 71 No. 11, Nov. 1975, pp 16-20

PURCHASE FROM: XUM Repr. PC

DOTL JC

01 128885

PRINCIPAL CHARACTERISTICS OF RAIL STEEL PRODUCTION CONSIDERING THE DEMANDS OF THE RAILROAD NETWORKS [Principales caracteristiques de la fabrication de l'acier a rails face aux besoins des reseaux ferroviaires]

This review emphasizes the ever increasing demands on rails in connection with increasing speeds of traffic and increasing loads to be carried. The different types of rail steel are described. Quality control by continuous testing for inclusions, flakes, and microcracks and the rolling of rails are discussed. [French]

Vicens, P (Saclor) *Revue de Metallurgie* Vol. 72 No. 5, May 1975, pp 387-402

PURCHASE FROM: ESL Repr. PC, Microfilm

01 129081

TRENDS IN TURNOUT AND CROSSING MAINTENANCE

Nationwide survey reported shows that more railroads are now working through main-line switches in conjunction with out-of-face surfacing operations, but individual practices vary widely. Practices at grade crossings were included in the survey. The machines that have been developed for working through turnouts including switch tampers are featured.

Railway Track and Structures Vol. 71 No. 8, Aug. 1975, pp 18-21

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 129094

ICG UNDERCUTS TRACK, CLEANS BALLAST WITH BIG MACHINES

The Plasser ballast undercutter-cleaner excavates the ballast section with an undercutting chain that cuts a swath which can be adjusted between 12 ft 4 in to a maximum of 14 ft 6 in width at a depth ranging from 10 in to 17 in below the bottoms of the ties. The chain, 80 ft long, has wear-resistant fingers and scoops. It operates at a speed of about 6 ft per second and conveys the excavated material up a chute to a receiving hopper, which distributes it onto vibrating screens.

Railway Track and Structures Vol. 71 No. 8, Aug. 1975, pp 24-25

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 129095

BUILDING TRACKS IN THE WASHINGTON METRO

Problems created by special fastening assembly are solved by the use of movable templates to position anchor bolts and in pouring grout pads for the assemblies. Tractor compressors are factor in facilitating construction.

Railway Track and Structures Vol. 71 No. 7, July 1975, pp 54-55

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 129096

MEASUREMENT AND ANALYSIS OF THE IMPACTS APPLIED TO THE RAILROAD TRACK UNDER THE RUNNING VEHICLES
No Abstract. [Japanese]

Ono, K Ito, Y *Japan Society of Civil Engineers, Proceedings* 240, Aug. 1975, pp 93-102, 11 Ref.

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

01 129186

THE TECHNICAL AND ECONOMIC ASPECTS OF CONCRETE SLEEPER RECONDITIONING [Techniczne i ekonomiczne zagadnienia regeneracji podkladow betonowych]

The author summarises the experience acquired in the reconditioning of concrete cross ties on the PKP and other railways. He then examines: 1) the actual renovation of the ties, its range, its efficacy, and its utility in relation to all types of defect likely to emerge in ties; 2) the methods of assessing the technical state of a tie and of determining the kind of renovation necessary, as well as of calculating the profitability of such an operation; 3) the technology of repairs to wooden peg fastenings, the organisation proposed for working sites and considerations on the introduction of an industrial organisation at the sites. [Polish]

Turyń, M *Przegląd Kolejowy Drogowy* No. 4, Apr. 1975, pp 14-19

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Wydawnictwa Komunikacji i Łączności Ul Kazimierzowska 52, Warsaw 12, Poland Repr. PC

01 129200

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 and 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.

This project was sponsored by the Federal Railroad Administration, DOT.

Kaiser, WD Nessler, GL Meacham, HC Prause, RH
Battelle Columbus Laboratories Interm Rpt. FRA-OR&D-76-70, May 1975, 59 pp, 18 Fig., 4 Tab., 28 Ref., 2 App.

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

Contract DOT-FR-300

01 129270

SKV 32 001 PRESS FOR WELDING RAIL ON THE TRACK [Schieneklemmvorrichtung SKV 32 001]

Welding of rails is only permitted within narrow temperature limits. The SKV 32 001 press is a device with a light, powerful, hydraulic pump (655 kg), which makes it possible, apart from the stipulated temperature limits, to draw or compress rails so as to make and keep the gap between the rails to be welded the exact optimal size.

Sperlich, W *Signal und Schiene* Vol. 19 No. 5, 1975, 3 pp, 3 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Transpress VEB Verlag fuer Verkehrswesen Franzoesische Strasse 13-14, 108 Berlin, East Germany Repr. PC

01 129271

TRACK ALIGNMENT ACCORDING TO FIXED POINTS WITH TRACK STRAIGHTENING OR TRACK STRAIGHTENING AND DAMPING MACHINES [Gleisrichten nach Festpunkten mit Richtbeziehungsweise kombinierten Richt-und Stopfmaschinen]

Following a reminder of how the old track straightening processes worked (using measurements from arrows, without, and then using reference point), the author states his ideas on future methods. This will involve straightening by machine according to very exact reference points with underpinning of the points of origin of the straightening damping cord as the machine makes

its single run. The technique and cases of use of these processes are discussed in depth. [German]

Warnick, A *Eisenbahningenieur* Vol. 26 No. 7, 1975, pp 251-254, 2 Tab., 11 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

01 129287

RECENT DEVELOPMENTS IN MEASURED SHOVEL PACKING
Detailed study of this track levelling method developed in collaboration between SNCF and Indian Railways.

Manglik, SK *Indian Railway Technical Bulletin* Vol. 31 No. 192, Feb. 1974, pp 5-15, 12 Fig., 2 Tab., 26 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Research Design and Standards Organization Alambagh, Lucknow 5, India Repr. PC

01 129306

RAIL FASTENING [Die Schienenbefestigung]

The author first gives a concrete description of the enormous stresses to which rails are subjected. From this observation, he then describes the various methods of fastening, from simple nailing to ballastless superstructure, including double-clamping elastic spikes, ribbed plates and concrete sleepers. [German]

Schultheiss, H *Europeavekehr* No. 2, 1975, pp 63-67, 3 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Europaverkehr Darmstadt, West Germany Repr. PC

01 129311

ARE FRA RAIL STANDARDS RESTRICTING RAIL-FLAW DETECTION

Since the FRA Track Safety Standards were implemented the number of defective rails has decreased, but the number of accidents due to rail failures has increased. The article tries to explain this discrepancy. A 10% increase in the availability of test equipment has resulted in only 6% increase in test mileage. In fact, Railway Companies lack the means of applying regulations concerning defective rails and this could lead them, in some cases, to put off inspection. Moreover, there is no flexibility in existing standards in so far as the priority removal of potentially hazardous defects known to be in the rail is concerned. The article discusses the need to tighten regulations or make them more flexible.

Railway Age Vol. 176 No. 11, June 1975, pp 42-43

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: XUM Repr. PC

DOTL JC

01 129312

MAKING BAD TRACK GOOD: WHAT ARE THE ECONOMICS

Reduced maintenance costs are not the only economy to be expected from track repair. Other aspects must be taken into consideration: reduction in the number of accidents, in supervision and routine maintenance costs, higher train speeds, increase in car utilization and better quality of service. No exhaustive study on this subject has ever been carried out, but the article gives an outline of the degradation and repair process for a track over an eight-year period, with quantified assessments by heading of expenditure and foreseeable economics.

Merwin, HD *Railway Age* Vol. 176 No. 11, June 1975, pp 36-37, 2 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: XUM Repr. PC

DOTL JC

01 129322

PROGRAMMED TRACK STABILIZATION-BY LIME INJECTION
Beginning in 1972, Southern Railway has been using lime injection to combat roadbed destabilization. Article reviews work of research program on lime stabilization at University of Arkansas Graduate Institute of Technology, the cost factor, and evaluation of results achieved to date.

Progressive Railroading Vol. 18 No. 11, Nov. 1975, pp 38-41, 5 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

01 129323

"CUSHIONED" TRACK

The shock absorbing characteristics of track tie pads is gaining increasing acceptance as railroads witness the growing wear on tracks caused by higher speeds and heavier tonnages, the damage to ballast and ties caused by the pumping action of track. Improved materials are now available for tie pads and economically it is becoming advantageous to invest in this additional material when skyrocketing track maintenance costs are considered. Three cushioning systems are described: (1) a pair of pads between the tie plate and the rail and between the tie plate and the tie; (2) rail-base encasement in place of the tie plate; (3) concrete slab track. Initial installations over a sixteen year period has shown a 50% maintenance cost reduction.

Progressive Railroading Vol. 18 No. 12, Dec. 1975, pp 36-38, 1 Fig., 4 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

01 129327

SINGLE TRACK, DOUBLE TROUBLE

During the last 30 years, major U.S. railroads adopted single-tracking as an economic measure resulting in tax savings, lowered maintenance costs, and reduced track investments. Single-tracking may have been only a quick answer to the railroads' problems. Only now are the long-term effects becoming apparent, particularly as railroads gain experience with the longer, heavier trains in use today. Problems of single-tracked lines include those of maintenance scheduling, the need to maximize maintenance of all system components, increasing rate of ballast degradation, increased frequency of track surfacing. Opinion within the industry is divided as to the economic validity of single-tracking as current problems are evaluated.

Shaffer, FE *Modern Railroads* Vol. 30 No. 10, Oct. 1975, pp 62-65, 1 Fig., 3 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

01 129328

THE ROAD TO DISASTER

Most crucial problem faced by North American railroads today is the deplorable condition of the roadbeds, the result of years of deferred maintenance. Money cannot now be found within the industry to stop the deferrals, much less to eliminate previously accumulated deferrals. A conservative estimate of this M/W deficiency is \$4,727 billion. Possible solutions to the problem are the nationalization of the railroads, so far rejected in the U.S.; a Congressional aid program that will not destroy the private enterprise rail system; government-guaranteed low-interest loans; or a self-liquidating rail trust fund, financed by highway excise and diesel fuel taxes and a special surtax on all surface freight transportation.

Myers, ET *Modern Railroads* Vol. 30 No. 10, Oct. 1975, pp 56-60, 3 Fig., 1 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

01 129332

THE BAND-AID APPROACH

Part 2 (Part 1 appeared in *Modern Railroads*, October 1975) of special report on the crucial problem of railroad physical plant. The result of years of deferred maintenance. The problem today is staggering—material, labour costs required to restore the track to a level capable of meeting present needs is now beyond the industry's ability to pay. The article analyzes two elements of the situation—the availability of material (steel rails, ties, track maintenance equipment) and of trained labour.

Myers, ET *Modern Railroads* Vol. 30 No. 11, Nov. 1975, pp 61-65, 1 Fig., 6 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

01 129411

ELASTICITY OF RAIL STRETCHES IN REACTION TO THE PARAMETERS OF THE FASTENINGS [Uprugost' rel'sovoyh 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 segment. Results are given concerning the experimental research into these problems. On the basis of tests with the fastening 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: International Union of Railways, BD

PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

01 129413

MODERN SYSTEMS FOR TRACK BUILDING

According to the authors, modern systems of track building and renewal can be classified into two large groups: systems using prefabricated track panels; systems with direct laying of sleepers on the ballast and fastening of the rails on the sleepers. For application of the first group of systems, two sites are necessary: one for assembly and the other for dismantling, which should be organized taking several factors into account: expenses, manpower, mechanization of the sites and frequency of train circulation. In this particular group, the authors mention the system used by SNCF which achieves the complete laying of track at a speed of 350 m/h. The integrated systems in the second group do not need the above indicated sites. However, special mention should be made of the system used by the "SECMAFER" gangs, presently adopted by the Mexican National Railways, the replace the track fastened with sleeper-screws by the track with an elastic pad. [Spanish]

Carrasco, M Palmer, M *Comunicaciones y Transportes* No. 15, Apr. 1975, pp 31-40

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Comunicaciones y Transportes Mexico Repr. PC

01 129415

TRACK BUILDING MACHINE USE PLANNING BY MEANS OF A SIMULATION MODEL [Maschineneinsatzplanung im Gleisbau unter Einbeziehung eines Simulationsmodells]

The authors describe a simulation model for planning the medium and short term use of track renewal equipment trains during breaks in the traffic flow. They deal with: the structure of data for planning use of machines; the output of track building and maintenance machines in relation to local conditions; the data acquisition method; the method of storing and updating data; the machine use planning model including remote data transmission. [German]

Bayer, W *Wissenschaftliche Zeitschrift* Vol. 21 No. 3, 1974, pp 357-554, 6 Tab., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Hochschule fuer Verkehrswesen — Friedrich List — Friedrich-List Platz 1, Dresden 801, East Germany Repr. PC

01 129416

A NEW METHOD FOR CURRENT MAINTENANCE OF THE TRACK [Eine neue Methode zur laufenden Instandhaltung des Schienenwegs ausserhalb des Schutterbetts fuer Gleise mit hohen Geschwindigkeiten]

The authors describe maintenance methods, with their advantages and drawbacks, with reference to quality requirements for high-speed lines. They

discuss a new method, and describe its operation, advantages, productivity and efficiency of the work. The new method is based on the use of a new rail fastening with a movable liner, which enables current maintenance of the track to be carried out without touching the ballast. [German]

Iwanow, G Mirtschew, M *DET Eisenbahntechnik* Vol. 23 No. 5, May 1975, pp 216-218, 1 Tab., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: VEB Verlag Technik, Oranienburgerstrasse, 13-14, 102 Berlin, East Germany Repr. PC

01 129420
FROM SANTA FE: WOODCHIP TIE

Reconstituted cross ties, made from old tie chips, are being tested to see if they perform as well in the field as they have in laboratory tests. A process developed by Cedrite Corp. produces a pressure molded beam which contains two steel reinforcing bars and involves the mixing of wood fibers with resins. The tie is seen as a possible hedge against future wood shortages and also as a means for solving the environmental problem of disposing of old ties.

Railway Age Vol. 176 No. 23, Dec. 1975, p 34

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

01 129422
TROUBLED TRACK

This article puts the industry in perspective, noting deferred maintenance is not confined to the publicized difficulties of the Northeast railroads. Over

the past two decades railroads have worked themselves into an overwhelming imbalance with equipment money being available and investments having been primarily above the rail. Money-starved track has then been punished by higher speeds and heavier axle loading. Government could decide it is time to equalize the "public cost" for transportation right-of-way betterment. Technology is of little use unless the railroad right-of-way is fit to serve contemporary needs and railroad personnel learn to use technology to best advantage.

Sillcox, LK *Bent* Vol. 66 No. 3, June 1975, pp 10-16, 2 Phot.

PURCHASE FROM: Tau Beta Pi Association, Incorporated P.O. Box 8840, University Station, Knoxville, Tennessee, 37916 Repr. PC

01 129424
WHAT MACHINES FOR BRANCH-LINE MAINTENANCE

Problems of branchline maintenance involve coping with unballasted track, poor drainage and light, badly worn rail. Available manpower is minimal. The author cites particular types of tools and machines which are seen as most effective in the hands of a few men. Design of track and choice of ballast are also discussed.

Blanchard, LC *Railway Track and Structures* Vol. 71 No. 12, Dec. 1975, pp 17-19

PURCHASE FROM: XUM Repr. PC

DOTL JC

02 052510

MAXIMUM SPEED ATTAINABLE ON THE WHEEL/RAIL SYSTEM. PRELIMINARY INVESTIGATION (SUPPLEMENT).

This report should supplement the Report on Preliminary investigations S 1004/RP 1, published in April 1972. It contains, in particular, the views of the JNR concerning that report and it also furnishes a survey of existing and planned high speed test sections and existing test vehicles. Finally, an analysis is given of the various components of the wheel/rail system and also an indication of the problems involved in the preparation of a synthesis of the overall system.

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

International Union of Railways S1004/RP2/E, Apr. 1973, 76 pp, Figs., Tabs., Photos., 30 Ref., 6 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

02 052666

ADHESION OF LOCOMOTIVES FROM THE POINT OF VIEW OF THEIR CONSTRUCTION AND OPERATION. ADHESION TESTS OF AUTUMN 1972

The report describes the adhesion tests carried out during Autumn 1972 using the B 44 Test Machine 18 000 equipped for operation with a 25 kV, 50 Hz feeding locomotive. The tests were a continuation of those already described in RP 9 and RP 10 but 1400 mm driving wheels were fitted. New data was obtained using the measuring axle-boxes, and the traction forces transmitted by each of the two driving wheels were measured. As before, both manual and statistical evaluations have been made to obtain the greatest information from the recorded results.

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

International Union of Railways B44/RP 11/E, Apr. 1975, 25 pp, Figs., Tabs., Photos., 3 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

02 052667

INFLUENCE OF THE TRANSVERSE PLAY OF THE SUSPENSION SYSTEM ON THE RIDING OF 2-AXLED WAGONS FIELD TESTS ON 2-AXLED GOODS WAGONS FITTED WITH HYBRID SUSPENSION AND UIC DOUBLE-LINK SUSPENSION

A comparison was made between a hybrid suspension and a conventional UIC double-link suspension, both installed in Gbs wagons. Both wagons had free transverse play of about 20 mm and were fitted with 14 mm thick UIC axle guards. The influence of the suspension on the riding of the wagons was studied on a tangent track (track gauges between 1432 and 1441 mm) and in curves of 300, 400 and 685 m radius. The results of the tests have shown that the hybrid suspension adversely affects the riding qualities of wagons.

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

International Union of Railways B131/RP 1/E, Apr. 1975, 30 pp, Figs., 2 Tab., 16 Ref., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

02 052682

CONSTRUCTIONAL ARRANGEMENTS FOR IMPROVING THE RIDING STABILITY AND THE GUIDING QUALITY OF ELECTRIC AND DIESEL LOCOMOTIVES AND VEHICLES. COMPARISON OF THREE MEASURING METHODS FOR DETERMINING THE FORCES EXERTED BY THE WHEELS OF A MOTIVE POWER UNIT ON THE RAILS IN A CURVE OF 300M RADIUS (GIORNICO 1957)

In order to make a comparison between the measuring methods developed by the NS and the SJ for determining the forces occurring between wheel

and rail, comparative tests were carried out on a curve of 300 m radius on the Gothardline in October 1957. For these tests the following measuring apparatuses were used: one measuring rail of the CFF; six measuring base plates of the NS; six measuring base plates of the SJ. For an initial series of tests, the measuring rail was laid on six adjacent sleepers fitted with the measuring base plates of the NS and, for a second series of tests, on six adjacent sleepers fitted with the measuring base plates of the SJ. The measuring rail was secured to the other sleepers by means of the usual CFF fastenings. The forces indicated by the CFF measuring rail on the one hand and by the NS measuring baseplates and the SJ measuring baseplates on the other hand, were determined at various speeds and compared with each other. Considerable differences were shown by the lateral forces determined in this way, by means of the measuring rail and the measuring baseplates of the NS and the measuring rail and the measuring baseplates of the SJ, respectively. Better agreement was displayed by the vertical forces, though, in this case, comparison was only possible between the measuring rail and the measuring baseplates of the NS (the measuring baseplates of the SJ not being designed for the measurement of the vertical forces). The considerable differences between the measured values were considered to have been caused chiefly by the mutual influence of the measuring rail and the measuring baseplates of the NS and the measuring rail and the measuring baseplate s of the SJ respectively, on each other. Since the test arrangement used at Giornico-measuring rail laid on measuring baseplates-did not prove satisfactory, it is suggested, when making comparative tests in the future, to have the three methods of rail measuring equipment arranged at adjacent sites on a curve. The relationship between the values supplied by the three measuring methods should be established with the aid of a fourth measuring method, e.g. by means of directly measuring on the wheel of the vehicle under test the forces exerted on the rails (as already developed by the SJ to a certain degree of perfection).

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

International Union of Railways B10/RP 4/E, Nov. 1960, 14 pp, Figs., Tabs., Apps.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

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 UNITS (MEASURED IN A CURVE OF 300M RADIUS AT GIORNICO)

In 1955 the CFF decided to initiate 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 locomotive types of the series Ae 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 B10 Specialists Committee, for the comparison between three different measuring methods for determining the forces exerted by the vehicles on the track (see B10 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 Repr. PC

DOTL RP

02 092345

COMPARISON BETWEEN COMPUTER SIMULATIONS AND SCALE MODEL TESTS OF SUBWAY TUNNEL AIR FLOW

The purpose of this report is to describe the validation of the aerodynamic theory in the subway environment simulation (SES) computer program, using data from the subway aerodynamic and thermodynamic test (SAT) scale-model facility. Direct comparisons of measured and theoretical vehicle aerodynamic drag and piston-action air flows are presented for both single train and bi-directional train operations, with and without tunnel venting. Prepared by Associated Engineers/A Joint Venture, New York.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Associated Engineers/A Joint Venture, (DC006-0010) Tech. Rpt. UMTA-DC-06-0010-74-3, Feb. 1974, 60p

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244567/4ST, DOTL NTIS

02 092354

DEVELOPMENT AND TEST OF SIMPLIFIED METHODS TO PREDICT SUBWAY AIR PRESSURE TRANSIENTS

This report is one of many reports leading to final product, a subway environmental design handbook. Simplified models are introduced to predict subway air pressure transients. The models deal with pressure changes due to portal entry, post portal entry, vent passage, portal exit and passing trains. Predictions yielded by the models are compared to full-scale field test data gathered at BART. It was concluded that the models are sufficient to identify pressure transient problem areas, as well as solutions in the early stages of subway system design.

Prepared by Associated Engineers/A Joint Venture, New York.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Associated Engineers/A Joint Venture, (DC-06-0010) Tech. Rpt. UMTA-DC-06-0010-74-1, Apr. 1974, 143p

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244654/0ST, DOTL NTIS

02 099771

ON WHEEL-RAIL ADHESION. DIMENSIONAL CONSIDERATIONS FOR TESTS WITH MODELS [Sull'aderenza ruotarotaia Considerazioni dimensionali per esperienze su modelli]

After recalling the main notions of the wheel-rail adhesion phenomenon and establishing a rational working dependence between the adhesion coefficient and a series of characteristic undimensioned groups, the author defines the appropriate similitude criteria enabling the phenomenon in question to be reproduced on the model. Finally, consideration is given to the possibility of carrying out research with the model which would not only be useful in throwing light by experimental means on several important interactions between vehicle and track, but also because such research could quickly lead to the development of practical and economical methods for full-scale applications. [Italian]

Chiesa, W Di Santolo, D *Ingegneria Ferroviaria* May 1974, pp 23-28, 1 Fig., 1 Tab., 16 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Collegio Ingegneri Ferroviari Italiani Piazza Croce Rossa, Rome, Italy Repr. PC

02 099811

ECONOMIC IMPACT OF TRIBOLOGY

Friction and wear-caused mechanical failures and maintenance normally have their roots in phenomena based on tribology, the science and technology of interacting surfaces in relative motion. Developments in tribology since the publication of the "Jost Report" have utilized existing and new knowledge from physics, chemistry, mathematics, statistics, engineering, etc. As a result, advances in diverse fields, from metalworking to medicine or space technology, have been produced. The economic benefits that may accrue to industry can be substantial; in the case of the U.S. the

savings obtainable through tribology could amount to as much as \$16 billion per annum. Some of the means used in the United Kingdom in order to reap the benefits attainable by application of the principles of the multi-disciplinary subject of tribology, and some of the results obtained, are described.

Jost, HP (Angel Lodge Laboratories) *ASME Journal of Mechanical Engineering* Vol. 97 No. 8, Aug. 1975, pp 26-33

ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

02 099842

ANALYSIS OF RAILROAD CAR TRUCK AND WHEEL FATIGUE. PART I-SERVICE LOAD DATA AND PROCEDURES FOR THE DEVELOPMENT OF FATIGUE PERFORMANCE CRITERIA

The development of fatigue performance standards for freight car truck components and wheels requires a knowledge of the fluctuation service load environment, and a basis for stating the conservatism of the design with respect to the environment. On this program special emphasis was given to determining the load environment by analyzing data from 53 test runs conducted on the Erie Branch test track of the Bessemer and Lake Erie Railroad. A number of test parameters were varied, such as speed, type of truck, modifications to the suspension system, etc., to determine those parameters having the greatest influence on the severity of the load. Vertical loads were measured at the side-frame-pedestal/roller-bearing-adapter interface and lateral loads were determined at the wheel/rail interface. The cyclic load data are summarized in a series of load spectra. Factors which must be considered in the development of fatigue performance standards from these spectra include reliability goals, the statistical spread of both load and fatigue strength data, and the philosophy followed in the design of the truck itself.

Sponsored by Federal Railroad Administration and under contract from Transportation Systems Center.

Johnson, MR
IIT Research Institute, Federal Railroad Administration, Transportation Systems Center, (DOT-TSC-FRA-75-11) Intrm Rpt. FRA-OR&D-75-68, May 1975, 146 pp, Figs., Tabs., Photos, 20 Ref., 4 App.

Contract DOT-TSC-727

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

PB-244090/AS, DOTL NTIS

02 125795

DAMPING: ITS APPLICATION IN TRANSPORTATION VEHICLES

Roles for damping in vehicle design for noise suppression are identified in isolation of the vehicle from input disturbances, reducing the response to that disturbance, reducing the noise radiated due to that response, and reducing the transmission of noise. Various mechanisms for the dissipation of energy are discussed, and means of adding damping so as to reduce the dynamic response of structural elements, particularly thin sheets, are considered.

This paper was presented at the 6th SAMPE National Technology Conference, Dayton, Ohio, October 8-10, 1974.

Torvik, PJ (Air Force Institute of Technology)
Society for the Advance of Material & Process Engr 1974, pp 68-78, 22 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Society for the Advance of Material & Process Engr Box 613, Azusa, California, 91702 Repr. PC

02 125807

TECHNOLOGICAL RESEARCH AND DEVELOPMENT IN RAILROAD TRANSPORTATION [Technologische Forschung und Entwicklung-Transport und Verkehr]

The volume contains papers and discussions dealing with research results on railroad cars and trucks. Investigation results on test vehicles, interaction on wheel/rail system, suspension and other railroad car elements are reported and evaluated. [German]

This study appeared in report #T74-42, December 1974.

Ministry for the Advance of Material & Process Eng Dec. 1974, 271 pp,
18 Ref.

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

02 125825
**RESPONSE OF CONTINUOUS PERIODICALLY SUPPORTED
GUIDEWAY BEAM TO TRAVELLING VEHICLE LOADS**
No Abstract.

Smith, CC (Texas University, Austin); Wormley, DN *ASME Journal of
Dynamic Systems, Meas and Control* Vol. 97 No. 1, Paper 74-WA/AUT-3,
Mar. 1975, pp 21-29

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

DOTL JC

02 125826
**MULTIPLE AND CONTINUOUS SPAN ELEVATED
GUIDEWAY-VEHICLE DYNAMIC PERFORMANCE**
No Abstract.

Smith, CC (Texas University, Austin); Wormley, DN *ASME Journal of
Dynamic Systems, Meas and Control* Vol. 97 No. 1, Paper 74-WA/AUT-4,
Mar. 1975, pp 30-40

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

DOTL JC

02 125848
AMERICAN TEST ROLLER TRACK IN PUEBLO, COLORADO
[Der Amerikanische Rollpruefstand in Pueblo, Colorado/USA]

The authors emphasize that the problems of the wheel/rail system are investigated all over the world, with different methods being adopted in various countries. In their first phase, American tests are focused on a translatory simulation of faults in track position, while in Germany efforts are made to analyze the separate and combined effect of disturbance functions and also to find a method for separate representation of faults in track alignment by rotatory movement of each test roller. [German]

Althammer, K (German Federal Railway) *Glaser's Annalen ZEV* Vol. 99 No. 4, Apr. 1975, pp 111-115

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

DOTL JC

02 125866
**BRITISH RAILWAYS HIGH SPEEDS IN THE OPEN AND
THROUGH TUNNELS**

Aerodynamic tests have been carried out in the open as well as in a 1660 m long double track tunnel in connection with the forthcoming introduction of high speed multiple unit trains. The tests were carried out with the aid of two trains pulled by a normal electric locomotive, as well as by one fitted with a streamlined cowl, speeds of up to 176 km/h being maintained in the tunnel. The main results are briefly dealt with and it is concluded that no problems or difficulties of fundamental nature were encountered throughout the tests. [German]

Koffman, JL *Glaser's Annalen ZEV* Vol. 99 No. 4, Apr. 1975, 6 pp

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

02 125867
STABILITY AND RIDING QUALITY OF RAILWAY VEHICLES

The so-called critical speed of a linearized railway vehicle is shown to be no useful measure for the stability of the system in practice. The important interaction between vehicle and track can be taken into account by the riding quality for a certain vehicle on every particular piece of track. The riding quality is determined by the accelerations transmitted by the payload, weighted according to comfort standards, and the relative displacements between wheel and rail. From the riding quality demands both for vehicle design and for maintenance of the track can be derived.

Broersen, PMT *Vehicle System Dynamics* Vol. 3 No. 2, Sept. 1974, pp 109-121

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

02 125885
**INSTRUMENTATION FOR MEASUREMENT OF FORCES ON
WHEELS OF RAIL VEHICLES**

The information in this report covers the procurement, development and testing of instrumentation designed to measure the dynamic forces and temperatures which are created in the wheels of a load rail vehicle truck. The information contained herein is intended for use by scientific, research and engineering personnel who are involved in the measurement of dynamic loads of rail vehicle wheels.

Sponsored by DOT Federal Railroad Administration.

Association of American Railroads Technical Center, ENSCO, Incorporated, (LT-328) Proj Engr. FRA-ORD&D 85-11, May 1974, 103 pp, Figs., Tabs., 13 Phot.

Contract DOT-FR-20010

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247154/AS, DOTL NTIS

02 125894
**RAILWAY TRACK RESEARCH--THEORETICAL AND
EXPERIMENTAL**

Presents theoretical approach for determining stresses that result from vertical and lateral bending of track and stresses that act in the vicinity of the contact area between wheel and rail. The influence of thermal and residual stresses on track behavior is discussed and the dynamic deflections and stress resulting from the action of moving wheels and track irregularities are considered. The occurrence of track failure is analyzed on the basis of failure criteria and fatigue theories.

Hanna, AN
Portland Cement Association Bulletin RD030.01R, 1975, 15 pp, 30 Fig., 24 Ref.

ACKNOWLEDGMENT: Portland Cement Association
PURCHASE FROM: Portland Cement Association Old Orchard Road, Skokie, Illinois, 60076 Repr. PC

DOTL RP

02 126391
**LAUNCHING MOTION OF A PASSENGER CAR GROUP [Der
Ablauf Einer Wagengruppe]**

By solving the d'Alembert basic equation, the speed and distance traveled is determined as a function of time. In the calculations the total mass of the train is assumed to be concentrated in the center of gravity. Allowance is made for a continuous load distribution. The influence on acceleration, speed and traveling time is shown. The derivations apply to the motion characteristics of one coach group. [German]

Sliwa, H *Glaser's Annalen ZEV* Vol. 99 No. 4, Apr. 1975, 5 pp, 5 Ref.

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

DOTL JC

02 126416
**WHEEL/RAIL ADHESION. THE INFLUENCE OF RAILHEAD
DEBRIS**

Evidence that rust is a major source of railhead debris, is presented. Particles are observed to spread on the wear band in wet weather and to be worn off in the dry. Laboratory experiments show that debris has little effect on friction except when mixed with an oil. Friction is then reduced depending on the quantity of oil and the surface area of the particles. A considerable proportion of oil is needed to reduce friction to its lowest value. Water can also substantially reduce friction on debris covered surfaces. A correlation is demonstrated between friction and humidity in which the friction coefficient is shown to be a simple function of the amount of water absorbed.

Beagley, TM (Railway Technical Center, England); McEwen, IJ Pritchard, C *Tavistock Institute of Human Relations* Vol. 33 No. 1,

June 1976, pp 141-152

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

02 126451

SOME PROBLEMS OF RAILWAY OPERATION AT HIGH AXLELOADS

Long high-axle-load trains create cracking, shelling, crushing and corrugation of the rail head while weight transfer further accentuates the situation. "Worn" tire profiles can reduce contact pressure by 30 percent, but excess cant will increase crushing on the inner rail and axle-loading must be considered in relation to rail steel quality in the track. Three-axle locomotive power trucks set up higher lateral forces than two-axle types. Locomotive and car suspension characteristics must be considered in three planes.

Koffman, JL Fairweather, DMS *Rail Engineering International* Vol. 5 No. 4, June 1975, pp 156-161, 10 Fig., 18 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

02 126990

THEORETICAL STUDY INTO THE DYNAMICS OF A PASSENGER-COACH WITH UNEVEN LOAD ON THE BODY PIVOTS [Teoreticeskoe issledovanie dinamiki passazirskogo vagona s nesimmetričnoj nagruzkoi pjatnikov kuzova]

The mathematical model adopted is designed to examine the dynamics of a 4-axle vehicle with 2-level suspension and uneven longitudinal distribution of the weight over the body. Vehicle movement is described by four second-degree differential equations. The dynamic indices of a vehicle with a constant-rigidity central suspension are less favourable than those of a modular-rigidity suspension. Comparison of the dynamic indices of the body to the right of the pivot with the highest load and to that of the pivot with the lowest load shows that the latter's dynamic indices are less favourable. Assessment of the dynamic quality of vehicles with uneven load distribution must consequently be based on the pivot with the lowest load. [Russian]

Usov, VE Cerkasin, JM *Vestnik Vniizt* Vol. 34 No. 1, Jan. 1975, pp 37-41, 2 Tab., 6 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

02 127346

EXPLORING ADHESION WITH BRITISH RAIL'S TRIBOMETER TRAIN

The British Rail tribometer train is a full-scale unit specially developed to accumulate a large amount of adhesion data from which a much better picture of the natural variation of adhesion can be determined. The train has been operating since the summer of 1972. Specific phenomena examined include the effect of rain, adhesion in tunnels, the effect of leaves on the railhead, problems resulting from faulty flange lubricators, effects of curved track and adhesion variations with speed. Results are analyzed statistically. The natural variations of adhesion are emerging and it is being shown how vehicle and track parameters and speeds can affect the use of the naturally available levels of adhesion.

Watkins, DJ *Railway Engineering Journal* Vol. 4 No. 4, July 1975, pp 6-13, 18 Fig., 3 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

02 127347

DEVELOPMENT OF REMEDIES FOR POOR ADHESION

This paper describes work carried out at the Railway Technical Center of British Railways on methods of improving poor wheel/rail adhesion. Only fundamental friction between wheel and rail is considered; truck design and propulsion controls which contribute to locomotive performance are outside the scope of this report. Causes and locations of low adhesion are discussed. Treatment of rail, use of dry grits and of so-called fluid sand, and the cleaning of wheel treads are all examined. Main sources of railhead contamination are reported. British Rail is continuing to examine all the sources and remedies of low wheel/rail adhesion.

Zobel, FGR *Railway Engineering Journal* Vol. 4 No. 4, July 1975, pp 14-20, 11 Fig., 16 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

02 127640

EFFECT OF NONHOLONOMIC CONSTRAINTS ON THE STABILITY AND OSCILLATIONS OF A MECHANICAL SYSTEM [O vliyanii negolonomnykhsvyazei na ustoičivost' i Kolebaniya odnoi mekhanicheskoj sistemy]

The stability and vibrations of a railroad carriage travelling along a straight path are considered. Two types of idealized schemes are discussed: a holonomic and a non-holonomic one. The effect of non-holonomic constraints on the stability and oscillations of the carriage is elucidated. [Russian]

Mechanics of Solids is an English translation of the Russian Izvestiia Akademii Nauk (S.S.S.R.) Mekhanika Tverdogo Tela.

Kondrat'ev, VF (Izvestiia Akademii Nauk SSSR) *Mechanics of Solids* No. 2, Mar. 1975, pp 10-14

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

02 127707

TRACK TRAIN DYNAMICS: PHASE I

More than 15,000 man days of effort have gone into completion of the first of three phases of an international government/industry effort scheduled to extend over ten years aimed at achieving equipment designs less prone to failure than existing units and at operating all equipment more safely. The Association of American Railroads, Federal Railroad Administration, Railway Progress Institute and the Transportation Development Agency of Canada have all funded and participated in the work. Phase I has consisted of 13 Tasks which are described. The three basic efforts in this phase consisted of administration and planning; information gathering; and analysis.

An International Government-Industry Research Program on Track-Train Dynamics. Requests for this Publication should be directed to J.G. Britton, Director of Operations, AAR.

Association of American Railroads AAR R-180, 1975, 170 pp, 32 Fig.

ACKNOWLEDGMENT: AAR

PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

02 127710

HARMONIC ROLL SERIES: FREIGHT CAR MODELS, DESIGN PARAMETER STUDY: FREIGHT CAR SIMULATION SERIES. VOLUME 3

To present the findings related to the primary objectives of Task 13, it was decided to present a series of harmonic roll related documents to the industry to be used as reference material in a similar manner to that of the Track-Train Dynamics Bibliography. The document presents technical information about computerized mathematical models used to simulate the dynamic response of freight cars to various operating conditions. Particular emphasis is placed on studying changes in certain basic freight car design parameters and how these changes affect the dynamic response. It is hoped that this information will be used as guidelines by the AAR Mechanical Division for establishing car design specifications and setting maintenance standards that insure the dynamic stability of freight cars.

An International Government-Industry Research Program on Train-Track Dynamics. Requests for this publication should be directed to J.G. Britton, Director of Operations, AAR.

Association of American Railroads AAR-R174, 1975, 98 pp, 58 Fig., 8 Tab., 2 App.

ACKNOWLEDGMENT: AAR

PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

02 127711

WIDE GAGE INVESTIGATION. VOLUME 1

One of the immediate problems in track maintenance and improvement is Gage Widening. Track lateral stability has been of great concern in recent

years, both from the thermal load aspects involved in the use of continuous welded rail, and the train dynamics aspects of heavier equipment and rail, and the train dynamics aspects of heavier equipment and longer trains. Two particular problems attributed to track-train dynamics interactions are wide gage and rail rollover. For this investigation of wide gage in tangent track, an experiment was conducted on a stretch of track on the Union Pacific Railroad near Pocatello, Idaho. Eight sections of track with different combinations of tie plates and fasteners were installed by the Union Pacific at a site noted for recent wide gage problems. The purpose of the experiment was two-fold: first, as a track train dynamics study, to identify specific factors contributing to development of wide gage; second, as a fatigue test, to evaluate the ability of various test sections to maintain gage under heavy, high speed traffic conditions. Measurements of gage and observations of track conditions at the test site were periodically collected by Union Pacific personnel, so that long term trends could be established. In addition, field experiments measured the dynamic response of the track to traffic during both summer and winter ambient conditions. Volume 1 presents a description of the wide gage experiments and results from the summer field experiment, during which 315 trains were recorded over a 3-week period about 1.5 million gross tons of traffic.

An International Government-Industry Research Program on Track-Train Dynamics. Requests for the publication should be directed to J.G. Britton, Director of Operations, AAR.

Association of American Railroads AAR-R178, 1975, 120 pp, 34 Fig., 13 Tab., 6 App.

PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

02 127712

WIDE GAGE INVESTIGATION. VOLUME 2

The wide gage investigation involved test measurements in the summer and winter months. The reasons for performing measurements by season was because experienced railroad engineers felt the phenomena of gage widening was accelerated during winter months. As reported in Volume I, permanent widening of gage occurs in the summer. Significantly, no appreciable permanent track deformation was found in periodic gage measurements at the test site between May (the installation of the test sections) and November of 1974. After a sufficient period of snow and subzero weather had passed, to assure that the ballast section had deep frost, the track dynamics instrumentation as described in Volume I was again set up for measurements. This report presents the results of this winter series of experiments.

An International Government-Industry Research Program on Track-Train Dynamics. Requests for this publication should be directed to J.G. Britton, Director of Operations, AAR.

Association of American Railroads AAR-R179, 1975, 44 pp, 16 Fig., 5 Tab.

PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

02 127713

PROPOSED NATIONAL RESEARCH PROGRAM ON TRACK-TRAIN DYNAMICS

A study by Southern Pacific showed the need for a study utilizing advanced technology for a systems approach to the total matter of interaction of current-day trains and the track with the objectives of improving railroad transportation reliability, safety and efficiency. This report details the plans for a National Research Program on Track-Train Dynamics with the objective of developing a better understanding of the dynamic relationships between the moving train and fixed guideway on which it operates. This is the final report indicating the three general phases and a detailed plan for Phase I indicating manpower requirements, resources and costs. The Appendices appear in a separate volume.

This study was prepared for the Association of American Railroads. Requests for this publication should be directed to J.G. Britton, Director of Operations, AAR. This is a 2 volume set.

Southern Pacific Transportation Company AAR-R189, Mar. 1972, 59 pp

PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

02 127714

PROPOSED NATIONAL RESEARCH PROGRAM ON TRAIN TRACK DYNAMICS: APPENDICES

As part of the Study by Southern Pacific of the need for a systems approach to the interaction of trains and track, SP surveyed railroads as a basis for selecting and scheduling study of track/train dynamics problem areas. This volume's four sections include: Questionnaire; Response by Question as Received from Each Railroad; Organizational Structure of Responses; and Track-Train Dynamics Key Word Index System.

This study was prepared for the Association of American Railroads. Requests for this publication should be directed to J.G. Britton, Director of Operations, AAR. This is a 2 volume set.

Southern Pacific Transportation Company AAR-R189, Mar. 1972, 100 pp

PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

02 127715

TRACK TRAIN DYNAMICS. GUIDELINES FOR: TRAIN HANDLING, TRAIN MAKEUP, TRACK & STRUCTURES, ENGINEER EDUCATION

This manual was prepared as an immediate aid in improving freight train performance. It has five sections: Definitions and Functions of Equipment; Train Handling; Train Makeup; Track and Structure; Engineer Education. These results are based on parametric study using validated analytical models.

A Government-Industry Research Program on Track Train Dynamics. Requests for this publication should be directed to J.G. Britton, Director of Operations, AAR. This is a 2 volume set.

Association of American Railroads AAR-R153, 1973, 33 pp, Figs.

ACKNOWLEDGMENT: AAR

PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

02 127716

PROCEEDINGS OF CONFERENCE ON TRACK/TRAIN DYNAMICS INTERACTION. VOLUME 1

The problems caused by track/train dynamics manifest themselves in a variety of ways. Regardless of how, the manifestations are extremely costly to the industry and must be solved. To provide interim solutions and to clarify those areas that should receive the greatest attention in the research effort on track/train dynamics, the AAR sponsored a conference on the subject. This is the first of two volumes. Subjects covered in this volume include: Interaction Mechanics; Train Operations and Control; Analytical and Experimental Techniques; Performance of Freight Car Component Systems.

Requests for this publication should be directed to J.G. Britton, Director of Operations, AAR. See also Volume 2, RRIS #1277170 Price for 2 Volume set is \$6.00 Conference held Dec. 15 & 16, 1971 in Chicago.

Association of American Railroads AAR-R190, Dec. 1971, 449 pp, Figs.

PURCHASE FROM: Association of American Railroads Technical Center 3140 South Federal Street, Chicago, Illinois, 60616

DOTL RP

02 127717

PROCEEDINGS OF CONFERENCE ON TRACK/TRAIN DYNAMICS INTERACTION. VOLUME 2

This is the second of two volumes on track/train dynamics. To provide solutions and to clarify those areas that should receive the greatest attention, AAR sponsored a conference on the subject. This is the second of two volumes and includes proceedings of the following sessions: Enhancing Train Operations; Instrument Cars and Research Cars; Interaction Mechanics; Train Operations and Control; Packaging; Accident Analysis. Summaries of Panel Discussions are also included.

Requests for this publication should be directed to J.G. Britton, Director of Operations, AAR. See also Volume 1, RRIS #127716. Price for 2 Volume set is \$6.00. Conference held Dec 15 & 16, 1971 in Chicago.

Association of American Railroads AAR-R190, Dec. 1971, 753 pp, Figs.

PURCHASE FROM: Association of American Railroads Technical Center
3140 South Federal Street, Chicago, Illinois, 60616

DOTL RP

02 127836

RAILWAY DYNAMIC TESTS

The verification of running safety and the quantitative assessment of the comfort of railway vehicles involves the taking of many dynamic measurements. The author first lists the range of the main recordings required and explains how they are taken: fitting of gauges, isolation of the phenomenon to be studied and transformation of the results into readings that can be interpreted more easily (usually an electric process), amplification, filtering, remote transmission of this data, reception and recording. The complex behaviour of a moving vehicle means that numerous phenomena must be recorded simultaneously and continuously by a whole series of measuring instruments. The author describes and explains in three sections the techniques used for measuring stresses and wheel-rail interaction, the series of measuring instruments, and the interpretation of the many and varied experimental results obtained, particularly with the TGV 001 trainset and the Z 7001 railcar. These results are very close to those obtained by calculation; they show the high value of the method using an analogue computer. [French]

Joly, R *Revue Generale des Chemins de Fer* Vol. 94 July 1975, pp 417-452

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

02 127842

RESEARCH PROGRAMME: LONG DISTANCE RAIL TRAFFIC

Systematic investigations in the necessary sub-fields of the wheel/rail system, particularly regarding the interactions between track and vehicle, the dynamic loading of the track, the aerodynamics, the data transmission and train control, and finally the influences of high-speed transport systems on the environment, are to provide the prerequisites for the development and operation of a modern transport system of advanced wheel/rail technology. [German]

Janousch, R Kurz, H *Glaser Annalen ZEV* Vol. 99 No. 7/8, July 1975, pp 193-196

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

02 128605

MECHANICS OF TRANSPORTATION SYSTEMS

This is a continuation of the work of the Applied Mechanics Division of the American Society of Mechanical Engineers on dissemination of information on application of mechanics in transportation. In no aspect of transportation technology does applied mechanics play a more decisive role than in suspension system design. The papers in this volume are: (1) Classifying Track by Power Spectral Density by Corbin and Kaufman, (2) Active Suspensions for Ground Transport Vehicles, A State of the Art Review by Hedrick and Wormley, (3) The Tire as a Vehicle Component by Segel, (4) Development of Advanced Suspension Systems for High Speed Railcars-The Metroliner, A Case Study. Part I-Dynamic Performance Requirements by Strong and Herring, Part II- Prototype Development and Testing by Dean.

The papers in this book were presented at the winter Annual Meeting of ASME, Houston, Texas, Nov 30-Dec 5, 1975. Individual papers are RRIS 03 128606, 03 128607, 01 128608 and 02 128609.

American Society of Mechanical Engineers AMD-Vol. 15, 1975, 110 pp

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC

DOTL RP

02 128609

ACTIVE SUSPENSIONS FOR GROUND TRANSPORT VEHICLES-A STATE OF THE ART REVIEW

This paper surveys the state-of-the-art in ground transport vehicle active suspension development and research. The advantages and disadvantages of

active suspensions are discussed. Suspension performance criteria and techniques for design and optimization of active suspensions are reviewed. Applications of active suspensions in automotive, rail and tracked levitated air cushion and magnetic suspensions are cited. Finally current and future directions of active suspension research are discussed.

This paper was presented at the Winter Annual Meeting of ASME, Houston, Texas, Nov 30-Dec 5, 1975 and is from ASME Mechanics of Transportation Systems, RRIS 02 128605

Hedrick, JK Wormley, DN (Massachusetts Institute of Technology)
American Society of Mechanical Engineers AMD-Vol. 15, 1975, pp 21-39, 9 Fig., 67 Ref.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC

DOTL RP

02 128618

PARAMETRIC STUDIES ON A RAILROAD FREIGHT CAR MATHEMATICAL MODEL

One common problem facing the railroad industry is the "harmonic roll" of freight cars. This problem is more predominant when cars traverse track with periodic low joints on half-staggered rails. When operating a freight car over track of this nature, the car body may rock violently, resulting in equipment failure, wheel-lift and possible derailments. This paper presents a detailed three-dimensional mathematical model which assumes 22 deg of freedom for the computer simulation of freight car dynamics. An extensive study on several important parameters such as the cars' geometry, the track and the suspension is performed and their effects are analyzed. The results can be used as a guideline to minimize the "harmonic roll" problem.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 4, 1975.

Martin, GC Tse, YH (Association of American Railroads)
American Society of Mechanical Engineers 75-WA/RT-11, Nov. 1975, 8 pp, 11 Fig., 1 Tab., 1 App.

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

DOTL RP

02 128624

COMPUTER ORIENTED DATA COLLECTION AND REDUCTION SYSTEM FOR ANALYSIS OF RAILROAD FREIGHT CAR TRUCK BEHAVIOR

The Truck Design Optimization Project has been conducting extensive field testing of conventional freight car trucks under various loadings, car types, track conditions, speeds, and a wide range of modifications. The data collection effort is controlled by a rail car-mounted minicomputer using interactive commands to guide the test crew in the entry of both alphanumeric descriptive data and the digitized values from 48 channels of accelerometers, displacement transducers, and strain gages. These data are recorded on magnetic tapes which are processed at a large computer installation to produce both printed and mechanically-plotted graphical output for detailed analyses.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 4, 1975.

Luttrell, NW Andresen, JA Bardwell, RA (Southern Pacific Transportation Company)
American Society of Mechanical Engineers 75-WA/RT-4, July 1975, 13 pp, 13 Fig.

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

DOTL RP

02 128625

HUNTING STABILITY OF RAIL VEHICLES WITH TORSIONALLY FLEXIBLE WHEELSETS

The effects of torsionally flexible wheelsets on the hunting stability of rail vehicles have been investigated by solving the eigenproblem. The primary model is that of a single truck with two torsionally flexible wheelsets. Results for a complete car model consisting of the car body, two trucks and four

torsionally flexible wheelsets are also presented for comparison. This study shows that the hunting critical speed of rail vehicles is reduced significantly by the use of torsionally flexible wheelsets.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.

Doyle, GR, Jr Prause, RH (Battelle Columbus Laboratories)
American Society of Mechanical Engineers 75-WA/RT-2, July 1975, 8
pp, 14 Fig., 2 Tab., 1 App.

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

DOTL RP

02 128627

VERTICAL MOTIONS DURING RAILCAR IMPACTS

In yard type impact situations, railcars strike other railcars producing car body pitching and vertical bounce. This vertical motion, if large enough, can cause vertical disengagement of couplers which could explain the penetration of tank car ends observed in accident situations. Preliminary investigation of vertical motions during impact, using a mathematical model, has successfully reproduced simulations of impacts in the elastic range. Examples confirm the possibility of coupler disengagement or center plate disengagement of railcars undergoing high speed impact. The computer program developed will solve for horizontal and vertical coupler force, vertical motion at the trucks and couplers, and slippage between adjacent car couplers. This work was sponsored by the RPI/AAR Tank Car Safety Research and Test Project Committee and represents one phase of the overall RPI/AAR study of means to improve tank car safety in accidents.

This paper was contributed the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 4, 1975.

Raidt, JB Manos, WP Johnstone, B (Pullman-Standard Car
Manufacturing Company)
American Society of Mechanical Engineers 75-WA/RT-10, July 1975, 7
pp, 10 Fig., 1 Tab., 10 Ref.

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

DOTL RP

02 128628

TRACK/TRAIN DYNAMICS RESEARCH AND PROGRESS: PHASE ONE

This paper describes the progress and achievements of the Phase One effort of the 10-yr, National Research Program on Track/Train Dynamics. The background of the project, undertaken jointly by the AAR, RPI, FRA and TDA of Canada, is described along with the major study efforts of the Phase One study.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 4, 1975.

Lind, EF
American Society of Mechanical Engineers 75-WA/RT-9, July 1975, 7 pp

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

DOTL RP

02 128629

AN INVESTIGATION OF CONTAINER FLAT CAR RIDE QUALITY

This paper contains summaries and analyses of data recorded during a two-phase program, run between 1970 and 1974, which investigated the ride quality of a container flatcar. The program was undertaken because certain wear conditions found in the wheels, trucks, container pedestals, and trailer hitches on intermodal flatcars appeared to be related to their ride qualities. Phase I showed the importance of such basic variables as length of containers, rigidity of lading, amount of lading, speed of train, position of container on car, condition of wheels, and design of friction damping. Phase II showed the importance of truck design, side bearing design, and track condition.

This paper was contributed by Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November

30-December 4, 1975.
Greenfield, LP (Trailer Train Company); Hodges, RN (Halliburton
Services)
American Society of Mechanical Engineers 75-WA/RT-7, July 1975, 12
pp, 2 App.

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

DOTL RP

02 128630

AN INVESTIGATION OF FACTORS CONTRIBUTING TO WIDE GAGE ON TANGENT RAILROAD TRACK

Wide gage--a fatigue failure of the track to maintain the nominal lateral distance between rail heads--is one of several modes of track failure on which the AAR-FRA-RPI-TDA Track Train Dynamics Program has focused attention. To investigate the generation of wide gage on tangent track, experiments were conducted to measure track dynamic response and long-term fatigue life of track sections on the Union Pacific Railroad in Idaho. Results of these experiments have defined the important factors in this mode of track fatigue.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.

Ahlbeck, DR Harrison, HD Noble, SL (Battelle Columbus
Laboratories)
American Society of Mechanical Engineers 75-WA/RT-1, July 1975, 9
pp, 9 Fig., 1 Tab., 5 Ref.

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

DOTL RP

02 128632

PROPOSED SOLUTIONS TO THE FREIGHT CAR TRUCK PROBLEMS OF FLANGE WEAR AND TRUCK HUNTING

This paper reports on the progress of a development program whose objective is to devise cost effective solutions to the problems of excessive flange wear and truck hunting. It is expected that later papers will deal with separate aspects of this program in greater detail. Three solutions for freight cars are proposed: (1) a retrofit steering assembly kit for application to the trucks of existing roller bearing cars, (2) modification of the side frame and bolster castings to incorporate a more cost effective steering assembly for new trucks and (3) a completely new truck design incorporating improvements in car suspension as well. All three designs include a steering feature which will reduce wheel and rail wear in curves and eliminate truck hunting. The second and third designs also provide better brake shoe/wheel alignment for additional savings in wheel wear. The appendices define the terminology used and identify the design characteristics of conventional trucks which lead to the present high cost of ownership.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 4, 1975.

List, HA (Instrument Society of America); Caldwell, WN Marcotte,
P (Canadian National Railways)
American Society of Mechanical Engineers 75-WA/RT-8, July 1975, 7
pp, 7 Fig., 2 App.

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

DOTL RP

02 128635

ANALYTICAL AND EXPERIMENTAL DETERMINATION OF NONLINEAR WHEEL/RAIL GEOMETRIC CONSTRAINTS

The wheel/rail geometric constraint relationships 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.

To be presented at the Winter Annual Meeting.

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 1975, 44 pp, 11 Fig., 9 Ref.

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

DOTL RP

02 128855

DYNAMIC STRESSES ACTING ON THE WINDOW PANES IN PASSENGER CARS OF THE TRAINS MEETING IN TUNNEL
[Dynamische Druckbeanspruchungen von Fensterscheiben in Reisezugwagen Bei Zugegegnungen und Tunneldurchfahrten]

An attempt is made to obtain a theoretical estimate of the stresses acting on window panes in passenger trains at high speeds. Pressure and expansion readings were taken on window panes while the train was passing through a tunnel, the results being evaluated during comparative tests under the influence of explosible pressures. The procedure is illustrated for the example of the nose wave. [German]

Voss, G (Hannover Technical University) *Glaser's Annalen ZEV* Vol. 99 No. 6, June 1975, pp 161-165, 14 Ref.

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

DOTL JC

02 128856

DESIGN OF RAILROAD CARS FOR HIGH SPEEDS [Ueber ein zur Rekonstruktion von Eisenbahnwagen]

A new approach in design of railroad cars to adapt them for higher speeds is outlined. A nonlinear theory was used for consideration of optimum parameters. Guidelines for changes in suspension elements are given. [German]

International Federation for Theory of Machines and Mechanisms, Intl Symposium: Machines and Mechanisms, University Research Work and Its Application to Industry, Proceedings, Dublin, Ireland, September 12-13, 1974.

Cucuz, N (Belgrade University, Yugoslavia); Rusov, L
International Federation of Mach & Mech Theory Sept. 1974, pp 71-88, 5 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: IF-TOMM Sofia, Bulgaria Repr. PC

02 128875

AXIALLY STRESSED RAILROAD TRACK ON AN ELASTIC CONTINUUM SUBJECTED TO A MOVING LOAD

The recent introduction of the welded railroad track raises the possibility that high axial compressive forces may occur in the rails due to constrained thermal expansions. This in turn may reduce the critical velocity of the track to within the operational velocities of present day trains. Recently the effect of axial forces upon the critical velocities of the track was analyzed by A.D. Kerr using the Winkler model for the base response. In this study, the effect of the axial compressive force on the critical velocity of the track is studied assuming for the base an elastic half space with inertia.

Labra, JJ (ENSCO, Incorporated) *Acta Technica* Vol. 22 No. 1-2, 1975, pp 113-129, 11 Ref.

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

02 128876

EFFECT OF A MOVING SYSTEM OF FORCES ON A BEAM LYING ON AN ELASTIC BASE [Deistvie dvizhushchetsiya sistemy sil na balku, lezhashchuyu nauprugom osnovanii]

Steady-state vibrations of an infinite beam supported by a Winkler base are investigated for the case when an infinite system of identical forces moves along the beam at a constant velocity. In addition, a uniformly distributed

load pressing the beam to the base acts on the beam. A computation algorithm is worked out taking into account the possibility of the appearance of a zone of separation of the beam from the base. The relationship between problem parameters accompanying the onset of such a zone is made clear. Results of numerical calculations for a wide range of parameters are presented. The possibility of the loss of stability by the beam from the plane in which the moving load acts is investigated. An example close to railroad track parameters is given. [Russian]

Muravskii, GB *Mechanics of Solids* No. 3, May 1975, pp 190-195

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

02 128898

AERODYNAMIC ANALYSIS OF SINGLE AND MULTIPLE VEHICLES

The analyses required to calculate the aerodynamic effects of tunnel entry, tunnel venting and multiple vehicle motions in open ended tunnels are presented. Results for several cases of open ended tunnel travel and various entry configurations are presented and described. The effects of an earlier vehicle's motion on the pressure peak associated with a second vehicle entering a tunnel are presented and discussed.

Strom, CR (Mitre Corporation)
Federal Railroad Administration FRA-OR&D 75-16, Jan. 1975, 43 pp, 3 Ref.

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

DOTL NTIS

02 129093

NEW KNOWLEDGE ABOUT TRAIN RESISTANCE AT VERY HIGH SPEED. (TESTS WITH THE TGV 001 TRAIN)

A report is given of the considerable program of measurements in connection with the train resistance of fast multiple unit sets which was undertaken as part of the studies, research and tests instituted by the S.N.C.F. (Fench National Railways) in preparation for the projected high speed lines. The results obtained enabled the performance and energy consumption calculations to be approached on a firm basis. The program comprised the following stages. The first stage was the measurement on the line, using the experimental TGV 001, of the overall resistance to motion on level tangent track as a function of speed, and the analysis of this resistance into its components, in particular the aerodynamic drag which preponderates at high speeds. Next was made the determination of the aerodynamic forces for formations varying from two to ten vehicles utilizing models of the TGV in the wind tunnel. Finally there was a comparison of measurements on the full scale TGV 001 with those made on the five-vehicle model and derivation of the values of drag for service sets expressed in general formulas taking account of the effect of the main geometrical dimensions of the sets.

Bernard, M (French National Railways) *French Railway Techniques* Vol. 18 No. 2, 1975, pp 31-36

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

DOTL JC

02 129104

FREIGHT CAR TRUCK DESIGN OPTIMIZATION. LITERATURE SEARCH. VOLUME I

This document serves as an introduction to the literature known to be available and relevant to rail freight car trucks, their components and performance characteristics. In connection with the Federal Railroad Administration sponsored research in Truck Design Optimization a literature search was conducted to review and assemble all relevant publications, papers, and articles. The collected documentation has been organized into five sections: (1) The History of the Freight Car Truck; (2) Truck Design; (3) Truck Components; (4) Track-Train Dynamics as Related to Truck Performance; and (5) Truck Performance. Each section contains; an introduction dealing with literature selected for reprinting, reprints of articles judged particularly representative or salient, and a bibliography alphabetized by author. The five sections have been organized into three-volumes. Volume I contains the sections entitled: "The History of the Freight Car Truck" and "Truck Design." Volumes II and III will complete

the compilation. It is expected that supplements to the three initial volumes will be published at a later date as additional information becomes available.

This interim report represents the first of a three volume set. Volume II (RRIS 02 129105) and Volume III (RRIS 02 129106) bear the same report number with B and C suffixes respectively.

Southern Pacific Transportation Company, (TDOP 75-251) Intrm Rpt. FRA-OR&D 75-81A, June 1975, 124 pp, Figs., Photos., Refs.

Contract DOT-FR-40023

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

02 129105

FREIGHT CAR TRUCK DESIGN OPTIMIZATION. LITERATURE SEARCH. VOLUME II

Volume II of the TDOP Literature Search contains the sections entitled: "Truck Components" and "Track-Train Dynamics As Related To Truck Performance." Each of the two sections contains: An introduction dealing with literature selected for reprinting, Reprints of articles judged particularly representative or salient, A bibliography alphabetized by author. The "Bibliography--Truck Components" is further organized into the following subsections: Brakes and Brake Rigging; Centerplates; Side Frames and Bolsters; Snubbers and Dampers; Springs; Wheels, Axles, and Roller Bearings; Miscellaneous Component Systems.

This interim report represents the Second of a three volume set. Volume I (RRIS 02 129104) and Volume III (RRIS 02 129106) bear the same report number with A and C suffixes respectively.

Southern Pacific Transportation Company, (TDOP 75-252) Intrm Rpt. FRA-OR&D-75-81B, July 1975, 198 pp

Contract DOT-FR-40023

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

02 129106

FREIGHT CAR TRUCK DESIGN OPTIMIZATION. LITERATURE SEARCH. VOLUME III

Volume III of the TDOP Literature Search contains the sections entitled: "Truck Performance" and "Literature Search Title Index." The section dealing with truck performance contains: An introduction dealing with literature selected for reprinting, Reprints of articles judged particularly representative or salient, A bibliography alphabetized by author. The "Bibliography--Truck Performance" is further organized into the following subsections: Computer Analysis of Truck Performance, Field Analysis of Truck Performance, Laboratory Analysis of Truck Performance. The index section contains a listing alphabetized by title of all publications included in the three-volume Literature Search.

This interim report represents the third of a three volume set. Volume I (RRIS 02 129104) and Volume II (RRIS 02 129105) bear the same report number with A and B suffixes respectively. Bibliographical additions will be made as more information becomes available throughout the Truck Design Optimization Project.

Southern Pacific Transportation Company, (TDOP 75-253) Intrm Rpt. FRA-OR&D-75-81C, Aug. 1975, 215 pp

Contract DOT-FR-40023

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

02 129152

FREIGHT CAR TRUCK DESIGN OPTIMIZATION. DETAILED TEST PLANS FOR SERIES 5 TESTS-PHASE 1

This document presents the detailed test plans for Series 5 Tests of Phase I of the Truck Design Optimization Project. It is a continuation of previous reports for the same project presenting the introduction and detailed test plans for Series 1, 2, and 3 Tests in the first volume and the detailed test plans for Series 4 Tests in the second volume. It includes a description of the trucks and cars to be used in the testing, the basis for selecting them, and a

description of the tests themselves. It lists the instrumentation to be used and the sequence of testing. The reader is referred to the previous documents for details of the instrumentation and data analysis.

The reports entitled Introduction and Detailed Test Plans For Series 1, 2, and 3 Tests, Phase I, and Detailed Test Plan for Series 4 Tests, Phase I are prerequisite to this document. Sponsorship was from FRA, DOT.

Southern Pacific Transportation Company, (TDOP 75-153) Intrm Rpt. FRA-OR&D 75-82, Nov. 1975, 32 pp, 6 Fig., 2 Tab.

Contract DOT-FR-40023

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-248631/AS, DOTL NTIS

02 129153

FREIGHT CAR TRUCK DESIGN OPTIMIZATION. INTRODUCTION AND DETAILED TEST PLANS-SERIES 1, 2, AND 3 TESTS-PHASE I

This document serves as an introduction to the Freight Car Truck Design Optimization Project (TDOP) and presents the detailed test plans for Series 1, 2, and 3 Tests of a contemplated group of four series for that project. Some of the background of the project is given, the development of the test method is described, a description of the instrumentation on the test track and test car and of the facilities of Southern Pacific Transportation Co. (SPT Co.) are given, a data collection and processing plan and analytical procedures for comparing test results with predicted values are presented. A description of the Series 1, 2, and 3 Tests, the contemplated test schedule, and the management structure for the project are also given. In the appendix, the tasks required to be performed by the statement of work for Phase I are outlined.

This is a prerequisite to the forthcoming interim report covering the test plan for Test Series 4, FRA Report FRA-OR&D 75-60. This document supersedes issue of July 1975. Sponsored by FRA.

Southern Pacific Transportation Company, (TDOP-75-11) Intrm Rpt. FRA-OR&D 75-59, Oct. 1975, 120 pp, 28 Fig., 11 Tab.

Contract DOT FR-40023

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-248632/AS, DOTL NTIS

02 129187

HIGH-SPEED DYNAMICS OF DRIVING AXLES OF A DIESEL LOCOMOTIVE, ANALYSIS OF TRANSIENT VIBRATION IN LOCOMOTIVE AXLES [Dyanmika pohonu napravy pro vyssi iizdni rychlosti motorove lokomotivy. Analýza nahodnych vibraci v pohonu napravy motorove lokomotivy]

The two articles analyse dynamic phenomena which appear when a diesel locomotive is running on an uneven track, and their effect on the axle movements. [Czechoslovakian]

Joradka, J *Technicke Zpravy CKD* No. 3, 1973, pp 44-53, 16 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Technicke Zpravy CKD Praque, Czechoslovakia Repr. pC

02 129198

FREIGHT CAR TRUCK DESIGN OPTIMIZATION. SURVEY AND APPRAISAL OF TYPE II TRUCKS

This report serves as an introduction to the family of truck designs known as Type II that will be studied in connection with the Federal Railroad Administration's Truck Design Optimization Project. An investigation was made of existing trucks and truck designs qualifying as Type II trucks and this investigation considers features which would be of interest in selecting candidates for testing and evaluation of such trucks under Phase II of the Truck Design Optimization Project. Type II special service designs embody new concepts that utilize current wheel set and journal bearing assemblies and braking arrangements compatible with current air brake systems. Car coupler height is maintained but car body support other than center plates can be employed. Ride quality and minimum maintenance cost are of major importance to Type II designs.

This project was sponsored by the Federal Railroad Administration,

DOT

Southern Pacific Transportation Company, (TDOP 75-201) Intrm. Rpt
FRA-OR&D-76-05, Dec. 1975, 133 pp, Figs.

Contract DOT-FR-40023

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248633/AS, DOTL NTIS

02 129281

**SIMULATION OF LATERAL MOTION OF 2-AXLE RAILWAY
VEHICLE RUNNING**

This report describes the results of model experiments on creep phenomena when a wheel rolls forward on a rail, and experiments of derailment caused by climb-on-rail or by hunting of the wheel, with a 1/5 model wheelset. By these experiments, the basic mechanics of derailment can be clarified. It describes also the simulation of railway vehicle motion in case that a 2-axle railway vehicle is running on a track with irregularities. The results are compared with those obtained by test runs on the Karikachi derailment test track.

Arai, S Yokose, K *Vehicle System Dynamics* Vol. 4 No. 2-3, pp 165-169

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

02 129284

THE GUIDANCE OF RAILWAY VEHICLES

World-wide the consensus is generally towards the use of rather low conicities for high speed vehicles. Whether the improvement of understanding and prediction techniques will alter this trend remains to be seen. For lower speed vehicles the consensus is less general. Some freight vehicles already successfully use a high-conicity approach with good linear curving, and the authors expect to see this trend continued. They also expect to see improvements in the design of commuter vehicles to increase the linear curving regime and thereby reduce flange and rail wear problems.

Gilchrist, AO Hobbs, AEW *Vehicle System Dynamics* Vol. 4 No. 2-3, 1975, pp 152-156

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

02 129292

DYNAMICS OF VEHICLES ON RAILWAY BRIDGES

Several mechanical models have been developed to simulate the dynamic action of railway vehicles moving along railway bridges. Vehicles are very complex mechanical systems with a number of degrees of freedom, linear and

non-linear springs and damping. Modern vehicles possess also clearly differentiated unsprung and sprung masses. Therefore, with respect to the purpose of the analysis, several mechanical models have been set up to idealize the basic properties of the dynamic movement of the vehicle. The behavior of the vehicle is described by a system of ordinary differential equations of second order with variable parameters.

Fryba, L *Vehicle System Dynamics* Vol. 4 No. 2-3, 1975, pp 208-210

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

02 129403

COUPLED VEHICLE/TRACK DYNAMICS

Dynamic coupling occurs between a railway vehicle and the track due to the reaction forces acting between the wheels and the track, and the elasticity of the track and the foundation. It has become apparent that track elasticity can influence the dynamic behaviour of the railway vehicle, yet in most of the research work in the area of railway vehicle dynamics reported so far, the track is regarded simply as a rigid structure, providing the reactions to the loads of passing vehicles. In this paper the models used for the analyses of the vehicle dynamics (on rigid track) and for the coupled vehicle/track dynamics are described. The equations of motion are derived, and the results obtained for the coupled vehicle/track model are presented and compared with those obtained for the case of an infinitely rigid track. Particular emphasis is on the lateral stability and the response to vertical track irregularities.

Maraghy, WHE Dokainish, MA *Vehicle System Dynamics* Vol. 4 No. 2-3, 1975, pp 203-207

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

02 129406

**HUNTING MOVEMENT AND CONDITIONS OF STABILITY OF
RAILWAY VEHICLES. STABILITY OF TRANSVERSAL
OSCILLATIONS OF VEHICLES [Vnivy pohyb a jeho stabilita u
kolejovych vozidel. Stabilita pricneho kmitani lokomotivy]**

Methods of calculating the stability of the transversal play of powered and hauled railway vehicles. The author discusses the influence of constructional parameters of the vehicles, and of the dynamic variations of the load applied to the track on critical speeds. [Czech]

Rus, L *Technicke Zpravy CKD* No. 4, 1973, pp 24-29

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Technicke Zpravy CKD Prague, Czechoslovakia Repr. PC

03 052671

**ROLLER BEARING AXLEBOXES AND AXLES.
RECOMMENDATIONS CONCERNING THE SELECTION AND
CONDITIONS FOR THE OFFICIAL TESTING AND
ACCEPTANCE OF GREASES INTENDED FOR THE
LUBRICATION OF ROLLER BEARING AXLEBOXES OF
RAILWAY VEHICLES**

The present report brings up-to-date the conclusions of 1964 of ORE Committee E 18 d concerning the methods for assessing roller bearing axlebox greases in taking into account the increase in distances run, loads and in speeds as well as the lengthening of the overhaul intervals. Following numerous enquiries, the ORE B 95 Committed has formulated recommendations concerning the choice of properties of greases intended for axleboxes of all vehicles running at speeds equal to or lower than 160 km/h, the conditions for the official testing and acceptance of these greases, the storing of greases and the refilling of axleboxes. A grease satisfying the official testing and acceptance conditions defined in this report permits, in the case of wagons, a control-check of axleboxes with renewal of greases, at intervals of 8 to 10 years.

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

International Union of Railways B95/RP 4/E, Oct. 1974, 24 pp, Figs., Tabs., Photos., 6 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

03 091886

PHYSICS OF COLLISIONS

Paper clears up some misconceptions on rail car structure and sets down the physical basis of collision analysis and car structure design.

Raskin, D
Transit Development Corporation, Incorporated Final Rpt.
TDC/500-74/6, Oct. 1974, 13 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-241852/3ST, DOTL NTIS

03 091889

STEEL WHEEL PLATE CRACKING

This document describes the results of an investigation into the cause of premature cracking on 28-inch reversed dish transit car wheels. Methods used in determining the operating thermal and track load stresses in the critical areas of a wheel are presented. The observations made on the cracked specimens all indicate that the cracks which formed were due to fatigue. The problem was resolved by specifying a new wheel plate thickness and also by machining and shot peening the plate surface.

Yontar, M
Transit Development Corporation, Incorporated TDC/500-74/4, 10 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-241849/9ST, DOTL NTIS

03 092215

**STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL
TEST REPORTS**

No Abstract.
Set includes PB-244 048 thru PB-244 052.

Boeing Vertol Company, Urban Mass Transportation Administration
Aug. 1974, 833 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC
PB-244047-SET/ST, DOTL NTIS

03 092216

**STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL
TEST REPORT. VOLUME I. COMPONENT TESTING**

The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop

urban rail systems. The overall objective is to enhance the attractiveness of rail transportation to the urban traveler by providing service that is as comfortable, reliable, safe and economical as possible. The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency. This document, Volume 1 of the SOAC Final Test Report, presents the test results of the component testing of the State-of-the-Art car. The purpose of these tests was to show compliance with the SOAC Detail Specification (NTIS PB-225 934). All component tests were conducted by the supplier of the applicable subsystems. An introduction, test procedures and results, and conclusions are presented. Appendices are titled: Propulsion, Dynamic Braking and Auxiliary Power Equipment; Truck Frame; Truck Bolster; Windshield; Seat Strength; and Materials-Fire Resistance.

See also Volume 2, PB-244 048. Paper copy also available in set of 5 report as PB-244 047-SET, PCS26.00.

Boeing Vertol Company, Urban Mass Transportation Administration
D174-10024-1, UMTA-IT-06-0026-74-1, Aug. 1974, 291 pp

Contract DOT-UT-10007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244048/5ST, DOTL NTIS

03 092217

**STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL
TEST REPORT. VOLUME 2. SUBSYSTEM FUNCTIONAL
TESTING**

The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing technology. Primary goals for the cars are passenger convenience and operating efficiency. This document, Volume 2 of the SOAC Final Test Report, presents the test results for the subsystem functional testing of state-of-the-art transit cars. The purpose of these tests was to show compliance with the SOAC Detail Specification (NTIS no. PB-222 147). After adjustments and changes where required, all subsystems met the requirements of the detail specification. Chapters of the report present instrumentation, test procedures and results, and conclusions. Items discussed in the chapter on test procedures and results are car body, lighting, wiring, equipment, main propulsion control and motor rotation, braking, propulsion auxiliaries, car weight, pantograph, air compressor, hostling panel, and visual.

See also Volume 1, PB-244 048, and Volume 3, PB-244 050. Paper copy also available in set of 5 reports as PB-244 047-SET, PCS26.00.

Dunton, W
Boeing Vertol Company, Urban Mass Transportation Administration
Final Rpt. D174-10024-2, UMTA-IT-06-0025-74-3, Nov. 1974, 143p

Contract DOT-UT-10007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244049/3ST, DOTL NTIS

03 092218

**STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL
TEST REPORT. VOLUME 3. ACCEPTANCE TESTING**

The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency. This document, Volume 3 of the SOAC Final Test Report, presents the test results for the vehicle acceptance testing of two state-of-the-art transit cars. Performance, ride quality, noise and electromagnetic interference (EMI) acceptance tests were conducted. Chapters contain a summary of test results, configuration, test equipment and instrumentation, and test procedures.

See also Volume 2, PB-244 049, and Volume 3, PB-244 051. Paper copy also available in set of 5 reports as PB-244 047-SET, PCS26.00.

Rail Vehicles and Components

Brown, P
Boeing Vertol Company, Urban Mass Transportation Administration
Final Rpt. D174-10024-3, UMTA-IT-06-0026-74-4, Apr. 1974, 284p

Contract DOT-UT-10007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244050/ST, DOTL NTIS

03 092219
STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORT. VOLUME 4. SIMULATED DEMONSTRATION TEST

The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency. Simulated Demonstration Tests of the SOAC two-car train was conducted with the purpose to enhance the probability of trouble-free operation in the demonstrations for the riding public to be held in the cities of New York, Boston, Chicago, Cleveland, and Philadelphia. The demonstration profile was set up as a composite of the five demonstration city routes.

See also Volume 3, PB-244 050, and Volume 4, PB-244 052. Paper copy also available in set of 5 reports as PB-244 047-SET, PC\$26.00.

Gordon, T
Boeing Vertol Company, Urban Mass Transportation Administration
Final Rpt. D174-10024-4, UMTA-IT-06-0026-74-5, Oct. 1974, 50p

Contract DOT-UT-10007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244051/9ST, DOTL NTIS

03 092220
STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORT. VOLUME 5. POST REPAIR TESTING

The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The objective of the State-of-the-Art car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency. This document presents the test results for the Post-Repair Testing of the SOAC. The purpose of these tests was to show: (1) compliance with the SOAC Detail Specification (NTIS no. PB-222 147) following repairs to the Number 2 car damaged in an accident on August 11, 1973 at the DOT High Speed Ground Test Center, Pueblo, Colorado; and (2) to complete the Simulated Demonstration Testing (Volume 4) which had been interrupted by the accident. Chapters present configuration, instrumentation, test procedures, test results and conclusions.

See also Volume 4, PB-244 051. Paper copy also available in set of 5 reports as PB-244 047-SET, PC\$26.00.

Christiansen, G
Boeing Vertol Company, Urban Mass Transportation Administration
Final Rpt. D174-10024-5, UMTA-IT-06-0026-74-6, Dec. 1974, 65 pp

Contract DOT-UT-10007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244052/7ST, DOTL NTIS

03 092463
SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORTS

No Abstract.

Set includes PB-244 747 thru PB-244 752.

Boeing Company, Urban Mass Transportation Administration,
Transportation Systems Center Jan. 1975, 824p-in 6V

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC
PB-244746-SET/ST, DOTL NTIS

03 092464
SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME I. PROGRAM DESCRIPTION AND TEST SUMMARY

The six-volume report presents the technical methodology, data samples, and results of tests conducted on the SOAC on the Rail Transit Test Track at the High Speed Ground Test Center in Pueblo, Colorado during the period April to July 1973. The Test program comprises three areas: Vehicle testing, ways and structures testing and track geometry measurement. The objective of the SOAC program is to demonstrate the current state-of-the-art in rail rapid transit vehicle technology, with passenger convenience and operating efficiency as primary goals. In this series, Vol. I contains a description of the SOAC test program and vehicle, and a summary of the test results; Vol. II, Performance Test data; Vol. III, Ride Quality Test data; Vol. IV, Noise Test data; Vol. V, Structural, Voltage, and Radio Frequency Interference Test data; and Vol. VI a description of the instrumentation system used for performance, ride quality and structural testing.

Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.

Boeing Company, Urban Mass Transportation Administration,
Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt.
UMTA-MA-06-0025-75-1, Jan. 1975, 88 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244747/2ST, DOTL NTIS

03 092465
SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME II. PERFORMANCE TESTS

No Abstract.

See also RRIS 03-092464. Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.

Boeing Company, Urban Mass Transportation Administration,
Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt.
UMTA-MA-06-0025-72-2, Jan. 1975, 160 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244748/0ST, DOTL NTIS

03 092466
SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME III. RIDE QUALITY TESTS

No Abstract.

See also RRIS 03-092464. Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.

Boeing Company, Urban Mass Transportation Administration,
Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt.
UMTA-MA-06-0025-75-3, Jan. 1975, 250 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244749/8ST, DOTL NTIS

03 092467
SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME IV. NOISE TESTS

No Abstract.

See also RRIS 03-092464. Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.

Boeing Company, Urban Mass Transportation Administration,
Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt.
UMTA-MA-06-0025-75-4, Jan. 1975, 125 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244750/6ST, DOTL NTIS

03 092468
SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TESTS CENTER. FINAL TEST REPORT. VOLUME V. STRUCTURAL, VOLTAGE, AND RADIO FREQUENCY INTERFERENCE TESTS

No Abstract.
See also RRIS 03-095464. Paper copy also available in set of 6 reports as PB-244 746-SET, PCS28.00.

Boeing Company, Urban Mass Transportation Administration,
Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt.
UMTA-MA-06-0025-75-5, Jan. 1975, 84 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244751/4ST, DOTL NTIS

03 092469
SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME VI. SOAC INSTRUMENTATION SYSTEM

No Abstract.
See also RRIS 03-092464. Paper copy also available in set of 6 reports as PB-244 746-SET, PCS28.00.

Boeing Company, Urban Mass Transportation Administration,
Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt.
UMTA-MA-06-0025-75-6, Jan. 1975, 117 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244752/2ST, DOTL NTIS

03 093125
INFLATABLE DRAG REDUCER FOR LAND VEHICLES
This patent application relates to inflatable drag reducers for land vehicles and, more particularly, to inflatable bags for specifically reducing base drag on land vehicles.

Government-owned invention available for licensing. Copy of application available NTIS.

McDonald, AT
Office of the Secretary of Transportation PAT-APPL-597 557,
DOT-TSC-10081, 10p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244451/1ST, DOTL NTIS

03 099772
LONGITUDINALLY FLEXIBLE OR RIGID WHEELSETS FOR GOODS WAGON BOGIES? [Bewegliche oder in Fahrzeugaengsrichtung starre Radsaetze fuer Gueterwagen-Drehgestelle]
In connection with the planned standardization of bogie wagons, the DB has carried out comparative tests on bogies specially equipped for measurement purposes. The results of these tests are represented by the cross stresses recorded both for the outside wheel on curves and for the inside wheel and in relation to the curve radius. They confirm that longitudinally rigid wheelsets cause inadmissible rail wear on curves with radii of less than 700 m. [German]

Madeyski, T *Eisenbahningenieur* Vol. 25 No. 12, 1974, pp 419-423, 8 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

03 099822
IMPROVEMENT IN THE QUALITY OF COMFORT OFFERED TO PASSENGERS ON MEDIUM AND LONG DISTANCE JOURNEYS

The passenger has a right to expect safety, speed and comfort from the railway. The concept of comfort is not so easy to define. During the course of the journey it is necessary to ensure safety, restrict causes of fatigue, encourage relaxation and repose, and facilitate activities such as reading, conversation or the taking of refreshment. Modern coaches will offer a degree of comfort very much superior to most of the stock in service at the present time, due particularly to the generalisation of air conditioning. It is to be hoped that the investment possibilities of the Railways will make it possible to eliminate the oldest and least comfortable coaches as quickly as possible. It is also desirable for the service life of railway rolling stock not to exceed 25 or 30 years in future; passenger rolling stock becomes obsolete through its level of comfort. However, comfort cannot be improved to infinity due to economic necessities.

Bernard, JP Daffos, MJ *Rail International* No. 5, May 1975, pp 409, Figs., Photos.

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

03 099826
BRITANNIA RIDES THE RAILS
This is another of a continuing series of reports on overseas railway systems. Described are Great Britain's electrification programs and high-speed passenger train projects. Features of the High Speed Train (HST) and of the Advanced Passenger Train (APT) are discussed. Also covered are automatic train control, the advanced signal techniques being evolved and special transport services which are the function of the British Railways.

Friedlander, GD *IEEE Spectrum* Vol. 12 No. 7, July 1975, pp 50-56

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 099828
TESTING ONE, TWO, THREE
This article describes the Truck Design Optimization Project being conducted by Southern Pacific Transportation Company under sponsorship of the Federal Railroad Administration. The \$8-million three-phase TDOP program which is to extend over 4 1/2 years is aimed at better performance from existing trucks and ultimately improved truck designs. Phase I has been an analysis of present general-purpose trucks. Phase II will emphasize special purpose trucks, possibly overlapping with Phase III which will look into unconventional carbody support systems.

Shedd, T *Modern Railroads* Vol. 30 No. 7, July 1975, pp 50-52, 3 Phot.

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC
DOTL JC

03 099837
DOUBLE-DECK CARS TO RAISE CAPACITY IN PARIS SUBURBS
A new generation of double-deck push-pull trains is now being delivered to allow the French National Railways to increase the capacity of its Paris suburban services by 42 per cent. Wide doors and large vestibules insure that unloading of 300 passengers is completed in under two minutes.

Railway Gazette International Vol. 131 No. 5, May 1975, pp 189-191, 2 Fig., 2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 099838
ACF'S PROBLEM SOLVER: THE CANNONAIDE
A pneumatic unloading system is incorporated in the Center Flow Cannonaide car which utilizes intermittent air blasts to dislodge and unload bulk shipments of such troublesome materials as asbestos, synthetic rubber and resins. Previously these materials have required bagging or boxing. The car, otherwise a conventional Center Flow design, has air tanks and blaster

units integrally positioned underneath. Nozzles extend through the slope sheets and can be programmed to be self rotating.

Railway Age Vol. 176 No. 15, Aug. 1975, p 8

PURCHASE FROM: XUM Repr. PC

DOTL JC

03 099839

BUDD AMTRAK CARS: FIRST OF 492 NEW CARS WILL ENTER SERVICE THIS MONTH

The locomotive hauled cars patterned after the self-propelled Metroliner cars are being delivered for service in the Northeast corridor. Designated as Amcoach, Amcafe and Amclub, these cars will later be joined by long-distance versions where interior arrangement will include dressing room modules and leg-rest seats. The cars feature a new Budd Pioneer III truck which combines air and coil spring suspension.

Railway Age Vol. 176 No. 15, Aug. 1975, pp 28-31, Photos.

PURCHASE FROM: XUM Repr. PC

DOTL JC

03 125791

REINFORCED (GLASS) PLASTIC COMPONENTS FOR RAPID TRANSIT CARS

This paper describes the procedure for the production of fiberglass reinforced polyester exterior and interior components for use in mass transportation and people-mover vehicles. The major emphasis of this presentation deals with describing the preparation of Skybus-type front ends and interiors. The paper covers the design and production of the wood patterns, finishing of the patterns, preparation of the production molds from fiberglass and polyester resins and the production of finished gel-coated exterior and interior components using hand lay-up and spray-up techniques. The sizes of these exterior and interior components range from eight to ten feet in width and height, constituting a very large production piece. Special jigs and holding fixtures are used in handling the components during the various stages of their production.

Presented at a meeting held in Washington, D.C., February 4-7, 1975.

Fekete, F Thrash, DJ
Society of the Plastics Industry 1975, 6 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 125819

RESEARCH INTO THE OPTIMIZATION OF THE AXLE OF ROLLING STOCK ON FRENCH NATIONAL RAILWAYS
[Recherches sur l'optimisation des essieux-axes de la S.N.C.F.]

The research work described is intended, among other things, to study how far in particular it would be possible to reduce the unsprung weight represented by the axle, a parameter whose influence increases with the speed of the vehicles. Various investigations, which are explained in detail as well as their results, were conducted in the following specific areas: more specific approach of the conditions with which the gear connections wedged on the axles must comply; possibilities provided by certain special steels; improvements to be expected from superficial mechanical treatments; and influence of different types of anti-corrosion methods. In French with English abstract. [French]

Revillon, A Leluan, A *Revue Generale des Chemins de Fer* Vol. 94 Mar. 1975, pp 179-189

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 125836

NEW DC MULTIPLE-UNIT TRAINS 472/473 FOR THE URBAN RAPID TRANSIT SYSTEM IN HAMBURG, WEST GERMANY
[Neue Gleichstrom-Triebzuege 472/473 fuer die Hamburger S-Bahn]

The rapid transit system operating in the metropolitan area of Hamburg uses 1.2-kv dc power, with current collection realized through a contact rail. The electric and mechanical equipment are described. Technical data on performance and capacity are tabulated. [German]

Rappenglueck, W *Elektrische Bahnen* Vol. 46 No. 3, Mar. 1975, pp 57-64, 8 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 125858

APPLICATION OF ALUMINUM TO BOGIE FRAMES

Lighter bogie frames using aluminum has had limited service attention. Nevertheless 12 years experience in Great Britain on BR of a wagon bogie set designed by Gloucester Railway Carriage & Wagon and those in service on Rhatische Bahn indicate this form is commercially worthwhile whilst London Transport's prototype set is about to enter service under a 'tube' line coach.

Rail Engineering International Vol. 5 No. 3, Apr. 1975, 3 pp

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 125879

AUTOMATION OF CAR INSPECTION AND REPAIR

Japanese National Railways have shown spectacular progress in the modernization of their rolling stock by developing a complex electronic control system incorporating the latest technology. This was necessary because conventional methods of inspection, relying mainly on the five senses (hearing, sight, etc...), are liable to produce errors due to variance in the measured values caused by the inspector's individual errors. To eliminate these drawbacks JNR have studied and developed sophisticated control equipment which automatically measures and evaluates pertinent data for all rolling stock. Two specialized articles are included: "Equipment for comprehensive test of electric cars", H. Matsuzawa, and "Automation of car inspection and repair at depots", Y. Asano.

Matsuno, T Matsuzawa, H Asano, Y (Japanese National Railways)
Japanese Railway Engineering Vol. 15 No. 2, 1974, pp 4-12, 3 Fig., 7 Tab., 7 Phot.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chiyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

03 126400

DEMANDS ON RAIL TRAVELING ALUMINUM TRAINS FROM THE VIEWPOINT OF THE TRAFFIC DEPARTMENT [Forderungen an Aluminium-schienefahrzeuge aus der Sicht des Verkehrsbetriebes]

Large scale use of aluminum trains contributes to a reduction of energy consumption and of wear of the track. Consideration of the economics of using aluminum trains leads to suggestions for reducing costs by changes in design and methods of production. Some of the cars of the German Federal Railway now in service are discussed. [German]

Rappenglueck, W *Aluminum* Vol. 51 No. 4, Apr. 1975, pp 277-280

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 126402

DAMPING PROPERTIES OF RUBBER-STEEL SHOCK ABSORBERS [Wlasnosci tlumiacie amortyzatorow gumowo-stalowych]

The results of the author's own studies of the effect of repeated loading and artificial aging of rubber-steel shock absorbers on their mechanical characteristics are presented. An evaluation is made of the suitability of rubber-steel shock absorbers for use in railway couplers in comparison with the hitherto used spring-type shock absorbers which consist of elastic-frictional rings. [Polish]

Mikula, S *Przeglad Mechaniczny* Vol. 34 No. 1, Jan. 1975, 3 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 126403

NEW LIGHT WEIGHT RAILCAR OF THE SERIES 627 OFFERS MORE ECONOMY BY ONE-MAN OPERATION [Der Neue Leichttriebwagen 627-Mehr Wirtschaftlichkeit durch Einmannbedienung]

The Series 627 railcar described is a self-contained unit with two driving cabs, luggage room, toilet and large-capacity passenger compartment for 64 seated passengers. The entire power plant, consisting of a 287 kW diesel engine with dynastarter and hydraulic transmission with two torque converters, is of underfloor type for optimum utilization of the floor space. The car body is of extremely lightweight construction and built up from corrugated standard light gage sheet steel with special corrosion protection. As a special feature, this railcar is fitted with equipment permitting one-man operation by passenger flow routing. [German]

Zboralski, D (German Federal Railway) *Glaser's Annalen ZEV* Vol. 99 No. 5, May 1975, pp 131-140, 6 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 126406

SUISSE--EXPRESS CARS OF THE SWISS FEDERAL RAILROAD [DieSuisse-Express-Wagen der Schweizerischen-Bundesbahnen]

A detailed description is presented of the design and construction features of the newly developed Swiss express cars made exclusively of welded modular parts of aluminum alloys Al-Zn Mg 1 and Al-Mg 3. [German]
Also published in French.

Schweizer Alumin Rundschau/Revue Suisse de Alumin Vol. 25 No. 5, May 1975, pp 109-115

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 126409

MATHEMATICAL STRESS ANALYSIS AND TESTS OF COMPONENTS IN THE DEVELOPMENT OF WHEEL SETS [Rechnerische Spannung-sanalyse und Bauteilpruefung in der Radsatzentwicklung]

The dynamic forces between wheel and rail increases with increasing traveling speeds. This fact requires minimization of the unsprung weight of the wheel sets. For the solution of this problem, the stresses caused by the dynamic forces and the stress-sustaining capacity of the material must be known. Stresses in highly strained areas of wheel sets are calculated and compared with experimentally determined fatigue strengths of the steels used. [German]

Raquet, E (Krupp Huettnerwerke); Knorr, W *Technische Mitteilungen Krupp, Werksberichte* Vol. 33 No. 2, May 1975, pp 69-72

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 126410

RESILIENT WHEELS TO REDUCE NOISE OF CARS

In this paper, the construction, the characteristics and the state of development of resilient wheels is discussed. It has been ascertained that resilient wheels contribute to reducing the noise from rolling contact of the wheels on rails and, until now, they have been mainly used for low-speed cars, i.e., streetcars and some subways. Recently, the noise of higher speed cars has also become a major problem. Hence the necessity of studying the use of resilient wheels in higher speed cars, as well as their construction. [Japanese]

Matsumiya, S Sugawara, S *Sumitomo Light Metal Technical Reports* Vol. 26 No. 2, Apr. 1974, pp 97-104, 12 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 126417

USE OF ALUMINUM FOR RAILROAD VEHICLES [Die Verwendung von Aluminium bei Schienenfahrzeugen]

A review is presented of railroad and subway cars constructed of lightweight aluminum alloys which are currently in use in various industrially developed countries. [German]

Schieb, AE *Metallurgie* Vol. 15 No. 1, 1975, pp 11-16

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 126418

EXPERIENCE IN MAINTENANCE AND OPERATION OF ALUMINUM RAILROAD ROLLING STOCK [Erfahrungen bei unterhalt und Betrieb von Aluminium-Schienen Fahrzeugen]

Based on years of experience by the Swiss Federal Railways with aluminum passenger and freight trains, the material-related characteristics and types of repair of damaged cars, technical qualifications of repair personnel, equipment of the repair shops, and problems of storage of semifabricated products for repair purposes are discussed. It is stated that with well organized repair shops aluminum rolling stock can be maintained for periods of 20 to 30 years. [German]

Lack, HR *Aluminum* Vol. 51 No. 5, May 1975, pp 351-354

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 126432

RAILROAD--COAL, AGGREGATE AND ORE CARS--YESTERDAY, TODAY AND TOMORROW

Railroad handling of bulk materials such as coal, sand, gravel, and ore has recently been studied by engineers to maximize efficiencies offered by this mode of materials handling. The author describes details of novel rail car designs that assure longer in-service time between repairs and maximize the users' return on investment. Associated facilities that match the capabilities of such cars are described.

Presented at the Joint Materials Handling Conference, Sheraton-Cleveland Hotel, Cleveland, Ohio, 23-25 September 1975.

Keniston, HE (Ortiner Freight Company)

Society of Manufacturing Engineers MS75-640, Sept. 1975

ACKNOWLEDGMENT: Society of Manufacturing Engineers

PURCHASE FROM: Society of Manufacturing Engineers 20501 Ford Road, Dearborn, Michigan, 48128 Repr. PC

03 126974

LABORATORY WEARING TESTS OF WHEEL MATERIALS

Laboratory tests were made of the stress imposed on materials in the boundary layer, of the hardness of materials and of the wearing process with a view to analysing the causes of frictional wearing between wheel and rail. For the choice of optimum wheel materials recommendations are given with respect to their temperature sensitivity (lower carbon content). [German]

Pigors, O *DET Eisenbahntechnik* Vol. 23 No. 8, Aug. 1975, pp 359-361

ACKNOWLEDGMENT: British Railways

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

03 126978

FRACTURE RESISTANCE OF RAILROAD WHEELS

The effects of manufacturing method, chemical composition, heat treatment, temperature, and loading rate on the plane strain fracture toughness K_{IC} of railroad wheels have been determined. Carbon content of the wheels is shown to be the principal factor which controls their toughness. One hundred wheels which fractured in service are analyzed by means of fracture mechanics procedures. The locations, configurations, and size of thermal and plate cracks which initiated brittle fracture are reviewed, and estimates made of the stress levels which resulted in failure. Estimates have been made of the minimum size of crack which could result in the failure of wheels under adverse service conditions. These are discussed with respect to the minimum size of defect which can be reliably detected by NDT. Included in the report are state-of-the-art reviews on thermal and plate cracking and on the stresses developed in railroad wheels.
Sponsored by FRA.

Carter, CS Caton, RG

Boeing Company, (DOT-TSC-FRA-74-10) Intrm Rpt. FRA-ORD&D-75-12, Sept. 1974, 216 pp, Figs., Tabs., Photos., 45 Ref., 3 App.

Contract DOT-TSC-617

ACKNOWLEDGMENT: FRA, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB243638/AS, DOTL NTIS

03 126982
THE DEVELOPMENT OF CONTAINER CARRYING WAGONS
[Zur Entwicklung von Containerwagen]

Trains conveying containers must operate as complete wagon loads, at a maximum speed of 140 km/h. The most economical wagons for container transport are articulated units. The author discusses problems of running stability, running gear and brake gear in connection with maximum operating speeds of 140 km/h. [German]

Ehinger, M *Schienenfahrzeuge* Vol. 19 No. 2, Feb. 1975, pp 47-50, 5 Fig., 8 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: VEB Verlag fuer Verkehrswesen Franzoesische Strasse 13-14, 108 Berlin, West Germany Repr. PC

03 126988
AUTOMATIC CONTROL OF WHEELTREAD WEAR
[Avtomaticeskij kontroliznosa katanija koles]

The article presents: the structure, working principles and results of tests on a prototype electronic image-converter for measuring the type profile on a moving train; the structural diagram of the test model of a system for controlling wear on the running surface of the rail; the algorithm of the solution to the problem of automation, control of the maximum value and the irregularity of the wheel profile. [Russian]

Sapovalov, VM *Zelezodoroznij Transport* Vol. 57 No. 2, Feb. 1975, pp 58-60, 3 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Zelezodoroznij Transport Moscow, USSR Repr. PC

03 126989
AN IMPROVED METHOD FOR MEASURING THE RESIDUAL STRESSES IN RAILROAD SOLID WHEELS

These residual stresses are those resulting in particular from heating due to braking applied to the running surface of the wheel. The suggested measurement method admits that stresses in the wheel have two possible causes: a stress due to rim/plate interaction; a residual stress which remains in the plate after its separation from the rim. It stems from this analysis. Once strain gauges have been placed: the plate is cut by a lathe out of the wheel; the rim is sawn; and opening displacements are estimated by a simple elastic stress calculation. Diagrams and tables give the results of tests carried out on three types of wheel.

Nishimura, S *Japan Society of Mechanical Engineers, Bulletin* Vol. 18 No. 116, Feb. 1975, pp 114-122, 14 Fig., 1 Tab., 8 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: ESL Repr. PC, Microfilm

03 127353
P-S-N CURVE FOR WHEEL-SEAT OF CAR-AXLE

This paper presents a fatigue life for the wheelseat of car axles. The results were obtained from fatigue test results for test axles using a full-scale fatigue testing machine. Statistical data are presented on fatigue crack initiation of actual axles and the reliability and usefulness of the P-S-N curve are discussed.

Tanaka, S, Hatsuno, K, Yaguchi, S *Railway Technical Research Institute* Vol. 16 No. 2, June 1975, pp 75-76, 2 Fig., 2 Tab.

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

03 127354
STUDY ON FLYING SNOW WITH THE PROTOTYPE HIGH SPEED SNOW PLOUGH FOR RAILWAY

To combat the effects of snow on the high-speed Shinkansen lines, tests were conducted to determine the best design for a high-speed snow plow and also to determine the pressures to which wayside structures would be subjected when such a unit was operated. Several scoop angles were tested at speeds

from 28.2 to 90.2 km/h. The height and direction of flying snow and its pressure on wayside fences were measured and extrapolated to estimate the effect of trains displacing snow at speeds to 250 km/h.

Shinojima, K *Railway Technical Research Institute* Vol. 16 No. 2, June 1975, pp 64-69, 12 Fig.

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

03 127357
STATICAL CONSIDERATION FOR RAILWAY VEHICLE OVERTURN DUE TO LATERAL WINDS

In an attempt to speed up trains on the narrow-gauge lines to 130 km/h, the lateral wind forces acting on the train were investigated as one of the factors concerning the speed restriction on heavily curved sections. First, models of the lightest passenger cars were submitted to wind-tunnel experiment. Results of the experiment were then analysed to calculate the critical wind speed for overturn of the vehicle. It was revealed that the acting drag force and the position of the aerodynamic centre in a vehicle were much more influential to overturn than the suspension stiffness.

Fukuchi, G *Railway Technical Research Institute* Vol. 16 No. 2, June 1975, pp 49-53, 9 Fig., 3 Ref.

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

03 127385
STRUCTURAL CHANGES IN THE GERMAN FEDERAL RAILWAY'S FLEET OF GOODS WAGONS

As part of the corporate plan of the German Federal Railway, a vehicle concept has been worked out which comprises passenger as well as goods vehicles. The present report is confined to the policy governing the development and composition of the goods wagon fleet. The aim is to re-define the future maximum speed and permissible axle load. As far as international traffic is concerned, these suggestions are to be discussed and decided upon within the UIC. The ratio of wagons with steering axles and bogie wagons is discussed, having regard to the influence factors. A systematization and classification of the types of goods wagons is recommended. Certain types of existing wagons are to be discontinued and other types of wagons introduced. The New policy in respect of privately owned wagons shows that, in future, certain types of wagons appear to be particularly suitable for private ownership.

Stelter, W *Rail International* No. 8, Aug. 1975, pp 695-712, 8 Tab., 7 Phot.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 127619
TESTING OF BOGIE FRAMES FOR RAILWAY CARS [Pruefung von Drehgestellrahmen fuer Eisenbahnfahrzeuge]

A new method of testing by the German Federal Railways laboratories is described. Only arc-shaped road travel is simulated. The deviations from the mean stress observed in these tests are treated as the basic stress amplitude. The forces are applied by servohydraulic equipment. A nomogram for determination of permissible lateral fatigue stresses is given. [German]

Schenk, H, Lange, H *Materialpruefung* Vol. 17 No. 6, June 1975, pp 178-180

ACKNOWLEDGMENT: EI
PURCHASE FROM: VDI-Verlag GmbH Postfach 1139, 4 Duesseldorf, West Germany Repr. PC

03 127642
3,000 DC ELECTRIC COACHES FOR CHILEAN STATE RAILWAYS

A total of twenty 3,000 v dc electric coaches designed for a track gauge of 1,676 mm were supplied to the Chilean State Railways, where they are now in successful commercial operation, three trains on the Santiago-Chillan local service (AEL coaches) and two on the Santiago-Concepcion long distance service (AEZ coaches). Basically, each train consists of four coaches, but up to 16 can be connected for multiple unit operation. The

maximum speed is 130 km/h for the AEL, and 160 km/h for the AEZ. Both types of coaches use common traction motors, traction control equipment, and bogie trucks. They are high-speed high-performance coaches completed strictly to customer specifications after overcoming a number of difficulties.

Fujita, M Hachijin, M Mizumoto, I Tamitani, T *Hitachi Review* Vol. 24 No. 4, Apr. 1975, pp 204-216

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

03 127837
CALCULATION OF RUBBER SPRING ELEMENTS

Rubber spring elements are normally calculated according to a linear one-dimensional deformation law, taking into account the deviations between calculated and actual deformation by a number of correction factors. This article describes an extended system of equations which permits the computation of the deformation characteristics of rubber elements with greatly varying dimensions, without any correction factors being required. The method of calculation with separate representation of the Poisson's ratio yields the result that rubber is by no means to be regarded as incompressible. In addition, this method of calculation proves that great deformations can be computed by way of transmission matrixes, this being equally valid for the step-by-step computation of such a deformation. The calculated results are compared with the results of deformation tests, a far-reaching agreement between calculated and experimental results being obtained. [German]

Walther, J *Glaser Annalen ZEV* Vol. 99 No. 7/8, July 1975, pp 197-206

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

03 127840
THE S.N.C.F. EQUIPMENT LABORATORIES

The author, Ingenieur en Chef at the SNCF, Head of the Equipment Control and Laboratories Department, explains that these laboratories are now housed under one roof following the gradual amalgamation of six laboratories previously operating on the different railway networks. These networks comprised several laboratories on the Western Region (chemistry, physics, mechanical tests and metrology), and each on the South West (various mechanical tests and chemical analyses), Northern (mechanical tests), Eastern (mechanical tests) and former Alsace-Lorraine (various tests) Regions. These Laboratories have, since 1973, been completely centralised. The article therefore deals successively with the functions of these laboratories, their organisation (staff and means facilities), their main activities over the last two years. It highlights the existing facilities and the diversity of the work carried out: the equipment modernisation policy will be continued, in order that the research work planned in various spheres may be carried out in optimum conditions. [French]

Revillon, A *Revue Generale des Chemins de Fer* Vol. 94 July 1975, pp 408-416

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

03 127844
FREIGHT CAR TRUCK DESIGN OPTIMIZATION PROJECT.
DETAILED TEST PLANS FOR SERIES 4

This document presents the detailed test plans for Series 4 Tests of Phase I of the Truck Design Optimization Project. It is a continuation of a previous report presenting the introduction and the detailed test plans for Series 1, 2, and 3 Tests, for Phase I of the same project. It describes the modifications to the trucks to be made prior to testing and lists the instrumentation to be used and the sequence of testing. The reader is referred to the previous document for details of the instrumentation and the data analysis.

This study was sponsored by Federal Railroad Administration, DOT. This report is a prerequisite to the report Freight Car Truck Design Optimization, Introduction and Detailed Test Plans-Series 1,2 and 3.

Southern Pacific Transportation Company, (TDOP 75-152) Intrm Rpt. FRA OR&D 75-60, Aug. 1975, 23 pp, 4 Fig., 2 Tab.

Contract DOT FR 40023

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

DOTL NTIS

03 127854
MODERN MAINTENANCE DEPOTS FOR HIGH SPEED TRAINS
With introduction of high speed trains on British Rail's Western Region in 1976, maintenance depots are being built at Bristol and London. These facilities will handle all daily servicing and regular maintenance of the 27 trainsets, aside from their annual main-works overhaul. Three similar shops are being built for the Eastern Region's 32 HSTs, on order for 1977-1978. The fixed-consist multiple unit trains require a different type of working than individual locomotives and coaches in traditional facilities. Covered facilities are now regarded as essential for servicing operations formerly performed outside.

Railway Gazette International Vol. 131 No. 9, Sept. 1975, pp 349-350, 2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 127870
FORTY YEARS OF DEVELOPMENT IN VEHICLE DESIGN ON NETHERLANDS RAILWAYS

The multiple-unit electric train has become the accepted technology of the Netherlands Railways. The use of rubber for wear-free pivots and sliding contacts, adoption of synthetics and development of electronics and static switching characterize car design, refinements of trucks and suspension systems are described. The evolution of traction and braking systems is also covered.

Zeevenhooven, CE (Netherlands Railways) *Rail Engineering International* Vol. 5 No. 5, Aug. 1975, pp 179-184, 16 Fig., 3 Tab.

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

03 128189
OUTLINE OF SHIN KANSEN HAKATA ROLLING STOCK MAINTENANCE BASE

The Shin Kansen was extended to Hakata in March 1975, and the total Shin Kansen fleet now numbers 2,128 electric cars. The Hakata base now functions as a conventional combined workshop and operations depot under a unified management. It is the most modern on JNR and has been playing a vital role on Shin Kansen. A very detailed description is given on this facility.

Ishii, K Toko, H (Japanese National Railways) *Japanese Railway Engineering* Vol. 15 No. 3/4, 1974, pp 15-19, 2 Fig., 2 Tab.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

03 128191
TROUBLE SHOOTING QUICKENER (TSQ) FOR SHINKANSEN
With extension of the Shin Kansen to Hakata in 1975, the line is now 1,000 km long and 2,100 cars are needed for the operation. Since this is the trunkline of JNR, its operation is characterized by high speed and heavy density. A malfunction on a single car can affect not only the entire Shin Kansen but also connecting services. Intended as a trainer for drivers, this electric railcar simulator was installed in Shin Osaka in 1974. The cab controls and the air conditioning controls are faithfully reproduced. Pantograph and underfloor brake equipment are installed on separate racks. Operators learn to operate under the prevailing Automatic Train Control signals and speed indications. Malfunction indications are coordinated with trouble shooting.

Okuda, D *Japanese Railway Engineering* Vol. 15 No. 3/4, 1974, pp 28-30, 2 Fig., 2 Phot.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

03 128606

DEVELOPMENT OF ADVANCED SUSPENSION SYSTEMS FOR HIGH SPEED RAILCARS. THE METROLINER, A CASE STUDY. PART 1 DYNAMIC PERFORMANCE REQUIREMENTS

This paper describes a technique for development of improved suspension systems for railcars. The Metroliner Ride Improvement Program 1 results are used to illustrate the application of the technique, to determine methods of improving ride quality of the Metroliners, and to establish the requirements for a new truck which should result in ride quality improvement.

This paper was presented at the Winter Annual Meeting of ASME, Houston, Texas, Nov 30-Dec 5, 1975 and is from ASME Mechanics of Transportation Systems, RRIS 02 128605.

Strong, PM Herring, JM (Atomic Energy Commission)
American Society of Mechanical Engineers AMD-Vol. 15, 1975, pp 67-81,
16 Fig., 1 Tab.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC

DOTL RP

03 128607

DEVELOPMENT OF ADVANCED SUSPENSION SYSTEMS FOR HIGH SPEED RAILCARS. THE METROLINER, A CASE STUDY. PART 2, PROTOTYPE DEVELOPMENT AND TESTING

Express railway passenger service between Washington and New York is provided by Amtrak with a fleet of electrically powered cars known as Metroliners. In an experimental program to improve the speed and ride comfort offered by passive railcar suspension systems, the Federal Railroad Administration of the Department of the Transportation sponsored the Metroliner Ride Improvement Program. Part I of this program, described in Reference 1, involved the testing of the current revenue service Metroliner trucks (suspension-propulsion units) and the development of specifications for new trucks. As part II of the program, experimental prototype trucks were developed and tested by the Vought Systems division of the LTV Aerospace Corporation, in association with the Swiss Industrial Company of Neuhausen Rhine Falls, Switzerland. Included in this paper are descriptions of the new truck design, of the suspension system and its adjustability, of the analyses supporting the design and of the running test program, where an extensive optimization of suspension parameters was carried out.

This paper was presented at the Winter Annual Meeting of ASME, Houston, Texas, Nov 30-Dec 5 1975 and is from ASME Mechanics of Transportation Systems. RRIS 02 128605.

Dean, FE (LTV Aerospace Corporation)
American Society of Mechanical Engineers AMD-Vol. 15, 1975, pp
83-108, 24 Fig., 1 Tab., 16 Ref.

ACKNOWLEDGMENT: ASME
PURCHASE FROM: ASME Repr. PC

DOTL RP

03 128619

CYCLIC DISTORTIONS AND STRESSES IN 36 INCH WHEELS UNDER COMBINED SERVICE LOADS

In previous publications the authors described analytical methods of determining the transient temperature distribution in railroad wheels due to tread braking. The stress fields caused by the combination of braking and non-symmetrical mechanical wheel-rail forces were determined throughout the body of the wheel. In this paper the authors utilize the methods developed in earlier work and present the stress fields for a 36-in. (914-mm) freight car wheel subjected to various cyclic mechanical and braking load combinations. The resultant stresses were determined at several angular positions relative to the wheel-rail contact plane to establish the magnitude of the maximum octahedral shear stresses. The distortion of the wheel is depicted in a film accompanying the presentation of this paper. This movie shows the distortion induced by a prescribed service environment through 360 deg of wheel revolution.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.

Novak, GE (Del Engineering, Incorporated); Eck, BJ (Griffin Wheel Company)
American Society of Mechanical Engineers 75-WA/RT-5, Nov. 1975, 8

pp, 17 Fig., 7 Ref.
ACKNOWLEDGMENT: ASME
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

03 128620

PROGRESS IN RAILWAY MECHANICAL ENGINEERING (1974-1975 REPORT OF SURVEY COMMITTEE) LOCOMOTIVES

This report covers motive power designs that have been delivered and developments undertaken in the survey period of September 1, 1974 to September 1, 1975. Data and photographs for six new diesel locomotives, two electric locomotives and four diesel train sets are presented. Electrification plans on a world-wide basis are also discussed.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.

Baker, PH Schulze, FW (General Electric Company)
American Society of Mechanical Engineers 75-WA/RT-12, Nov. 1975, 16
pp, 20 Fig., 3 Tab.

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

DOTL RP

03 128621

PROGRESS IN RAILWAY MECHANICAL ENGINEERING (1974-1975 REPORT OF SURVEY COMMITTEE) CARS AND EQUIPMENT

This survey of the annual ASME report covers some of the major developments in freight and passenger equipment made public in the last calendar year. Because of federal legislation and, in general, a continuing shortage of oil, the need for cars to haul low sulfur coal is still large. The establishment of "Rail Box" has created a large need for a "standardized" general purpose box car. In the people transport area, rapid transit is continuing to grow and new equipment is in the offing for Amtrak.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.

Manos, WP (Pullman-Standard Car Manufacturing Company)
American Society of Mechanical Engineers 75-WA/RT-6, Nov. 1975, 8
pp, 27 Fig.

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

DOTL RP

03 128633

ANALYSIS OF THERMAL STRESSES AND RESIDUAL STRESS CHANGES IN RAILROAD WHEELS CAUSED BY SEVERE DRAG BRAKING

A finite-element computer program, which takes into consideration nonlinear material behaviour after the yield point has been exceeded, has used to analyze the thermal stresses in railroad freight car wheels subjected to severe drag brake heating. The analysis has been used with typical wheel material properties and wheel configurations to determine the thermal stress field and the extent of regions in the wheel where the yield point is exceeded. The resulting changes in the residual stress field after the wheel has cooled to ambient temperature have also been calculated. It is shown that severe drag braking can lead to the development of residual circumferential tensile stresses in the rim and radial compressive stresses in the plate near both the hub and rim fillets.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 4, 1975.

Johnson, MR Welch, RE Yeung, KS (IIT Research Institute)
American Society of Mechanical Engineers 75-WA/RT-3, July 1975, 6
pp, 22 Fig.

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

DOTL RP

03 128634

INVESTIGATION OF A TORSIONALLY FLEXIBLE FREIGHT CAR

With the introduction of a new design wood chip gondola car on the Seaboard Coast Line Railroad, problems arose which defied attempts at solutions by analytical methods and laboratory testing. To positively identify the source of these problems and at the same time analyze the effects of rigidizing the car body, Seaboard Coast Line in a joint effort with Pullman-Standard conducted tests in the actual operating environment of a car. The results of these tests, which are herein discussed, led to the conclusion that "truck hunting" action on the empty car was the primary source of structural problems. The test results are presented in graph form followed by a discussion and conclusions. A summary of the ongoing efforts to determine the most economical solution to the problem is also presented.

This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 4, 1975.

Mims, WE (Seaboard Coast Line Railroad); Yang, TH (Pullman-Standard Car Manufacturing Company)
American Society of Mechanical Engineers 75-WA/RT-13, July 1975, 8 pp, 12 Fig., 1 Tab.

ACKNOWLEDGMENT: ASME

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

03 128836

AMTRAK GETS FIRST OF 492 METROLINERS

Budd Company has started to produce the first of a \$192 million order for 492 metroliner cars for service on Amtrak's Washington-New York-Boston line. Article provides details of car features.

Progressive Railroading Vol. 18 No. 8, Aug. 1975, pp 33-34, 3 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

03 128839

L & N DOES BIG JOB ON BIG DIESELS

Louisville and Nashville's South Louisville locomotive shops have been converted by means of new work flow and innovative work techniques resulting in higher capacity and better quality control at the shops. A straight line pattern is followed for cleaning, inspection, servicing, and heavy maintenance over-hauling permitting a fast, efficient reconstitution of diesel engines. Automated techniques are employed throughout the maintenance facility.

Progressive Railroading Vol. 18 No. 9, Sept. 1975, pp 91-94, 19 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

03 128842

CHESSIE PUTS ON BIG PUSH IN COAL CARS

Predicted increase in coal productive capacity of over 42 million tons by the end of 1979 has resulted in the build-up of Chessie System's coal-hauling, open-top hopper car fleet. The Mechanical Dept., with an average of 7300 employees, oversees the design and maintenance of the car car and locomotive fleets. Aiming to produce greater efficiency, high productivity and less expense, the following systems are used: 1) A card system continuously monitors the condition of the fleet, and provides information for forecasting fleet condition, preparing repair cost estimates; the market planning group responsible for forecasting car demand shares the information from the system. 2) Special maintenance forces have been established at five strategic locations to handle small repairs quickly. 3) The locomotive fleet is on a 90-day maintenance cycle, resulting in increased utilization of work forces and facilities and a balanced work-load. Problems remain, the being the need for standardization within the industry. Chessie System looks to the A.A.R. Mechanical Division to lead the way to standardization.

Hackney, TP, Jr (Chessie System) *Progressive Railroading* Vol. 18 No. 9, Sept. 1975, 5 pp, 10 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

03 128854

NEW ALUMINUM MULTIPLE UNIT SUBURBAN TRAINS FOR THE SWISS FEDERAL RAILROAD [Neue Vorortstrriebzuege der SBB in Aluminiumbauweise]

Detailed description is presented of the design and operation of two new types (RABDe 8/12 and 8/16) of Swiss multiple unit suburban trains made of lightweight aluminum alloys. [German/French]

Knecht, H *Schweizer Alumin Rundschau/Revue Suisse de Alumin* Vol. 6 June 1975, pp 148-155

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 128871

USE OF STEEL PLATE AND SHAPES IN THE CONSTRUCTION OF LOCOMOTIVES [Utilisation des toles et profiles en acier dans la construction du materiel moteur destine aux chemins de fer]

The types of steel used in modern electric or Diesel engines for frames, housings, boilers, and other parts are discussed. Replacement of more conventional structural steels by copper-alloyed and high-yield strength steels is dealt with. Some difficulties in selection are mentioned. [French]

Chavanon, R *Revue de Metallurgie* Vol. 72 No. 5, May 1975, pp 419-423

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 128877

METALS USED AT THE SOCIETE ARBEL-INDUSTRIE FOR RAILROAD ROLLING STOCK [L'utilisation des metaux pour le materiel ferroviaire a la societe arbel-industrie]

The amounts and types of different steels used in specific railroad cars are tabulated and discussed. This includes covered and open cars, two-axle or bogie-type cars, hopper cars, container carrying cars, and others. [French]

Daulny, C (Arbel-Industrie (Douai)) *Revue de Metallurgie* Vol. 72 No. 5, May 1975, pp 433-440

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 128878

MANUFACTURE OF ONE-PIECE WHEELS AND AXLES AT THE DUNES WORKS OF CREUSOT-LOIRE AND THE VALENCIENNES LES DUNES (VALDUNES) CONSORTIUM [Fabrication des roues monoblocs et des essieux a l'usine des dunes de la societe Creusot-Loire et du groupement d'interet economique Valenciennes les Dunes]

A detailed description is given of the production of wheels, mostly from open hearth steel, including steelmaking, casting of ingots, forging of the wheels, and quality control. This is followed by a description of ingot casting, rolling, forging, heat treating, and machining of the axles. Special metallurgical problems, those resulting from service performance and those involving compliance with specifications are dealt with on examples. [French]

Dupuis, B *Revue de Metallurgie* Vol. 72 No. 5, May 1975, pp 403-417, 10 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

03 129134

COMPUTER GRAPHICS FOR STRUCTURAL ANALYSIS

A large structural analysis program using the finite element method, NEWPAC, has been written at British Rail to analyze the wide range of structures involved in railroad engineering, such as locomotive frames, coach bodies, bogie frames, wheels and bridges. It was decided that any computer graphics aid should be applicable to the whole range of jobs so that as many designers and engineers as possible would benefit. It is concluded that within

the project computer graphics is proving to be a useful tool. The speed with which structural analysis data can be checked and the results investigated has been reduced.

Presented at a meeting at the University of Southampton, Hamps., Engl., April 8-11, 1974.

Sunley, VK (Railway Technical Center, England); Turney, M
Institution of Electrical Engineers Conf Publ 111, 1974, pp 1-5, 2 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 129138

CALCULATION OF RUBBER ELASTIC STRUCTURAL ELEMENTS [Die Berechnung Gummielemente Konstruktionselemente]

Rubber spring elements are calculated according to a linear one-dimensional deformation law, taking into account the deviations between calculated and actual deformation by a number of correction factors. This article describes an extended system of equations which permits the computation of the deformation characteristics of rubber elements with greatly varying dimensions, without any correction factors being required. The method of calculation with separate representation of the Poisson's ratio yields the result that rubber is by no means to be regarded as incompressible. [German]

Walther, J *Glaser's Annalen ZEV* Vol. 99 No. 7-8, July 1975, pp 197-206, 4 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 129142

FUTURE INTERNAL SERVICE COACHES OF THE S.N.C.F.

The development of new coaches for the internal services of the French National Railways (S.N.C.F.) is described, beginning with an in-depth study of the wishes of the traveling public, 80% of whom, accounting for 70% of the revenue, seek improved second-class accommodations. For economic reasons, attractive, modern, second-class coaches would draw revenue away from obsolescent first-class coaches, so it was decided to provide new first-class coaches also, along similar lines, to provide trains with uniformly modern cars. Both new designs are 26.4 m long overall, with 80 seats in second class, 58 seats in first class. First class has both wider seats and a wider aisle (2 seats on one side, one on the other, instead of pairs of seats on both sides). Features of air-travel amenities have been incorporated, such as indirect general lighting, plus individually controlled reading lights, individual pull-down tables in the back of the seat ahead, luggage racks for small items, with an end-of-car storage area for heavy baggage, refreshment cubicles at one end of each car, and a public address system. The air-conditioning system is capable of maintaining 22 C when the external temperature ranges from 20 C to 24 C; when the external temperature exceeds 24 C, the interior temperature can be regulated to 20 C plus half the amount by which the external temperature exceeds 20 C.

Ravel, J (French National Railways); Bernard, JP *French Railway Techniques* Vol. 18 No. 2, 1975, pp 37-56

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 129144

LONGER LIFE FOR ROLLER BEARINGS? TWO-WEAR WHEELS?

Association of American Railroads proposal for a two-wear wheel, reduction in the reapplications limit for rim thickness on the 100-ton car, modified reclamation procedures for truck side frames and bolsters, and wide-ranging standards engineering including coordination with national and international standards bodies on COFC matters is discussed.

Ellsworth, KG *Railway Age* Vol. 176 No. 14, July 1975, 3 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 129154

PHASE 05 REPORT ON HEAD SHIELD FATIGUE TESTS

In order to reduce the probability of DOT Class 112A and 114A railroad tank car head punctures, the Department of Transportation has required that one-half inch thick steel head shields be applied to these cars. They are to be spaced in front of the tank head and are to cover approximately the lower half of the head. Recognizing the need to assure that the method of attachment of these heavy plates is adequate, the RPI-AAR Tank Car Safety Project conducted an extensive series of instrumented impact and in-train tests of four different attachment designs. Using these test data and data on predicted in-service environment, fatigue life calculations were made for each design. This report describes the entire study and concludes with a proposed specification which is recommended to be adopted by the AAR Tank Car Committee to qualify candidate attachment designs.

Phillips, EA

Association of American Railroads Technical Center, (AAR R-197)
RA-05-3-35, Nov. 1975, 35 pp, 11 Fig., 5 Tab.

ACKNOWLEDGMENT: Association of American Railroads Technical Center
PURCHASE FROM: Association of American Railroads Technical Center
3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

03 129164

URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM ANNUAL REPORT, JULY 1974

This 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. The ACT-1 program progressed to the award of a contract for the design and construction of ACT-1 train. A list of candidate subsystems has been proposed for test and development under the Advanced Subsystem Development Program (ASDP).

Boeing Vertol Company, (D174-10033-1) Ann. Rpt. UMTA-IT-06-0026, July 1974, 116 pp

Contract DOT-UT-10007

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC

DOTL NTIS

03 129175

CRACKED-WHEEL DETECTOR "COULD SAVE MILLIONS"

Wheelfax is a system of ultrasonic detection of cracks in vehicle wheels during running up to 30 mph. One unit has been undergoing tests at the Argentine yard of Santa Fe Railroad since June 1973, and two others have been ordered, for Jacksonville (Florida) and Saint-Luc (Montreal) yards.

Railway System Controls Vol. 6 No. 5, May 1975, pp 12-14, 6 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 129192

STUDY ON THE SEATING SOLIDITY OF WHEELS ON THE WHEEL SEATS [Issledovanie prochnosti posadki koles teplovoznykh kolesnykh par]

The article presents the results of experimental studies on the seating solidity of wheels on the axles of diesel locomotives, effected under dynamic stress, using both test models and actual assemblies. One of the recommendations seen to be indispensable in the light of these studies is the following: measures such as the increase of permissible efforts and loads, and the use of larger diameter wheels must be associated with an examination of the solidity of wheel seating and, if necessary, with experimental work. [Russian]

Greciscev, ES Krecetova, NE *Vestnik Vniizt* Vol. 34 No. 4, 1975, pp 27-30, 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

03 129264
GLASS FOR THE FRONT WINDOWS OF HIGH-SPEED RAIL TRACTION STOCK

Efforts to increase the top speed of rail vehicles to more than 200 km/h provide the starting point for considering the optimal design of the front windows of high-speed traction stock. The Authors describe tests for measuring the mechanical impact strength of composite safety-glass windows at train-meeting speeds. [German]

Kalkbrenner, E Kneuttlinger, A *Eisenbahntechnische Rundschau* Vol. 24 Sept. 1975, pp 335-338

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

DOTL JC

03 129265
USE OF MODERN METHODS OF CALCULATION FOR DETERMINING STRESSES AND DEFORMATIONS IN WHEELSETS

A series of computations is being presented to illustrate the possibilities offered by the use of a computer programme to set up stress and deformation analysis of wheelsets according to the finite element method. After a short description of the "ANTRAS" system, the first part of the study deals with the influence of a monobloc wheel web shape on the stress distribution and axial deformation of a wheel. The computations refer to three typical shapes and consider two load conditions exposing the wheel centre to heavy stresses. The second part deals with the ascertainment of stresses in wheelset axles. The computational method is also suited for difficult detail investigations of critical wheelset areas. This is being substantiated by computations of shrinking and centrifugal forces in hollow axles and the bending stresses at the fillets of the axles caused by wheel load and lateral force. [German]

Raquet, E *Glaser's Annalen ZEV* Vol. 99 No. 9, Sept. 1975, pp 249-255

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

03 129272
PLAIN BEARINGS FOR RAILWAY WAGONS

Plain wagon bearings, better known as 'brasses', are in operation on many of the world's railways, but they have a number of disadvantages. A new design of plain bearing by Vandervell is described to replace the 'brasses' and offers certain advantages. Also an advanced plain cylindrical bearing is described, designed for use on the high speed trains of the future.

Bruce, J *Tribology* Vol. 8 No. 5, Oct. 1975, 4 pp, 4 Fig.

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

03 129274
DEVELOPMENT OF A FLANGE LUBRICATING DEVICE AND BRAKE-SHOE INSERTE GUIDED BY THE FLANGE FOR THE DIESEL LOCOMOTIVE BR120 [Die Entwicklung einer Spurkranzschmiereinrichtung sowie spurkranzgefuehrter bremssohlen fuer die Diesellok BR120]

Wear on the flanges of motive units running on winding lines can be reduced by using flange lubricating devices. However, instead of brake-shoe inserts to exert a braking force on the flange, inserts guided by the flange must be used. The authors describe the flange lubricating device and guided brake-shoe inserts for the diesel locomotive BR 120. These brake-shoe inserts guided by the flange do not affect the flange lubrication in any way.

Bolke, G *Schienefahrzeug* Vol. 14 No. 5, May 1975, pp 161-165, 6 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: VEB Verlag fuer Verkehrswesen Franzoesische Strasse 13-14, 108 Berlin, East Germany Repr. PC

03 129296
BOGIE DESIGN FOR HIGHER SPEEDS, MORE COMFORT
Brief presentations of the most striking characteristics of Fiat bogies: 1) type 7196 for speeds up to 140 km/h, 2) type 71 for speeds up to 200 km/h, 3) type 0160 for speeds up to 250 km/h, and pendular suspension vehicles.

Santanera, O *International Railway Journal* Vol. 15 No. 10, Oct. 1975, 5 pp, 6 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: XUM Repr. PC

03 129308
THE TORSIONAL STRENGTH OF BOGIE WAGONS [Der Verwindungswiderstand von Drehgestell-Guterwagon]

The number of wagons with torsional rigidity and widely spaced bogie king pins is increasing. The greatest attention should be given to the constructional rigidity of wagons. The author gives comments on calculations for a tank-wagon design in which torsional strength does not endanger safety against derailment. He adopts as a basis the test results of the ORE B 55 Specialists Committee on "Prevention of derailment of goods wagons on distorted track", and on the estimated derailment of an empty 102-tonne tank wagon. [German]

Koffman, JL *DET Eisenbahntechnik* Vol. 23 No. 8, Aug. 1975, pp 355-358, 4 Fig., 2 Tab., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: VEB Verlag Technik Oranienburgerstrasse 13-14, 102 Berlin, East Germany Repr. PC

03 129326
10,000 TANK CARS IN 6 YEARS

Union Tank Car Co. investment of \$20 million in a new tank car building plant is termed a success. Advanced fabrication techniques resulting in a simplification of processes, unique equipment, and a revolutionary plant layout have resulted in improved quality of cars, an output of sixty five cars/week, and the production of their own car components geared to the production of the tank structures.

Progressive Railroading Vol. 18 No. 12, Dec. 1975, pp 32-35, 8 Phot.

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

DOTL JC

03 129423
R-46

The R-46 cars, long awaited by New York subway riders, represent the largest order ever placed for rail passenger cars in the U.S., a total of \$214 million for 754 cars. These technologically sophisticated vehicles presented many design and production problems. Introduction of the cars into service was then delayed by problems with the cam control system.

Van Der Sluys, W (Pullman-Standard Car Manufacturing Company) *Mass Transit* Vol. 2 No. 11, Dec. 1975, 5 pp, 7 Phot.

PURCHASE FROM: Mass Transit 538 National Press Building, Washington, D.C., Repr. PC

03 129430
NICKEL STAINLESS STEELS HELP STRETCH TRANSIT DOLLARS

Starting in 1931, stainless steel was used for lightweight railway cars. Almost two-thirds of all passenger cars in Europe are of stainless steel and almost all new cars built in the U.S. in the past 25 years have been of this material. Corrosion resistance, strength, ease of fabrication, impact resistance and fire resistance are among the qualities which recommend these alloys for the car application.

Nickel Topics Vol. 28 No. 4, 1975, pp 7-10, 2 Tab., 6 Phot.

PURCHASE FROM: International Nickel Company, Incorporated 1 New York Plaza, New York, New York, 10004 Repr. PC

04 091614

HEALTH IMPLICATIONS OF THE CATALYTIC CONVERTER

The oxidation catalytic converter should substantially reduce emissions of hydrocarbons (HC), carbon monoxide (CO), oxides of nitrogen (NO), total oxygenates and certain aromatics. Ozone levels should also be reduced as a result of lower levels of HC and NO. Atmospheric lead should be reduced since low-lead gasoline must be used with the converter. There are, however, several adverse effects which could result from use of the catalytic converter: (1) recent tests indicate that these devices emit sulfates and sulfuric acid, both of which would have adverse health impacts; (2) if manganese is used to replace lead in gasoline, ambient manganese levels could increase; (3) the disposal of the spent catalytic materials (e.g. platinum and palladium) may cause additional environmental health problems; (4) mechanical failure of the converter will allow the automobile to emit as much pollution as the 1968 model.

National Aeronautics and Space Administration, Illinois Institute for Environmental Quality, (NASACASE-NPO-13613-1) Patent App PAT-APPL-574208, May 1975, 23 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

N75-22747/0ST, DOTL NTIS

04 091814

STIRLING CYCLE ENGINE AND REFRIGERATION SYSTEMS**[Patent Application]**

A Stirling cycle heat engine is described in which displacer motion is controlled as a function of the working fluid pressure and a substantially constant pressure. The heat engine includes an auxiliary chamber at the constant pressure, and an end surface of a displacer piston is disposed in the auxiliary chamber. During the compression portion of the engine cycle when the fluid pressure rises above the constant pressure, the displacer forces the working fluid to pass from the cold chamber to the hot chamber of the engine. During the expansion portion of the engine cycle the heated working fluid in the hot chamber does work by pushing down on the engine's drive piston. As the working fluid pressure drops below the constant pressure, the displacer forces most of the working fluid in the hot chamber to pass through the regenerator to the cold chamber. The engine is easily combinable with a refrigeration section to provide a refrigeration system in which the engine's single drive piston serves both the engine and the refrigeration section.

Government-owned invention available for licensing. Copy of application available NTIS.

Higa, WH

National Aeronautics and Space Administration, (NASACASE-NPO-13613-1) Patent App PAT-APPL-574208, May 1975, 23 pp

Contract NAS7-100

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

N75-22747/0ST, DOTL NTIS

04 093214

DESIGN AND DEVELOPMENT OF A SEGMENTED MAGNET HOMOPOLAR TORQUE CONVERTER

This program is for the research and development of a new mechanical power transmission concept: the segmented magnet homopolar torque converter. The purpose of this device is to convert unidirectional torque of constant speed (such as from a steam turbine prime mover) into variable speed output torque in either the forward or reverse directions. The concept offers an efficient, lightweight low volume design with potential application over a wide range of speeds and power ratings in the range from hundreds to tens of thousands of horsepower. This machine concept can be applied to commercial and military advanced concept vehicles for both terrain and marine environments. The program places particular emphasis on the technology of liquid metal current collection systems for the reason this is essential for the success of the homopolar machine concept. In Phase I the technical problems were reviewed, the machine concepts were studied, and a detailed technical plan was evolved for the entire program. In Phase II, theoretical, engineering, and experimental tasks were performed to develop a reliable constant speed current collection system which was demonstrated in an actual segmented magnet homopolar generator (SEGMAG). The objectives of Phase III are to extend the technology developed in Phase II

for constant speed machines to the case of the torque converter which must operate at variable and reversing speeds. This report period encompasses a portion of the work performed during Phase III. (Author)

Semi-annual Technical Report for period ending May 31, 1975.

Mole, CJ Arcella, FG Berkey, E Boes, DJ Doshi, VB
Westinghouse Electric Corporation, Advanced Research Projects Agency
EM-4705, July 1975, 170 pp

Contract DAHC15-72-C-0229

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

AD-A014503/7ST, DOTL NTIS

04 099796

REFITTED METROLINERS: PROTOTYPES FOR UPGRADING THE FLEET

An improvement program started in 1970 has produced four Metroliner cars rebuilt to assure greater reliability and more economical maintenance. Dynamic braking resistors have been moved to the roof and air intakes for cooling air for underbody electrical equipment are also located there. Major modifications were made to power conditioning, propulsion, trainlines, cooling, suspension, environmental control and wiring, and a new diagnostic and monitoring system has been incorporated. The remaining 57 Metroliners may be retrofitted with this same equipment; Amtrak has not yet made a decision.

Ellsworth, KG *Railway Age* Vol. 176 No. 9, May 1975, pp 38-39, 3 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

04 125809

CONTRIBUTION OF THE EMISSION CHARACTERISTICS OF DIESEL ENGINES AT TRANSIENT OPERATION [Beitrag zum Emissionsverhalten von Dieselmotoren bei Instationaerem Betrieb]

Investigations under transient engine conditions have been carried out in which the emission concentrations have been measured during well-defined acceleration periods. The results show clearly that the concentrations are different for stationary and transient conditions. The reason is obviously the influence of the combustion chamber wall temperature. [German]

Meggyes, A *MTZ Motortechnische Zeitschrift* Vol. 36 No. 4, Apr. 1975, pp 111-115, 8 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 125818

INTERNAL COMBUSTION ENGINE FAILURES: A STATISTICAL ANALYSIS

The company's primary interest is in the safe operation of all insurable equipment and in the prevention of failure of that equipment, wherever possible, by means involving manufacturing, operation and maintenance, and inspection techniques. The equipment involved includes diesel and dual-fuel engines, spark-ignited gas and gasoline engines and internal combustion engines driving reciprocating compressors. The accident analysis coding system provides three basic categories under which each reported failure is coded for future analysis. These are: Type of Accident. Initial Part to Fail. Primary Cause of Failure. For convenience the items are handled in that order with a brief discussion following each.

Prepared for meeting 6-10 April 1975.

Blue, GB (Hartford Steam Boiler Inspection and Insurance Co)
American Society of Mechanical Engineers Paper 75-DGP-16, 1975, 7 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 125845

GYROSCOPIC EFFECT OF FLYWHEELS IN MACHINES

There has recently been a tendency to use inertia energy storers on transport equipment. When designing inertia storers using flywheels of the types described it is necessary to know the gyroscopic effect of the flywheels on the machine which is to use the storer. The characteristics of a machine usually include the maximum reserve of energy in the storer and the diameter

of the flywheel; thus, depending on the type chosen, the kinematic moment of the flywheel, even for the same specific energy capacity and diameter, will be different. The kinetic moment of the flywheel is the basic characteristic of its gyroscopic effect on the machine since the requirements on the manoeuvrability of the machine and thus on its angular velocity in turning in different planes must not vary depending on the type of flywheel used. Thus if the angular velocity of the machine is constant, the kinetic moment can be taken as sole characteristic of the gyroscopic effect of the flywheel on the machine in any type of bearings (rigid, elastic, visco-elastic). Different types of flywheels with the same specific energy capacity and diameter have different kinetic moments since the moment of inertia and angular velocity both vary. The gyroscopic moment for flywheels of various shapes and made from different materials on moving machines can be calculated from the graph developed in this article. An example is given of the determination of the gyroscopic effect of the different types of flywheels with the same energy capacity and with radius l_m .

Gulia, NV *Russian Engineering Journal* Vol. 54 No. 7, 1974, pp 41-43, 6 Ref.

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

04 125861
DYNAMIC LOADS ON THE GEARS OF TRACTION MOTORS

The gearings of railcars and locomotives serve in the most severe conditions compared with those of other types, namely, they have to transmit high power to make maximum use of the limited space, depending strongly on the speed and the vibrations. Gears of JNR are relieved and/or crowned at the tooth face in order to avoid a high tooth bearing, which leads to a tooth failure. Calculations and close investigations have been made but it is utterly nonsensical to predict or to calculate the strength of gear without accurate knowledge of the load. It is shown that the dynamic loads on the gears of traction motors passing over rail points have great influence upon the strength of gears in case of Cardan drive (the parallel shafts type) on vehicles for SHIN KANSEN and a new type of drive protecting gears from the dynamic loads is presented.

Miyanishi, K *Railway Technical Research Institute* Vol. 15 No. 4, Dec. 1974, pp 205-206

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

DOTL JC

04 126255
INTERNATIONAL CONFERENCE ON POWER ELECTRONICS-POWER SEMICONDUCTORS AND THEIR APPLICATIONS, 3-5 DECEMBER 1974

Among the papers presented at the conference were the following: A Transistor Controller for a Battery Driven Vehicle. Daniels, AR, Gott, VS and Howe, KW; A High Voltage Thyristor Regulator for Control of a Linear Induction Motor, Brown, M and Ferry, GA; Analogue/Hybrid Simulation of a D.C. Chopper Drive System, Tso, SK and AU, PK; Stability Criteria in Feedback Control System for a Full-Chopper Rapid Transit Application, Camurri, F and Rizzi, C. /TRRL/

Institution of Electrical Engineers Conf Pub 123, 1974, 274 pp, Figs., Tabs., Photos., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213517)
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 126392
ANALOG COMPUTER MODELING OF A SYSTEM OF AUTOMATIC CONTROL OF THE ARMATURE CURRENT AND EXCITATION CURRENT OF A DC TRACTION MOTOR WITH INDEPENDENT EXCITATION [Modelirovanie systemy avtomaticheskogo regulirovaniya toka yakorya i toka vzbuzhdeniya tyagovogo dvigatelya Postoyannogo toka s nezavisimym vzbuzhdeniem na avm]

The character of transient processes in a system of automatic control of the armature current and excitation current of a traction motor subject to

voltage impulses of the contact network is investigated by means of mathematical modeling. Stabilizing feedback is selected to ensure steady operation of the automatic control system. An analog computer of the MN 17M type is used in investigations. [Russian]

Pyatina, ON Rezhko, NA Bud'ko, OA Baranov, BK Sokut, LD *Izvestiia Vysshikh Ucheb Zaved, Elektromekhanika* No. 3, 1975, pp 309-316

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

04 126393
APPROXIMATE CALCULATION OF LOSSES DUE TO THE CURRENT IN THE ARMATURE WINDING OF A COLLECTOR MACHINE [Priblizhennyi raschet poter' obuslovlennykh tokom v obmotke yakorya kollektornoi mashiny]

A numerical method is proposed for the calculation of losses in the armature winding, given any known law of steady current. Using the example of the armature winding of a traction motor, it is shown that losses in each slot, even with a radial layout of conductors, are distributed very unevenly. This can cause excessive overheating of some elements of the winding above the mean rated value. [Russian]

Bityutskii, IB *Izvestiia Vysshikh Ucheb Zaved, Elektromekhanika* No. 12, Dec. 1974, pp 1322-31

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

04 126394
COMMUTATION PROPERTIES OF DC SERIES MOTORS SUPPLIED FROM THYRISTOR CONVERTERS [Wlasnosc komutacyjne silnikow szeregowych pradu stalego zasilanych z przetwornikow tyrystorowych]

Commutation effects of pulsating armature current in dc series motors are more complex than in dc motors with separate excitation. Transformer voltage induced in the commutating armature winding section disturbs in general the sparkless commutation, but in special cases acts advantageously. Methods to suppress the transformer voltage in the commutating armature winding sections are considered. The most effective method consists of shunting the excitation winding by diodes or the application of two anti-parallel circuited bifilar wound excitation windings. Both method suppress the transformer voltage and increase the sparkless commutation areas of the series motor. [Polish]

Paszek, W Glinka, T Ryczko, Z *Archiwum Elektrotechniki* Vol. 24 No. 1, 1975, pp 3-14, 6 Ref.

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

04 126399
INTERLAMMELAR VOLTAGES ON TRACTION MOTORS WITH GROOVELESS ARMATURE IN TRANSIENT PROCESSES [Mezhlamel'nye napryazheniya na tyagovom dvigatele s bespazovym Yakorem pri perekhodnykh protsessakh]

The effect of initial conditions, the degree of field attenuation, and the parameters of the inductive shunt on maximum interlamellar voltages in a traction motor with impulsive voltage variation in the power circuit of an electric locomotives is investigated. It is found that, in transient processes, the time of the appearance of the highest voltage between the collector plates must not necessarily coincide with the attainment of its highest value by the armature current. [Russian]

Bocharov, VI Loginov, IY Sedov, VI *Elektrotehnika* No. 12, Dec. 1974, pp 10-13

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

04 126437
THYRISTOR PROTOTYPE WILL DEMONSTRATE BETTER ADHESION CHARACTERISTICS

A prototype 25 kV 50 Hz electric locomotive is serving to test thyristor control on British Railways. Until now all BR ac electric motive power has used tap changers to regulate motor current. Better use of adhesion because

tractive effort peaks caused by notching up are eliminated--plus the rapid response of solid state circuits to wheelslip detection--are the principal advantages claimed for thyristors. Maintenance requirements are also reduced. Against these must be set possible harmonic interference with signalling and telecommunications circuits. Preliminary trials showed that electrical interference effects are likely to be within acceptable limits.

Railway Gazette International Vol. 131 No. 8, Aug. 1975, pp 301-303, 3 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 126440

BELGIAN FOUR-CAR CHOPPER SETS START TRIALS

The first of a series of chopper-controlled four-car electric multiple-unit trains for service in Belgium has been delivered. Each unit has two driving trailer cars and two intermediate coaches motored on all eight axles. Bodies are of low-carbon steel. Power at 3 kV dc is fed to the traction motors through a control consisting of two chopper groups, each of which feeds four motors in series/parallel.

Railway Gazette International Vol. 131 No. 8, Aug. 1975, pp 309-310, 2 Fig., 1 Tab., 2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 126453

PROTOTYPE THYRISTOR-CONTROLLED BR CLASS 87 25 KV INTRODUCED AND TRIALS START TO EVALUATE INFLUENCE ON SIGNALLING AND COMMUNICATIONS

Stepless power control produced by solid-state propulsion systems has advantages from performance and weight saving aspects but can cause telecommunications problems because of electrical interference. Predecessor locomotives of this same general design have normal tap changer control of acceleration; British Railways elected to build a prototype locomotive with thyristor power conditioning system so that aspects such as power factor and general harmonics might be investigated. Previous BR experience with thyristors had been on multiple-unit trains; this installation represents a significantly higher power level.

Rail Engineering International Vol. 5 No. 4, June 1975, pp 151-153, 3 Fig., 1 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 126454

SWISS FEDERAL RAILWAYS NEW COMMUTER 15-KV MULTIPLE-UNIT PROTOTYPE SETS IN LIGHT ALLOY WITH THYRISTOR CONTROL

To obtain greater versatility, lightweight trainsets were selected for pre-production service evaluation. Two power cars were incorporated in three-or four-car sets to determine acceptable power demand consistent with good acceleration. Thyristor controls are seen as having several advantages in suburban operation, but problems of electrical interference with communications and signal cables are special problems.

Winter, P *Rail Engineering International* Vol. 5 No. 4, June 1975, pp 144-150, 11 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 126455

SERVICE-RUNNING TRIALS ON DB WITH ELECTRIC TRACTION EMBODYING ASYNCHRONOUS TRACTION MOTORS

To test the practicability of the asynchronous traction motor for a new generation of high-speed electric locomotives, a Henschel-BBC DE2500-1 locomotive and its permanently coupled driving trailer have been in operation. The three-phase power transmission will allow a single unit to be used in either freight or passenger service with electric coupling of wheels preventing slipping of individual wheelsets and utilizing fully available adhesion. The asynchronous motor is compact, light and requires little maintenance because of the absence of commutator and brushes. German Federal Railway has been using this prototype unit in daily freight service. *Rail Engineering International* Vol. 5 No. 4, June 1975, pp 163-164, 3 Fig.,

2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 126973

CONTROL OF POWER ON A LARGE DIESEL ELECTRIC LOCOMOTIVE OF NEW DESIGN

To control the power of a large locomotive effectively the driver must be provided with some form of automatic control of tractive effort and engine power. This must ensure that the engine is never overloaded, and that the most efficient use is made of the available adhesion. Some details of load control are discussed from a stability point of view, and ways and means of using the available power are discussed. An ideal characteristic is proposed and the limitations of existing machine systems are described. A description of a locomotive, in which the principles described were used, is given with a block diagram of the control system. A simplified schematic diagram of the control system used is given, and the function of the principal elements in it is explained. Finally, the paper draws some broad conclusions from the experience gained during operation of the system in service.

Lucas, HW *Institution of Electrical Engineers, Proceedings* Vol. 122 No. 4, Apr. 1975, pp 409-413

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 126983

FLASH APPEARANCE CONDITIONS WITH THE COMMUTATOR, OF THE NB-412 K TRACTION MOTOR IN TRANSITORY OPERATION [Uslovija vznikovenija krugovovo ognja na killektore tjagovovo dvigatelja NB-412 K v perehodnyh rezimah]

A presentation of the test results and calculations aimed at establishing the conditions for flashing on NB-412 K motor commutators, together with regulations for the protection of traction motors. These results show that in transitory operating conditions associated with excess current, pronounced sparking under the brushes is the cause of flashing on the commutator.

Suvorov, AG *Vestnik Vniizt* Vol. 34 No. 1, Jan. 1975, pp 16-20, 4 Fig., 4 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

04 126984

FUNDAMENTAL DEPENDENCE OF THE SIZE OF THE TRACTION MOTOR AND OF CONVERTER IN THE CASE OF ASYNCHRONOUS-MOTOR DRIVE [Grudsatzliche Abhaengigkeiten der Fahrmotor-und Wechselrichter-Dimensionierung beim Asynchronmotorantrieb]

The author illustrates this dependence by examples and demonstrates the need to regulate the slip frequency in relation to temperature so as to use the driving motor couple to the maximum. The author then considers the effects of the impulse frequency in the cycle and the undulation method adopted, on the capacity of use of the inverter. He goes on to explain the use of electronic data processing in preparing projects. In the case of the HENSCHEL-BBC-DE 2500 locomotive, the fitting of transmission with a nose-suspended motor is possible for speeds up to 160 km/h because of the low weight of the asynchronous motor. [German]

Teich, W *Eisenbahntechnische Rundschau* Vol. 24 No. 1-2, Jan. 1975, pp 44-50, 16 Fig., 11 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

04 126985

SERVICE OVER-HEATING CONTROL IN CONNECTION WITH ELECTRIC TRACTION MOTORS [Kontrol nagrevanija tjagovyh elektrodvigatelej v ekspluatcii]

Description of the analog simulator for controlling overheating in the armature winding of the NB-418 K electric motor, with a view to automating the regulation of frequency rotation in the ventilator motors of VL 80K and

VL 80T electric locomotives. The aim of this automation is to procure economies in electric traction. The analog simulator allows for a relatively simple variation of the running conditions as regards ventilator equipment in relation to the thermal state of the electric motors. The operational precision of the simulator is to a few Celsius degrees, which is quite adequate for the objectives sought. [Russian]

Nekrasov, OA Rahmaninov, VI *Vestnik Vniizt* Vol. 34 No. 1, Jan. 1975, pp 11-16, 5 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

04 126986

CHARACTERISTICS OF THE DIRECT CURRENT TRANSFORMER USING A CHOPPER MOUNTED IN PARALLEL [Caracteristiques du transformateur de tension continue utilisant un hacheur en montage parallele]

A study of the voltage and output characteristics reveals the more important performance zones and the disadvantages of inadequate ratings and current flows. The described mounting may, in particular, be utilized for recuperation purposes, at variable speed, as regards electric traction. [French]

Moury, P *Revue Generale de l'Electricite* Vol. 84 No. 1, Jan. 1975, pp 4-12, 6 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Societe Francaise des Electriciens 16 rue Franklin, Paris 16e, France Repr. PC

04 127001

IMPROVEMENTS IN BATTERIES [Fortschritte bei Akkumulatoren und Primaerelementen]

New improvements and developments have been made to batteries as a result of a systematic search for reaction equations and methods for the transfer of ions. The author discusses starting batteries, drive batteries for vehicles and fixed batteries; he explains the problems of increasing capacity, improving starting behaviour when cold and reducing maintenance operations, as well as the amount of time batteries can be kept in storage. [German]

Euler, KJ *Elektrotechnische Zeitschrift, Ausgabe B* Vol. 27 No. 5, 1975, pp 92-95, 3 Fig., 2 Tab., 4 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: ESL Repr. PC, Microfilm

04 127002

SYSTEM-ANALYSIS METHODS IN THE DEFINITION PHASE FOR HIGH-SPEED TRACTIVE UNITS [Systemtechnische Methoden in der Definitionsphase fuer ein Hochgeschwindigkeits-Triebfahrzeug]

High-speed tractive units are maximum-performance vehicles and they can cause rather important interactions with the track and the current-supply system. The author considers the design of prototypes from the standpoint of their overall economy of operation, taking reciprocal influences into account, with the help of calculation by simulation, value analysis of use, cost-benefit analysis, and a critical-path diagram. He takes as a basis a motive power unit with a pantograph and a 20-tonne axle load. [German]

Pleger, J *Eisenbahntechnische Rundschau* Vol. 24 No. 1-2, Jan. 1975, pp 35-43, 4 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Hestra-Verlag Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

DOTL JC

04 127348

ANALYSIS OF COMMUTATORLESS MOTOR WITH CYCLO-CONVERTER

Use of a commutatorless motor (CLM) for traction on cars of Japanese high speed trains would aid in eliminating flashovers that result when snow conditions are encountered. This report indicates the test results of a proposed power conditioning system to be used with ac power supply. Problems encountered include torque ripple at starting and higher harmonics of the source current.

Aburaya, K *Railway Technical Research Institute* Vol. 16 No. 2, June 1975, p 94, 1 Fig.

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

04 127605

FLYWHEEL ENERGY PROPULSION AND THE ELECTRIC VEHICLE

The flywheel is considered as an energy storage device for an electrically driven car. Certain recent advances in design concepts including a magnetic bearing support system, demonstrated to be feasible in two working models constructed at the City College of New York, have resulted in a simple, virtually friction-free flywheel. The next stages are well within the capabilities of present technology; it is possible, within two years, to build a simple vehicle which would have a range of 50 miles, a top speed of 50 mph, carry 2.4 passengers, require little or no maintenance, have an extremely long life expectancy, and could be completely recharged in 20 minutes. Energy dissipation, (friction, eddy current, and hysteresis losses) have been so significantly reduced, that a single spin of the hand (approximately 60 mph) will keep the flywheel turning for over 6 hours. Since provision for a vacuum chamber could not be realized for this Phase I device, windage losses increase drastically with the speed; from an initial speed of 1,000 rpm the rotor will come to rest in about 13-1/2 hours.

Symposium held February 19-21, 1974 and sponsored by the Electric Vehicle Council, New York, New York.

Weber, R (New York City College); Menkes, SB International Electric Vehicle Symp & Expo, 3rd Proc Paper No. 7458, 1974, 23 pp, 19 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 127609

COMPUTERIZED DATA ACQUISITION SYSTEM

The system described relates to tests of the performance and durability of diesel engines. The system is designed as a tool for the test operator to enable him to get better data faster. In front of him and adjacent to throttle and dynamometer controls is an Operator's Panel mounting a group of push-button switches, indicator lamps and projection type digital readouts. Any parameter of the test may be displayed on the right-hand side of the panel by pressing the Display button and three Number buttons to define the data point of interest. At the start of an engine test, the operator sets the speed control potentiometer to give the required wide open throttle speed, he then types into the computer the "On Cycle" command. From then on throughout the control period set point adjustments are made, at 1/10 second intervals, as a required percentage of both speed and throttle. Repeatability of the cycle over a 1000-hour certification run is excellent and adjustments due to engine improvement or deterioration can be easily accomplished. The techniques of carrying out total Real-Time control and the calibration of gaseous emissions analyzers have been developed and the software written.

Henderson, J (General Motors Corporation) Intl Symp on Autom of Engine & Emiss Test, 2nd Proc Paper Vol. 2 1973, 26 pp, 2 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: London University, England Queen Mary College, London, England Repr. PC

04 127610

DIAGNOSIS OF DIESEL ENGINE TROUBLES--CYLINDER CONDITION MONITORING SYSTEM

This paper deals with the new approach to developing a diagnostic methodology for monitoring the cylinder conditions of marine diesel engines while in operation as applied to a medium-speed, four-stroke diesel engine. The new monitoring system makes possible the diagnosis of the physical state of components around the combustion chamber, such as the fuel injection system and the gas-sealed parts while the engine is running. It also checks whether these components are operating normally and in case of any malfunctioning, identifies the nature of such malfunctioning as well as where it is occurring.

This is a paper from the 3rd International Symposium held September 25-27, 1974. It is sponsored by Queen Mary College, Dept. of Mechanical

Engineering, London.

Iseki, Y (Mitsui Shipbuilding and Engineering Company, Ltd)
Intl Symp on Autom of Eng Test: Perf, Emiss & Diag Vol. 1 1974, 22 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 127611

AUTOMATED MAINTENANCE SYSTEM FOR DIESEL ENGINES

A new mechanism for labor-saving and time-saving overhaul has been established on a newly developed 4-cycle medium speed diesel engine. The total system for rationalized maintenance comprises three sub-systems, semi-automatic overhaul and assembly sub-system, automatic transportation and storing sub-system and semi-automatic cleaning and adjusting sub-system. A semi-automatic special overhaul and assembly device, for instance, is applied to the piston. The automatically operated engine parts carrier can travel automatically on rails along the engine to the place where the stacker crane is waiting. The store room is an automated parts warehouse equipped with stacker crane which can go down to the parts carrier in the engine room. Pistons pulled out from the engine and stocked in the store room are cleaned and adjusted by means of a specially developed device in the workshop. Accordingly, maintenance and overhauling of this engine require minimum manhours, moreover ensuring maximum safety and accuracy. The total system for rationalized maintenance is described and illustrated. This entire system is designed to service the engine aboard a ship at sea. The automatic control system uses a minicomputer.

Danjoh, Y (Mitsui Shipbuilding and Engineering Company, Ltd)
Intl Symp on Autom of Engine & Emiss Test, 2nd Vol. 1 1973, 29 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: London University, England Queen Mary College, London, England Repr. PC

04 127623

GASTURBINE PROPULSIONS OF THE GERMAN FEDERAL RAILWAY [Gasturbinenantriebe bei der Deutschen Bundesbahn]

An evaluation is made of the locomotives with gas turbine propulsion. Compared to diesel engines with equal weight of the power unit, the installed power obtained from gasturbines amounts to two or three times the power of a diesel propulsion. In comparison to diesel engines, disadvantages are the double price, higher maintenance cost and increased fuel consumption. Experimental service results describe the difficulties of adapting an improved flight engine with regard to the given requirements when using it as a main drive in a railcar. [German]

Feulner, A *MTZ. Motortechnische Zeitschrift* Vol. 36 No. 6, June 1975, pp 161-167, 4 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 127624

OPTIMAL POWER IN ELECTRIC LOCOMOTIVES

After reviewing the rise in specific power of European electric locomotives since 1920 from 10 to 35 hp/1000 lbs, the author expresses surprise that in planning for electrification in the United States, the Department of Transportation, the railroads, and the utilities are basing their plans on more or less a modification of the existing diesel electric locomotives with relatively low power or 5100 rail hp on 6 axles with the same small wheels and axle-suspended traction motors etc. as for the existing diesel-electric locomotives which gives a specific power of only 14 hp/1000 lbs. On the basis of European experience, it was described that the 2 locomotives EMD is manufacturing for demonstration in the US will have 31 hp/1000 lbs or 11000 hp pro 6 axles. The paper then proceeds to explain in detail the operating and economic advantages of the more powerful locomotives, considering some specific American coal-hauling routes.

Symposium held February 19-21, 1974 and sponsored by the Electric Vehicle Council.

Franzen, S
International Electric Vehicle Symp & Expo, 3rd Proc Paper No. 7454, 1974, 26 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 127627

STUDIES IN ENGINE SIMULATION

Present investigations for exhaust emission control, alternative fuels and combustion research have highlighted the possible advantages of an analytical approach to engine development and there are at present a large number of working computer simulations of internal combustion engines of one sort or another. This paper investigates the advantages or otherwise of engine simulation for various areas of development and describes a simulation exercise carried out at Queen Mary College of the University of London.

This is a paper from the 3rd Int'l Symposium held September 25-29, 1974. It was sponsored by Queen Mary College, Dept. of Mechanical Engineering, London.

Gravestock, RE (London University, England)

Intl Symp on Autom of Eng Test: Perf, Emiss & Diag Vol. 2 1974, 11 pp, 6 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 127641

QUASI-STATIONARY METHOD FOR DETERMINING GAS PARAMETERS IN THE CYLINDERS AND EXHAUST SYSTEM OF AN INTERNAL COMBUSTION ENGINE [Methode quasi-stationnaire de la determination des parametres du gaz dans le cylindre et dans le systeme d'echappement du moteur a combustion interne]

A graphical solution is presented for the calculation of gas characteristics during the scavenging of the cylinder both for two- and four-stroke engines. The technique of constructing such graphics is described and examples of calculations applied to scavenging processes of two different engines and corresponding experimental data are given. [French]

Kroughlov, MG Tchistiakov, VK *Entropie* Vol. 11 No. 62, 1975, pp 5-17, 3 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 128853

POWER SEMICONDUCTORS

Current power semiconductors are characterized by high switching speeds, higher voltage and current ratings, greater reliability and lower prices than their predecessors. Two decades of quiet evolution in power semiconductors have produced not only improved SCRs, but other thyristors such as triacs, rectifiers and power transistors. The devices in this article are those that dissipate enough power in normal operation that power dissipation is a limiting factor in their application. Very-high-power applications include electric power generation and distribution, railroad and electric-car transportation, uninterruptible power supplies for large computer backup equipment and others where dissipation levels are typically in the range of hundreds to thousands of watts.

Allan, R *IEEE Spectrum* Vol. 12 No. 11, Nov. 1975, pp 37-45

ACKNOWLEDGMENT: IEEE Spectrum

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 128859

PREVENT ENGINE CRANKCASE BLASTS

Crankcase explosions in diesel engines seldom occur, but when they do, extensive damage is the usual result. Operators should understand the causes, and the precautions to be taken to eliminate the possibility of an explosion. Prevention of a crankcase explosion resolves itself into two areas. Either formation of an explosive mixture can be prevented, or the means of igniting such a mixture can be eliminated. Because crankcase explosions can occur only if the oil mist is ignited, and because ignition can result only from an overheated part, obviously an explosion will be least likely to take place if all precautions are taken to prevent internal overheating. The article lists 14 ways to reduce crankcase-explosion danger.

Kantebet, VV *Power* Vol. 119 No. 8, Aug. 1975, p 33

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 128860

SEMT-PIELSTICK PA 6-280 DIESEL ENGINE

This engine is designed to provide the highest output per cylinder capable of installation on locomotives operating on the standard gage of the International Union of Railways (UIC). Further to extend its applicability, the engine has been designed to operate on the heaviest residual fuels so it can be readily adapted as prime mover for small electric power stations or for propelling ships of moderate tonnage. Simplified maintenance has also been a guiding principle. Cylinders (bore, 280 mm, stroke 290 mm) are arranged in a 60 degree V. In "stage one" of the design, 350 hp/cylinder is obtained at 1050 rpm; in "stage two", 400 hp/cylinder has been obtained at 1100 rpm. Engines in 12, 14, 16, and 18- cylinder versions have been built. Design details are illustrated and discussed. Specific fuel consumption of less than 160 grams/hp/hr has been obtained at 350 hp/cylinder on a 12-cylinder engine. Although the first engines have been in service since 1973, experimental work is continuing at increases in power to 500 hp/cylinder. A merchant-marine version is also under test.

Gallois, J *French Railway Techniques* Vol. 18 No. 1, 1975, pp 23-30

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 128865

FEW PROBLEMS RAISED BY THE APPLICATION OF ELECTRIC ROTATING MOTORS TO HIGH-SPEED TRANSPORT SYSTEMS [Quelques problemes poses par l'application des moteurs electriques rotatifs aux transports a grande vitesse]

The author observes that the increasing interest shown at the present time for high-speed transport leads mainly to achievements in the railway field. Consequently he seeks to evaluate the influence of this speed increase on propulsion, confining himself to the case of electric rotating motors. He examines therefore successively the systems based on such motors as may be taken into account, the main propulsion data of a vehicle, and also the performance to be attained by propulsion. [French]

Chatelain, JM *Revue Generale de l'Electricite* Vol. 84 No. 2, Feb. 1975, pp 102-106, 5 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 128866

ELECTRIC TRACTION MOTORS FOR HIGH CAPACITIES AND SPEEDS [Moteurs electriques de traction pour puissances et vitesses elevees]

After having summed up the recent evolution which has made it possible to reach and even to exceed the limit of 200 km/h, the author examines the types of electric rotating motors which may be envisaged for rail propulsion at a higher speed, notably the induction motor and the dc motor. He then summarizes the solutions applied in this field and more especially, dwells on very high speed propelling units. The results already obtained with one of these: the TGV 001 experimental train-set with gas turbine and electric drive, enable him to draw a very positive conclusion as regards the future of high speed rail propulsion. [French]

Cossie, A (French National Railways) *Revue Generale de l'Electricite* Vol. 84 No. 2, Feb. 1975, pp 107-111

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 128867

FACILITIES AND METHODS APPLIED BY THE S.N.C.F. FOR THE HIGH-SPEED TESTING OF VEHICLES PROPELLED BY ELECTRIC MOTORS [Moyens et methodes mis en oeuvre par la S.N.C.F. pour des essais a grande vitesse de vehicules propulses par moteurs electriques]

After having recalled the double mission of the TGV 001 experimental train, the author defines the main characteristics of its propelling equipment, comprising gas turbines and electric drive, and examines in detail its braking equipment. He then explains the broad outlines of the tests made since April 1972, first of all in Alsace and later on-at high speed-in the Landes. The main results obtained are ultimately reviewed. They confirm that the achievement of speeds in the range of 260 km/h may henceforth be envisaged with guarantee of complete safety and full reliability required. [French]

Garde, R (French National Railways) *Revue Generale de l'Electricite* Vol. 84 No. 2, Feb. 1975, pp 141-148

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 128872

ELECTRIC TWO-FREQUENCY LOCOMOTIVE, MODEL 181.2-1,2 [Elektrische Zweifrequenzlokomotive Baureihe 181.2-1,2]

The electric railroad service on the segment Saarbruecken-Trier-Koblenz, West Germany, was extended in 1974 to the French and Luxemburg border. Since the West German railroad system operates at 16 2/3 Hz, 15 kv while the systems in the neighboring countries operate at 50 Hz, 25 kv it was necessary to develop appropriate locomotives in order to close the gap. The development of 25 locomotives meeting this requirement is reported. The mechanical and electric equipment is described. [German]

Guethlein, H Tietze, C *Elektrische Bahnen* Vol. 46 No. 5-6, May 1975, 20 pp, 12 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 128880

AUTOMATIC VARIABLE FIELD CHOPPER CONTROL SYSTEM FOR ELECTRIC RAILCARS

A description is presented of 1) principle of the AVF chopper control system; 2) analysis of field characteristics, the field intensity to the chopper-conduction ratio; 3) applying the AVF system to high voltage, large capacity, high frequency chopper equipment; and 4) test results on the Chiyoda Line of Tokyo's Teito Rapid Transit Authority.

IEEE Ind Appl Soc, 9th Annual Meeting, Conf record, Pittsburgh, Pennsylvania, October 7-10, 1974.

Kitaoka, T (Mitsubishi Electric Corporation); Ohno, E Ashiya, M Katsuki, K Katta, T *IEEE Transactions on Industry Applications* No. 1, 74 CHO 833-41A, 1974, pp 85-94, 3 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: IEEE Repr. PC

04 129083

CHARACTERIZATION AND SIMULATION OF A UNIT INJECTOR

The characteristics of the diesel engine unit injector were studied both theoretically and experimentally. The transient fuel pressure in the unit injector was indirectly measured by using strain gauges placed in different locations on the drive train, between the cam and plunger. The events which take place during the injection process were analyzed and the effects of several design and operating variables on the different injection parameters were determined. Computer simulation showed a fairly good agreement between computed and experimental results.

Presented at a meeting held Sept. 8-11, 1975.

Henein, NA (Wayne State University); Singh, T Rozanski, J Society of Automotive Engineers Preprint 750773, 1975, 10 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

04 129091

GENERALIZED COMMUTATION THEORY OF LARGE DC MACHINES

The present paper shows the following facts using the commutation equation. (1) The non-spark zone is bounded by the critical no-spark curve of the contact voltage at the head edge of the brush. The no-spark zone vanishes if the current density at the tail edge of the bush exceeds a critical value. (2) The non-spark zone can be calculated even if the contact voltage characteristics of the brush are linear. (3) The armature current can always be commutated linearly even if two or more coils are commutated simultaneously by one brush. (4) When one brush short-circuits two or more coils simultaneously, the center line of the no-spark is expressed in terms of a polynomial of the electromagnetic coupling factor between two adjacent commutated coils. Its position cannot be determined until the commutation equation is solved.

Matsuda, T (Muroran Institute of Technology, Japan) *Electrical Engineering in Japan* Vol. 94 No. 5, Sept. 1974, pp 82-90, 10 Ref.

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

04 129092
ANALYSIS OF DC-MACHINE COMMUTATION

The commutation equation is expressed in terms of state variables. An iterative method is proposed for solving it on the basis of periodic change of the commutation circuit. In the proposed method, the contact characteristics of the brush are fully taken into account. The validity of the method is confirmed experimentally using a 3-kw test machine.

Matsuda, T (Muroran Institute of Technology, Japan) *Electrical Engineering in Japan* Vol. 94 No. 5, Sept. 1974, pp 74-82, 17 Ref.

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

04 129098
CLASSIFICATION AND SYSTEMATIZATION OF POSSIBLE COMBINED ENGINE SCHEMES [Klassifikatsiya i sistematzatsiya vozmozhnykh skhem kombinirovannykh dvigatelei]

A classification of combined engines by the type of coupling between the piston section and the bladed section is proposed. All the realized and proposed schemes of combined internal combustion engines are divided into 10 groups. In each group, schemes are arranged in a certain sequence, according to the increase of their basic elements constituting the combined engine systems, as well as quantities. Cost computations are based [Russian]

Mizernyuk, GN Bezborodov, AI *Izvestia Vysshikh Uchebnykh Zavedenii, Mashinostr* No. 5, 1975, pp 118-121

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

04 129102
OUTPUT CURRENT REGULATION WITH PWM INVERTER-INDUCTION MOTOR DRIVES

Current regulation plays an important part in the protection of solid-state drives operating from stiff voltage sources. Certain types of pulsewidth modulated (PWM) inverters, however, are not directly suited for peak or average output current regulation with induction motor loading. It is established in the paper that the typical output voltage response times of defined voltage waveform PWM inverters are too high for peak output current regulation, and too low for average output current regulation--i.e., for stable current regulation, the control system must limit the rate of inverter output voltage reduction. Inverter voltage control requirements and inverter deratings necessary to implement average output current regulation are presented. Experimental results from a 15-hp breadboard are included.

Forsythe, JB (AiResearch Manufacturing Company); Dewan, SB *IEEE Transactions on Industry Applications* Vol. IA11 No. 5, Sept. 1975, pp 517-525, 14 Ref.

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

DOTL JC

04 129137
NEW GENERATION OF COMBINATION LOCOMOTIVES FOR UNDERGROUND MINING

Several accidents have occurred through the years in underground coal mines, directly related to the use of overhead trolley lines, and it has become economically attractive to do away with the trolley line, altogether, in areas other than the main haulageways. This, however, poses a problem in powering locomotives in side entries. A new generation of combination locomotives that can operate from the existing trolley line while on the mains and from a built-in battery when in the butt entries is described as a possible solution to this problem.

Blutreich, JN *Mining Congress Journal* Vol. 61 No. 8, Aug. 1975, pp 44-47

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

04 129140
ORE'S NEW DIESEL ENGINE ACCEPTANCE PROCEDURE

A new engine acceptance procedure was introduced under supervision of the office for Research and Experiments in the United Kingdom to be applied to new engines before orders are placed. It is reported that there will be a considerable saving of time over earlier lengthy procedures.

Vokac, P *Railway Gazette International* Vol. 131 No. 9, Sept. 1975, pp 339-340

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

DOTL JC

04 129143
PERFORMANCE SIMULATION OF A DIESEL PISTON AND RING SYSTEM

Analytical models of piston movement, gas flow in the ring belt, and piston ring movement are described and integrated to form a system simulation which was implemented on a digital computer. Sample computer solutions are given to illustrate the models' usefulness in predicting the effect of design and operating variables upon specific performance characteristics. The paper emphasizes the need for a ring face hydrodynamic oil film analysis which considers ring tilt and lateral loading of the ring by groove friction. As such an analysis becomes available, it can be added to the present simulation.

Presented at a meeting held Sept. 8-11, 1975.

Bishop, GR Leavitt, AH
Society of Automotive Engineers Preprint 750768, 1975, 29 Ref.

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

04 129166
EVALUATION OF THE WABCO AC PROPULSION SYSTEM. SET OF 2 VOLUMES

This is a set of two volumes comprising PB 245-389 and 245-390, RRS numbers 04 129167 and 04 129168.

Cleveland Transit System Sept. 1974, 507 pp

ACKNOWLEDGMENT: UMTA
PURCHASE FROM: NTIS Repr. PC

PB-245388, DOTL NTIS

04 129167
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 of other transit properties in the future. Measurements of wheel wear, window safety glazing, ride quality, and passenger reaction to the restyled car interiors, and new AC propulsion system are discussed. Chapters present project objective, project description, summary and conclusions, principal task evaluations, the AC/PWM Propulsion System, and Ancillary task evaluations. A bibliography is furnished.

Prepared by TRW, Inc, Transportation and Environmental Operations for the Cleveland Transit System. Related report is "Vol. II: Related Reports and Exhibits", RRS #04 129168. Two Volume Set, RRS #04 129166.

Hoppe, CF
Cleveland Transit System Fingal Rpt UMTA-ON-06-0006-74-3, Sept. 1974, 206 pp

ACKNOWLEDGMENT: UMTA
PURCHASE FROM: NTIS Repr. PC

PB-245389, DOTL NTIS

04 129168

EVALUATION OF THE WABCO AC PROPULSION SYSTEM RELATED REPORTS AND EXHIBITS. VOLUME 2

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. 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.

Prepared by TRW, Inc. Transportation and Environmental Operations for the Cleveland Transit System. Related report is: "Vol. I: CTS/UMTA AC Propulsion Project", RRIS #04 129167. Two Volume Set, RRIS #04 129166.

Hoppe, CF

Cleveland Transit System Final Rpt. UMTA-OH-06-0006-74-4, Sept. 1974, 301 pp

ACKNOWLEDGMENT: UMTA
PURCHASE FROM: NTIS Repr. PC

PB-245390, DOTL NTIS

04 129190

SPEED MEASUREMENT INDEPENDENT OF THE CORRELATION METHOD [Beruehrungslose Geschwindigkeitsmessung mittels Korrelationsverfahren]

The article describes a measuring device, independent of the wheel, for determination of speeds and distances covered in railway operation. Two optical detectors successively scan the rail surface. The signals, electrically transformed, are displaced in relation to each other over the distance between the two observation points. By means of a correlation procedure and a regulating circuit it is possible to obtain a relative value of the above-mentioned journey duration. [German]

Meyr, H *Hasler Mitteilungen/Hasler Review* Vol. 24 No. 2, 1975, pp 33-47, 2 Fig., 9 Ref.

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

04 129276

LOCOMOTIVE SAND-BOXES

For electric locomotives group E 444 it was necessary to have an absolutely trustworthy sanding plant. The solution was sought not only among the devices in use, but also among what has been thought up in more than a century of railway operation. Adoption was made of the sander named FS 2, perfecting solutions already known, completed by intuition aiming at overcoming eventual shortcomings of men and objects. [Italian]

Greco, A *Ingegneria Ferroviaria* Vol. 30 No. 7-8, July 1975, pp 5-15

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 129280

UNSYMMETRICAL CROSSED BRAKE CONNECTIONS [Unsymmetrische gekreuzte Bremsschaltung]

A reference point is needed when checking axle rotation speed to ascertain that the axles of a motive power unit do not slide during braking. However, electric locomotives most often do not have idler axles which could serve as

a reference point. The author suggests lowering the induction field of one of the motors to eliminate all possibility of its slowing the axle to which it is connected. Some thirty formulas and equations are given to explain how to calculate the brake power of 2 motors in relation to the speed of the motive power unit and for various values of a shunting coefficient on one of the two inductors. [German]

Sliwa, H *Elektrische Bahnen* Vol. 46 No. 6, June 1975, pp 147-150, 3 Ref.

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

DOTL JC

04 129288

GENERAL ASPECTS OF BLOWER DESIGN AND OPERATION

Didactic document explaining the working and general theory of blowers in electric locomotives.

Sharma, MK *Indian Railway Technical Bulletin* Vol. 31 No. 193, May 1974, pp 51-56, 2 Fig., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Research Design and Standards Organization Alambagh, Lucknow 5, India Repr. PC

04 129305

OPTIMISATION OF THE DIMENSIONS OF THE SYNCHRONOUS ELECTRIC MOTORS OF TRACTIVE UNITS SUPPLIED FROM CONVERTERS [Optimierung bei der Auslegung stromrichter gespeister Triebfahrzeugmotoren synchroner Bauart]

When deciding on measurements for traction motors supplied from static converters, account must be taken of the energy supply system in general. The author gives the measurement criteria of the structural elements according to the voltage waves, current waves and switching reactance with a view to optimisation of the weight and total volume of the tractive unit. [German]

Rentmeister, M *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 9, Sept. 1975, pp 413-418, 4 Ref.

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

04 129313

STATE-VARIABLE STEADY-STATE ANALYSIS OF A CONTROLLED CURRENT INDUCTION MOTOR DRIVE

The exact equations defining steady-state operation of a controlled current induction motor drive system are derived by solving the system state equations in the stationary reference frame. These equations, which assume ideal current filtering, eliminate the difficulties involved in taking derivatives of discontinuous currents by defining a pair of pseudocurrent variables. Effects of saturation are included by using the slope ratio method. Electromagnetic torque and current pulsations are computed for various load conditions, and experimental confirmation of the calculated results is made. Similarities and differences and differences to voltage controlled characteristics are presented. It is shown that normal open-loop operation occurs on the unstable side of the torque-slip characteristic necessitating the use of feedback control for stable operation.

Lipo, TA Cornell, EP (General Electric Company) *IEEE Transactions on Industry Applications* Vol. IA11 No. 6, Nov. 1975, pp 704-712

ACKNOWLEDGMENT: IEEE Transactions on Industry Applications
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 129314

PULSEWIDTH MODULATED INVERTER MOTOR DRIVES WITH IMPROVED MODULATION

The performance of inverter drives, which use the voltage and frequency, are critically influenced by the choice of the modulation policy used in the control circuits. This paper deals with practical inverter drives for squirrel cage induction motors and presents some basic considerations on modulation requirements. The advantages and limitations of popular modulation methods are discussed, and an improved modulation scheme, which allows us to extend the practical speed range of PWM ac drives, is presented.

Zubek, J Abbondanti, A Norby, CJ (Westinghouse Electric Corporation) *IEEE Transactions on Industry Applications* Vol. IA11 No. 6, Nov. 1975, pp 695-703

ACKNOWLEDGMENT: IEEE Transactions on Industry Applications
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 129409

STABILITY CONDITIONS REQUIRED TO AVOID STICK-SLIP OSCILLATION IN LOCOMOTIVE DRIVE SYSTEMS
[Stabilitätsbedingungen zur Vermeidung von Stick-Slip-Schwingungen in Lokomotiv Antrieben]

The author has defined the conditions necessary for avoiding stationary stick-slip oscillations by means of a linear torsional vibration system made up of n masses and without dampers. It is presented in the form of a model of a rail vehicle drive mechanism. In this article, the author lays down more severe conditions for avoiding stick-slip oscillations and supports his arguments with theoretical examples. He now also includes damper systems in the study. Although the difference between these conditions and the conditions required are generally very slight, they are sufficient in most cases for avoiding stationary stick-slip oscillations. [German]

Kolerus, J *Glaser's Annalen ZEV* Vol. 99 No. 3, Mar. 1975, pp 68-74, 5 Fig., 12 Ref.

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

DOTL JC

04 129421

THREE-PHASE MOTOR BUILT INTO HOLLOW AXLE

Utilizing the hollow axles developed for the Advanced Passenger Train, British Rail's R&D Division has developed a three-phase induction motor which mounts inside the axle and is supplied by solid-state inverters. The aim is a relatively low power motor for use on suburban multiple-unit cars with the advantage of minimizing air gap to maximize torque and eliminate all gearing. Beyond the proposed design, due for laboratory and road tests, is an advanced motor design that would use a solid (as opposed to a cage) rotor

with a diesel-alternator power source that could be controlled to maintain a high level of flux.

Railway Gazette International Vol. 131 No. 11, Nov. 1975, p 433, 1 Fig.

PURCHASE FROM: XUM Repr. PC

DOTL JC

04 129425

THREE-PHASE INVERTER-CONTROL APPLICATION TO FS 3000-V SHUNTER EQUIPPED WITH ASYNCHRONOUS TRACTION MOTORS

This article describes a trial application of asynchronous motors which were designed in collaboration with the Automation Institute of Rome University. The steps described are: (1) Determination of torque needed for running performance and choice of a motor; (2) Identification of motor parameters to permit choice of power semiconductors; (3) Determination of wave form so the motor can produce desired alternating torque; (4) Design of filters to reduce supply system harmonics below levels that can affect signal system; (5) Design of inverter of optimize components against both load and output desired.

Giovanardi, G *Rail Engineering International* Vol. 5 No. 6, Sept. 1975, pp 223-26, 6 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

04 129426

ELECTRONICS IN TRANSPORT TRACTION

This article is a brief general appraisal of chopper and thyristor techniques as applied to rail and tramway traction. The growing interest is discussed, with special reference to recent locomotive orders incorporating asynchronous traction motors. There seems little doubt that despite some early troubles, the future of electronics in the control of electric traction is insured.

Meier, GA *Rail Engineering International* Vol. 5 No. 6, Sept. 1975, pp 227-30, 4 Fig., 4 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

05 125793

ELECTROMAGNETIC EDDY CURRENT BRAKE (SNCF TRIALS)

In order to avoid the dependence of braking effect on the adhesion of the wheels to the rails, experiments have been carried out by the SNCF (French National Railways) on two designs of electromagnetic brakes acting by inducing eddy currents in the rail. The tests were made on an experimental high-speed vehicle drawn by a locomotive at speeds up to 250 km/hr. Fitted to the frame of a long-wheelbase truck, each "shoe" is approximately 2 m long and contains up to 9 poles. The mean air gap is 7 mm, and the pole faces are 78 mm wide, which is 6 mm wider than the railhead of the U80 60 kg/m rail often used for high speeds as continuously welded rail, and 13 mm wider than the more common U36 50 kg/m rail. A retarding force of 1400 daN has been obtained with the new brake at an acceptable electric power demand. Tests indicated that switch points and rail joints did not present a hazard, and that heating of the rails was slight. Remaining problems to be investigated and directions of further research are indicated.

Pouillet, P (French National Railways) *French Railway Techniques* Vol. 17 No. 3, 1974, pp 98-105

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

05 127636

OBSERVATIONS ON ENERGY REGENERATION IN RAPID TRANSIT SYSTEMS [He'arot 'al Hehzayr Energiya Be-ma'arakhot Le'hassa'a Hamonit]

Present-day electric train systems for rapid transit use single wagons following closely one another, not long trains, separated by great distances. Energy regeneration is therefore not produced by a single train moving down a grade and returning energy to the national network, but rather by the supply of braking energy from one wagon to another wagon that is accelerating nearby. The actual saving of energy will depend on adequate organization of the traffic time-table, which should ensure that when a wagon starts up, there should be another one nearby that is braking. The factors involved in energy regeneration are discussed and computation methods presented. Diagrams, curves, and equations complement survey. [Hebrew]

Wallach, I (Technical-Israeli Institute of Technology) *Association of Engineers & Architects of Israel, J* Vol. 34 No. 1, Jan. 1975, pp 12-18, 5 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: Association of Engineers & Architects of Israel, J Repr. PC

05 128199

UNITED STATES SAFETY APPLIANCE STANDARDS AND POWER BRAKE REQUIREMENTS

No Abstract.

Title on cover is: Safety Appliances and Power Brakes.

Federal Railroad Administration Sept. 1973, 90 pp

ACKNOWLEDGMENT: Monthly Catalog US Government Publications
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

05 128873

WEAR RESISTANCE OF BRAKE SHOES WITH INTERMITTENT FRICTION CONTACT [Iznosostoikost tormoznykh kolodok s preryvistyim kontaktom treniya]

Specific features of deformation processes of friction surfaces when friction contact is interrupted by periodically removing the brake shoe from a wheel in cases of impulse braking are considered. An analysis is given of industrial tests of wear resistance of brake shoes in impulse and continuous braking conditions for an open pit train. Results of these tests confirm that it is advantageous to apply intermittent friction contact in braking processes. [Russian]

Man'ko, NN (Kiev Polytechnic Institute) *Gornyi Zhurnal* No. 5, 1975, pp 133-136

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

05 128881

CAUSES OF THE GROOVE FORMATION ON THE TREADS OF WHEELS WITH BRAKE BLOCKS AND THEIR PREVENTION [Ursache der Rillenbildung in Raedern Klotzgebremster Schienenfahrzeuge und deren Vermeidung]

Partial melting and removal of fused wheel steel on heating due to friction above the line temperature were determined as causes of the groove formation. In case of cast-iron brake blocks, the fusing temperature can be reduced by the addition of phosphorus and sulfur. [German]

Pahl, E (Bundesbahn-Versuchsanst) *Glaser's Annalen ZEV* Vol. 99 No. 6, June 1975, pp 166-176, 34 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

05 129141

INDISPENSABLE ELECTRIC BRAKE

In this two-part paper, Jean Bouley reviews the history and the merits of electric braking; Andre Cossie discusses the technology and performance of electric braking systems. Electric braking systems require the traction motors to function as generators. In the "rheostatic" system, the energy so generated is dissipated as heat in resistors. In the "regenerative" system, the energy generated is returned to the power lines. Either ac or dc locomotives can use the rheostatic system; regenerative braking is usable on ac systems, but rarely is substitution equipment reversible on dc systems. A great advantage of electric braking at any speed is that it protects the wheels from mechanical and thermal stresses. At high speeds and/or heavy loads, electric braking is essential, because the total braking effort could not be absorbed by the wheels with friction braking. A further advantage of regenerative braking is the saving of energy. Another electric brake, the eddy-current brake, utilizes some of the energy generated by the traction motors to induce currents for retardation in the rails. This system is used as an auxiliary, since it must not heat the rails too much. The electric braking systems presently available on S.N.C.F. (French National Railways) are describe in some detail, for both ac and dc systems, with performance curves, for all three electric braking techniques.

Bouley, J *French Railway Techniques* Vol. 18 No. 2, 1975, pp 57-66

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

05 129182

MATHEMATICAL BRAKING CURVES FOR RAIL VEHICLES [Die mathematische Bremskurve fuer Schienenfahrzeuge]

A collection of formulae and diagrams showing how, in accordance with DB operating stipulations and UIC Leaflet 544, Appendix 6, the following can be calculated: braking percentages in relation to train speed up to 170 km/h and for advance warning signal distances of 400m, 700m, and 1,000m, braking distances in relation to the braking percentages and for speeds up to 170 km/h. [German]

Burgholf, H *Eisenbahningenieur* Vol. 26 No. 7, 1975, pp 246-248

ACKNOWLEDGMENT: International Union of Railways, BD

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

05 129268

POWERFULL ELECTRIC BRAKING ON FAST ELECTRIC LOCOMOTIVES. ADJUSTMENT OF THE UNIVERSAL RHEOSTATIC ELECTRODYNAMIC BRAKE ON ELECTRIC LOCOMOTIVES [Le freinage electrodynamique puissant des locomotives electriques rapides-RABA et KYR-Realage du frein electrodynamique rheostatique universel des locomotives electriques]

The first article is a general description of the rheostatic braking system on Skoda electric locomotives. The second article describes the technical characteristics of the main components. [French]

Stekl, M Raba, F *Skoda-Revue* No. 1-2, 1975, 14 pp, 1 Fig., 1 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Skoda-Revue Prague, Czechoslovakia Repr. PC

05 129318

THE IMPORTANCE OF BEING ABLE TO STOP

This first of three installments about the development of the air brake describes how George Westinghouse adapted compressed air to the control and stopping of trains. It covers U.S. applications from 1869 to the 1890s. This period saw the refinement of the straight air brake because it was not fail safe and was slow to respond in long trains into the automatic air brake based on the triple valve. Utilized first in passenger service in the early 1870s, applications of automatic brakes were made in freight service in 1877. The industry then sponsored a series of tests aimed at standardizing and appraising the limits of capabilities of air brakes. By 1890 the industry was ready to move toward industry-wide application.

Blaine, DG *Trains* Oct. 1975, pp 44-53, 5 Phot.

PURCHASE FROM: Kalmbach Books 1027 North Seventh Street, Milwaukee, Wisconsin, 53233 Repr. PC

DOTL JC

05 129319

LOAD-TO-TARE RATIOS VS. BRAKING

This second installment traces the evolution of the air brake as steel replaced wood in freight cars, and both individual car capacities and train lengths grew. Following passage of the Safety Appliance Acts of 1893 which required power brakes eventually on all cars, passenger and freight brake systems began to evolve on different paths. The more highly sophisticated passenger brake system developed control features which were gradually

incorporated in freight equipment. Traced here are development of the Types H, L, K, and AB freight brake systems, the empty-load brake and the PC, Universal, and electro-pneumatic equipments for passenger service. Period covered in 1890 to 1930.

Blaine, DG *Trains* Dec. 1975, pp 48-53, 10 Phot.

PURCHASE FROM: Kalmbach Books 1027 North Seventh Street, Milwaukee, Wisconsin, 53233 Repr. PC

DOTL JC

05 129320

POST-ZEPHYR BRAKING

This installment covers brake developments from introduction of the diesel-electric streamliners in the early 1930s to the present. The HSC, EP and electronic brake control systems for passenger service and the development of the AB and ABD valves for freight service, along with refinements such as composition brake shoes, pressure maintaining, 26-L locomotive control valves and wheel slip and slide controls for braking systems are described. The development of the radio-controlled locomotives in the middle of trains is also discussed.

Blaine, DG *Trains* Jan. 1976, pp 40-46, 6 Phot.

PURCHASE FROM: Kalmbach Books 1027 North Seventh Street, Milwaukee, Wisconsin, 53233 Repr. PC

DOTL JC

06 052669

**USE OF ELECTRONIC COMPONENTS IN SIGNALLING.
DEFINITION OF TERMS CONCERNING ELECTRONIC SAFETY
SIGNALLING SYSTEMS**

The definition of terms, which is made up by adding to each term an appropriate explanation, was compiled to improve understanding within the A 118 Specialists Committee and to facilitate the study by the user of the reports issued by this Committee. Priority was given to the terms which are of particular importance to railway safety engineering, or which require a specific interpretation when encountered during the reading of the reports. An alphabetically arranged index was added to facilitate the tracing of the terms.

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

International Union of Railways A118/RP 7/E, Apr. 1975, 21 pp

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

06 092423

ANALYSIS OF POSITION ERROR HEADWAY PROTECTION

An analysis is developed to determine safe headway on PRT systems that use point-follower control. Periodic measurements of the position error relative to a nominal trajectory provide warning against the hazards of overspeed and unexpected stop. A computer program has been developed to model these hazards for arbitrary safety system design parameters. The results of computer runs indicate that the critical hazard on the main guideway is unexpected stop of a preceding car; on a station entry deceleration ramp, it is overspeed of a following car. The deceleration ramp headways are larger and are more sensitive to system parameters than are the main guideway headways. Typical headways are five seconds on a 30 mph main guideway and 16 seconds on a deceleration ramp for state-of-the-art system parameters. With advanced system parameters and emergency decelerations applicable to well supported, seated passengers, required headways are 2.5 seconds on the main guideway and 3.5 seconds on the deceleration ramp.

Whitten, RE
Alden Self-Transit Systems Corporation, Transportation Systems Center,
Urban Mass Transportation Administration Intrm Rpt. DOT-
TSC-UMTA-75-10, July 1975, 104 pp

Contract DOT-TSC-421

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244552/6ST, DOTL NTIS

06 099763

**THE APPLICATION OF RELIABILITY THEORY AND
CONTROL THEORY TO AUTOMATIC TRANSPORT SYSTEMS**

This paper presents the principles of a safety system designed in a German Government project, the so called "Guided high speed ground transport system" (Hochleistungsschnell-bahn). The authors criticise the safety systems applied to conventional railways, and suggest, on the basis of the reliability and control theories, to find an absolute measure of traffic safety. The concept would be based on Boolean algebra, on the simulation of a "phantom train" which would maintain distance between trains and on speed control according to the location of a train in relation to the "phantom train". Its structure would comprise two distinct functions: a safety function, including a few simple fail safe devices; a control function acting according to procedures established by the safety function.

Paper presented at the 2nd Symposium organized by AFCET in Monte-Carlo from 16 to 21 September 1974.

Wiegand, KD Glimm, J
AFCET-Traffic Control and Transportation Systems 1974, pp 429-439,
1 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey,
75015 Paris, France Repr. PC

UIC cat. No. 65N7

06 099799

P&LE UPGRADES CROSSING PROTECTION

In the course of installing welded rail, the Pittsburg & Lake Erie was confronted with eight grade crossings in a 1 1/2-mile stretch. The goal was to produce a safe system that would not unduly delay vehicular traffic. Audiofrequency overlays of the conventional type would have been extremely complicated. The solution was installation of electronic movement detection through measurement of rail impedance changes. Several frequencies are overlapped for some distance beyond the crossings.

Progressive Railroading Vol. 18 No. 8, Aug. 1975, pp 43-44, 3 Phot.

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton
Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

06 099835

**POINTS AND TRAFFIC LIGHTS UNDER COMMON CONTROL
USING VETAG**

A trial installation of Philips' Vetag (vehicle tagging) equipment will be made in Amsterdam following a policy decision on adopting a standard method of automatic control of tramway switches and traffic lights. Vetag functions to detect, identify and locate selected vehicles in a stream of road traffic and is adapted to automation of LRT or streetcar signalling which must operate without external supervision. Vetag consists of three basic units--an interrogator installed along the roadway, a detection loop in the roadway surface and a transponder underneath each vehicle.

Meyer, F *Railway Gazette International* Vol. 131 No. 5, May 1975, pp
193-194, 1 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 125808

**CONTROLLING THE RENDEVOUS BETWEEN A HIGH SPEED
TRAIN AND A FEEDER VEHICLE [Regelung des
Rendezvousvorgangs Zwischen Einer Hochleistungsschnellbahn und
Einem zubringerfahrzeug]**

An automatic system is introduced for controlling the transfer of passengers between a high speed train and its feeder vehicle during a rendezvous manoeuvre. The overall structure includes an optimal terminal control system and a classical PD-control system, both of which are digitally implemented. It is shown by simulation that this control system compensates all possible types of disturbances. [German]

Wehrich, G *Regelungstechnik und Prozessdatenverarbeitung* Vol. 22 No.
10, Oct. 1974, pp 294-300

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

06 125842

**RADIO INTERFERENCE PROBLEMS IN ELECTRIC TRACTION
[Problem Zaklocen Radioelektrycznych w Trakcji Elektrycznej]**

The sources of the radioelectric interference are outlined. Means for interference suppression are discussed. The question whether suppression devices should be applied to individual items of equipment or to such complete functional units as substations, network, rolling stock, etc., is considered. The standard specification PN-73/E-05108 is criticized. [Polish]

Nasilowski, J (Institute Elektrotech, Poland) *Przegląd Elektrotechniczny*
Vol. 51 No. 2, Feb. 1975, pp 78-79, 8 Ref.

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

06 125868

BLOCKJOINTLESS TRACK CIRCUIT-LONDON TRANSPORT

The paper describes an audio frequency blockjointless track circuit developed by London Transport and the Westinghouse Brake and Signal Co. Ltd. to meet the special requirements of the LT railway system, which were not fully catered for by the existing audio frequency systems examined when the work began in 1972. The type of track circuit which has been developed in centre-fed, with a maximum frequency around 12 kHz and modulation rates between 7.5 and 12.5 Hz derived through frequency dividers from

crystals oscillating in the 1 to 10 MHz range. After describing the circuit in detail the paper deals with aspects of system design when using it; a further section shows how it could be integrated with Automatic Train Operation. It is emphasised that the complex mathematics involved in the design would not have been practical without computer assistance, and much has been learned from comparisons between computer simulation and practical tests. The track circuit which has been evolved is interesting as a compromise between the conflicting parameters set down in the initial studies.

Norton, DJ Lawrence, LS
Institution of Railway Signal Engineers Mar. 1975, 13 pp

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Institution of Railway Signal Engineers 1 Ashbourne Close, London W5, England Repr. PC

06 126411
TRAIN SAFETY CONTROL SYSTEM FOR SHINKANSEN-CPU SYSTEM WITH PRIORITY ON SAFETY

For 10 years since its opening SHINKANSEN, Japan's 210 km/hr railway line, has carried 700 million passengers with a perfect safety record. Train operation safety depends on the working of local devices, while overall traffic control is maintained by a centralized system with a computer to aid the dispatchers. The local devices for safety control have an extremely high failsafe function which rejects any mistaken order from the center, when it judges that said order conflicts with the safety. The present paper describes the fundamental idea behind this highly reliable train operation control system.

Kataoka, N (Railway Technical Research Institute) *ASME Journal of Dynamic Systems, Meas and Control* Vol. 97 No. 2, Series G, June 1975, pp 146-148, 5 Ref.

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

DOTL JC

06 126975
A COMMUNICATION LINK APPROACH TO ACTUATION OF GRADE-CROSSING MOTORIST-WARNING SYSTEMS

Previous studies indicate that one promising avenue to grade-crossing motorist-warning systems, offering lower cost and independent of rail-road-track circuits, is use of a radio-communication link for signal activation. By this means, the presence of a train approaching a crossing can be communicated to the crossing from an appropriate distance. This study describes analysis, development, and test activities carried out at the Transportation Systems Center to determine the basic feasibility and practicality of a microwave realization of this approach. A brief review of the conceptual framework is followed by detailed discussion of field-test procedures and results, with special attention then given to train detectors, microwave-propagation aspects, use of solar power, and radar train detection.

Hopkins, JB Abbott, R Holmstrom, FR White, EF Newfell, AT
Transportation Systems Center, (DOT-TSC-FRA-75-7) Final Rpt.
FRA-OR&D-75-80, July 1975, 118 pp, Figs., Tabs., Photos., 7 Ref.

ACKNOWLEDGMENT: FRA, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244584/AS, DOTL NTIS

06 126981
GREATER SAFETY THROUGH LINEAR CONTROL OF TRAINS
[Securite accrue par le controle lineaire des trains]

A short description of the integrated transmission system designed by the ORE. The tests were begun on the Lavorgo-Bodio (St-Gothard) line, with RE 4/4 II type locomotives. Further tests are planned on the Turgi-Coblentz section with one of the new RABDe 8/16 type suburban trainsets. The system as a whole will be thoroughly tested between now and 1977, so that large-scale production can be begun at that date. [French]

Also published in German.

Winter, P *CFF-Staff Bulletin* Vol. 52 No. 4, 1975, pp 64-67, 4 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: CFF-Staff Bulletin Berne, Switzerland Repr. PC

06 126992
"UTRL"--AN ELECTRONIC FAIL-SAFE LOGIC IN RAILWAY SIGNALLING

The author begins by explaining the indispensable failsafe requirements of a railway signalling system and how they have been developed from the first mechanical interlocking boxes to the semi-conductor electronic equipment now in use. He then describes how the URTL, which is a dual-channel system, achieves almost total positive security by means of: twin switching units operating in antiphase; comparison of the state of the twin switching units; clockpulse checking of the state of the units; basic elements comprising two identical majority logics; control transducers permeable to signals only if a certain Boole algebra chain is established. A functional unit comprises 30 integrated basic elements assembled on a standard logic printed circuit card.

Paper read at the IRSE in Brussels on 21/2/75 on the subject of a Siemens electronic logic designated URTL (Überwachbare Resistor Transistor Logic).

Lohmann, HJ
Institution of Railway Signal Engineers Feb. 1975, 11 pp, 3 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Institution of Railway Signal Engineers 1 Ashbourne Close, London W5, England Repr. PC

06 127007
THE DB'S OPTICAL WARNING SYSTEM FOR PERMANENT WAY MAINTENANCE GANGS [Die optische Rottenwarnanlage der DB]

The use of audible warning signals to gangs working on the line causes much disturbance for people living near the railway, especially at night. The DB has tried to replace audible warnings by optical signals for work on the permanent way at night. The principle is that at the arrival of the train, the lighting intensity at the worksite is varied according to the two frequencies used by the DB to show the track on which the train is arriving. On engines with autonomous lighting, electronic flash-devices are used to warn the gangs. Finally, the author stresses that the present warning system depending on a look-out man, as used by the DB, is unsatisfactory from the safety point of view. Only automatically operated equipment could meet safety requirements. Moreover, this optical warning device saves manpower, as the look-out man is not required. [German]

Koerber, H *Eisenbahningenieur* Vol. 26 No. 3, Mar. 1975, pp 89-90, 3 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

06 127617
SPOORPLAN (GEOGRAPHICAL TYPE) INTERLOCKING SYSTEM SPDRS U FOR URBAN RAILWAYS

Urban railways are characterized by short distances between stops, identical vehicle type overground and underground lines as well as close headway. For railways showing essentially these features, Siemens has developed and in several cases already placed in service the Spoorplan interlocking system SpDrS U. The building block technique of such interlocking systems considerably facilitates planning making available of building blocks, and assembly. The fail-safe function of all building blocks and their co-operation have passed successfully the inspections of the supervising authorities. The authors deal in detail with principle and function of this Spoorplan interlocking system.

Hadeloff, D Meier, J *Siemens Review* May 1975, pp 183-184, 2 Ref.

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

06 127635
APPRECIATION OF THE POTENTIALITIES AND LIMITATIONS OF COMPUTERIZED CONTROL OF LINEAR TRANSIT SYSTEMS

The paper considers the theory of safe stopping on a trackway and the problem of station delay accretion from the viewpoint of control requirements and performance. It is shown that existing control methods relying on trackside-sensing equipment only is limited in scope and requires on-board supplementation if substantial headway reduction is to be

achieved. A control equation is suggested similar to that used in practice by car-drivers which should allow this reduction to be achieved using existing technology.

Brain, RR (Brain and Associates)
Institute of Engineering Proc Paper 1974, pp 130-134, 17 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Institute of Engineering Sydney, Australia Repr. PC

06 127731
INTERFERENCE DELAYS ON A PARTIALLY DOUBLE-TRACKED RAILWAY WITH INTERMEDIATE SIGNALLING

This paper develops expressions for expected interference delays encountered on a partially double-track line where intermediate signals are used. A Fortran computer program has been written to implement this model. The model can be used to analyze a particular rail line or can be included in an optimization model or the mainline portion of an entire railway. The form of delay expressions arrived at depends on the operating procedures. New expressions can be derived if the operating rules are changed. Refinements which incorporate length of train, interference resulting from track maintenance and failure of a locomotive can be included. The utility of fleeting groups of trains may also be appraised.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Petersen, ER (Queen's University, Canada)
Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 55-62, 8 Fig., 5 Ref.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

06 127841
THE S.N.C.F. CENTRAL SIGNALLING AND TELECOMMUNICATIONS LABORATORY

The author, Head of Section at the S.N.C.F. Equipment Department, relates the history of this laboratory since it was built by the former Northern Railway. He describes its present arrangement and states its purpose which is not research but essentially the verification of equipment, tests, investigations. This work is in principle confined to S.N.C.F. signalling and telecommunications equipment. Activities have been grouped as a result of the reform of S.N.C.F. structures. The author then describes the laboratory equipment and its use as regards electronics, photometry, relays, track circuit testing with simulators (high speed, information), and the testing of telecommunications and electronic equipment, computer functioning, etc. He then gives facts about the laboratory's mobile equipment which enables readings to be taken at any point in the installations, in particular 10 testing coaches, a power coach taking current directly from the 1,500 V supply, and an experimental railcar. [French]

Kieffer, A *Revue Generale des Chemins de Fer* Vol. 94 July 1975, pp 476-484

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 127852
AUTOMATIC FREIGHT-TRAIN SURVEILLANCE IN SWITZERLAND

Swiss Federal Railways has been carrying out field trials of a number of devices capable of identifying faults which can occur on freight trains and triggering alarms as monitoring points so the defective train can be stopped for examination. Closed circuit television is used for general checking of trains with videotape records being made. The other monitoring systems include detectors for hot journal boxes, stuck-brake detectors, infrared beams for detecting anything about trains extending beyond loading gauge clearances, excessive axle loading detectors and means of detecting flat wheels. It is concluded that all these systems are needed if danger of serious derailment is to be reduced.

Modern Railways Vol. 32 No. 325, Oct. 1975, pp 411-413, Figs., Photos.

PURCHASE FROM: XUM Repr. PC

DOTL JC

06 127867
CHARTING THE LIMITS OF UNMANNED OPERATION

Introduction of full automation of rapid transit does require a radical change of views in which there can be no shrinking from technical, operating and legal challenges. Today's automation technology does allow rapid transit systems to be run with very few employees. Use of trains without operators and stations without attendants does not jeopardize safety, but in some cases improves it. Attractiveness of service can be improved at little expense. The author has described his efforts over 20 years in technical direction of efforts at automating West Germany's Hamburg transit system.

Tappert, H (Hamburger Hochbahn AG) *Railway Gazette International* Vol. 131 No. 10, Oct. 1975, pp 373-377, 8 Ref.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 127868
DESIGN PHILOSOPHIES IN AUTOMATIC TRAIN CONTROL

Two broad categories of automatic control have emerged in 15 years of rapid transit automation, identified by use of track circuits or separate conductors for the ground-to-train communications channel. Continental Europe has favored a wide-band link which gives flexibility in allocating functions to lineside and on-train equipment, but places heavy reliance on reliability of electronic logic. North American practice, represented by the Washington Metro, is to build up a control hierarchy from elements which can function independently in the event of failure.

Freehafer, JE (General Railway Signal Company) *Railway Gazette International* Vol. 131 No. 10, Oct. 1975, pp 377-382, 3 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 127869
SWISS EXPERIMENTS WITH TRACK-TO-TRAIN COMMUNICATION

Two sections of line--one flat and one mountainous--are to be equipped with track conductors for experiments in continuous cab signalling with mandatory speed supervision. Swiss Federal Railways intention is to improve safety, line capacity and operating efficiency, rather than replace the operator by introducing full Automatic Train Operation (ATO).

Winter, P *Railway Gazette International* Vol. 131 No. 10, Oct. 1975, pp 387-388, 2 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 128843
GTW PIONEERS NEW KIND OF "SHARING"

The article describes the fully-integrated communications system on the Grand Trunk Western, from the beginnings in 1969 when Grand Trunk Radio Communications Inc. (GTRC) was set up to the development of a system-wide microwave communications system.

Chase, JD (Grand Trunk Western Railroad) *Progressive Railroadng* Vol. 18 No. 9, Sept. 1975, 5 pp, 2 Fig., 2 Phot.

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

DOTL JC

06 128882
PROCESS CONTROL IN DIRECTING TRAFFIC [Prozessrechner in der Verkehrslenkung]

Application of computerized control for the railroad in Saarbrücken, for the buses and streetcars in Hannover and as an aid in waterways traffic is described. [German]

Elektrotechnische Zeitschrift, Ausgabe B Vol. 27 No. 14, June 1975, p 377

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

06 128883

COMPUTERS, COMMUNICATION AND HIGH SPEED RAILWAYS

This article describes how the railways have been making progress in utilization of electronic systems which are now becoming more and more necessary for economy, efficiency and safety as traffic volume and speeds increase. Control and signaling for high speed trains, centralized signal-box operation, a modernized communications system and computer control for the goods fleet are all examined with an eye to the future to determine the benefits that accrue from developments in electronics.

Anderton, WE *Wireless World* Vol. 81 No. 1476, Aug. 1975, pp 348-353

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

06 128887

OCCUPANCY DETECTION TECHNIQUES FOR TRANSIT SYSTEMS

A relatively simple and inexpensive method of verifying one of the most crucial functions in transit systems, that of continuous verification of train location is presented. While the system described is based primarily on hardware implementation, it would be relatively easy to implement the off-train logic using redundant minicomputers and software logic. While more sophisticated techniques could be developed, many present and future systems could adapt themselves to this technique, thereby increasing their reliability and safety.

IEEE Ind Appl Soc. 9th Annual Meeting, conf record, Pittsburgh, Pennsylvania, October 7-10, 1974.

Barpal, IR (Westinghouse Transportation Division) *IEEE Transactions on Industry Applications* No. 1, 74 CHO 833-41A, 1974, pp 319-322

ACKNOWLEDGMENT: EI

PURCHASE FROM: IEEE Repr. PC

06 129135

PRESENT DESIGNS AND TRENDS IN GERMAN RAILWAY SIGNALING

Modular interlocking relay racks, schematic layout plan and spoor-plan of a German interlocking type SpDr S-60, cab control panels, and control room of the computerized supervisory control center in Munich are featured. Safety approaches in German spoorplan interlocking systems are discussed.

Koehn, KE (Siemens Corporation West Germany) *Railway System Controls* Vol. 6 No. 7, July 1975, pp 27-30

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 129136

USE OF A COMPUTER IN THE DESIGN OF RAILWAY SAFETY SIGNALING CIRCUITS

The operation of London Transport's underground railroad network is controlled by an extensive signalling system. The use of computers is being currently examined in many areas of signal engineering. A pilot project was set up to examine the application of a computer to the ancillary work in the design process for safety signal circuits.

Dawson, AC (London Transport Executive); Hopper, A
Institution of Electrical Engineers Conf Publ 1974, pp 168-173

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 129159

MAINTENANCE OF A MODERN RAILWAY WITH PARTICULAR REFERENCE TO SIGNALING

The author shows how the introduction of power signalling led to more sophisticated equipment for detecting and remedying faults, also to the use of more highly qualified maintenance staff.

Bates, RG

Institution of Railway Signal Engineers 1975, 7 pp

ACKNOWLEDGMENT: UIC

PURCHASE FROM: Institution of Railway Signal Engineers 1 Ashbourne Close, London W5, England Repr. PC

06 129165

INDUSTRIAL AND SCIENTIFIC APPLICATIONS OF DOPPLER RADAR

This is a survey of the state of the art in industrial and scientific applications of short-range radar, describing some of the problems encountered and detailing several current installations. Railways are defined as one of the growth areas for Doppler radar applications, being used for speed sensing on the Advanced Passenger Train as an alternative to axle-driven tachometers which are affected by wheel slip. Other applications being examined are wheel slip indication, warning of maintenance personnel of the approach of trains, and for location signals in making road tests. Doppler radar is used for speed control in hump classification yards in Europe and America.

Whetton, CP *Microwave Journal* Vol. 18 No. 11, Nov. 1975, pp 39-46

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

06 129174

EON-1 TYPE SHORT LENGTH SUPERIMPOSED TRACK CIRCUITS [Krotkie obwody nakladane typu Eon-1]

The EON01 (superimposed electronic circuit) is an improved version of the KON (short length superimposed circuit). The operating mode, field of application and maintenance principles are the same as for the KON. The article gives a detailed description of the structure of the device, the active and passive receiver slide-in units, the proposed alternative production versions and cases where EON-1 units could possibly be used. [Polish]

Tomczynski, J *Przegląd Kolejowy Elektrotechniczny* Vol. 22 Apr. 1975, pp 8-12, 2 Fig., 2 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Wydawnictwa Komunikacji i Lucznosci Kazimierzowska 52, Warsaw 12, Poland Repr. PC

06 129184

INSTRUMENTS AND METHODS FOR THE COMPLEX EXAMINATION OF BALLAST RESISTANCE OF ISOLATED RAIL TRACK CIRCUITS [Vasuti szigetelt sinaramkorok balla-sztellenallasanak komplex vizsgalati modszere es muszerei]

The author starts by considering the ballast resistance factors, then goes on to describe the measurement possibilities and the measuring instruments and procedures developed by the Railway Scientific Research Institute in Budapest. [Hungarian]

Erdos, L *Kozlekedestudományi Szemle* Vol. 24 No. 12, Dec. 1974, pp 567-572, 18 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

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

06 129185

RELIABILITY AND SAFETY, TWO FUNDAMENTAL CONCEPTS WHEN DESIGNING SAFETY INSTALLATIONS [Fiabilite et securite, deux notions fondamentales dans la conception des installations de securite]

To distinguish clearly between the concepts of reliability and safety, the author bases himself on the operating principles for railway safety installations. Using various examples, he shows the difficulties encountered when producing safety installations and states ways likely to give the highest possible degree of safety (controlled element circuits, intrinsic safety circuits). He stresses the difficulties and risks there would be if we tried to express these safety levels in quantitative terms as for reliability. [French]

Besacier, G *Automatisme* Vol. 20 No. 4, Appendix 3, Apr. 1975, pp 141-150, 2 Fig., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: ESL Repr. PC, Microfilm

06 129195

UNDERGROUND RADIOTELEPHONIC TRANSMISSION BY RADIANT HIGH FREQUENCY CHANNEL [Unterirdische Funkübertragung mit abstrahlenden Hochfrequenzleitungen]

In long subways, such as underground railway tunnels, radiant high frequency channels are necessary for sending the electrical signals covering conversations between mobile transmitters and receivers, and to transmit and receive them through the split armature of these radiant channels. For such radio-telephonic transmission, particular use is made of metric waves and, as regards construction, several solutions are possible. The authors present the multiple-channel radiotelephonic installations of the Hanover Underground, which have proved their worth. [German]

Breitenbach, O Stitz, G *Elektrische Bahnen* Vol. 46 No. 7, July 1975, pp 155-163, 7 Fig., 1 Tab., 6 Ref.

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

DOTL JC

06 129304

PRACTICAL PERFORMANCE OF RADIATING CABLES

Experimental techniques are describes which are used to establish the coupling loss between a radiating cable and an antenna, the attenuation per unit length of the cable and its sensitivity to mounting position. Eight different cables were evaluated over a frequency range of 42-460 MHz. Field

strength plotting and digital computer analysis techniques were used to reduce the data recovered from the experiment.

Cree, DJ Giles, LJ *Radio and Electronic Engineer* Vol. 45 No. 5, May 1975, 9 pp, 9 Fig., 4 Tab.

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

DOTL JC

06 129428

AUTOMATION AND SAFETY OPERATION OF METROPOLITAN RAILWAYS BASED ON HIGH-TENSION IMPULSE TRACK CIRCUITS

This article describes the train control system developed by Jeumont-Schneider that is being installed on the Montreal and Marseille Metros. There are a number of self-contained functional elements which may be applied separately, or combined to integrate their several functions. The functions are high-voltage impulse track circuits, train-to-train communication or cab signals, continuous speed control; driverless train operation, and section-timing control of train operations. Application of linked self-contained modules avoids total failure and running may continue under proper manual operation.

Davy, M *Rail Engineering International* Vol. 5 No. 7, Oct. 1975, pp 272-275

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

07 092213

DESIGN FOR THE HANDICAPPED IN ELEVATED TRANSPORTATION SYSTEMS

The report is concerned with the mobility of the physically disabled within urban areas. It identifies architectural barriers faced by the handicapped in relation to rapid transit, establishes design standards, and shows ways these standards may be incorporated in prototypical and existing stations. An evaluation of the Howard Street line of the Chicago Transit Authority (CTA) is presented. Design standards are established to aid designers in making elevated transportation systems accessible to the handicapped. Various architectural elements, including doors, entry and exit controls, stairs and elevators are diagrammed and discussed. The design standards established are for minimal tolerances and may be exceeded wherever it is felt necessary. The two basic types of platforms presently being used in rapid transit systems, the mid platform and the split platform, are analyzed with particular interest to providing access to the handicapped. Representative station types presently used are explained by diagrams and text.

Gelick, MS Silver, ML

Illinois University, Chicago, Urban Mass Transportation Administration Res. Rpt. RR-11, UMTA-IL-11-0024-75-1, Jan. 1975, 68 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243650/9ST

07 092738

STANDARDIZATION OF CONTROLS FOR UNDERGROUND ELECTRIC FACE EQUIPMENT. APPENDIX 3. RAILED PERSONNEL CARRIERS

The appendix includes recommendations for the standardization of controls on railed personnel carriers and is intended to be used in conjunction with the Final Report (BuMines OFR 45(1)-75; PB-242 562). The primary purpose of the effort was to apply modern human engineering technology to reduce human error and accidents associated with the on-site operation of railed personnel carriers.

See also Appendix 2, PB-242 563.

Krause, JR Hedling, WG

Applied Science Associates, Incorporated, Bureau of Mines Res Rept. BuMines-OFR-45(4)-75, Dec. 1974, 34p

Contract H0230021

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242565/0ST, DOTL NTIS

07 092739

STANDARDIZATION OF CONTROLS FOR UNDERGROUND ELECTRIC FACE EQUIPMENT. APPENDIX 2. TROLLEY MINE LOCOMOTIVES

The appendix includes recommendations for the standardization of controls on trolley mine locomotives. It is intended to be used in conjunction with the Final Report (BuMines OFR 45(1)-75; PB-242 562). The primary purpose of the effort was to reduce human error and accidents associated with the on-site operation of trolley mine locomotives.

See also Appendix 1, PB-242 563 and Appendix 3, PB-242 565.

Krause, JR Hedling, WG

Applied Science Associates, Incorporated, Bureau of Mines Res. Rept. BuMines-OFR-45(3)-75, Dec. 1974, 32p

Contract H0230021

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242564/3ST, DOTL NTIS

07 092812

TRAVEL CHARACTERISTICS OF THE PHYSICALLY DISABLED IN THE WASHINGTON METROPOLITAN AREA

The study investigated the occurrence of disabilities among the population of the Washington metropolitan area and the effect of these disabilities on the use of escalators which had been planned to provide the sole means of access to the Metro rapid rail system. Random telephone interviews were conducted in an attempt to determine the number of physically handicapped

within the region; once handicapped individuals were determined through the random survey, follow-up interviews were conducted to provide more detailed information. Information is presented in the study on the nature of the disabilities among those who were interviewed, the use of special aids for mobility, employment status, income, present means of transportation, and a description of the recent types of trips which had been made in the area.

Mobility Study: 1970.

Washington Metropolitan Area Transit Commission, Starch (Daniel) and Staff, Incorporated WMATA-75/22, Dec. 1971, 57p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242838/1ST, DOTL NTIS

07 092835

TRANSPORTATION FOR THE ELDERLY OR PHYSICALLY HANDICAPPED (A BIBLIOGRAPHY WITH ABSTRACTS)

Reports on planning for public transportation for older persons or those persons who are physically disabled are abstracted in the bibliography. Included are studies of difficulties encountered, special design, and real and potential use of facilities. (Contains 41 abstracts).

Supersedes COM-74-10887.

Young, ME

National Technical Information Service Report July 1975, 46p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

NTIS/PS-75/575/1ST, DOTL NTIS

07 099708

HUMAN INFORMATION PROCESSING UNDER VARYING TASK DEMAND

Experiments on the rate of human information transmission show that the relationship between performance and demand depends upon time history of demand; beyond overload, performance does not recover at the expected rate as demand is reduced. The resulting 'hysteresis' effect increases after moderate doses of alcohol. Some implications of these results in real-life situations are discussed. (A) /TRRL/

Cumming, RW (Monash University, Australia); Croft, PG (New South Wales Dept of Motor Transport, Australia) *Ergonomics* Vol. 16 No. 5, 1973, pp 581-586, 4 Fig., 9 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 211949)

PURCHASE FROM: ESL Repr. PC, microfilm

DOTL JC

07 099709

SAFETY PSYCHOLOGY: A REVIEW OF THE LITERATURE

This paper reviews the major concepts and trends in safety psychology under four headings: (1) personal factors affecting the causation of accidents; (2) environmental factors affecting accident causation; (3) theories in safety psychology; (4) research problems in safety psychology. The most important conclusion reached, is that safety psychology lacks a theoretical framework which is necessary for both predicting accidents before they occur and as a cohesive force for drawing together the immense amount of information that is available in the field of safety. (A) /TRRL/

Dunn, J

Aston University, England R&D Rept. AP #35, 1971, 34 pp, Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 211978)

PURCHASE FROM: Aston University, England Department of Applied Psychology, Birmingham B4 7ET, England Repr. PC

07 099762

VOCATIONAL APTITUDE TESTING--A CONTRIBUTION TO OPERATING SAFETY [Eignungstests--ein Beitrag Zur Betriebssicherheit]

Vocation aptitude testing should conform to scientific quality criteria and be practically put to the test to check its validity. The author describes the methods of the particular tests and their effectiveness for increasing operating safety. [German]

Dvorak, H *Die Bundesbahn* Vol. 50 No. 12, 1974, pp 943-945

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Hestra/Verlag Holzhofallee 33, 61 Darmstadt, West
Germany Repr. PC

07 099805

ROLE OF PSYCHOLOGICAL NEEDS IN MASS TRANSIT

This paper discusses the need for the use of psychological considerations in the planning of mass transit. The authors develop a set of basic psychological human needs and discuss how they might be applied to improve the image and quality of mass transit. These needs are also used to evaluate present-day bus operations as well as 2 modes of personal rapid transit vehicles. A section is also devoted to discussing how such a psychologically oriented approach might influence transit marketing in order to achieve maximum effectiveness.

Teahan, C Wachs, M *High Speed Ground Transportation Journal* Vol. 9 No. 2, June 1975, pp 35-50

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

07 125098

MOTION DISCOMFORT AND TRANSPORTATION GUIDEWAY FORM

A three-dimensional theory of motion discomfort is developed by defining scalar indices measuring discomfort due to acceleration and jerk. These indices are functions of effective acceleration and jerk vectors and their orientation to the preferred configuration of a subject. The optimal bank angle of a guideway is defined and shown to minimize acceleration discomfort. Isotropic approximation to the discomfort indices are proposed. Expressions for the indices are obtained in terms of the vehicle motion and guideway geometry. Detailed analyses of motion along optimally banked circular helical and three-dimensional spiral curves are presented. Motion with zero fore-aft thrust on a curve in a vertical plane is also detailed. The approach assumes a smooth guideway and so vibrational inputs are not included. The analysis should be followed up by an experimental program before it is taken too seriously in Design. /TRRL/

Dais, JL Balachandra, M (Illinois University, Urbana) *Transportation Research* Vol. 8 No. 6, Dec. 1974, pp 523-531, 8 Fig., 4 Tab., 11 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212692)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

07 125798

HUMAN FACTORS IN URBAN TRANSPORTATION SYSTEMS

Encouraging the re-emergence of public transportation in cities requires a total assessment of the physical and behavioral characteristics of the user population as well as their economic, social, and esthetic preferences. This population includes many groups not normally considered in human engineering design, such as the physically or functionally handicapped and the aged. Existing data reviewed and research needs are identified for the design of urban transportation systems.

Hoag, LL (Oklahoma University); Keith, AS *Human Factors* Vol. 17 No. 2, Apr. 1975, pp 119-131, 31 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

07 125857

HUMAN FACTORS... PUBLIC TRANSPORTATION

Four papers are included in this section of the Proceedings: Human factors research in urban transportation; Psychological design factors in urban public transportation vehicles; human factors involved in current public attitudes toward public transit concepts; and Bus modification to improve safety, comfort and human reliability.

Proceedings of the 18th Annual Meeting.

Human Factors Society 1974, pp 1-17

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: Human Factors Society 1134 Montana, Santa Monica, California, 90403 Repr. PC

07 125893

HUMAN FACTORS IN RAILROAD OPERATIONS: ACTIVITIES IN FISCAL YEAR 1973

This is an interim report covering human factors services rendered by TSC to the FRA under the project: "Human Factors in Railroad Operations," during fiscal year 1973. It reviews all activities briefly and contains more detailed reports on a research plan for use with a locomotive cab simulator, a training survey, studies of train handling, and fault-tree analysis of railroad accident data.

Devoe, D Feehrer, CE Hill, JH Sussman, ED
Transportation Systems Center, Federal Railroad Administration,
(DOT-TSC-FRA-73-11) Tech. Rpt. FRA-OR&D-74-32, Feb. 1974, 114
pp, Figs., Tabs., 3 App.

ACKNOWLEDGMENT: FRA, NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244540/1ST, DOTL NTIS

07 126395

ECONOMIC PREDICTION AND HUMAN ACTION

Empirical prediction entails syllogistic reasoning, the major premise being a "proposition of regularity". This latter can itself be tested empirically, as the hypothesis "past regularity implies future regularity". In the social sciences (in contrast to the physical sciences), the deterministic version of this hypothesis is demonstrably untrue. Though the "statistical" version of the hypothesis stands, the likelihood of its truth has never been expressed in probability terms. Thus empirical prediction in economics confronts not only uncertainty, which can be expressed in statistical terms, but an added element of "ignorance" which (at least as yet) cannot be so expressed.

Stewart, IMT (Nottingham University) *Futures* Vol. 7 No. 2, Apr. 1975, pp 129-138, 17 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: IPC (America), Incorporated 205 East 42nd Street, New York, New York, 10017 Repr. PC

DOTL JC

07 126419

HUMAN CRITERIA IN THE DESIGN AND ARRANGEMENT OF CONTROL ELEMENTS

This article examines some important factors that should be considered in the design and arrangement of control elements from the standpoint of human engineering. The need for ready identification of individual control elements is stressed, and several possibilities for differentiation between control knobs--based on variation of the shape, size, color, texture, position and operating method--are described. The basis for the coding of control elements in either of these ways is human sensibility. Finally, hand controls and foot controls are discussed in terms of selection, best positioning and arrangement.

Shan, HS (Roorkee University, India) *Machinery and Production Engineering* Vol. 126 No. 3258, May 1975, pp 455-459, 7 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

07 127005

ACUTE MYOCARDIAL INFARCTUS AMONG CSD RAILWAYMEN [Akutni infarkt myokardu u zeleznicaru]

The analyses were based on 1971 data. The average age of railwaymen examined was 52.2 years. The survey reveals the importance of preventive examinations. The main criteria for deciding on return to active duty are: the seriousness of the illness and the type of job done by the staff concerned. As regards the resumption of work, the age criterion is of secondary importance. [Czech]

Sramek, J *Zeleznicni Zdravotnictvi* Vol. 18 No. 1, 1974, pp 3-30

PURCHASE FROM: Zeleznicni Zdravotnictvi Prague, Czechoslovakia

07 127832

HUMAN FACTORS ANALYSIS OF THE DIESEL-ELECTRIC LOCOMOTIVE CAB

Using information collected over 6 1/2 years, a human factors analysis was completed of the diesel-electric locomotive cab. The analysis was directed

towards displays, control design and arrangement, and environmental quality. Nineteen recommendations were provided for the modification of existing cabs and the design of new cabs to enable future locomotive crews to work more efficiently and safely in a more comfortable work environment.

This article was published in *Human Factors*, Vol 17, No. 2, pp 149-156, 1 Figure, April 1975.

Gamst, FC
Rice University Apr. 1975, 7 pp

Grant NSF GS 3040

PURCHASE FROM: Johns Hopkins Press Homewood Campus, Baltimore, Maryland, 21218 Repr. PC

07 127833

THE DIESEL-ELECTRIC LOCOMOTIVE AS A WORK ENVIRONMENT: A STUDY IN APPLIED ANTHROPOLOGY

Human factors in the diesel-electric locomotive is the subject of a study in applied ethnology and applied physical anthropology. Working from the viewpoint of locomotive crew members, the study's principal objective is to aid in designing locomotives that will enable crews to work efficiently and safely. Thirty recommendations are made to this end. After a discussion of applied anthropology, general characteristics of present-day locomotives and operations of the crew in the locomotive are covered. Recommendations and background information are presented in the following areas: (1) arrangements of cab displays of warning devices and mechanical indicators, (2) arrangement and design of controls, (3) locomotive structure, (4) impacts, (5) exterior signaling for the locomotive, and (6) vibration on the locomotive.

Published as part of "Studies in Cultural Anthropology," Rice University Studies, Vol 61, No. 2, pp 37-78, 8 Figures, Spring 1975.

Gamst, FC
Rice University Aug. 1975, 41 pp

Grant NSF GS 3040

PURCHASE FROM: Rice Campus Store P.O. Box 1892, Houston, Texas, 77001 Orig. PC

07 129295

THE OVERALL JOURNEY TIME AS COMPARED WITH TRAVELLING TIME IN LOCAL PUBLIC TRANSPORT [Die fahrzeitäquivalente Reisezeit im öffentlichen Personennahverkehr]

The journey time is composed of different elements, to which different weighting factors should be applied, so as to which different weighting factors should be applied, so as to give them a value corresponding to the passenger's psychological attitude to each different aspect of the journey. The author analyses weighting factors for walking time, waiting time, and time spent catching connections. He then illustrates with examples the influence of the weighting factor of these times and of frequency of the service on the overall journey.

Walther, K *Verkehr und Technik* Vol. 28 No. 7, July 1975, pp 271-275, 1 Tab., 19 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Schmidt (Erich) Verlag Herforder Strasse 10, 4800 Bielefeld, West Germany Repr. PC

08 083969

TECHNOLOGICAL ASPECTS OF PUBLIC RESPONSIBILITY FOR GRADE CROSSING PROTECTION

Recent interest in improvement of safety at railroad-highway grade crossings has been accompanied by a growing involvement of government at all levels. Public responsibility typically has been confined to providing funding, developing information, planning, and regulating; the design, installation, and maintenance of automatic protection has been exclusively a railroad activity. This paper examines the technical limitations that constrain public authorities from taking total responsibility for crossing protection devices, which are the only highway traffic control devices that are not the responsibility of highway officials. Research directed toward removal of those limitations is described. A review of the legal history and current role of governmental units precedes a description of conventional technology in terms of impact on a wider public role. Means of train detection and motorist warnings are discussed; the conclusion drawn is that the principal technological impediment to non-railroad responsibility for crossing protection is the present dependence on track circuit techniques for determination of train presence. Recent research directed at removing this constraint is presented. Analysis of system requirements and available technology has identified a discrete train detector-microwave communication link concept, and the results of field testing indicate a number of attractive features and general feasibility.

Hopkins, JB (Transportation Systems Center) *Transportation Research Record* No. 514, 1974, pp 33-43, 4 Fig., 8 Ref.

PURCHASE FROM: TRB Publications Off Orig. PC

DOTL JC

08 092397

COLLISION OF A SOUTHERN RAILWAY WORK TRAIN WITH A POLK DISTRICT SCHOOLBUS AT ARAGON, GEORGIA, OCTOBER 23, 1974

About 7:55 a.m. e.d.t., on October 23, 1974, a Polk District schoolbus carrying 87 students was struck on a grade crossing in Aragon, Georgia, by the caboose of a Southern Railway System work train. The train, which consisted of a locomotive and 12 cars, was backing through the crossing. Failing to stop at or near the point of impact, the train pushed the schoolbus 315 feet down the track. During the movement the caboose overrode the bus as that vehicle rolled onto its roof. The roof of the bus was crushed to the level of the seat tops. There were no ejections or fire. Seven of the occupants

of the bus were killed. The busdriver and 71 of the students were known to be injured. None of the occupants of the train were injured. The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver of the schoolbus to stop his vehicle short of the track until it was safe to proceed, and the failure of a crewmember of the train to guard the unprotected crossing.

Railroad/Highway Accident Report.

National Transportation Safety Board NTSB-RHR-75-1, July 1975, 30 PP

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244467/7ST, DOTL NTIS

08 129263

LOCOMOTIVE TO AUTOMOBILE BASELINE CRASH TESTS

Four Locomotive to Automobile Crash tests were performed by the Dynamic Science Division of Ultrasystems at DOT's High Speed Ground Test Center under contract to the Transportation Systems Center, which is conducting the work for the Federal Railroad Administration. This report documents these four tests, which will provide baseline data for evaluation of future locomotive front structure modifications designed to attenuate the severity of the grade crossing accident. The automobiles were all 1973 standard size sedans of the same model with similar options. For each test, a 130-ton Alco locomotive impacted a stationary automobile at a nominal 50 mph. The first two tests contained no instrumentation on either the locomotive or automobile except for high-speed cameras. The last two tests were instrumented repeats of the first two tests which also involved a direct side impact and a side impact centered on the automobile front fender. The last two tests had an anthropomorphic dummy in the automobile and over 50 accelerometers installed in it. Each test had extensive high frame rate photographic coverage.

Sponsorship was from Federal Railroad Administration, DOT.

Anderson, RL

Ultrasystems, Incorporated, (DOT-TSC-FRA-75-18) Final Rpt.
FRA-OR&D-76-03, Aug. 1975, 150 pp

Contract DOT-TSC-700

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

09 090829

ALTERNATING METHOD APPLIED TO EDGE AND SURFACE CRACK PROBLEMS

An alternating method for solving edge crack problems in two dimensions and surface crack problems in three dimensions is presented. The mechanics of the alternating method are defined. A numerical example of the alternating method, based on a simple problem with no singularities is provided. Specific application of the alternating method to the following situations is analyzed: (1) infinite plate with a central crack, (2) edge loaded semi-infinite plate, (3) penny-shaped crack in an infinite body, and (4) semi-elliptical cracks. (Author)

Hartranft, RJ Sih, GC
Lehigh University, (TR-1) NASA-CR-140846, Apr. 1972, 111 pp

Contract NGR-39-007-066

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
N75-12353/9ST, DOTL NTIS

09 091772

NEW ASPECTS OF FATIGUE AND FRACTURE MECHANICS

The significance of the results of Scanning Electron Microscope studies of the microstructural deformation and damage processes in different types of metals for the formulation of an engineering approach to the problem of fatigue and of its relation to fracture mechanics is discussed. The futility of attempts to develop a unique model of fatigue based either on physical theories of lattice defects or on mechanical theories of plastic strain accumulation is demonstrated, and the usefulness of fracture-mechanics concept applied to microcrack development and combined with probabilistic considerations based on order statistics is illustrated.

Freudenthal, AM
George Washington University, Office of Naval Research, Naval Ship Systems Command, Air Force Materiel Laboratory Tech. Rpt. TR-16, Dec. 1973, 68 pp

Contract N00014-67A-0214-0011

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
AD-A011353/0ST, DOTL NTIS

09 092194

A STUDY OF SUBCRITICAL CRACK GROWTH IN SHIP STEELS

The report presents an evaluation of the potential problems associated with crack initiation and subcritical crack growth in high strength, low alloy steels used in welded ship structure. An interpretive review of the state-of-the-art is given, emphasizing design tools that are available and their potential for use in fail safe or safe crack growth ship design philosophy. A crack initiation and crack growth criterion is presented, which permits welded ship structure to be designed with confidence that serious failures can be avoided, while at the same time full use of the attractive static properties of HSLA steels can be exploited. The report also includes a list of problem areas in need of further clarification in order to enhance confidence in the proposed criterion.

Francis, PH Lankford, JJ Lyle, FFJ
Southwest Research Institute, Ship Structure Committee, Naval Ship Engineering Center, (SR209) Final Rpt. SWRI-02-3568, SSC-251, June 1974, 176p

Contract N00024-73-C-5199

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
AD-A013970/9ST, DOTL NTIS

09 099598

ELECTROCHEMICAL STUDY OF THE PROTECTION OF STEEL BY MEANS OF GALVANIZED COATINGS [Elektrokhimicheskoe Issledovanie Zashchitnykh Svoystv Metallizatsionnykh Pokrytij]

Results are presented of a study of the protection of steel by means of electrochemical deposits of zinc, aluminium, and alloys of both. Mention is made of the need of having sufficiently thick coatings. The protection will last in non-salted water. /TRRL/ [Russian]

Rozenfeld, IL (Institut Fizicheskoy Khimii Anssr); Kamarenko, DM Abtoshin, EV Nemkovskij, IA *Zashchita Metallov* Vol. 8 No. 2, 1972, pp 234-239, 3 Fig., 9 Ref.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussees, Transport and Road Research Laboratory (IRRD 100400)

PURCHASE FROM: Mezhdunarodnaya Kniga Smolenskaja Ploscad 32/34, Moscow G-200, USSR Repr. PC

09 099785

ENVIRONMENTALLY ASSISTED FRACTURING: RESEARCH AND STANDARDS

The relation between research and standardization is examined as it applies to the environmentally assisted fracturing processes, particularly in light of progress that has been made in some of the areas of purely mechanical fractures and, to a lesser extent, areas of purely chemical corrosion. An arbitrary list is made of 20 possible chemical and mechanical failure processes and includes general and pitting corrosion, crevice and intergranular corrosion, fatigue cracking, stress rupture, and cavitation and corrosion fatigue. The lessons learned in the development of control measures for purely mechanical fracturing, especially brittle fracture, give useful guidance for the strategy for development of control plans for environmentally assisted fracturing processes, especially stress corrosion cracking.

Brown, BF *ASTM Standardization News* Vol. 3 No. 5, May 1975, pp 8-16

PURCHASE FROM: ESL Repr. PC, Microfilm

09 125300

STEEL UNIT JOINTS BY MEANS OF EPOXY GLUE AND HIGH-STRENGTH BOLTS [Polaczenia Elementow Stalowych z Zastosowaniem Zywic Epoksydowych i Srub Sprezajacych]

Results are presented of tests on glued bolted and mixed joints. It was found that, the strength of mixed (glued and bolted) joints is greater by at least 50% than that of ordinary joints. /TRRL/ [Polish]

Falkowski, J Pancewicz, Z *Inzynieria i Budownictwo* Vol. 331 No. 7, 1972, pp 271-275, 6 Fig., 3 Tab., 14 Ref.

ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussees, Transport and Road Research Laboratory (IRRD 101081)

PURCHASE FROM: Wydawnictwa Czesopism Technicznych NOT Przesibiorstwo Naczelnej Organizacji Tech, ul Mazowiecka 12, Warsaw, Poland Repr. PC

09 125790

MULTISTAGE OPTIMIZATION OF STRUCTURES

The design optimization problem is formulated as a multistage decision system by decomposing the structure into a series of substructures. The adoption of indeterminate forces as the state variables in a dynamic programming formulation is shown to be an effective means to describe truss and frame structural systems. A set of decomposition principles are presented which relate static indeterminacy, the number and position of the external reactions, and the stability of the structures corresponding to each stage. Design constraints on the individual members are considered by the concept of constrained policy space for the force state variables. A discrete programming technique is developed for elastic frame optimization problems in which member sizes are restricted to standard structural shapes.

Twisdale, LA (Carolina Power and Light Company); Khachaturian, N *ASCE Journal of the Structural Division* Vol. 101 No. 5, May 1975, pp 1005-20, 13 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 125794

MATERIALS AND DESIGN FOR HIGH SOUND TRANSMISSION LOSS

The basic mechanics which govern the transmission loss of single and double wall impermeable barriers are reviewed, and the material and design properties which control the transmission of sound are identified. Material and design properties which can increase the transmission loss of barriers are discussed.

This paper was presented at the 6th SAMPE National Technology Conference, Dayton, Ohio, October 8-10, 1974.

Wittig, LE (Bolt, Beranek and Newman, Incorporated)
Society for the Advance of Material & Process Engr 1974, pp 79-85, 2 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: Society for the Advance of Material & Process Engr Box
613, Azusa, California, 91702 Repr. PC

09 125799

**REVIEW OF CONTINUUM, FINITE ELEMENT AND HYBRID
TECHNIQUES IN THE ANALYSIS OF STRESS
CONCENTRATIONS IN STRUCTURES**

A whole series of techniques has been developed to deal with different classes of shapes and domains, causes and sources of concentration, material behavior, phenomenological formulation, etc. These include real and complex functions, conformal mapping, transform techniques, integral equations, finite differences and relaxation, and, more recently, the finite element methods. With the advent of large high speed computers, development of finite element concepts and a good understanding of functional analysis it is now, in principle, possible to obtain with economy satisfactory solutions to a whole range of concentration problems by intelligently combining theory and computer application. An example is the hybridization of continuum concepts with computer based finite element formulations. This new situation also makes possible a more direct approach to the problem of design which is the primary purpose of most engineering analyses. The trend would appear to be clear; the computer will shape the theory, analysis and design.

Rao, AK (Indian Institute of Science) *Nuclear Engineering and Design*
Vol. 31 No. 3, 1974, pp 427-433, 33 Ref.

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

09 125800

**THREE DIMENSIONAL ELASTO-PLASTIC FINITE ELEMENT
ANALYSIS**

Advances in technology and interest in limit state design have made the inclusion of nonlinear effects, such as elasto-plastic behavior, desirable in the analysis of many structures. Improvements in solution algorithms coupled with parallel developments in high speed digital computers have now made the practical solution of such problems possible. The paper presents numerical solutions to three-dimensional elasto-plastic problems illustrating the applicability of isoparametric elements and the order of computation times involved.

Owen, DRJ (Wales University, Swansea); Salonen, EM *International Journal for Numerical Methods in Eng* Vol. 9 No. 1, 1975, pp 209-218, 15 Ref.

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

DOTL JC

09 125801

**ANNUAL BOOK OF ASTM STANDARDS, 1975--PART 4.
STRUCTURAL STEEL; CONCRETE REINFORCING STEEL;
PRESSURE VESSEL PLATE AND FORGINGS; STEEL RAILS,
WHEELS, AND TIRES**

This volume contains the specifications for structural steel; steel for concrete reinforcement and prestressed concrete; steel plate, forgings and rivets for boilers and pressure vessels; steel rails and accessories, wheels, axles and tires. A metric practices guide is included.

American Society for Testing and Materials Apr. 1975, 720 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Society for Testing and Materials 1916 Race
Street, Philadelphia, Pennsylvania, 19103 Repr. PC

01-004075-02

09 125802

**ANNUAL BOOK OF ASTM STANDARDS, 1975--PART 5. STEEL
BARS, CHAIN, AND SPRINGS; BEARING STEEL; STEEL
FORGINGS**

This volume contains the specifications for recommended practices and methods of test for steel bars, billets, alloy tool steel bars; carbon and alloy

steel chains, spring steel and steel springs; carburizing steels for anti-friction bearings, ball and roller bearing steel; steel forgings for railway use, pressure vessel components, gears, rotors, shafts, turbine wheels and disks and for nuclear and other special applications and high temperature service. A metric practice guide is included.

American Society for Testing and Materials Apr. 1975, 820 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Society for Testing and Materials 1916 Race
Street, Philadelphia, Pennsylvania, 19103 Repr. PC

01-005075-02

09 125810

**SOME ASPECTS OF THE MECHANICAL BEHAVIOR OF
WELDS [Quelques aspects du comportement mecanique des soudures]**

A description is given of two of the main characteristics of the mechanical behavior of a weld. One is the possibility of brittle fracture initiated by different weld defects. These are enumerated and illustrated. Methods of determining the limits of the service life of such a welded assembly are explained. The second is the existence of internal stresses formed during the welding cycle. In service, they are superimposed on nominal stresses. Their measurements are illustrated on an example. [French]

Poirier, J LeRoy, PE Jolly, N *Metaux* Vol. 49 No. 591, Nov. 1974, pp 437-446, 20 Ref.

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

09 125840

**EVALUATION OF THE EFFECT OF STRESS CONCENTRATION
ON THE ENDURANCE LIMIT OF STEELS AT LOW
TEMPERATURES**

Based on an analysis of the results of low temperature (down to -196C) fatigue tests, a dependence of the endurance limit of steel on the test temperature is established. Equations are proposed for the calculation of the endurance limit of smooth and notched test-pieces at the temperature of 20 C. The equations obtained are valid for cases when structural changes in steel are absent and when the viscous character of failure is maintained. [Russian]

Strength of Materials is the English translation of the Academy of Sciences of the Ukrainian SSR Institute of Problems of Strength, Problemy Prochnosti,

Makarov, EG (Leningrad Mechanical Institute) *Strength of Materials* Vol. 7 No. 3, Mar. 1975, pp 50-54

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

09 125849

**ANNUAL BOOK OF ASTM STANDARDS 1975--PART 27.
PAINT--TESTS FOR FORMULATED PRODUCTS AND APPLIED
COATINGS**

This volume contains the methods of test and recommended practices for paint including sampling and general methods, color and clarity of liquids; density, specific gravity and weight per gallon; chemical tests for nonvolatile content; volatile content, water content, acid value and reactivity; miscellaneous methods of analysis; panel specifications and preparation, drying rates and anomalies; dry paint film properties including thickness, porosity and permeability; appearance properties; physical strength and resistances (nonchemical); resistance to chemicals and environment; durability tests; and schedules of examination for testing paint products. A metric practice guide is included.

American Society for Testing and Materials Apr. 1975, 854 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Society for Testing and Materials 1916 Race
Street, Philadelphia, Pennsylvania, 19103 Repr. PC

01-027075-14

09 125850

VERSATILE COATING SYSTEMS CAN SOLVE THE SELECTION PROBLEMS IN ORGANIC FINISHING

The advantages of using paints based on chlorinated rubber resin for long-lasting surface protection of steel in aggressive environments are noted. Such paints dry solely by solvent evaporation and are therefore quick-drying irrespective of environmental temperature. In addition, high-build chlorinated rubber-based paints have thixotropic properties and when freshly applied, exert a slight solvent action on underlying dry coats. The protective finishes produced with chlorinated rubber-based coatings have been found to be sufficiently durable to withstand the mechanical damage which can occur during the handling and erection of factory-finished steelwork. This particular feature can be used to advantage in the construction industry where the site environment can create problems during initial plant painting.

Herbert, PA *Metal Finishing* Vol. 73 No. 5, May 1975, 5 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

09 125859

PRELIMINARY TESTS TO DETERMINE THE FATIGUE STRENGTH OF DEFECTIVE STEEL CASTINGS

Little information is available on the relationship between defects and the fatigue strength of steel castings. Some preliminary fatigue tests were therefore carried out on steel castings which had been rejected on radio-graphic evidence of shrinkage porosity. The tests showed that the fatigue strength would probably have been adequate for the intended application. Failure in the castings originated at defects but little correlation was found between the radiographs and the origin of failure. It is suggested that a classification scheme for the fatigue strength of steel castings, similar to those already in use of weldments, should be drawn up.

Pook, LP Greenan, AF
National Engineering Laboratory Report No. 585, Jan. 1975, 6 pp, Figs.

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: National Engineering Laboratory East Kilbride, Glasgow, Scotland Repr. PC

09 125862

DESIGNING WITH THREE-DIRECTIONAL COMPOSITES

Here's a description of three-directionally reinforced composite materials and the micromechanical and macromechanical design analysis procedures used in their application. A micromechanical analysis uses three dimensional finite element techniques to determine macroscopic properties and the stress in fiber bundles and binding matrix. The new method does not have the limitations of previous analytic techniques and appears amenable to inclusion of the effect of voids, cracks, and other nonlinear features.

Ross, AL *ASME Journal of Mechanical Engineering* Vol. 97 No. 4, Apr. 1975, pp 32-37

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 125863

THE STATE-OF-THE-ART OF COMPUTER GRAPHICS APPLICATIONS IN STRUCTURAL ENGINEERING

This report provides a survey of the ways in which computer graphics is used in engineering practice, particularly in structural engineering. The Committee attempted not only to survey the uses to which computer graphics was being put, but also to critically evaluate the uses, and to give recommendations for desirable work. Not all of these goals were met, but each of these areas is discussed.

Logcher, RD *ASCE Journal of the Structural Division* Vol. 101 No. 513, Mar. 1975, pp 459-504

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 126504

AS TRANSPORTATION GOES METRIC

A short history of the development of the two major systems of measurement is given, showing the reasons for the progression toward the metric system. Costs and benefits for various transportation sectors are discussed. One major problem to be solved is that of inventory. Though conversion to metric has been shown to reduce inventories, the transition is a long and costly process. Implications of a changeover to metric are discussed for the railroad, trucking, automobile, and aviation industries, as are the effects of such a change on inland waterway transportation.

Transportation USA Vol. 1 N2 Jan. 1975, pp13-15

PURCHASE FROM: DOT Repr. PC

DOTL JC

09 126991

THE ACTION OF SILICONE FILM ON HIGH-VOLTAGE INSULATORS [Wirkungsweise von Siliconfilmen auf Hochspannungsisolatoren]

Silicone film acts on the surface of insulators and increases surface resistance. Tests have shown that this film progressively removes a film of absorbed water which causes conductivity. The author examines this water repellent action and analyses the molecular structure of the film. [German]

Steinbach, HH *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 3, Mar. 1975, pp 126-128, 2 Fig., 1 Tab., 10 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of

PURCHASE FROM: ESL Repr. PC, Microfilm

09 127607

ANNUAL BOOK OF ASTM STANDARDS, 1975-PART 40. ELECTRICAL INSULATION SPECIFICATIONS: SOLIDS, LIQUIDS, AND GASES; TEST METHODS; LIQUIDS AND GASES

This volume contains the specifications for methods of test and definitions of terms relating to insulating shellac and varnish; plates, tubes, rods and molded materials; ceramic products (glass, porcelain and steatite; flexible sheet, tape and tubing; insulating papers; mica products; rubber tape and electrical protective equipment; insulated wire and cable; textile materials for electrical insulation; and electrical insulating liquids and gases. A metric practice guide is included.

American Society for Testing and Materials July 1975, 726 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Society for Testing and Materials 1916 Race Street, Philadelphia, Pennsylvania, 19103 Repr. PC

01-040075-21

09 127618

RELATIONSHIP BETWEEN TENSILE STRENGTH AND CHEMICAL COMPOSITION OF RAILROAD AXLE STEEL [Zależność pomiędzy wytrzymałością na rozciąganie, a składem chemicznym stali na osie wagonowe]

Having calculated the coefficients of correlation between $R_{sub m}$ (dependent variable) and each of the chemical constituents in three analysed series, specification of correlation matrixes separately for each series, as well as coefficients of partial and multiple correlations, a multiple regression equation was computed showing the dependence of $R_{sub m}$ on the chemical composition. The significance of the obtained coefficients of regression has been checked. For each series diagrams have been made showing the changes of $R_{sub m}$ in dependence on the content of C in steel, which varies according to the analyzed steel type from 0.20% to 0.42% C. Equations, diagram, curves, and tables show data. [Polish]

Nielubowicz, O Satora, K *Hutnik* Vol. 42 No. 4, Apr. 1975, pp 166-170, 5 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

09 127851

150TH ANNIVERSARY ISSUE

The Institutions of Mechanical, Civil, Electrical and Railway Signal Engineers conducted an International Engineering Conference in September

1975 to commemorate the 150th anniversary of passenger railway. This issue has editorial comment designed to complement the papers presented at the Conference. The contents of this issue are as follows: Modern track fastenings; Developments in Welding techniques for rolling stock; Modern dc traction motor design practice; Non-ferrous brake materials; Bridge reconstruction for overhead electrification; Ferrous fittings for overhead equipment; Roller bearings for railway rolling stock; Thyristor control of traction motors; Appraisal of tank car valves and their application; Australia's railways invest in passengers; Electric cables for signalling and track to train communications; Brake blending and wheelslide protection; High speed track recording coach; Ultrasonic rail flaw detection; Flexicoil suspensions; Prestressed concrete beams for bridges; Recent developments in plain bearings; Asynchronous motor drive for locomotives; Gangway connections between long carriages; Point heaters--progress in design; Batteries for railway applications; TOPS equipment; electrical carbon and the challenge of railways; Design and cost of containers; Railway roller bearings; Computer aided design in railway signalling; Adoption of AWAC catenary on BR, Powered doors for rail vehicles; Signal control desks.

Railway Engineering Journal Vol. 4 No. 5, Sept. 1975, 160 pp, Figs., Tabs., Photos.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

09 128631

A SIMULATION METHOD OF ESTABLISHING FATIGUE LIFE DISTRIBUTION

This paper presents a Monte Carlo simulation method for fatigue failure, by which the randomness of two material properties as well as that of the applied load can be incorporated into a stochastic model using an appropriate failure criterion to predict the statistical characteristics of fatigue life under constant and random amplitude cyclic loading conditions. In this technique, both the endurance limit $S_{sub e}$ and the fatigue strength coefficient $S_{sub f}$ are treated as stochastic variables. The combined effect of the randomness of $S_{sub e}$, $S_{sub f}$, and the applied stress on the statistical characteristics of fatigue lives is predicted analytically using digital simulation of fatigue tests. The life distributions and their statistical characteristics are found to be in good agreement with those obtained from analyzing the experimental results, indicating that the proposed technique and the underlying assumptions and hypotheses are adequate. The suggested method is believed to be an effective, fast, and easy-to-use design tool which is suitable for use on electronic computers. It is ideal for parametric studies compared with the costly and time-consuming laboratory fatigue tests. Minimum experimental data are needed as a basis for the analysis. New results are presented which show the effect of the randomness of the loads and material properties on the randomness of fatigue life distribution.

This paper was contributed by the Design Engineering Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.

Elmaraghy, HA Siddall, JN (McMaster University, Canada)
American Society of Mechanical Engineers 75-WA/DE-25, July 1975, 6 pp, 12 Fig., 28 Ref.

ACKNOWLEDGMENT: ASME

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL RP

09 128840

"ANAEROBIC" ADHESIVES: VERSATILE FOR RAILROADS

Loctite Corporation has developed a special line of anaerobic adhesives which are finding many railway applications, particularly in problem areas for holding parts together under severe stress, vibration and high operating temperatures.

Progressive Railroading Vol. 18 No. 9, Sept. 1975, 3 pp, 5 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

09 128888

ON EFFECTS OF THICKNESS ON DUCTILE CRACK GROWTH IN MILD STEEL

Critical crack opening displacement (COD) values have been examined for a range of specimen thicknesses. The COD at the initiation of fracture is found to be constant, given a plane-strain crack-tip stress-state, whereas the COD at maximum load delta max decreases with increasing thickness. The loads required to produce instability are found to vary with thickness, in a way analogous to behavior observed under linear elastic conditions. Crack growth under constant load for a range of specimen thicknesses has been examined, and failure has been found to occur at loads below that associated with delta max, the minimum load per unit thickness required to cause failure decreasing with specimen thickness.

Green, G (Cambridge University, England); Knott, JF *Journal of Mechanics and Physics of Solids* Vol. 23 No. 3, June 1975, pp 167-183, 19 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

09 128889

TORSION FATIGUE AND RESISTANCE TO FATIGUE

CRACKING OF THREE GRADES OF RAIL STEEL [Endurance en torsion et resistance a la fissuration par fatigue de trois nuances d'aciers a rails]

The materials investigated were an 0.7C-0.95Mn-0.85Cr-0.77Si steel and two heat treated unalloyed steels with 0.79 and 0.60% C, with tensile strengths of 1065, 1260, and 1000 N/sq mm, respectively. Fracture toughness and fatigue crack formation and propagation are reported in terms of fracture mechanics. Woehler curves are given for torsion fatigue, and types of fracture are shown in fractographs. [French]

Baus, A *Revue de Metallurgie* Vol. 72 No. 5, May 1975, pp 373-386

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

09 128890

CAST LOW-TEMPERATURE STEEL

To obtain sufficiently low brittle threshold temperatures, steels should contain as little C, P and S as possible and be alloyed with Ni. Inherently fine-grained steels are used, in order to secure a fine austenite grain structure in the finished components. Superior low-temperature properties are difficult to obtain in cast steels, because of the additional structural imperfections in the primary austenite grain boundaries and on the dendrite interfaces. Steel 35GTRL contained 0.30-0.40 percent C, 0.9-1.4 percent Mn, 0.4-0.9 percent Si, 0.001-0.003 percent B, 0.005-0.003 percent Ti, 0.05 percent S and 0.06 percent P. Melting as described ensured a high degree of purity with respect to refractory nitrides and high-silica silicates; the fine non-metallic inclusions, of suitable form and location, occurred as scattered globules inside the primary austenite grains. The low-temperature toughness of the steel from 10 melts was determined in the normalized and quenched martensitic states. The austenitisation temperatures were 890 and 1050 deg C and the soaking period 45 min; the quenched testpieces were tempered for 90 min at 180-200 deg C. It was established that when steel 35 GTRL is quenched from the ordinary low austenitising temperature its threshold lies between 0 and 20 deg C, i.e., it is already brittle at room temperature. Quenching from 1050 deg C lowers the threshold below -60 deg C and makes the steel superior to other cast steels in low-temperature toughness. The threshold temperature for steel 35 GTRL normalized from 890 deg C is also below -60 deg C and thus lower by 20-40 deg C than for other cast steels currently used in mass production. When the normalizing temperature for steel 35 GTRL is raised to 1050 deg C, its brittle threshold temperature once again shifts back to the room-temperature range.

Yakimova, AI Shvedunov, AI *Russian Castings Production* No. 6, June 1974, pp 242-243

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

09 129146

HAZARDOUS MATERIALS TANK CARS-EVALUATION OF TANK CAR SHELL CONSTRUCTION MATERIAL

A metallurgical analysis of a steel plate sample (the Bell sample) was requested by the Federal Railroad Administration. The steel sample was

taken from a tank car (number 88300) which had been involved in an accident near Bell, West Virginia. An investigation was conducted at the National Bureau of Standards to characterize the steel from the failed tank car and to determine whether the steel meets the specification AAR Tc 128-69. Another purpose of the investigation is to determine the nature of the fracture of the head plate of the failed tank car.

Sponsorship was from the Federal Railroad Administration, DOT.

Hicho, GE Brady, CH
National Bureau of Standards, (312.01/14) Final Rpt. FRA-OR&D
75-46, Sept. 1975, 35 pp, 25 Fig., 6 Tab.

Contract DOT-AR-10023

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

DOTL NTIS

09 129147
METALLURGICAL ANALYSIS OF A STEEL SHELL PLATE
TAKEN FROM A TANK CAR ACCIDENT NEAR SOUTH BYRON,
NEW YORK

A metallurgical analysis of a steel plate sample (the South Byron sample) was requested by the Federal Railroad Administration. The steel sample was taken from a tank car (number PPGX9990) which had been involved in an accident near South Byron, New York. This sample was reported to have been produced to specification AAR-M-128-65-DTD-1966-Flange Quality-Grade B, and it was reportedly taken from the second course of shell plate of car number PPGX9990. The fracture in this course circumscribed the tank car and resulted in the division of the car into two sections. An investigation was conducted at the National Bureau of Standards to determine if the plate sample conformed with the above Association of American Railroads (AAR) Specifications for Tank Cars and to gather information pertinent to the question of the suitability of this type of steel for use as the shell plate of tank cars.

Sponsorship was from Federal Railroad Administration, DOT.

Interrante, CG Hicho, GE
National Bureau of Standards, (312.01/35) Final Rpt. FRA-OR&D
75-47, Oct. 1971, 57 pp, 14 Fig., 7 Tab., 2 App.

Contract DOT-AR-10023

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

DOTL NTIS

09 129148
A METALLURGICAL ANALYSIS OF ELEVEN STEEL PLATES
TAKEN FROM A TANK CAR ACCIDENT NEAR CALLAO,
MISSOURI

A metallurgical analysis of eleven steel plate samples designed as Callao samples K-1, K-2, K-3 and K-5 to K-12 was requested by the Bureau of Railroad Safety, Federal Railroad Administration, Department of Transportation. The Callao samples were removed from a tank car numbered GATX 94451 which had been involved in an accident near Callao, Missouri where the ambient temperature was reportedly 15 degrees F. An investigation was conducted at the National Bureau of Standards to determine if the plate sample conformed with the Association of American Railroads (AAR) Specification AAR-TC128-65 (flange quality, grade B, fine-grain practice) for high-tensile strength, carbon-manganese steel plates for tank of this type of steel for use as plate materials of tank cars.

Sponsorship was from Federal Railroad Administration, DOT.

Interrante, CG Hicho, GE Harne, DE
National Bureau of Standards, (312.01/51) Final Rpt. FRA-OR&D
75-29, Sept. 1972, 184 p, 42 Fig., 9 Tab., 9 App.

Contract DOT-AR-10023

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

DOTL NTIS

09 129149
ANALYSIS OF FINDINGS OF FOUR TANK-CAR ACCIDENT
REPORTS

A comprehensive overview of the findings and metallurgical analyses of tests conducted at the National Bureau of Standards on samples of tank-car materials submitted by the Federal Railroad Administration is presented. The submitted samples were taken from tank cars which had been involved in accidents during the period January 1970 to January 1971. The testing conducted during the metallurgical analyses included full chemical analyses, ambient temperature tensile tests on longitudinal and transverse specimens, quantitative metallography to determine ferrite grain size, peralite colony size, and inclusion content, size, and shape, hardness tests, bend tests on longitudinal and transverse specimens, and a very comprehensive program of impact testing, which is covered in a separate report on Impact Properties.

Sponsorship was from Federal Railroad Administration, DOT.

Interrante, CG Early, JG Hicho, GE
National Bureau of Standards, (NBSIR 75-655) Final Rpt. FRA-OR7D
75-50, Jan. 1975, 76 pp, 13 Fig., 4 App.

Contract DOT-AR-40008

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

DOTL NTIS

09 129196
PHASE 03 REPORT ON FRACTURE PROPERTIES OF TANK
CAR STEELS--CHARACTERIZATION AND ANALYSIS

Questions of fracture characteristics of tank car steels have been fully clarified by statistical examination of fracture properties based on rational fracture mechanics criteria. It is analytically proven that brittle fracture of tank cars is not a significant problem at any temperature of service. This independent finding is in agreement with general experience based on accident investigation and analysis. A clear relationship has been demonstrated between ASTM ferrite grain size and Dynamic Tear (DT) test rational criteria (true fracture mode for full section). It is possible to examine a metallographic sample and to predict within a narrow range of temperature the type of fracture to be expected for a tank car steel. The mechanical significance of deviations from unusual grain structures (such as mixed grain size, etc.) can be understood in terms of heat treatment or fire environments-based on the knowledge generated in this study. The relationship of plastic fracture properties to tearing type rupture of tank cars at elevated temperatures has been clarified.

This is a RPI-AAR Tank Car Safety Research and Test Project.

Pellini, WS Eiber, RJ Olson, LL
Association of American Railroads Technical Center, (AAR R-192) Res.
Rpt. RA-03-4-32, Aug. 1975, 81 pp, 56 Fig., 6 Ref.

ACKNOWLEDGMENT: Association of American Railroads Technical Center
PURCHASE FROM: Association of American Railroads Technical Center
3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL RP

09 129197
FINAL PHASE 03 REPORT. MATERIAL STUDY ON STEELS
USED IN CURRENT AND FORMER TANK CAR
CONSTRUCTION AND FROM CARS INVOLVED IN ACCIDENTS

A study has been made of the steels used in the construction of pressure tank car tanks as part of the RPI-AAR Tank Car Safety Research and Test Project. The number and type of tests made represent the most comprehensive ever performed on tank car tank steels. Fracture toughness properties are not a part of the material specifications for tank car tanks except for certain low temperature applications. None-the-less, the fracture toughness properties were determined using the Charpy V-notch Test, Drop Weight Tear Test, Dynamic Tear Test, and NDT Drop Weight Test for current, accident, and old materials. The fracture properties obtained represent the best properties that are technologically attainable for the current steels for the heat treatment employed. For TC128-B material, no significant transition temperature improvement can be achieved by changing to other pearlitic type steels. It was concluded that the TC128-B steel is an optimum product for the service and that changes are not justified on the basis of the fracture properties.

This is a RPI-AAR Tank Car Safety Research and Test Project.

Eiber, RJ Olson, LL

Association of American Railroads Technical Center, (AAR R-193)
RA-03-5-33, Aug. 1975, 193 pp, 38 Fig., 16 Tab., 11 Ref.

ACKNOWLEDGMENT: Association of American Railroads Technical Center
PURCHASE FROM: Association of American Railroads Technical Center
3140 South Federal Street, Chicago, Illinois, 60616 Repr. PC

DOTL JC

09 129787

**EFFECT OF RESIDUAL STRESSES IN HARDENED RAILS ON
THE FORMATION AND PROPAGATION OF STRESS FISSURES
DUE TO CYCLIC STRAINS [Vlijanie ostatocnyh napgazenij V
Zakalennyh rel'sah Vozniknovenie i rasprostranenie ustalostnyh trescin
pri Cikliceskom izgibe]**

The authors have reached the following conclusions: The railhead, as a result of heat treatment or cold straightening, can develop a considerable drop in the stress limit, a drop in the number of cycles completed before stress fissures occur, a drop in the number of cycles completed during the stress fissure propagation period, a reduction in the critical size of each stress fissure, or a drop in the curability of hardened rail, 2) the residual compression stresses which occur in the rail head accentuate the above characteristics. [Russian]

Sur, EA Konjuhov, AD *Trudy CNII MPS: Ostat nagrija i Proc Zelez relsov* Vol. 491 1973, pp 29-37, 1 Tab., 13 Ref.

ACKNOWLEDGMENT: UIC

PURCHASE FROM: Trudy CNII MPS: Ostat napvja i Proc Zelez relsov
Moscow, USSR Repr. PC

10 052513

AUTOMATIC WARNING OF TRACK MAINTENANCE GANGS. METHOD OF MEASURING THE NOISE EMITTED BY TRACK MAINTENANCE MACHINES

This report contains a summary of the "Analysis of the studies and investigations made by some railway administrations to measure the noise emitted by track maintenance machines". The main subject of the report concerns a "Method of measuring the noise emitted by track maintenance machines"; it was devised to ensure that its use will furnish the administrations with comparable measured values. A detailed method for noise measurements associated with track maintenance machines, which has been tested in practice, is described.

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

International Union of Railways A124/RP2/E, Apr. 1973, 38pp, 9 Fig., 2 Tab., 8 Ref., 1 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

10 052679

NOISE ABATEMENT ON BRIDGES. NOISE MEASUREMENTS ON THE ROSENHEIM BRIDGE

The influence of two variants of direct rail laying, on a steel bridge with orthotropic decking, on the excitation of the structure-borne noise of the bridge and the airborne sound radiation are analysed. In the case of a continuous rail laying on the decking plate, the level of the airborne noise radiated by the bridge increases by about 7 dB(A), whilst it remains unchanged on an average in the case of the laying of rails on so-called "elastic" sleepers. This negative finding implies a continuation of the theoretical practical investigations for developing a ballast-free track-laying system for steel bridges which, from the acoustic aspect, can replace the wooden-sleeper track on ballast bed with its high overall construction depth requirements.

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

International Union of Railways D105/RP 2/E, Apr. 1969, 16 pp, Figs., Tabs.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

10 052680

NOISE ABATEMENT ON BRIDGES. FINAL REPORT

In a first report D 105/RP 1 "Noise development in steel railway bridges", the results of noise measurements made on 16 railway bridges were given, the structural design and mode of track-laying of these varying greatly. As shown by the measurements, steel bridges with direct ballast-free track laying produce sound levels in the vicinity of the source up to 19 dB(A) higher than those measured on a reinforced concrete bridge with wooden-sleeper track on ballast bed. The bridges are distinguished from each other according to their subjectively perceived loudness level (ratio 4 : 1). Pending the results of further theoretical and practical investigations for reducing the radiation of noise from steel bridges with direct ballast-free track laying (savings in total construction depth and in costs), the obtained survey should provide the bridge designer with informative data for avoiding noise annoyance to line-side inhabitants in the neighbourhood of bridge structures in densely populated residential areas. ORE report D 105/RP 2, "Noise measurements on the Rosenheim bridge", contains an analysis of the effect which two variants of laying rails directly on a steel bridge with an orthotropic deck exerted on the excitation of the structure-borne noise of the bridge and the radiation of airborne sound. With a continuously supported rail and with a 15 mm thick ZwP 10 rubber pad as continuous intermediate layer, the level of airborne sound radiated by the bridge increased by about 7 dB(A) in comparison with that radiated by a bridge with the usual discrete rail support. Laying rails on elastic sleepers i.e. rubber between steel plates, did not result in an improvement when compared with the usual discrete rail support. In this final report measured results of four additional bridges have been analyzed, to compare them with the results of the 16 bridges described in report D 105/RP 1. Rails laid directly on a reinforced concrete deck supported by box steel girder (Marne

bridge) and the laying of a reinforced concrete deck with neoprene pads on the steel rail bearers of an arched bridge (Lahn bridge) produced noise reductions. The results obtained from measuring the 20 bridges enabled conclusions to be drawn contributing for noise abating designs. Measured results of the DR are also used. The effect of the type of track laying on the radiation of bridge noise is the subject of a theoretical study. There are references to the comprehensive experimental programme which the "Studiengesellschaft fuer Anwendungstechnik von Eisen und Stahl, Dusseldorf" (Society for the study of the technology concerned with the use of iron and steel) will conduct on a 150 m long test bridge at Duisburg to eliminate the drumming noise of steel structures by using sandwich plates and rails supported in such a way that the drumming noise is suppressed. Propagation of noise due to railway traffic on open track and bridges can be reduced by walls, dams, hedges and walls on bridges (ORE report E82/RP 3, April 1969).

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

International Union of Railways D105/RP 3/E, Apr. 1971, 28 pp, Figs., Tabs., Photos., 10 Ref., 7 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

10 052681

NOISE ABATEMENT ON BRIDGES. NOISE DEVELOPMENT IN STEEL RAILWAY BRIDGES

The increasing importance of the consideration of questions of noise in the planning of railway bridges was the occasion for making the results of noise measurements on steel bridges already submitted, available in standardized form to a wider circle. Until the submission of a final Report on the current theoretical and practical investigations into the noise behaviour of bridges, the survey given by it can be of use in the choice of the bridge construction acoustically most favourable in specifically situated cases e.g. a densely settled residential district.

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

International Union of Railways D105/RP 1/E, Oct. 1966, 9 pp, Figs., Photos., 52 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

10 090990

HANDBOOK OF AIR POLLUTANT EMISSIONS FROM TRANSPORTATION SYSTEMS

This report describes procedures for estimating the rate of air pollutant emissions from transportation systems. Emission factors and computation techniques for motor vehicles, railroad locomotives, aircraft, and waterborne vessels are presented. The major emphasis is on motor vehicle emission computations; and data on model year emission rates, control device deterioration, and vehicle speed adjustments are given. Procedures for separating cold start effects, computing evaporative emissions by source, and developing mode-wise emission factors are presented. TREFACT, a computer program designed to calculate motor vehicle emission factors, is described.

Cirillo, RR Wolsko, TD
Argonne National Laboratories, Illinois Institute for Environmental Quality Final Rpt. ANL/ES-28, Dec. 1973, 183 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr PC, Microfiche
PB-239614/1ST, DOTL NTIS

10 092327

VISUAL IMPACT OF PERSONAL RAPID TRANSIT

PRT systems offer on-demand, non-stop service from origin to destination over extensive networks of guideways. To date, these guideways have been portrayed as elevated above grade, minimizing network costs and interference with other circulation systems, but maximizing the visual impact on neighborhoods they pass through. This study does not attempt to present a design solution to these problems, but rather it lays a foundation for

developing PRT visual impact design criteria on which future design decisions can be predicted. The key lies in finding effective communications media through which the visual impact of PRT can be conveyed to the public at large. The study explores the effectiveness of three graphic communication techniques.

Lavine, L Peterson, R Bulbulian, F
Minnesota University, Minneapolis, Urban Mass Transportation Administration Final Rpt. UMTA-MN-11-0037-74-2, Nov. 1974, 35p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244459/4ST, DOTL NTIS

10 092337
NOISE PREDICTION MODELS FOR ELEVATED RAIL TRANSIT STRUCTURES

The report presents the theoretical development of a model for the prediction of noise radiated by elevated structures on rail transit lines. In particular it deals with noise and vibration control for urban rail transit track and elevated noise and vibration control for urban rail transit track and elevated structures. The model allows for the prediction of both the vibration transmission between elements of the structure and the resulting noise radiation from each major structural element, in terms of design parameters for the different elements. Thus the potential effectiveness of various alternative methods for noise control can be evaluated. Results of a field study of three different types of elevated structure on the MBTA Rapid Transit System are also summarized. These results support the validity of the prediction model. The engineering application of the prediction model is discussed in another report.

Manning, JE Hyland, DC Fredberg, JJ Senapati, N
Cambridge Collaborative, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-75-13,, Aug. 1975, 249p

Contract DOT-TSC-643

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244509/6ST, DOTL NTIS

10 092338
SUBWAY ENVIRONMENT SIMULATION (SES) HEAT CONDUCTION MODEL VALIDATION

The purpose of this particular report describes the validation of heat conduction analytical model which comprises part of the subway environment simulation (SES) computer program. The conduction model is a closed form transfer cylindrical coordinate frame solution which treats the case of unsteady heat transfer in two, interfacing concentric materials. The validation was accomplished through field tests conducted within the Toronto Transit Commission subway over several months. The field measurements, including temperature at the tunnel air-wall interface and temperature in the earth beyond the tunnel structure, were compared directly with analytical model predictions.

Prepared by Associated Engineers/A Joint Venture, New York.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Associated Engineers/A Joint Venture, (DC-06-0010) Tech. Rpt. UMTA-DC-06-0010-74-2, Jan. 1974, 43p

ACKNOWLEDGMENT: NTIS, UMTA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244510/4ST, DOTL NTIS

10 092419
STATE-OF-THE-ART OF ENVIRONMENTAL IMPACT STATEMENTS IN TRANSPORTATION

The National Environmental Policy Act of 1969 (NEPA) is a direct outgrowth of the significance Congress has attached to environmental impacts of government actions and policies. The Council on Environmental Quality (CEQ) has written guidelines for Federal agencies to follow when establishing policies concerning the environment. These guidelines also instruct agencies as to the content of impact statements, which may have a wide variation of content. In order to determine how well transportation impact statements conform to NEPA, forty statements were randomly

selected, reviewed and summarized in this report. Sites chosen were both urban and rural, magnitudes ranged from statewide to local, modes included highway and mass transit, and report sizes were from a few pages to a few hundred.

Johanning, J Talvitie, A
Oklahoma University, Urban Mass Transportation Administration, (HPR)
UMTA-OK-11-0016-74-2, Nov. 1974, 75 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244539/3ST, DOTL NTIS

10 092650
FIRST REPORT ON STATUS AND PROGRESS OF NOISE RESEARCH AND CONTROL PROGRAMS IN THE FEDERAL GOVERNMENT. VOLUME 2: RESEARCH PANEL REPORTS

Issued in compliance with Section 4(c)(3) of the Noise Control Act of 1972 (PL 92-574), this report describes Federal noise control and research activities and establishes a baseline of agency program information that may be used in subsequent years to assess progress in the Federal Government's noise control efforts. Thirty-nine Federal agencies were requested to submit information on their noise related activities to EPA. Volume 2 consists of four reports describing Federal agency noise research, development, and demonstration programs in the areas of surface vehicle noise, aviation noise, noise effects, and machinery noise. The reports include project descriptions and fiscal data and were prepared jointly by the membership of four interagency research panels, formed in 1974 by EPA.

See also Volume 1, PB-243 447.

Environmental Protection Agency Final Rpt. EPA/5509-75/023-V2, June 1975, 585 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243448/8ST, DOTL NTIS

10 092651
FIRST REPORT ON STATUS AND PROGRESS OF NOISE RESEARCH AND CONTROL PROGRAMS IN THE FEDERAL GOVERNMENT. VOLUME 1: REPORT ON STATUS AND PROGRESS

Issued in compliance with Section 4(c)(3) of the Noise Control Act of 1972 (PL 92-574), this report describes Federal noise control and research activities and establishes a baseline of agency program information that may be used in subsequent years to assess progress in the Federal Government's noise control efforts. Thirty-nine Federal agencies were requested to submit information on their noise related activities to EPA. Volume I of the report contains a summary and assessment of reported activities which are described both by agency and by the following functional areas: noise standards and regulations, noise abatement, hearing conservation, technical assistance, and research.

See also Volume 2, PB-243 448.

Environmental Protection Agency Final Rpt. EPA/550/9-75/023-V1, June 1975, 254 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243447/0ST, DOTL NTIS

10 092774
NITROGEN OXIDE AIR POLLUTION. PART 4. BIOLOGICAL EFFECTS (A BIBLIOGRAPHY WITH ABSTRACTS)

The effects of nitrogen oxide air pollution on humans, plants, and animals are covered in this bibliography. Toxicology, epidemiology, pathology, and the synergistic effects of nitrogen oxides and other pollutants are covered. (Contains 49 abstracts)

Partial revision of NTIS/PS-74/089. See also NTIS/PS-75/611.

Werner, KG
National Technical Information Service Report Aug. 1975, 54p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
NTIS/PS-75/610/6ST, DOTL NTIS

10 092775

NITROGEN OXIDE AIR POLLUTION. PART 3. ATMOSPHERIC CHEMISTRY (A BIBLIOGRAPHY WITH ABSTRACTS)

This bibliography covers the chemistry of nitrogen oxide pollutants in the atmosphere. Photochemical air pollution models, smog chemistry and reactivity, and SST exhaust effects are included. Auroral and upper atmospheric chemistry and photochemistry of naturally occurring nitrogen oxides are excluded. (Contains 81 abstracts)

Partial revision of NTIS/PS-74/089. See also NTIS/PS-75/610.

Werner, KG

National Technical Information Service Report Aug. 1975, 86p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

NTIS/PS-75/609/8ST

10 099707

CHANNEL RAIL-LINK DILEMMA. PUBLIC OBJECTION SPEEDS LEAP IN COSTS

This article critically discusses some engineering and planning problems of the Channel Tunnel Railway Line. The author first suggests some aspects of organisation and timing, which have impeded the project. Taking account of the public's feelings is now necessary. Landscape architecture is an important aspect of railway design; the public's fear of noise and vibration in new high-speed railways is however probably the chief obstacle to the new channel tunnel line. The chief source of noise is friction and oscillation between wheel and rail. Some recent developments in noise suppression are described. Plastic pads between rail and sleeper seem effective, although high-speed lines, to minimize maintenance, need an inherently noisy solid rail bed. The author describes a detailed design for the channel tunnel rail line: in open countryside, it would run in a cutting, both reducing visual intrusion and containing, within side walls, much of the airborne sound waves. Polystyrene mixed in the rail ballast would absorb much conducted noise. The line could run in tunnels near centres of population. Lastly the choice of route is discussed. A London terminus at Covent Garden is proposed and British rail's reply and justification of their White City Site, follow. The public should be more involved in making this choice.

Tilden, RO *Undergr Serv* Vol. 2 No. 4, 1974, pp 26-30, 5 Fig., 3 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRR D 212705)

10 099764

RAILWAY NUISANCES, NOISE, AND VIBRATION. ARCHITECTURAL ACOUSTICS [Nuisances ferroviaires, bruits et vibrations. L'acoustique architecturale]

After a reminder of the basic notion of acoustics and the difficulties encountered over assessing the subjective sensations of unease caused by noise and vibration, the authors describe the solutions tested or applied at both railway-operating and architectural levels. [French]

Erieau, J Paris, P *Informations Techniques-SNCF-Direct de L'Equip* No. 14, Dec. 1974, 23 pp, 6 Fig., 6 Tab., 9 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

10 099765

NUISANCES CAUSED BY NOISE: MEASUREMENT, INTERPRETATION AND ELIMINATION [Geluidshinder. Meten interpreteren, verbeteren]

The authors start by recalling certain basic notions and measuring situations. The analysis of signals picked up can be carried out by different means and should result in the detection of the noise source. When noise abatement is not possible or is too expensive, use of noise-absorbing walls is advocated. Finally, the article gives a few simple and practical rules for reducing noise. [Dutch]

Gobin, R Van Engeland, T *Revue M[Mecanique]* Vol. 20 No. 4, 1974, pp 359-377, 37 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Societe Belge des Mecaniciens 21, rue des Drapiers, B[1050 Brussels, Belgium Repr. PC

10 099766

A PROGRAM FOR THE MEASUREMENT OF ENVIRONMENTAL NOISE IN THE COMMUNITY AND ITS ASSOCIATED HUMAN RESPONSE

This report aims at establishing the instruments and techniques for assessing the noise exposure of people in their everyday activities, for establishing a noise description scale which relates most accurately to human response to noise, and for preparing enquiry on noise problems on a national scale. The first volume presents the basic concepts of noise environment, the existing measurement techniques, and the rationale for and the detailed results of a "pilot" test. The second volume describes the development of a noise description scale and presents a programme for a national enquiry relating to noise and noise control.

Report on the work carried out by Wyle Research under the co-sponsorship of the Office of Noise Abatement of the DOT, and the Office of Noise Abatement and Control, Environmental Protection Agency.

Sutherland, LC

Department of Transportation Dec. 1973, 521 pp, 96 Fig., 48 Tab., 143 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: NTIS Repr. PC

DOTL NTIS

10 099841

ASSESSMENT OF CONTROL TECHNIQUES FOR REDUCING EMISSIONS FROM LOCOMOTIVE ENGINES

The primary objective of this study was to determine the most effective method of reducing emissions of oxides of nitrogen from a two-cylinder version of an EMD series 567C locomotive engine. The control method judged most effective was that which resulted in the greatest reduction in NO sub x, had the least adverse effects on other emission constituents and engine operation, yet was simple to install and maintain. The NO sub x control techniques selected for use in this study included: (1) change in fuel injector design, (2) variation in injection timing from the standard-setting, (3) inlet air humidification (water induction), (4) reduction of scavenging air volume (air box bleed), and (5) exhaust gas recirculation (EGR). In addition, methods (2) and (3) were used in combination. Results of these tests indicated that the most effective control method was retarded injection timing (4 deg from standard). The next most effective method was EGR, with the recirculated exhaust cooled to 125-150 deg F. It was necessary to derate (or reduce) engine power at certain points to maintain smoke opacity at acceptable levels with all of these control techniques.

Sponsored by Federal Railroad Administration and under contract from Transportation Systems Center.

Storment, JO Springer, KJ

Southwest Research Institute, (DOT-TSC-FRA-73-9) Final Rpt. FRA-ORD&D-74-21, Nov. 1973, 318 pp, Figs., Tabs., Photos., 7 Ref., 3 App.

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC

DOTL NTIS

10 099845

ENVIRONMENTAL ASSESSMENT OF THE SYSTEM PLAN

This report reviews environmental factors associated with railroad operations. An environmental assessment was made for five major environmental sectors: air quality, noise, land use, energy, and water quality. The generic problems considered under these sectors were abandonment, reduced and increased service, electrification, rehabilitation, and expansion. The study analyzes the changes likely to be brought about by implementation of the System Plan for Conrail. It recommends that this study be used to produce a set of guidelines for use in railway planning.

Sponsored by USRA.

Battelle Columbus Laboratories, United States Railway Association Final Rpt. USRA/R-092, Apr. 1975, 286 pp, 172 Ref.

Contract USRA-C-50039

ACKNOWLEDGMENT: United States Railway Association, NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche PB-243841/4ST, DOTL NTIS

10 125812

**PREPARING ENVIRONMENTAL IMPACT STATEMENTS:
COMMENTS BASED ON PERSONAL EXPERIENCE**

To aid in the preparation of environmental impact statements for power line rights-of-way the National Environmental Policy Act of 1969 provides guidelines for description of the proposed action, for description of the project, financing of the project, and for the use of adjacent land and the proposed facilities. After an evaluation of the aforementioned, the study must also include an environmental impact statement of the proposed action. This model statement shall contain information pertaining to impact on soils, flora, fauna, water resources, and aesthetics and impact on wilderness areas, historical areas, aviation corridors, and economics of the study area. The model statement shall include both favorable environmental effects and the unavoidable adverse environmental effects of a project. Alternatives to a proposed action are also considered such as no transmission line, alternate transmission line routes, alternate types of construction, and alternate methods of construction. Methods of dealing with vegetation analysis, soils, water resources, and impact on aesthetics are discussed.

Proceedings of the Annual Meeting, "Biotic Manage Along Power Transm Rights of Way," Amherst, Massachusetts 21 June 1973.

Stalter, R (St John's University)

American Institute of Biological Science Paper June 1973, pp 133-149, 55 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: Cary Arbor New York Botanical Garden, Millbrook, New York, Repr. PC

10 125813

**HISTORICAL AND LEGAL ASPECTS OF TRANSMISSION
LINES**

Perhaps the most significant success to be claimed by the new field of environmental law is that an increasing number of governmental officials are being held accountable for the environmental implications of their decisions. Environmental lawyers are in effect bringing a new dimension to the legal system. Legal action involving environmental issues has led to delay and reconsideration of questionable projects. In addition to the disclosure required for the rationale of such environmentally sensitive projects as off-shore oil leases, gas extraction, oil and gas transmission, and electric generation and transmission, there is now in effect a rigorous reassessment of rationale in light of environmental costs and benefits.

Proceedings of the annual meeting, "Biological Manage Along Transm Rights of way," Amherst, Massachusetts, 21 June 1973.

Irwin, HS (New York Botanical Garden, Bronx)

American Institute of Biological Science June 1973, pp 114-126

ACKNOWLEDGMENT: EI

PURCHASE FROM: Cary Arbor New York Botanical Garden, Millbrook, New York, Repr. PC

10 125823

**EXHAUST ODOR AND SMOKE EMISSION FROM DIESEL
ENGINES AND THEIR CONTROL**

This paper analyzes the different types of diesel emissions and examines the effect of various operating parameters on the nature and composition of diesel exhaust pollutants. Diesel exhaust test results show that it is less harmful than the invisible exhaust from gasoline-powered engines of automobiles. In the case of diesel engines, the major problem is the repulsive color and odor of the exhaust. The author considers several methods for the control of diesel smoke and odor.

Mathur, HB (Indian Institute of Technology, Delhi) *Institution of Eng (India) Journal, Mech Eng Div* Vol. 55 P No. ME4, pp 169-173, 10 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

10 125829

**CRC EVALUATION OF TECHNIQUES FOR MEASURING
HYDROCARBONS IN DIESEL EXHAUST-PHASE IV**

A multi-cylinder diesel generating set was circulated among 15 participating laboratories, and each laboratory measured exhaust hydrocarbon by methods that complied with SAE Recommended Practice J215, "Continuous Hydrocarbon Analysis of Diesel Exhaust." They also measured

hydrocarbon concentrations of two bottled gases having unknown compositions. Analyses were fairly consistent within laboratories both on bottled gases and engine exhaust the standard deviations were 3% and 10% of the grand average respectively. However, analyses differed substantially among laboratories both on bottled gases and engine exhaust; the standard deviations were about 10% and 22% of the grand averages, respectively. These results scatter more than desirable for engineering measurements, and they indicate that further improvement should be sought in techniques for analyzing hydrocarbons in diesel exhaust.

Prepared for meeting 24-28 February 1975.

Wagner, TO (American Oil Company); Broering, LC Johnson, JH Society of Automotive Engineers Preprint 750203, Feb. 1975, 8 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

10 125851

**EMISSION RESULTS FROM COAL GAS BURNING IN GAS
TURBINE COMBUSTORS**

As part of a continuing experimental development program supported by the U.S. Office of Coal Research, to prepare the gas turbine portion of an integrated gasification and power generation plant, emissions from scaled and full size coal gas combustors have been measured. Fuel used was a mixture of carbon monoxide, hydrogen, carbon dioxide, methane; and nitrogen, blended to match low heating value coal gas from an air-blown gasifier. The results of testing in a full scale, high pressure combustor rig are compared with the small scale work with respect to carbon monoxide and nitrogen oxides emissions, and the implications for design discussed.

Pillsbury, PW (Westinghouse Electric Corporation); Cleary, ENG Singh, PP Chamberlain, RM

American Society of Mechanical Engineers Paper 75-GT-44, Mar. 1975, 9 pp, 5 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

10 125883

**WHEEL/RAIL NOISE AND VIBRATION VOLUME I:
MECHANISMS OF WHEEL/RAIL NOISE GENERATION**

Reported here are the final results of a project under the UMTA Urban Rail Supporting Technology Program 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. In general, the agreement between the predictions and the measurements is adequate to verify the formulas, although uncertainties in the wheel/rail stick-slip curve and significant variations in roughness across the faces of wheels and rails (measured by a device developed during the program) lead to some uncertainties in the squeal and roar predictions, respectively. A number of new devices for the control of wheel/rail noise are suggested and a number of old techniques are evaluated in light of new information generated during this program. Lastly, testing techniques are suggested for reproducibly evaluating wheel/rail noise control measures. The report is divided into two volumes. The first deals with the theory of wheel/rail noise generation and the second deals with applying the theory to the control of wheel/rail noise.

Sponsored by DOT Transportation Systems Center.

Remington, PJ Rudd, MJ Vere, IL

Bolt, Beranek and Newman, Incorporated, (DOT-TSC-UMTA-75-1.1) Final Rpt. UMTA-MA-06-0025-7510, May 1975, 212 pp

ACKNOWLEDGMENT: UMTA

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244514, DOTL NTIS

10 125884

**WHEEL/RAIL NOISE AND VIBRATION. VOLUME II:
APPLICATIONS TO CONTROL OF WHEEL/RAIL NOISE**

For abstract see RRIS 10 125883.

Sponsored by DOT Urban Mass Transportation Administration.

Remington, PJ Rudd, MJ Vere, IL
Bolt, Beranek and Newman, Incorporated, (DOT-TSC-UMTA-75-1) Final
Rpt. UMTA-MA-06-0025-7511, May 1975, 170 pp

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

PB-244515, DOTL NTIS

10 126256

SILENCING TECHNIQUES

The author examines the problems of silencing techniques in relation to internal combustion engines. Two methods are discussed: the reactive system and the resistive system. Each system is described, the reactive type consisting of a set of acoustic filters, and the resistive system comprising porous packing material filling an annular chamber around a perforated or mesh tube: energy is removed from the vibrating gas by inertia and frictional resistance. The problems of counteracting aerodynamic noise are discussed, together with the significance of back pressure and silencer performance. Details are given of a method of analysing the noise output of the reactive type of silencer, which produces an "engine noise signature" in the form of a narrow band spectrum, plotted against wavelength; the wavelengths of the loudest constituents of the noise spectrum are apparent, and hence it is possible to determine the lengths of the annular chambers around the pipe intrusions needed to filter them out. The importance of ensuring that none of the pipe lengths is designed such that its fundamental frequency or any of its harmonics coincide with those of another pipe is emphasised. Influencing factors such as speed and temperature of the exhaust gas are considered. It is concluded that with future developments in car design related to fuel economy, clear exhaust gas, and low noise levels, the problems of aerodynamic noise will be stressed. /TRRL/

Garrett, K *Engineering Material and Design* Vol. 19 No. 2, Feb. 1975, pp 11, 3 Fig., 2 Phot., 7 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213754)

PURCHASE FROM: ESL Repr. PC, Microfilm

10 126401

ESTIMATION OF CONTRIBUTED NOISE LEVELS OF DIESEL ENGINE COMPONENTS FROM VIBRATION MEASUREMENTS

An experimental technique to estimate the contributed noise levels of diesel engine components is presented. The technique predicts the contributed noise level in a reverberant acoustic environment from vibration measurements made on the surfaces of the engine components and the use of simple acoustic radiation theory. An experimentally determined value of the radiation efficiency is used in calculating the contributed noise levels. Experimental results are presented for a high speed Vee form engine.

Seybert, AF (Purdue University)
Society of Automotive Engineers Preprint #750160, Feb. 1975, 6 pp, 10 Ref.

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

10 126413

NOISE INSIDE STREETCARS [Il rumore acustico all'interno delle vetture tranviarie]

The noise in three-car streetcars belonging to A.T.M. (Milan Public Transport) has been measured and its level compared with that in streetcars belonging to transit authorities in a Swiss and a German town. It was found that the maximum level of noise inside the German car was 70 dBA, and inside that A.T.M. car 84 dBA. The "nuisance" loudness of the A.T.M. vehicle was about double that of the German car. [Italian]

Campolongo, G Capponi, G *Ingegneria Ferroviaria* Vol. 30 No. 3, Mar. 1975, pp 19-24

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

DOTL JC

10 126428

ANALYSIS OF URBAN TRANSPORTATION CRITERIA

The criteria should accurately account for the quality of the transportation service, accessibility to various land-use opportunities, economic efficiency,

system and traffic characteristics, community disruption, pollution of the environmental, adaptability to changes in technology and travel behavior, and esthetic quality of transportation facilities. The results of an attitudinal survey conducted by the Delaware Valley Regional Planning Commission (DVRPC) indicate that individuals can adequately rank well-defined criteria. The examination of the criteria ranks by population groups of different socioeconomic characteristics shows no larger variations from the ranking by the total population in the sample. The DVRPC survey indicates that safety and security is the most important criterion in transportation, followed by reliability, air pollution, travel time, preservation of neighborhood, comfort, noise pollution, esthetics, job opportunities, transfers, duration of service, construction cost, and shopping opportunities.

Zakaria, T *ASCE Journal of Transportation Engineering Proc Paper* Vol. 101 No. TE3, 11496, Aug. 1975, pp 521-536

ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

10 126429

NOISE REDUCTION IN RAIL TRAVELING URBAN TRANSIT SYSTEMS BY USING RUBBER CUSHIONED WHEELS [Geraeuschninderung im Schienengebundenen Nahverkehr durch Einsatz Gummigefederter Raeder]

Results of determinations of noise emission produced by rolling contact between wheel and rail are presented. The effects of wheel design, differences between straight track and curves, and other variables are taken into consideration.

Raquet, E Licht, H Spieker, W *Technische Mitteilungen Krupp, Werksberichte* Vol. 33 No. 2, May 1975, pp 51-54

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

DOTL JC

10 127388

THE ADVANTAGES OF THE RAILWAYS FOR THE COMMUNITY AS REGARDS THE PROTECTION OF THE ENVIRONMENT AND THE ECONOMIC UTILISATION OF SPACE AND ENERGY

This report shows that the railway has considerable advantages over other modes as regards environmental protection. Railroads operate with substantially less occupancy of land than does the highway mode. The economic efficiency of railway traction, particularly electric traction, is evident and railroad handling of a higher proportion of freight and passenger transport would save energy. Authorities must carry out long-term transportation policies to assure the proper role for railroads. This should involve rapid modernization of railroad plant.

Sredojevic, D Radotic, M *Rail International* No. 7, July 1975, pp 615-619, 2 Tab.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

10 127394

TRANSPORTATION NOISE BIBLIOGRAPHY

This is a general-interest publication, introductory in nature, designed to aid the user in gaining basic familiarity with, and understanding of, transportation noise. Items have been included which give basic information with a minimum of technical terminology. The bibliography gives preference to 1972-1974 literature. Short journal articles, longer research reports and papers from conference proceedings are all included, each chosen for its topical interest to the non-specialist, its intensive coverage of a subject and its readability.

Transportation Systems Center No Date

PURCHASE FROM: TSC Repr. PC

10 127603

PROBLEMS IN PERFORMING ENVIRONMENTAL ASSESSMENTS

Three general problems associated with the performance of environmental assessments are identified. The first is the problem of defining the scope of

study, including geographic boundaries, level of detail, and use of the assessment. The second category concerns problems involving interdisciplinary team organization and communication. The third problem relates to selection of the appropriate methodology to use in performing the assessment. An analysis of these problems along with suggested approaches for their solution is presented.

Paper of the Technical Council on Water Resources Planning and Management.

Dickson, KL Kern, DW Ruska, WF Cairns, J, Jr *ASCE Journal of the Hydraulics Division Proc Paper* Vol. 101 No. HY7, No. 11463, July 1975, pp 9650976

ACKNOWLEDGMENT: ASCE Journal of the Hydraulics Division
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

10 127612

STUDY ON REDUCTION OF NITROUS OXIDES OF DIESEL ENGINE

Measurements were made of the engine performance and the concentrations of NO and NO₂ released in the exhaust gas in the case of a water-cooled, four-cycle, precombustion-chamber type diesel engine using gas oil and unleaded gasoline as the fuel under various operating conditions. It is found that in a precombustion-chamber type engine it is possible to achieve a significant reduction of NO concentration without deteriorating the engine performance by driving the engine under conditions of retarded injection timing. In this case, moreover, it is possible to achieve smoother combustion and reduced exhaust smoke, provided that the injection timing is not extremely retarded. In addition, it is possible to reduce the NO concentration by decreasing various characteristics governing the smoothness of combustion, for instance, the maximum combustion pressure, rate of pressure rise, rate of heat release, etc. Given the same values of maximum combustion pressure, rate of pressure rise etc, the NO concentration in the case of unleaded gasoline is found to be lower than in the case of gas oil.

Murayama, T (Hokkaido University, Japan) *JSME Bulletin* No. 6, Apr. 1974, pp 56-64

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

10 127613

SOME ASPECTS OF THE MEASUREMENT OF DIESEL EXHAUST SMOKE

The measurement of the exhaust smoke of diesel engines meets with some difficulties. Within the scope of the opacimetric method and with reference to two types of instruments that seem particularly well-suited to the task, the present paper assesses the problem in its most significant aspects. Namely there are the calibration and operation of opacimeters both in static and dynamic situations, their most judicious mode of installation, and the extent to which measurements obtained with different instruments can be correlated. Some new results are obtained; it is substantiated, e.g. that opacity depends on the exhaust-gas temperature according to a certain law, and therefore useful recommendations can be formulated for the adoption of a particular instrument and its most appropriate use, depending on the type of test to be carried out.

Bignardi, L (Cagliari University, Italy); Cabitza, S Scognamiglio, A Intl Symp on Autom of Engine & Emiss Test, 2nd Vol. 1 1973, 48 pp, 16 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: London University, England Queen Mary College, London, England Repr. PC

10 127614

EXPERIMENTAL STUDY ON EXHAUST SMOKE IN DIESEL ENGINE

A study was made of the mechanism of exhaust smoke formation in diesel engines for the purpose of devising a method of reducing this smoke formation. It is found that the dominant cause of the formation of exhaust smoke in a diesel engine is the rate of air utilization and flame cooling. The former controls the amount of carbon particles formed, while the latter affects the combustion of the carbon particles. An improvement in the rate of air utilization and the removal of factors which prevent the combustion

of carbon particles are necessary in order to decrease the amount of exhaust smoke. Fuel additives can reduce the smoke density. In this case, there is no differences in the engine performance, but the maximum power does not improve. On the other hand, if light fuel with a cetane number not as low as that of undoped gasoline is used in a precombustion-chamber type engine, auxiliary methods are almost unnecessary. In this case exhaust smoke decreases by a large margin, and smoke limited increase in power is possible.

Fukazawa, S (Hokkaido University, Japan); Murayama, T Fujiwara, Y *JSME Bulletin* No. 6, Apr. 1974, pp 22-32

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

10 127615

TOXICOLOGY OF DIESEL EMISSIONS

The almost unending complexity of diesel emissions with respect to their chemical constituents has been increasingly revealed, as evermore sensitive and specific procedures have been used for their analysis and identification. However, the character and amount of the complex exhaust mixture is drastically altered by changes in power output, motor speed, engine design and load, and fuel additives. Lack of proper engine maintenance further modifies the nature and amount of emissions. So, despite analytic advances, chemical characterization of diesel emissions is still far more complete, either as to type or amount of the various compounds. Analytic investigators often fail to agree on some classifications of emission components or fail to analyze for the same constituents, leaving comparison gaps. Those uncertainties and unknowns, coupled with potential toxicologic interactions among the exhaust constituents, make it extremely difficult to make a definitive toxicologic evaluation, or to suggest anything but highly tentative air standards.

Presented at a meeting in Pittsburgh, Pa., Jan. 30-31, 1973.

Stokinger, HE (National Inst for Occupational Safety and Health) Bureau of Mines Inf. Circ. No. 8666, 1975, pp 147-158, 15 Ref.

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

10 127616

DIESEL EMISSIONS MEASUREMENTS AND CONTROL

This paper is intended to focus upon one aspect of diesel engine use--control of its exhaust product. To place the problems of diesel emission control in proper context, it would be well to attempt a correction of two widely held misconceptions about the characteristics of the diesel engine. The first of the two misconceptions is that the diesel, by its inherent nature, produces a dirty exhaust--dirty in the sense of being heavily loaded with objectionable pollutants, the fact is that diesel exhaust is not inherently "dirty". In fact, in comparison with spark ignition engines typical of production only a few years ago, the diesel produces exhaust that is relatively "clean". A well-designed, well-adjusted, well-maintained diesel engine need not smoke excessively, need not produce malodorous exhaust, and typically will produce carbon monoxide only at very low concentrations compared with unmodified exhaust of the spark ignition engine. The second of the misconceptions is that the diesel engine does not--even by some representations cannot--produce, toxic exhaust. The fact is that a diesel engine typically does produce toxic gases, and it is indeed a very dangerous misconception to hold that the diesel generates no toxic material. The point of emphasis is the need to understand that diesel engines do in fact produce toxic combustion products but that the diesel family is not inherently "dirty" and that the toxic products are controllable at acceptable levels.

Hurn, RW Bureau of Mines Inf. Circ. No. 8666, 1975, pp 47-58

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

10 127629

STATES' ROLE IN THE UTILIZATION AND DEVELOPMENT OF ENVIRONMENTAL TECHNOLOGIES

Federal legislation enacted over the past years delegates responsibility for implementation of our national environmental policy to the states. In a variety of environmental areas the states have taken the initiative and are instituting comprehensive programs accompanied by appropriate standards and effective enforcement procedures. Via federal directives and their own

actions, state governments are therefore assuming a critical role in the formulation and implementation of our national environmental goals. The authority to establish the necessary administrative and regulatory agencies to implement environmental policy resides with both the legislative and executive branches of government.

Presented at a meeting held July 21-24, 1975.

Helminski, EL
American Society of Mechanical Engineers Paper No. 75-ENAS-12, 1975,
7 pp, 7 Ref.

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

10 127700
FIRE SAFETY AND FIRE HAZARDS RELATED TO POLYMERIC MATERIALS IN CARS OF WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

This report by the National Materials Advisory Board of the National Research Council represents a review of the technical decisions made by WMATA in selection of materials and design for car interiors from the viewpoint of fire safety. It is concluded that electrical fires are a continuing threat to rapid transit system safety and that awareness of fire safety in transport vehicles was only emerging when the WMATA cars were planned. Review of prior fire experiences was not made; emphasis on comfort and styling have increased fire load in car interiors; hydraulic brake systems increase the probability of electrical fires; choice of polymeric interior materials and wool carpeting should be reevaluated.

National Academy of Sciences-Natl Research Council 1975, 25 pp, Figs.,
Tabs., 11 Ref.

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244971/8ST, DOTL NTIS

10 127902
DEALING WITH TECHNOLOGY'S MORE NOISY ADVANCES

The authors discuss the increasing noise problem associated with present day technology and the methods that are being used to measure noise level. They first deal with noise from high-speed electric passenger express trains with particular reference to the proposed (but shelved) channel tunnel rail link, the Japanese adaptations of the NNI concept and the attitude in France. It is pointed out that the proposed ctrl noise level of 67db(a) leq corresponded to a facade peak level of about 83db(a). Low-speed rail terminal noise generation is discussed, which would go on by night as well as day and, because the background noise is less, would have a more disturbing effect. Extension of the leq scale is discussed and the American proposals for the ldn index which takes account of the time of day. Good agreement is demonstrated between the estimated facade ldn level of 72db(a) and the leq of 67db(a) suggested for high-speed railways. It is suggested that compensation should be considered if construction and demolition noise continued at a high level for more than two working months in succession. Helicopter generated noise is examined. The complex nature of this noise is investigated, and the advantages of straightforward peak db(a) noise measurement are pointed out. Measured noise levels are discussed in relation to doe recommendations for limiting housing development. The authors conclude that the simplicity of the versatile leq db(a) noise measuring approach will assist the noise control engineer in his problems. /TRRL/

Dee, IF (Greater London Council); Hill, C (Surrey County Council, England) *Municipal Engineering* Vol. 152 No. 11, Mar. 1975, pp 523-524,
2 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD
214549)
PURCHASE FROM: ESL Repr. PC, Microfilm

10 128188
NOISE CONTROL OF HIGH SPEED RAILWAYS

The original Shin Kansen opened a decade ago has gained a worldwide reputation as a very useful transportation system. The construction of a national Shin Kansen network is in progress. There is a growing concern for the protection of the environment and the noise and vibration caused by the passing of Shin Kansen trains have become a very serious problem for people living along the track. To solve this problem, JNR in the past few years has devoted much time to research in methods for eliminating noise and

vibration. This article describes the work done by JNR and the noise legislation which has been enacted.

Miyamoto, T (Japanese National Railways) *Japanese Railway Engineering*
Vol. 15 No. 3/4, 1974, pp 10-14, 6 Fig., 5 Tab., 1 Phot.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi,
Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

10 128623
APPLICATION OF CROSS-CORRELATION TECHNIQUE TO THE CASING NOISE INVESTIGATION OF A HIGH POWERED DIESEL ENGINE

The importance of structural vibration related noise in high-powered diesel engines is discussed in view of its significant contribution to the overall engine noise generation. A cross-correlation technique for noise investigation due to structural vibrations is briefly described and then applied successfully to GM 645 E Series 20 cylinder turbo-charged diesel engine operating in a semi-reverberant environment of a test cell. Implications of cross-correlograms and cross-correlation coefficients have been discussed. This technique can be applied to other vibrating structures for establishing an order of importance of elements of the structure in a noise abatement program.

This paper was contributed by the Diesel and Gas Engine Power Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 4, 1975.

Srivastava, NS (Ames Company); Kumar, S (Illinois Institute of
Technology)
American Society of Mechanical Engineers 75-WA/DGP-3, May 1975, 8
pp, 7 Fig., 2 Tab., 12 Ref.

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

DOTL RP

10 128858
TURBOCOOLING AND NO SUBX EMISSION REDUCTION OF DIESEL ENGINES [Die Turbokuehlung und die Verminderung der NO sub X Emission von Dieselmotoren]

Turbocooled super-charging is considered for reducing the NO sub X-emission of diesel engines. In the purpose a digital model was developed to study the common operating processes of diesel engine, turbocharger and turbocooler. With the aid of this model it was possible to determine numerically the effect of turbocooler-turbocharger variants collected from various conditions on the engine characteristics. [German]

Kalmar, I (Budapest Technical University); Antal, J *Periodica Polytechnica, Mechanical Engineering* Vol. 19 No. 1, 1975, pp 57-67, 10 Ref.

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

10 128861
NEW METHODS FOR REDUCING VISIBLE EMISSIONS DIESEL ENGINES

It is general practice today when starting diesel engines, to inject excess fuel, i.e. an additional amount of fuel in excess of the full load quantity, independent of ambient and engine temperatures and regardless of whether this is necessary or not. It is demonstrated that excess fuel should only be injected when starting a cold engine at ambient temperatures below freezing point and that the quantity of excess fuel should increase with falling temperature, reaching its maximum at the minimum engine starting temperature. A burner starting aid of simple design and fully automatic operation is described, which has been newly developed and is used to suppress, or even to eliminate, the emission of the white and blue smoke during cold start and warm-up.

Prepared for meeting Sept 8-11, 1975.

Fraenkle, G (Daimler-Benz); Hardenberg, HO
Society of Automotive Engineers Preprint n 750772, 1975, 8 pp

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

10 128891

VIBRATION MEASUREMENTS OF STEEL TRANSIT STRUCTURES

Vibrations induced into rail rapid transit structures may be radiated from the structure as airborne noise that disturbs the rider and the wayside community, or as ground-borne vibrations that propagate into the foundations of wayside structures setting walls, floors, and common household items into annoying vibration. This report describes the results of field measurements on existing steel elevated structures presented to aid civil engineers concerned with design, performance, repair, and evaluation of steel elevated transportation structures. These measurements showed that peak acceleration levels are generated in decreasing order of magnitude on the rail, on the top and bottom girder flanges, on the girder web, on cross-bracing, on the column, and at the footing base. In addition, peak acceleration levels of 70 g are little attenuated as they are transmitted from the rail through the structure, and peak acceleration levels significantly increase for increasing train speeds.

Silver, ML (Illinois University, Chicago); Venema, T *ASCE Journal of the Structural Division* Vol. 101 No. 9, Sept. 1975, pp 1855-69, 6 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

10 129082

TECHNIQUES FOR QUIETING THE DIESEL

Reducing diesel engine noise in a cost effective way requires a positive identification of the noise levels radiated by different engine surfaces. Proper stiffness and mass distribution can provide 3-4 dB(A) reductions, but must be balanced against weight limitations. Shielding various engine parts is effective when properly designed with adequate transmission loss, sealing, isolation, and area coverage. Damping is particularly effective where noise is due to radiation from resonant vibration modes. For engine covers, maximum reductions of 5-6 dB(A) are typical. Isolation of engine components is effective, especially at higher frequencies.

Automotive Engineering Vol. 83 No. 9, Sept. 1975, pp 34-39

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

10 129084

FUNDAMENTAL INVESTIGATION INTO THE PROBLEM OF NO FORMATION IN DIESEL ENGINES

A rapid acting sampling valve to obtain gas samples directly from the combustion chamber of a running diesel engine was developed concurrently

with a mathematical model for the formation of NO in diesel engines, based on the extended Zeldovich mechanism. The temporal and spacial distribution of NO and the local air fuel ratio were determined in each case. The model depended heavily on the information provided by the gas samples which, in conjunction with high speed photography of the combustion process, indicated that NO was formed only in gases exposed to high temperature flame and that any NO found in cooler areas of fresh air or weaker mixture appeared there solely by mixing the hot gases, despite the high oxygen concentration. In addition the delay between the combustion and the appearance of NO is clearly shown and this allowed considerable simplification of the model in that only the reactions involved in NO formation needed to be considered kinetically in order to give good correlation between experimental and theoretically predicted exhaust NO content over most of the engine operating range.

Presented at a meeting held Sept. 8-11, 1975.

Nightingale, DR

Society of Automotive Engineers Preprint 750848, 1975, 17 pp, 20 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

10 129085

MEASUREMENT AND ANALYSIS OF PARTICLES EMITTED FROM A DIESEL COMBUSTION PROCESS

A typical diesel engine was used for measurements of particulate emissions. It was felt that diesel engine, popular because of its low emissions of hydrocarbons and carbon monoxide, has not been developed to its full potential. Hot sampling techniques for the measurement of particulate matter were developed that gave representative and repeatable results. An inertial impactor was used to collect and size the particles. Four engine operating conditions were studied to assess the effect of exhaust temperature and engine speed on the nature of the particles. Both scanning and transmission electron microscopes were used to analyze the particles collected. A number of micrographs were taken which were used to determine the physical size of the particles as well as to illustrate this distribution and geometry. The results indicate that basic particles do not change greatly with different engine operating conditions.

Presented at the Combustion Institute, West and Central States Section, Joint Spring Meeting at the Southwest Research Institute, April 21-22, 1975.

Vuk, CT Johnson, JH

Combustion Institute Proc Paper 1975, 41 pp, 18 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: Combustion Institute Irvine, California, Repr. PC

11 072123

RESEARCH AND INVESTIGATION CONCERNING TUBE TRANSPORTATION AS A NEW FREIGHT TRANSPORT SYSTEM

This report is a feasibility and economic study on the tube transportation system. The report points out that since 1960 Japan's gross national product has increased 3.3 times and goods to be transported 3.8 times. In order to meet future needs, the tube transportation system is investigated as an alternative to the existing high fuel consuming rail, vehicle and car-ferry transportation systems. The mechanism and construction of the T/S is discussed: 1) type of material for the pipeline construction: steel, concrete, and plastic 2) elevated, ground or under-ground construction; 3) methods to connect the pipe-line sections; 4) The route system: a combination of linear, loop, and loop with multiple stations systems; 5) types of capsule containers; 6) a four part control system: a, manual mode, b. automatic mode, c. computer assisted, d. computer control mode; 7) maintenance. The feasibility and cost of using the tube transportation for long and short distance transport are studied: the construction of a Tokaido route (major eastern route along the ocean) is estimated to cost 5,981,700,000,000 yen for a 720 containers/hr and 11,245,300,000,000 yen for a 1440/hr system; the construction of a solid waste transportation pipe-line for the 23 districts of Tokyo as a pilot project to introduce the T/S is recommended; and the feasibility of constructing a freight T/S route from Haneda airport to Tokyo station is discussed. [Japanese]

Japan Transport Economics Research Center Mar. 1974, 139 pp, Figs., Tabs.

ACKNOWLEDGMENT: TSC

PURCHASE FROM: Japan Transport Economics Research Center (105) 1, Shibakotohira-cho, Minato-ku, Tokyo, Japan Repr. PC
DOTL HE277.J372

11 092034

TEST AND EVALUATION OF AN EDDY CURRENT CLUTCH/BRAKE PROPULSION SYSTEM

This report covers the Phase II effort of a program to develop and test a 15 hp eddy-current clutch propulsion system. Included in the Phase 2 effort are the test and evaluation of the eddy-current clutch propulsion system on board a test vehicle. The test vehicle was designed and built to be compatible with an existing monorail track and was instrumented for the duration of the test program.

See also report on Phase 1 dated Oct 73, PB-225 093/4.

Adams, GJ

Mobility Systems and Equipment Company, Urban Mass Transportation Administration Final Rpt. Phase I, DOT-TSC-UMTA-74-14, Feb. 1975, 98 pp

Contract DOT-TSC-357

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242686/4ST, DOTL NTIS

11 092154

DYNAMIC INTERACTIONS OF PRT VEHICLES AND ELEVATED GUIDEWAYS

The study provides an analytical basis for preliminary design of Personal Rapid Transit (PRT) system guideways and vehicle suspension systems. Careful attention has been given to the development of high fidelity mathematical models of PRT vehicle dynamics, including primary and secondary suspension systems. The report presents the equations of motion of a nine degree of freedom vehicle model traversing a moving guideway. Also included are the equations of small elastic vibration for both straight and curved elevated guideways, modeled as elastic beams. Vehicle and guideway equations are combined for purposes of system stability analysis and simulation.

Likins, PW

California University, Los Angeles, Department of Transportation Final Rpt. UCLA-ENG-75-23, DOT/TST-75/104, Mar. 1975, 51 pp

Contract DOT-OS-40080

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243655/8ST, DOTL NTIS

11 092744

SUPERCONDUCTING MAGNETS (A BIBLIOGRAPHY WITH ABSTRACTS)

The cited reports include research on materials studies, theory, design and applications of superconducting magnets.

Reimherr, GW

National Technical Information Service Bibliog. Aug. 1975, 142p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PS-75636/1ST, DOTL NTIS

11 092992

PERFORMANCE EVALUATION OF AN AIR-LEVITATED AIR-PROPELLED, PASSIVE VEHICLE PERSONAL RAPID TRANSIT SYSTEM

An eight-passenger Uniflo vehicle was tested to 30 ft/sec on enclosed guideway through curved straight and switch sections. The following parameters were measured: ride quality, as 3 axis acceleration; noise emission as perceived by passengers and in area near guideway, vehicle acceleration and service braking, switch response time, levitation air flow and power requirements, propulsion air flow and power requirements, and performance and reliability between-20F and 90F.

Prepared by Urban Mass Transportation Administration, Washington, D.C., and Transportation Systems Center, Cambridge, Mass.

Smoot, CH

Uniflo Systems Company, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-75-3, June 1975, 117 pp

Contract DOT-TSC-367

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244454/5ST, DOTL NTIS

11 097025

SUPERCONDUCTING MAGNET SUSPENSIONS IN HIGH SPEED GROUND TRANSPORT

There are a number of magnetic suspensions of which superconducting suspensions are a subset. In these suspensions the movement of the vehicle is used to induce currents in a conducting track which then interacts with the magnets on the vehicle to produce a repulsive suspension force. This work provides a technical and economic definition of high speed ground transport systems using these suspensions. The full range of common superconducting suspensions and of propulsions are covered with designs produced for speeds ranging from 100 m/s (225 miles/hr) to 250 m/s (560 miles/hr). For operating cost evaluation, throughputs ranging from one to thirty million seats per annum, each way, are considered. Technical descriptions of the vehicles, their suspensions, propulsions and tracks are given in some detail and operating costs are presented for all the systems together with details of the breakdown of costs and the capital costs involved. The design assumptions, the costing procedure and a cost sensitivity study are also presented to put the figures in context. The report concludes that the systems are technically feasible; that they are suited to existing duorail track for low speed running and that, in these circumstances, they would be economically viable over some routes. On this latter point costs range from 2.2p per seat km at a throughput of one million seats per year to 0.3p per seat km at a throughput of thirty million seats per year. They are consistently less than the costs quoted for tracked hovercraft designs. Comments are made on the best form which the system should take. Comments are also made regarding the preferred direction of future work-some of which is already in progress. /Author/TRRL/

Alston, IA

Transport and Road Research Laboratory Suppl Rpt. No. 72 UC, 1974, 92 pp, 24 Fig., 26 Tab., 20 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 211787)

PURCHASE FROM: Transport and Road Research Laboratory Department of the Environment, Crowthorne, Berkshire RG11 6AU, England Orig. PC

11 125047

MINITRAM-CROYDON OR SHEFFIELD FIRST?

This article describes the current potential of minitram for usage in Sheffield. It briefly discusses initial reactions to the scheme and the different attitudes to it between the local authorities, their departments, the government, and TRRL. The need for a public demonstration system and the reasons why Sheffield is suitable are noted. The features of the system such as mechanics, performance, controls, vehicle interior and general exterior design are listed as are a series of criteria for guideway design relating to alignment, power, control, robustness and environmental intrusion. Consultants admit that there will be a degree of intrusion but suggest that suitable treatment may soften the impact. Croydon is also noted as a possible site for an installation for a number of reasons. /TRRL/

Milne, R *Surveyor - Public Authority Technology* Vol. 144 No. 4301, Nov. 1974, pp 10-13, 1 Fig., 6 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 400118)

PURCHASE FROM: IPC Building and Control Journals Limited 32 Southwark Bridge, London SE1, England Repr. PC

11 125048

IMPROVEMENTS IN OR RELATING TO GUIDANCE APPARATUS FOR TRACK FOLLOWING VEHICLES

This patent gives details of an invention relating to guidance apparatus for track following vehicles of the kind in which the vehicle is normally guided along the track by a guidance abutment at each side of the track. The invention incorporates left and right hand secondary guidance, which can be moved by a selector on the vehicle. This prevents loss of vehicle guidance at fork junctions. Figures show (1) the plan and end elevation of a vehicle on a track (2) a plan view of a track junction and (3) a detailed end view of co-operating parts of the vehicle and track. Operation of the guidance apparatus is described. /TRRL/

Langdon, MG

British Patent Office Patent Specif 1352 246, 1974, 5 pp, 5 Fig.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 400114)

PURCHASE FROM: British Patent Office 25 Southampton Buildings, Chancery Lane, London WC2A 1AY, England Repr. PC

11 125049

CONFERENCE ON CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 28-30 AUGUST 1974

The following papers were presented at the conference. Simulation of train following behaviour in HSGT systems, Barwell, FT and Leech, DJ; Railway cybernetics, Gelbstein, EE and Parkman, WT; Practical Headway Limitations for Personalised Automated Transit Systems, Hinman, ES and Pitts, GL; Longitudinal Track to Vehicle Communications, Hutchings, BW and Cree, DJ; The Solution of Merging and Control Problems of a Deterministic Auto-Taxi System, Jeffries, TO and Cox, F; The Effects of Mandatory Speed Restrictions Upon an Automated Vehicle Following System, Mellitt, B and Calderbank, HJ; Control Strategies of Non-scheduled Traffic in a time tabled system, Mellitt, B and Ward, DP; Safety requirements for the longitudinal control of tracked automatic vehicles after the demerging of contact trains, Perrott, FC. For the covering abstract of the Conference, See IRRD Abstract No. 400100. /TRRL/

Institution of Electrical Engineers Conf Paper Conf Publ 117, 1974, Figs., Tabs., Photos., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 400104)

PURCHASE FROM: Institution of Electrical Engineers Savoy Place, London WC2R 0BL, England Repr. PC

11 125072

HIGH SPEED SURFACE TRANSPORT. THE WORK OF TRACKED HOVERCRAFT LTD

This paper reviews the origins of Tracked Hovercraft Ltd and its achievements over the period 1967-1972. The principal topics discussed are: the role of new technology in inter-city and urban transport, the inter-action of system components and the relative importance of track cost on the economics of operation, the development of the single-sided linear induction motor and the unsolved question of the choice of primary suspension. The paper concludes with a look at future trends, those areas where there is now some convergence of view internationally and those still requiring further study. /TRRL/

Fellows, TG *Railway Engineering Journal* Vol. 3 No. 2, Mar. 1974, pp 4-13, 9 Fig., 6 Phot., 5 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212713)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

11 125073

TRANSPORTS OF DELIGHT?

This is a discussion of innovative transport as applied in Ontario, Canada. \$1.3 billion will be invested over ten years, hopefully giving Canada the lead in the world market. Because of rapid urbanization, the Ontario government has, since 1969, heavily supported public transport. The goal in planning now is to reduce the need for travel, rather than to allow a suburban sprawl. Toronto is the location for several experiments. A dial-a-bus service operates in the suburbs, while staggered working hours have reduced peak-hour travel. The most important step is the development of an intermediate transit system, in a public park, to test the acceptability of such a system. This could carry up to 30,000 passengers per hour, with far less visual intrusion, noise and pollution than rapid transit or motorways. Eight firms tendered for the design, and Krauss-Maffei of Germany won the contract, with a magnetically-suspended vehicle. A test track and vehicles were built in Germany. They have now withdrawn, leaving the project to the public urban transportation development corporation. Another company, with government help, is designing linear induction motors. The current system design is for a rubber-tyred vehicle powered by linear motors. One large American Firm has a license to market the Krauss-Maffei system in the USA, and is collaborating with the UTDC on the Toronto demonstration. /TRRL/

Croome, A *Nature* Vol. 253 No. 5493, Feb. 1975, pp 580-581, 1 Tab., 1 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212670)

PURCHASE FROM: MacMillan Journals Limited 4 Little Essex Street, London WC2R 3LF, England Repr. PC

11 125100

AREAS

This article proposes a plan to pedestrianise London's Oxford Street and Regent St, and to use conveyors to move people and goods. It begins with a brief resume of Oxford Street's history, and an outline of the GLC's plans for the area. The author argues for nationalisation of services to shops. These could be under or above ground. Pedestrian flows at the underground stations could be controlled and alleviated by the installation of high-speed passenger conveyors along Oxford Street. Dunlop's "speedaway" is a prototype of such a conveyor. 10,000 passengers per hour could be carried. The fast conveyors would be elevated, leaving the street open for pedestrian circulation. Parallel low-speed conveyors could serve shoppers making short trips. A first stage in relieving Oxford Street of goods traffic could be achieved by off peak hour servicing, as done on the continent. In the long term, an automated system of freight conveyors in tunnels would be needed. Lastly, it is shown that elsewhere pedestrianisation has resulted in greatly increased turnover of trade, and in greater numbers of pedestrians. /TRRL/

Jones, RO *Underground Services* Vol. 2 No. 4, 1974, pp 8-12, 5 Fig., 2 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212704)

PURCHASE FROM: Foundation Publications, Limited 32 Short Croft, Dodinghurst, Essex, England Repr. PC

11 125148
USING TRANSPORT MODELS TO FORECAST A LONG RANGE MARKET

This essay sets out the conclusions of a study to estimate the likely overseas market for automated personal rapid transit systems. The UK share of that market is inferred. Personal rapid transit and more conventional systems are considered as competitors for the world market. A survey was made (by questionnaire) of planning officers in 151 cities in 22 countries, to find out their long-range plans, and to gather general data. The data were used to predict demand for prt as a function of location, size of city, etc. In the next 10 years U.S. cities will constitute the sole market; cities elsewhere will lag 5 to 10 years behind. A dynamic model was developed to predict the share of public transport won by a new system. Auto-taxi is best if car-drivers are to be attracted. A probabilistic market model was used to estimate world and U.K. markets. The author warns that development of these markets depends on political and social, rather than technological, forces. A distribution is presented, showing pessimistic and optimistic forecasts of the world market for PRT. Good agreement with two independent estimates is shown. The U.K. share of the market is discussed, although no actual estimate is given. /TRRL/

Programmes Analysis Unit.

Love, PE
 Her Majesty's Stationery Office R&D Rept. No. PAU, 1974, pp 40-54, 4 Fig.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 211965)
 PURCHASE FROM: Her Majesty's Stationery Office 49 High Holborn, London WC1V 7HB, England Repr. PC

11 125222
CONFERENCE ON CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 28-30TH AUGUST, 1974

The following papers were presented at the conference: Design of a Multivariable Controller for a Magnetically Supported Vehicle, Hazlerigg, ADG and Sinha, PK; Power Amplifier and Magnet Techniques in Controlled Levitation Systems, Hodkinson, RL; Transducers and their Influence in the Design of Magnetically Suspended Vehicles, Jayamant, BV, Hodkinson, RL, Wheeler, AR and Whorlow, RJ; Magnetic Suspension of Transport Vehicles, Lhenry, M, Gilles, G and Ivanis, MI; Computing, Designing and Testing Levitation Magnets at Messerschmitt-Boelkow-Blohn, Nave, M; Modelling and a Study of the Maglev Concept, Parker, JH, Charles, RJ, Renfrew, RM, Billing, JR, Crate, GF, Gagne, RE and Amyot, R; Maglev Vehicle Oscillations and Damping Mechanisms, Rhodes, RG, Mulhall, BE and Abel, E; A Controlled Electromagnetic Levitating Frame of a Track-bound Vehicle, Von Thun, HJ and Zimmerman, H. For the covering abstract of the conference, see IRRD Abstract No. 400100. /TRRL/

Institution of Electrical Engineers Conf Paper No. 117, 1974, Figs., Tabs., Phots., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 400102)
 PURCHASE FROM: Institution of Electrical Engineers Savoy Place, London WC2R 0BL, England Repr. PC

11 125223
CONFERENCE ON CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 28-30TH AUGUST, 1974

The following papers were presented at the conference: Practical Problems in Switching, Guidance and Headway Control of Minitram, Barnard, R and Rossignol, PJ; Simulation of a Minitram System, Bradley, AH; Greenway, P and Horsman, JL; Propulsion and Power Collection for Minitram Systems, Eley, MK; Network Strategies for Minitram Systems, Goodwin, L; The Place of New Transport Modes in the Urban Fabric, Grey, A and Hodgkin, KE; Management of a Minitram System, Howard, MG and Streeter, JH; Urban Transport Systems Capacity with Special Reference to London Transport Underground Railways, Rice, P. For the covering abstract of the conference, see IRRD Abstract No. 400100. /TRRL/

Institution of Electrical Engineers Conf Paper No. 117, 1974, Figs., Tabs., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 400101)

PURCHASE FROM: Institution of Electrical Engineers Savoy Place, London WC2R 0BL, England Repr. PC

11 125581
CONFERENCE ON LINEAR ELECTRIC MACHINES, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 21-23 OCTOBER 1974

Some of the papers presented at the conference were as follows:-Levitation and propulsion of guided vehicles using superconducting magnets-Abel, E, Corbett, AE, Mulhall, BE and Rhodes, RG; The application of permanent magnets to the suspension of surface-guided vehicles-Bahmanyar, H and Ellison, AJ; A new linear electromagnetic motor traklec opens a wide field of application to linear machines- Barthalon, M; An electromagnetic bearing-Bolton, H; Some aspects of a transverse flux linear induction motor design, suitable for high speed application-Chahal, JS; Test results from the US linear induction motor research vehicle program-Chirgwin, KM; Linear motor applications-Davey, AW; Pole-change linear induction motors-Eashtam, JF and Balchin, MJ; The application on linear electric motors to the proposed surface-guided transport systems of the future -Ellison, AJ and Bahmanyar, H; Normal force in single-sided linear induction motors-Freeman, EM and Lowther, DA; A catamaran as a magnetically levitated vehicle-Hochhausler, P; Parallel connected linear motor for high speed transportation and rapid transit systems-Lamb, C St J; Application of a linear motor to the hydraulic transportation of ore-Lazarus, JH, Liddiard, RC and Enslin, NC; High-speed, iron-cored, synchronously operating linear motors-levi, E (continued as IRRD Abstract No. 213012). /TRRL/

Institution of Electrical Engineers Conf Paper No. 120, 1974, 250 pp, Figs., Tabs., Phots., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213011)
 PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

11 125582
CONFERENCE ON LINEAR ELECTRIC MACHINES HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 21-23 OCTOBER, 1974

(Continued from IRRD Abstract No. 213011). Dc linear motor controlled by thyristors and testing equipment for its high speed characteristics-Matsui, K, Umemori, T, Taketsona, Y and Hosoda, Y; Dynamic interaction between a linear induction motor and elastic reaction rail-Moon, FC and Dowell, EH; Computation of constant voltage operation characteristics of linear induction motors-Nicolas, A and Sabonnadicre, JC; The characteristics of high speed linear induction motors analysed using a space harmonic technique- Nonaka, S and Yoshida, K; Application of a general analysis for single-sided linear induction motors-Skalski, CA; Analysis and control of a linear synchronous motor for high-speed ground transport-Slemon, GR, Turton, RA, Burke, Pe and Dewan, SB; The magneplane linear synchronous motor propulsion system-Thornton, RD; Studies on linear motor in the Institute of JNR-Usami, Y, Fujie, J and Fujiwara, S. /TRRL/

Institution of Electrical Engineers Conf Paper No. 120, 1974, 250 pp, Figs., Tabs., Phots., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213012)
 PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

11 125803
GROUND RAPID TRANSIT SYSTEM WITH MANGNETIC SUSPENSION-1,2,3 [Spurgebundener Schnellverkehr mit Beruehrungsfreier Fahrtechnik]

Some 24 papers presented at this Seminar are arranged in three volumes that are grouped under the following titles: the system concepts, linear motors, power transmission, tracks, magnetic levitation and control. The safety and reliability of this type of transportation is treated in four papers. [German]

This study appeared in 3 separate reports, T74-38 December 1974, 206 pp, T74-39; 233 pp, T74-40, 227 pp.

Ministry for Research & Technology, West Germany Dec. 1974, 47 Ref.

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

11 125804
PRT IMPACT ON TRANSPORTATION

The increasing congestion of urban areas requires multimodal transportation solutions. Personal Rapid Transit (PRT) is discussed as one of the supporting modes for regional systems as a feeder to high-speed corridors and for circulation and distribution missions. PRT may begin as small loop or linear systems and expand to complex network grids in planned phases. For equal dollars spent, increased ridership and route coverage is possible with PRT systems versus line-haul corridor systems. All modes must complement each other.

Prepared for SAE meeting, February 24-28, 1975.

Holt, WJ (Rohr/Monocab, Incorporated); Samusson, L
Society of Automotive Engineers Preprint 750445, 1975, 13 pp

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

11 125805
PERSONAL RAPID TRANSIT--MORGANTOWN, W. VA.

Personal Rapid Transit (PRT) is a relatively new transportation mode, offering passengers a direct, non-stop, origin/destination ride, on demand. Development has taken various forms, and still continues at a considerable pace with intense interest. The first full operational PRT system in the world is at Morgantown, W. Va., and is described in detail. Some observations are offered on capital and recurrent costs, and means of meeting them through revenue.

Presented at the 6th SAMPE National Technology Conference, Dayton, Ohio. October 8-10, 1974.

Cunliffe, JP
Society for the Advance of Material & Process Engr 1974, pp 36-45

PURCHASE FROM: Society for the Advance of Material & Process Engr Box 613, Azusa, California, 91702 Repr. PC

11 125814
NUMERICAL CALCULATION OF LINEAR INDUCTION MACHINES [Numerische Berechnung von Linearen Induktionsmaschinen]

This report describes a numerical method for the calculation of linear induction machines based on the alternating direction implicit iteration method. The numerical method is 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. [German]

Carpets, C *Deutsche Luft-und Raumfahrt, Forschungsbericht* DRL-FB 75-25, 1975, 135 pp, 35 Ref.

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

11 125815
ARMATURE WINDING ARRANGEMENT EFFECT ON THE OPERATION OF LINEAR ASYNCHRONOUS MOTORS [Einfluss der Staenderwicklungsanordnung auf das Betriebsverhalten von Asynchronen Linearmotoren]

With linear motors of high speed, utilisation is adversely affected due to the steeply increasing running-in effect. The use of a compensating part-winding makes it possible to keep the alternating fluxes to a minimum. Higher utilisation and better efficiency are achieved. The aim must be multipole machines as long as possible, with compensated winding and secondary parts with moderate Reynolds numbers, i.e., high rail resistances. [German]

Deleroi, W (Technical University, Braunschweig); Huebner, KD *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 95 No. 11, Nov. 1974, pp 601-606, 5 Ref.

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

11 125820
SUPERCONDUCTING MAGNET FOR "ML-100"

A magnetically levitated experimental vehicle (ML-100) was designed and constructed using two superconducting magnets. The superconducting magnets showed stable performance in levitating the vehicle body. The vehicle is designed to levitate about 100 millimeters off the ground at a speed of 60 km/hr.

Saito, R (Hitachi Works, Limited); Fujinaga, T Tada, N Kimura, H
Hitachi Review Vol. 24 No. 2, 1975, pp 103-108

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

11 125835
RAPID TRANSIT SYSTEM FOR INNER-CITY TRANSPORTATION

The author discusses a rapid transit system based on his parallel connected linear motor. This motor permits fine and individual digital control of every vehicle on the overhead track to take into account all variables encountered over the route. A possible layout for Sydney, Australia, is discussed.

Lamb, C St J *Electrical Engineer* Vol. 52 No. 2, Feb. 1975, pp 11-13

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

11 125839
URBAN DEVELOPMENT OF AN AERIAL GUIDEWAY PEOPLE MOVER IN THE DETROIT CBD

This paper presents findings of the functional and engineering feasibility studies for an aerial guideway people mover system (PMS) within the Detroit Central Business District (CBD). Emphasis is placed upon the process of developing alternative alignments and their evaluation. A detailed discussion is included regarding the problems of constructing an aerial guideway within an existing urban center and how the environmental requirements are met in achieving a plan commanding broad-based community support.

Prepared for meeting 24-28 February 1975.

Dietz, RJ (Gannett Fleming Cordery & Carpenter, Incorporated); Bondada, M
Society of Automotive Engineers Preprint 750446, Feb. 1975, 14 pp

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

11 125853
A COMPLETE FORMULATION OF INERTIAL EFFECTS IN THE GUIDEWAY-VEHICLE INTERACTION PROBLEM

This paper contains a new algorithm for the solution of the dynamic displacement of an elastic guideway (single and multiple-span) as it interacts with a vehicle with an air cushion suspension. Illustrative examples are given comparing the solutions for dynamic displacements of the system when the vehicle is modeled as a moving force, as a moving mass or as a true air cushion system, all inertial effects being considered.

Genin, J Ginsberg, JH Ting, EC *Journal of Sound and Vibration* Vol. 38 No. 1, Jan. 1975, pp 15-26

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

11 125860
SOME AIR CUSHION TECHNOLOGY RESEARCH IN CANADA

The paper discusses low temperature operation-the icing of vehicles and of TACV guideways; use of ACV's as icebreakers; field trails of hoverbarges; and Project CASPAR-a mobile laboratory vehicle to study performance and interaction.

Published in the Quarterly Bulletin of the Div. of Mechanical Engineering & the Nat. Aeronautical Establishment.

Fowler, HS
National Research Council of Canada Oct. 1974, pp 21-31

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: National Research Council of Canada Montreal Road, Ottawa, Ontario K1A 0R6, Canada Repr. PC

11 125889

TRACKED LEVITATED RESEARCH VEHICLE BODY/CHASSIS SUSPENSION IN PERTURBED GUIDEWAY AEROPROPELLED
The results of the first tests of the Tracked Levitated Research Vehicle (TLRV) in the Body/Chassis Suspension mode over the perturbed guideway at the High Speed Ground Test Center (HSGTC) are presented. Vehicle dynamic response behavior is discussed for the speed range from 0 to 70 mph, including comparisons of test data with the responses computed by the TLRV Dynamics Simulation Program.

Sponsored by DOT Federal Railroad Administration.

Zapotowski, B Bauer, B Magnani, E
Grumman Aerospace Corporation, Federal Railroad Administration,
(PMT-B4-R74-4) Test Sum. FRA-OR&D-75-98, Nov. 1974, 117 pp,
Figs., Tabs., 5 Ref.

Contract DOT-FR-30041

ACKNOWLEDGMENT: FRA, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-249258/AS, DOTL NTIS

11 125890

TRACKED LEVITATED RESEARCH VEHICLE PERIODIC TEST SUMMARY REPORT BODY/CHASSIS SUSPENSION AEROPROPELLED-SMOOTH GUIDEWAY
The results of the first tests of the Tracked Levitated Research Vehicle (TLRV) in the guideway at the High Speed Ground Test Center (HSGTC) are presented for the Body/Chassis Suspension mode. Vehicle dynamic response behavior and secondary suspension characteristics are discussed. Braking performance is discussed for the speed range from 0 to 78 mph.

See also PB-244281/2ST

Fischer, G Zapotowski, B
Grumman Aerospace Corporation, Federal Railroad Administration,
(PMT-B4-R74-2) Test Sum. FRA-OR&D 75-97, Aug. 1974, 157 pp,
Figs., Tabs., 5 Ref.

Contract DOT-FR-30041

ACKNOWLEDGMENT: FRA
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243987/5ST, DOTL NTIS

11 126457

TDA-RCA CAPSULE PIPELINE PROJECT. PHASE I REPORT, PART I
The three-year Capsule Pipeline project was launched to analyze hydrodynamics of capsule pipelining and to produce reliable design equations based on experimental results obtained in pipelines of varying diameters. A series of test lines, one of which would be sufficiently large to produce meaningful measurements, were selected. The goal was to develop analytical means of predicting behavior of trains of capsules of various configurations in liquid carriers. This Phase I Report reviews analytical work and details of grants for experiments are given.

Research Council of Alberta, Information Series No. 63, Feb. 1973, 84 pp,
Figs., Tabs., Refs.

PURCHASE FROM: Research Council of Alberta Publications Department,
11315 87th Avenue, Edmonton 7, Alberta, Canada Repr. PC
DOTL RP

11 126458

TDA-RCA CAPSULE PIPELINE PROJECT. PHASE 2 REPORT
This report deals with experimental and analytical results obtained in 1972 and 1973, represents interpretations and conclusions of work done during this period. Results show definite relationship between capsule pressure gradient, capsule velocity and liquid velocity. With cylindrical capsules, the capsule pressure gradient is affected by surface roughness, coefficient of friction between the surfaces and distortion of the velocity profile of the liquid.

Research Council of Alberta, Information Series No. 63, Feb. 1974, 126 pp

PURCHASE FROM: Research Council of Alberta Publications Department,
11315 87th Avenue, Edmonton 7, Alberta, Canada Repr. PC
DOTL RP

11 126459

TDA-RCA CAPSULE PIPELINE PROJECT. CAPSULE PIPELINE SYSTEM ANALYSIS. PART 1. CAPSULE PIPELINE R&D REQUIREMENTS

This report identifies all major physical components of a pipeline system, the state-of-the-art of each and the R&D time and expense necessary to attain operational viability. It assigns priorities to R&D work required to produce a critical path diagram for such development.

Research Council of Alberta, Information Series No. 67, Oct. 1974, 120 pp,
25 Fig., Tabs., Refs.

PURCHASE FROM: Research Council of Alberta Publications Department,
11315 87th Avenue, Edmonton 7, Alberta, Canada Repr. PC
DOTL RP

11 126460

TDA-RCA CAPSULE PIPELINE PROJECT. CAPSULE PIPELINE SYSTEM ANALYSIS. PART 2. CAPSULE PIPELINE TECHNO-ECONOMIC SIMULATION MODEL

This report establishes a computer simulation model to provide a total economic evaluation of any potential pipeline application before development work is commissioned. It identifies all the parameters and variables peculiar to capsule pipelining and reduces them to economic terms. The model can optimize systems under consideration and makes it possible to assess the potential of capsule pipelining in more realistic terms than has previously been possible.

Research Council of Alberta, Information Series No. 67, Oct. 1974, 75 pp,
Figs., Tabs., 3 App.

PURCHASE FROM: Research Council of Alberta Publications Department,
11315 87th Avenue, Edmonton 7, Alberta, Canada Repr. PC
DOTL RP

11 126461

TDA-RCA CAPSULE PIPELINE PROJECT. PHASE 3 REPORT. PART 1

This is a summary of an investigation of capsule pipelines. About 67,000 sets of measurements were gathered and analyzed. Chapter 2, Designing a Capsule Pipeline, presents a systematic approach to calculations. Size of pipeline is determined first from solid throughput, line fill and capsule velocity. Capsule pressure gradient is determined with equations presented in Chapters 4 and 5 for cylinders and in Chapter 6 for spheres. Two pressure gradients, due to flow of capsules and liquid, are combined to give total pressure drop. Chapter 7 has calculations for liquid flow rates from which the required horsepower and number of pumping stations can be determined. Six appendices form Part 2 of the report.

Research Council of Alberta, Information Series No. 63, Jan. 1975, 267 pp,
Figs., Tabs., Refs.

PURCHASE FROM: Research Council of Alberta Publications Department,
11315 87th Avenue, Edmonton 7, Alberta, Canada Repr. PC
DOTL RP

11 126462

TDA-RCA CAPSULE PIPELINE PROJECT. PHASE 3 REPORT. PART 2

Six appendices form Part 2 of this report. Five of these are published reports arising from the project which are included for the convenience of the reader. The sixth is the computer program for operation of the 0.5 to 4.0 inch laboratory pipelines which were developed in the course of Phase 1 of this project.

Research Council of Alberta, Information Series No. 63, Jan. 1975, Figs.,
Refs., 6 App.

PURCHASE FROM: Research Council of Alberta Publications Department,
11315 87th Avenue, Edmonton 7, Alberta, Canada Repr. PC
DOTL RP

11 126463

ANALYSIS OF SUPERCONDUCTING MAGNETIC LEVITATION AND LINEAR SYNCHRONOUS MOTOR PROPULSION FOR HIGH SPEED GUIDED GROUND TRANSPORTATION

This report describes progress made during 1973 in analysis of the maglev system, involving the use of superconducting magnets for electrodynamic

suspension and guidance and for linear synchronous propulsion for high speed guided ground vehicles. Technical and operational characteristics of a system with vehicles cruising at 300 mph along the Canadian corridor have been investigated. Designs for various aspects of the maglev system are compiled. The propulsion system has been analyzed and a design for the maglev vehicle is given. The test facility at Queens University is described.

Prepared for the Transportation Development Agency.

Canadian Institute of Guided Ground Transport Project No. D.71.72, 235 pp, Figs., Refs., 3 App.

PURCHASE FROM: CIGGT Repr. PC

DOTL RP

11 126976

**ANALYSIS OF A COMBINED
ATTRACTION-MAGLEV-PROPULSION SYSTEM FOR A HIGH
SPEED VEHICLE**

This document presents the results of a study of a combined levitation-propulsion system for a high speed ground transportation vehicle incorporating a single-sided linear induction motor as the levitation-propulsion unit. The system is first synthesized in accordance with design constraints and subsequently examined in detail. Time responses and rms values of various parameters of interest are calculated. The conclusion of this preliminary investigation is that such a system is feasible and deserves further study.

Sponsored by FRA.

Muhlenberg, JD Nene, VD
Mitre Corporation, (MTR-6630) FRA-75-61, Mar. 1974, 45 pp, 32 Fig.,
4 Tab., 9 Ref.

Contract DOT-FR-30015

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245189/AS, DOTL NTIS

11 126999

**PERMANENT-MAGNETIC SUSPENSION FOR
AUTOMATICALLY CONTROLLED TRANSPORTATION
SYSTEMS**

The author describes the research carried out at the Krupp Research Institute in Essen. He lists some characteristics of permanent-magnetic suspension: no energy required, quietness of operation, no vibration, smooth and comfortable ride, no wear and tear, no friction, etc. He also describes the properties of certain magnetic materials such as ferrites, rare earth metals combined with cobalt, which have been studied by Krupp and Philips. He discusses the various possible arrangements for permanent magnet systems, and gives a tentative design concept for an urban transit project with small, automatically-controlled cabs seating 4 people, running nonstop between origin and destination. He describes investigations into the problems of this suspension, and concludes that this means of transport would be no less favourable as regards capital expenditure than any other means of transport, would offer higher riding comfort, be safer, more durable and cheaper to run, and would also be much less of a burden to the environment.

Proceeding of the International Conference on Transportation Research, Bruges, Belgium, June 1973.

Hejj, E

International Conference on Transport Research Proceeding June 1973,
pp 566-572, 7 Fig., 12 Ref.

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

11 127350

**CHARACTERISTICS OF PROPULSION SYSTEM OF THE
MAGNETIC LEVITATION VEHICLE NAMED ML-100**

Magnetic levitation test vehicle ML-100 has fixed primary linear induction motor propulsion system and superconducting magnets. This paper describes test results concerning temperature rise of the reaction plate and the apparent power of the propulsion system. Experimental results agreed fairly well with calculated values. The effect of location of several kinds of LIM stators was demonstrated.

Fujiwara, S *Railway Technical Research Institute* Vol. 16 No. 2, June 1975,
pp 77-78, 3 Fig.

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

11 127393

**THE ATTAINMENT OF RIDING COMFORT FOR A TRACKED
AIR CUSHION VEHICLE THROUGH THE USE OF AN ACTIVE
AERODYNAMIC SUSPENSION**

The feasibility of controlling high speed ground transportation systems through the use of active lifting surfaces was studied. Aerodynamically three dimensional canards are employed to control the pitch and plunge steady-state response of the vehicle and passenger to harmonic guideway excitations. Various control laws are assumed and vehicle and passenger response studied. An optimal solution to the classic regulator problem is found, providing optimal acceleration suppression for two aerodynamic cases. Comparison of vehicle response at 300 miles per hour to the ISO riding comfort standards is made. Except for the optimal cases, all results indicate an uncomfortable and harmful ride would result from the vehicle's response. The optimal control provides a comfortable and safe passenger environment.

Shanahan, BG Stearman, RO Healey, AJ
Texas University, Austin Res Memo 18, Sept. 1974, 207 pp, Refs.

ACKNOWLEDGMENT: Texas University, Austin

PURCHASE FROM: Texas University, Austin Council for Advanced Transportation Studies, Austin, Texas, 78712 Repr. PC

11 127604

**SELECTION OF PARAMETERS FOR LINEAR INDUCTION
MOTORS [Choix des parametres des moteurs lineaires a induction]**

A calculation method which correlates simultaneously the effects of current displacement as well as the finite width and length of the motor is the prerequisite for obtaining optimal motor dimensions. A method is proposed which makes it possible to describe the response of such motors independently of their output. [French]

Wayre, N Jufer, M *Bulletin de l'Association Suisse des Electriciens* Vol.
66 No. 10, May 1975, pp 530-540, 5 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: FABAG & Druckerei Winterthur AG Stauffachquai
36-40, 8004 Zurich, Switzerland Repr. PC

11 127628

**SUPERCONDUCTING MAGLEV AND LSM DEVELOPMENT IN
CANADA**

Studies on the use of superconducting magnets for levitation, synchronous propulsion and guidance of high speed intercity ground transportation in Canada are reported. For a 100 passenger vehicle weighing 300 kN, a levitation height of 22 cms at 480 km/hr is obtained by the interaction of eight 3.85×10^5 to 5th power amp turn 100×30 cm magnets with eddy currents induced in two 80×1 cm aluminum guideway strips. In low speed sections, aluminum thickness is graded to 3 cm to maintain total drag (aerodynamic and magnetic) almost speed independent. The variable speed LSM use fifty 5×10^5 to 5th power amp turn 40×150 cm magnets on a half pitch of 45 cm. The motor, with split 3-phase guideway windings energized in 5 km block lengths, has 72% efficiency and 0.82 power factor. A favored guidance scheme for a flat-topped elevated guideway (minimizing snow accumulation) uses the interactions of the propulsion magnets with flat null-flux loops overlying the LSM windings and with the edges of the levitation strips. This scheme produces a lateral stiffness of 10 to 6th power N/m and a maximum guidance force equal to vehicle weight. The test facility uses full scale magnets and a 7.6 m dia wheel rotated about a vertical axis with a maximum peripheral speed of 100 km/hr.

Presented at a meeting, Argonne Nat'l Lab., Ill. and Nat'l Accel Lab, Batavia, Ill., September 30-October 2, 1974.

Atherton, DL Eastham, AR *IEEE Transactions on Magnetics* Proc Paper
No. 2, Vol. MAG-11, Mar. 1975, pp 627-632, 8 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

11 127630

UNITED STATES DEPARTMENT OF TRANSPORTATION PROGRAM IN MAGNETIC SUSPENSION (REPULSION CONCEPT)

The TMLV Technology Program is concerned with the use of magnetic levitation for suspension of high-speed ground vehicles traveling at speeds of 480 km/h. The program is configured to permit comparative evaluation of two competing MAGLEV concepts--repulsion and attraction. The program has two major tasks: conceptual design of a passenger-carrying system which meets a specified ride quality objective, and design and test of a high-speed (480 km/h) rocket-propelled test vehicle capable of providing engineering data relevant to the aforementioned conceptual design. The high-speed tests will be carried out at the Naval Weapons Center, China Lake, California. This paper discusses both parts of the program, with emphasis on the superconducting magnets used in the levitation/guidance systems.

Presented at a meeting, Argonne Nat'l Lab, Ill. and Nat'l Accel Lab, Batavia, Ill., September 30-October 2, 1974.

Reitz, JR (Ford Motor Company); Borcherts, RH *IEEE Transactions on Magnetics* Proc Paper Vol. MAG-11 No. 2, Mar. 1975, pp 615-618, 9 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

11 127631

SUPERCONDUCTING LEVITATED HIGH SPEED GROUND TRANSPORTATION PROJECT IN JAPAN

An outline of the magnetic levitation project in Japan is given. Research has been concentrated on levitation system utilizing electromagnetic repulsive force between a normal metal track and on-board superconducting magnets. Development of levitation magnets together with other items basic for a levitation system is given.

Presented at a meeting, Argonne Nat'l Lab, Ill. and Nat'l Accel Lab, Batavia, Ill., September 30-October 2, 1974.

Ohtsuka, T (Tohoku University, Japan); Kyotani, Y *IEEE Transactions on Magnetics* Proc Paper Vol. MAG-11 No. 2, Mar. 1975, pp 608-614, 23 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

11 127632

COMPARISON AND OPTIMIZATION OF LIFT AND DRAG FORCES ON VEHICLES LEVITATED BY EDDY CURRENT REPULSION FOR VARIOUS NULL AND NORMAL FLUX MAGNETS WITH ONE OR TWO TRACKS

Lift and drag forces are compared for various null and normal flux superconducting magnet configurations where each coil consists of a pair of infinitely long parallel wires separated by a fixed distance. The null-flux configuration has a minimum in the drag to lift ratio for a particular value of I to the 2nd power/ $W(I = \text{magnet current}, W = \text{vehicle weight})$ when the vehicle cruises freely at constant speed. This calculation takes into account losses due to nonuniform eddy-current density distribution in the solid track. Results indicate that the null-flux configuration is the most efficient design, followed by the normal-flux, single track configuration. All other schemes are less efficient for a thin track configuration. A general method is outlined for calculating the zero-torque case.

Presented at a meeting, Argonne Nat'l Lab, Ill. and Nat'l Accel Lab, Batavia, Ill., September 30-October 2, 1974.

Hogan, JR Fink, HJ *IEEE Transactions on Magnetics* Proc Paper Vol. MAG-11 No. 2, Mar. 1975, pp 604-607, 12 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

11 127633

TRIDIM AEROTRAIN--AN ECONOMICAL ALTERNATIVE TO URBAN TRANSPORTATION

The Tridim system described uses air-cushion suspension and electric drive. It is intended for transportation traffic densities midway between buses and subway, as for urban traffic in medium-size cities, large suburban areas, or within airports or large business or manufacturing complexes. In such applications, distances between stations stay around a few hundred meters,

exceptionally a few kilometers. Thus optimal cruising speed generally stands between 40 and 70 km/h, acceleration performances being often more significant than mere speed. An experimental Tridim program has been on trial since mid 1973. It consists of a short track illustrating lay-out difficulties (20 m radius bend--10 m curve switch--20% slope) and a 4/6 seats test vehicle equipped with a simple on-board automatic program. Motors are all electric, propulsion using pinions on a rack coated with synthetic rubber. The whole prototype installation, including design and testing, has been carried out within a budget of 2.5 million French francs, evidence of the favorable economics of the system.

Symposium held February 19-21, 1974 and sponsored by the Electric Vehicle Council, New York, New York.

Bertin, J

International Electric Vehicle Symp & Expo, 3rd Proc Paper No. 7433, 1974, 12 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

11 127634

INTRODUCTION TO AIR CUSHION VEHICLES

Basic ACV principles, types of cushions and propulsion systems, physical and operational characteristics, capabilities and applications are discussed and work capacity and cost compared with other transport modes. Diagram, graphs and photo illustrate operation.

Presented at ASAE 67th Annual Meeting, Oklahoma State University, Stillwater, June 23-26, 1974 and the Winter Meeting, Chicago, Ill., December 10-13, 1974.

Abele, G (Cold Regions Research and Engineering Laboratory)

American Society of Agricultural Engineers Proc Paper No. 74-1551, 1974, 12 pp, 13 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

11 127639

ELECTRIC PROPULSION TECHNOLOGY FOR TRACKED LEVITATED VEHICLES

The technology of electric propulsion as applied to tracked levitated, high speed ground transportation vehicles is discussed. A brief review of the linear induction motor and its associated power conditioning is presented. The electric power and propulsion systems of selected vehicles currently under development and test by the U.S. Department of Transportation are discussed. The electric propulsion characteristics of several vehicles currently under development by the U.S. Department of Transportation that utilize linear induction motors are given. The linear induction motor research vehicle (LIMRV) is a 250 mph research vehicle whose prime mission is linear motor research. The tracked levitated research vehicle (TLRV) is a 300 mph, air cushion levitated vehicle whose mission is research in high speed propulsion and in track levitation. The prototype tracked air cushion vehicle (PTACV) is a 150 mph, air cushion levitated, 60 passenger prototype vehicle for intra-urban application. The LIMRV uses an on-board power source consisting of a gas-turbine-driven alternator providing variable-frequency power to the LIM. The TLRV and the PTACV both pick up three-phase electric power from the wayside. The LIMRV and TLRV use power conditioners rated at approximately 1 mph/Hz, the PTACV power conditioner provides variable-voltage fixed-frequency power control.

Symposium held February 19-21, 1974 and sponsored by the Electric Vehicle Council, New York, New York.

Raposa, FL (Transportation Systems Center)

International Electric Vehicle Symp & Expo, 3rd Proc Paper No. 7435, 1974, 15 pp, 6 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

11 128622

HEAVE MODE DYNAMICS OF A TRACKED AIR CUSHION VEHICLE WITH SEMIACTIVE AIRBAG SECONDARY SUSPENSION

Bond graph modeling techniques are used to develop a fully nonlinear heave mode model of a tracked air cushion vehicle incorporating a semiactive airbag secondary suspension. The governing state space equations were

simulated for various deterministic guideway inputs and comparisons were made with the exact solution of the linearized equations. An experimental test stand is described which provides experimental corroboration of the mathematical models for the case of totally passive secondary suspension elements. Theoretical results are presented which demonstrate the superior vehicle ride characteristics with respect to passenger-guideway isolation provided by the combination of soft airbag springs and semiactive dampers.

This paper was contributed by the Automatic Control Division of The ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.

Margolis, DL (California University, Davis); Tylee, JL (General Electric Company); Hrovat, D (California University, Davis)
American Society of Mechanical Engineers 75-WA/AUT-3, July 1975, 9 pp, 19 Fig., 14 Ref.

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

DOTL RP

11 128626

THE EFFECT OF ELEVATED GUIDEWAY CONSTRUCTION TOLERANCES ON VEHICLE RIDE QUALITY

In this paper the ride quality of a vehicle traversing an elevated guideway is related directly to guideway construction tolerances and design parameters. Moreover, the construction tolerances are modeled in terms familiar to a guideway contractor. The tolerance modeled for an elevated, two-span semicontinuous, concrete guideway are: surface finish, camber deviations, pier survey errors, and pier settlement. The major design parameters relating to live-load deflection, stiffness (material and cross-section), and pier spacing are included. A general technique is presented for relating these tolerances to vehicle ride quality by means of a digital computer simulation. Various ride quality criteria are considered, including rms acceleration, acceleration spectral density, acceleration frequency decomposition, and a deterministic state boundary. Numerical results are presented for a particular vehicle-guideway configuration and as such are valid only for the system considered. It is shown that for this system, equivalent ride quality can be maintained while adjusting the various construction tolerances. This trade-off capability allows the contractor to choose the least costly combination of tolerance parameters.

This paper was contributed by the Automatic Control Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.

Hedrick, JK (Massachusetts Institute of Technology); Ravera, RJ Anderes, JR (Mitre Corporation)
American Society of Mechanical Engineers 75-WA/AUT-4, July 1975, 9 pp, 14 Fig., 13 Ref., 1 App.

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

DOTL RP

11 128863

AXIAL MOTOR AND ITS APPLICATIONS [Le moteur axial et ses applications]

The author recalls the principle of the linear axial motor and its properties. He summarizes then the corresponding development work undertaken since 1970 and the first solutions which emerged from it. This work is being continued with a view to the development of a technology particularly suited to high speed propulsion. [French]

Guimbal, J (Societe Generale d'Etude et Construction) *Revue Generale de l'Electricite* Vol. 84 No. 2, Feb. 1975, pp 121-123

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

11 128864

CONCERNING A FEW MYTHS LINKED TO THE USE OF LINEAR MOTORS AT HIGH SPEED [Sur quelques mythes lies a l'utilisation des moteurs lineaires en traction a grande vitesse]

The author notes that the only prototype of linear motor having recently exceeded the speed of 410 km/h, is fitted to a vehicle on rails. In spite of the rare experience gained, he discards the "myths" linked to the pretended difficulties in the design or realization of such motors and examines

objectively the various questions raised by the use of high speed linear motors, as well as the answers which can be advanced at the present time, without falling prey to the "technique fiction". Among the main data of the problem, the author dwells especially on the following factors: speed, power and consumption, and approaches then the corresponding choice criteria in the electric and mechanical fields. [French]

Machefert-Tassin, Y *Revue Generale de l'Electricite* Vol. 84 No. 2, Feb. 1975, pp 91-101

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

11 128879

MAGNETIC SUSPENSION CONTROL SYSTEMS FOR THE MBB HIGH SPEED TRAIN

The problem of designing the magnetic suspension system for a wheelless train with maximum speeds of up to 500 km/hr is discussed. Special attention is given to the modeling of rigid body and elastic modes as well as magnetic dynamics in the vehicle system. Disturbances from curves and grades, which are especially important, wind forces, track tolerances, accelerometer biases and instrument measurement errors are investigated. The paper compares a number of control synthesis techniques. Several design methods, such as decomposition, arbitrary dynamics and linear quadratic optimum control are applied.

Gottzein, E (Boelkow-Blohm); Lange, B *Automatica* Vol. 11 No. 3, May 1975, pp 271-284, 16 Ref.

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

11 128886

APPLICATION OF LEVITATED VEHICLES TO URBAN RAPID TRANSIT

The relative properties of LVS (Levitated Vehicle System) and rail rapid transit are analyzed, and it is shown that substantial reductions in capital and operating costs are possible. Of the various types of LVS, it is shown that only the flexible-base air-film type or the attraction-type of magnetically levitated vehicle are applicable to rapid transit. The capital cost of the air-film type is definitely lower than the magnetically levitated, but this system has a cost absent in the magnetic types. The air supports must be replaced periodically, as they are worn by contact with irregularities in the track.

IEEE Ind Appl Soc, 9th Annual Meeting, conf record, Pittsburgh, Pennsylvania, October 7-10, 1974.

Miller, DR (Daniel, Mann, Johnson, Mendenhall); Sulkin, MA Holden, WHT *IEEE Transactions on Industry Applications* No. t2, 74 CHO 833-41A, 1974, pp 701-723, 9 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: IEEE Repr. PC

11 128899

INVESTIGATION OF THE VERTICAL MOVEMENT OF THE ELECTROMAGNET OF A TRANSPORT VEHICLE SUSPENSION [Issledovanie vertikal'nogo dvizheniya elektromagnita podveski transportnogo ekipazha]

The process of steady movement of the suspension magnet of a transport vehicle moving along an uneven track structure at a speed of 150 m/s is modeled by computer-aided resolution of a system of equations of motion and electric circuit. A relation is obtained for the dependence of the voltage supplied to the magnet input to ensure stable motion, on the magnitude of track unevenness, velocity of motion, and magnet parameters. [Russian]

Zosimov, VV Polyashov, LI Tkach, LS *Izvestiya Akademii Nauk S.S.S.R., Energ I Transp* No. 3, May 1975, pp 151-155

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

11 128900

MAGNETIC LEVITATION AND PROPULSION, 1975

A status report on progress toward the development of a magnetic levitation and propulsion system for mass transportation is presented. It summarizes

important results and provides a bibliography for further study. Emphasis is placed on various aspects of different magnetic structures which have been proposed for this application.

Thornton, RD (Massachusetts Institute of Technology) *IEEE Transactions on Magnetics* No. 4, Vol. MAG-11, July 1975, 124 Ref.

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

DOTL JC

11 128901
PROPULSION OF THE TEST VEHICLE FOR TESTING THE ELECTRODYNAMIC SUSPENSION TECHNOLOGY. EXAMPLE OF A LINEAR MOTOR DRIVE [Der Antrieb des Versuchsfahrzeuges zur Erprobung der Elektrodynamischen Schwebetechnik. Beispiel eines Linearmotorantriebes]

A drive is described which is used as a test vehicle for clarifying various new relationships and technologies. It represents the second stage of a study. The first stage involved the use of model machinery, such as a test bench with rotating disk. The interaction of linear motor and inverter is discussed. [German]

Wiegner, G *Elektrische Bahnen* Vol. 46 No. 5, May 1975, pp 118-124, 3 Ref.

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

DOTL JC

11 128902
PROPULSION REQUIREMENTS FOR HIGH SPEED VEHICLES WITH ELECTRODYNAMIC SUSPENSION

The thrust force and power requirements for the propulsion of a vehicle with electrodynamic suspension are discussed. Acceleration thrust, magnetic drag and aerodynamic drag are shown to lead to calculated power requirements of 8.0 MW under acceleration, and 5.2 MW for cruising is 300 mph. Aerodynamic and magnetic drag forces together produce acceptable passive deceleration characteristics. Propulsion requirements under normal operation and in emergency situations are described. Propulsion systems are discussed, and it is concluded that the linear synchronous motor is most suitable for the proposed Maglev vehicle.

Presented at the IEEE Industry Applications Division, 9th Annual Meeting, Pittsburgh, Pa., October 7-10, 1974.

Atherton, DL (Queen's University, Canada); Eastham, AR
Institute of Electrical and Electronics Engineers No. t2, 74CHO833-41A, 1974, pp 695-700, 6 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: IEEE Repr. PC

11 128903
CANADIAN DEVELOPMENTS IN SUPERCONDUCTING MAGLEV AND LINEAR SYNCHRONOUS MOTORS

Superconducting Maglev and linear synchronous motor (LSM) propulsion for high speed inter-city transportation is being investigated by a group of Canadian scientists and engineers. Their present development program is modest compared with efforts in Japan and West Germany, but stresses some relatively advanced concepts, including variable-speed phase angle controlled LSM propulsion and guidance schemes using flat-topped guideways (minimizing ice and snow accumulation--a potentially serious problem during Canadian winters). At 480 km/hr, a 100 passenger vehicle weighing 300 kN is levitated 15 cm clear of a flat guideway by eight 3.85×10^5 to 5th power ampere-turns 100×30 cm magnets interacting with eddy currents induced in two 80×1 cm aluminum strips. The variable-speed LSM uses fifty 5×10^5 to 5th power ampere-turns 40×150 cm magnets interacting with split three-phase windings energized in 5 km sections and phase angle controlled to give 72% efficiency and 0.82 power factor. A lateral restoring force of 10 to 4th power N/cm is produced by the propulsion magnets interacting with the levitation strip edges and with flat null-flux loops overlying the LSM windings.

Atherton, DL (Queen's University, Canada); Eastham, AR *Cryogenics* Vol. 15 No. 7, July 1975, pp 395-402

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

DOTL JC

11 128904
REPULSION MAGNETIC SUSPENSION RESEARCH--U.S. PROGRESS TO DATE

An outline is given of the progress made during an 8-year period of United States' research on repulsion magnetic suspension particularly those programs supported by the United States Department of Transportation. Discussion starts with small-scale laboratory experiments measuring the lift and drag forces on superconducting coils, continues through measurement of cryogenic losses, superconducting parametric studies, and ride predictions, and concludes with a summary of the recently completed conceptual vehicle design and system study.

Borcherts, RH (Ford Motor Company) *Cryogenics* Vol. 15 No. 7, July 1975, pp 385-393

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

DOTL JC

11 128905
DEVELOPMENT OF SUPERCONDUCTING LEVITATED TRAINS IN JAPAN

A research and development project is now being carried out in Japan on a superconducting levitated train powered by a linear synchronous motor (LSM). The experiments described concern the possibility of levitation with a lightweight superconducting magnet, the use of such a magnet for both levitation and LSM propulsion, the possibility of recovering evaporating helium, and the use of a null-flux system for guidance. A 7-km test track is to be constructed which will check the feasibility of superconducting levitated LSM propulsion up to 500 km/hr under conditions which are as close as possible to those encountered in operation.

Kyotani, Y (Japanese National Railways) *Cryogenics* Vol. 15 No. 7, July 1975, pp 372-376

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

DOTL JC

11 128906
MAGNEPLANE SYSTEM

The magneplane is not a railroad in which magnet pads simply replace wheels, but a radically new transportation system conceived to make full use of the advantages offered by electrodynamic levitation. Lightweight cylindrical vehicles travel 25 cm above a lightweight aluminum trough, supported and guided by superconducting magnets extending over most of their underside. They are propelled by a synchronously traveling magnetic field generated by conductors in the guideway. Information transmitted from the vehicle to wayside power control units maintains synchronism, actively damps oscillations of the vehicle, and maintains positive position control of all vehicles in the system. The results of tests of a 1/25 scale-model system using both samarium-cobalt and superconducting magnet vehicles with on-board control telemetering systems, operating on a 116 m long actively synchronized guideway are presented.

Kolm, HH (Massachusetts Institute of Technology); Thornton, RD Iwasa, Y Brown, WS *Cryogenics* Vol. 15 No. 7, July 1975, pp 377-384

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

DOTL JC

11 129101
TRACTIVE CHARACTERISTICS OF DC LINEAR MOTOR WITH A CONSTANT VOLTAGE APPLIED TO GROUND COIL

The tractive characteristics of the dc linear motor with normal conducting magnets aboard the train are discussed. The ground coils are assumed to be excited with a constant voltage. The main conclusions follow. The self-inductance of the ground coil varies with time because the magnetic poles aboard the train move facing the ground coils. Hence, the coil current decreases as train speed increases, resulting in reduction of the tractive force.

Ground coil current must be limited in order to prevent the magnetic core aboard the train from being saturated. Hence, the exciting voltage should be kept as low as several hundred volts. Tractive force required to drive the train at 500 km/h is obtainable by mounting multiple magnets on each car. From the standpoint of levitation force, the magnetic pole should have a horizontal length of about 20 m. This is excessively long because each car is at most 25 m long. Further, as Earnshaw's theorem suggests, some feedback control is indispensable for stabilizing the levitation height.

Amemiya, Y (Nagoya University); Aiba, S *Electrical Engineering in Japan* Vol. 94 No. 5, Sept. 1974, pp 97-103, 3 Ref.

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

11 129122 PLASTICS IN TRANSIT

This paper presents results of a research program which aimed at the development of the most technologically advanced computerized and pollution-free transportation system incorporating scientific advancements especially formulated for "Astroglide"--hydrostatic levitation (air-cushion) and linear induction propulsion. Astroglide represents the first major urban transportation alternative to be presented to cities within the last 50 years. The use of plastics in the astroglide system is discussed under the headings: vehicle body; structural frame work (GFRP); doors; windows; and ventilating ducts. The paper was illustrated by slides.

Presented at the SPE National Technical Conference: Plastics in Surface Transport, Detroit, Michigan, Nov. 12-14, 1974.

Seelzo, GP (PRT Systems Corporation)
Society of Plastics Engineers Proc Paper 1974, pp 217-218

ACKNOWLEDGMENT: EI
PURCHASE FROM: Society of Plastics Engineers Detroit, Michigan, Repr. PC

11 129155 CONCEPTUAL DESIGN AND ANALYSIS OF THE TRACKED MAGNETICALLY LEVITATED VEHICLE TECHNOLOGY PROGRAM (TMLV)-REPULSION SCHEME; EXECUTIVE SUMMARY

This report is an Executive Summary of FRA report OR&D-75-21 which summarizes studies to establish the technology of repulsion magnetic suspension for ultimate use in a passenger carrying high speed ground transportation (HSGT) system-at speeds on the order of 134m/s (300 mph). A baseline revenue system is described in terms of vehicle/guideway configuration, system performance and cost. Levitation and guidance is provided by eight superconducting magnets. The magnetic fields interact with a pair of L-shaped aluminum guideway elements. Propulsion alternatives are discussed but this is the area where much work remains to be done to provide adequate performance and cost data for a final selection. This technology, designed to free ground transportation from the speed and noise limitations imposed by steel wheel on steel rail, will make possible the short trip times of planes with the huge capacity of trains. Both speed and capacity are essential to meet the demonstrated demand for rapid travel in the nation's congested corridors.

Sponsorship was from Federal Railroad Administration, DOT.

Ford Motor Company, Philco - Ford Corporation Final Rpt.
FRA-OR&D 75-21C, Feb. 1975, 22 pp

Contract DOT-FR-40024

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

DOTL NTIS

11 129199 CONCEPTUAL DESIGN AND ANALYSIS OF THE TRACKED MAGNETICALLY LEVITATED VEHICLE TECHNOLOGY PROGRAM (TMLV)-REPULSION SCHEME; VOLUME 1-TECHNICAL STUDIES

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 transporta-

tion modes in the short-haul regime. These advanced systems have the potential of alleviating the heavy traffic congestion predicted for the highly populated regions of the U.S. in the 1985-1995 period. The national energy shortage has intensified the search for more energy-efficient and cost-effective transportation modes. This volume summarizes the analyses and designs which demonstrate the performance of the system including the ability to meet the DOT ride quality standards on straight and level guideways as well as on curves and grade transitions. Conceptual designs and costs are shown for the vehicles, guideways, and the complete system. Various propulsion systems and guideway configurations are investigated, and a simple economic model is developed for the evaluation of MAGLEV systems on a cost per seat-mile or cost per passenger-mile basis.

This project was sponsored by the Federal Railroad Administration, DOT.

Ford Motor Company, Philco-Ford Corporation, (TMLV-37) Final Rpt.
FRA-OR&D-75-21, Feb. 1975, 380 pp, Figs., 7 App.

Contract DOT-FR-40024

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

DOTL:NTIS

11 129260 A PRELIMINARY EVALUATION OF ELECTRICAL PROPULSION BY MEANS OF IRON-CORED SYNCHRONOUSLY OPERATING LINEAR MOTORS

This report is a preliminary evaluation of the technical feasibility of using iron-cored, synchronously operating motors to propel ground transportation vehicles in the high cruise speed range. A second consideration is the possibility that the motor might also provide strong attractive and lateral forces. Three motor types, all realizable with passive track rails are investigated: (a) claw-pole synchronous motor, (b) homopolar inductor motor, and (c) heteropolar inductor motor. A rail clearance of 1.5 cm is specified. However, the effect of variations in this and other design parameters is also analyzed. All three types considered compare favorably with an equivalent single-sided induction motor, insofar as weight, efficiency, and power factor are concerned. The calculations are supported by analog simulation experiments.

Levi, E
Polytechnic Institute of New York Tech Rpt. Jan. 1975, 100 pp, Figs.,
Tabs., 1 App.

Contract DOT-FR-30030

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

DOTL NTIS

11 129266 RESEARCH AND DEVELOPMENT POSITION OF THE ELECTROMAGNETIC LEVITATION SYSTEM IN THE GERMAN FEDERAL REPUBLIC [Forschungs-und Entwicklungsstand der elektromagnetischen Schwebetechnik in der Bundesrepublik Deutschland]

The author describes the test installations and vehicle prototypes used to date and gives details of aims and performances. He also reports on the most promising concepts for developing a test vehicle for real operations and considers the future of research and development in the magnetic levitation technique context. [German]

Winkle, G *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 9, Sept.
1975, pp 367-373, 9 Fig., 2 Tab., 2 Ref.

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

11 129277 SYNCHRONOUS PROPULSION USING A LONG INDUCTOR WITH NORMAL, REGULATED, ATTRACTING FORCES [Synchroner Langstatorantrieb mit geregelten, anziehend wirkenden Normalkraefften]

Following brief details of the requirements for propulsion systems and the basic problems with the long inductor technique the author describes the

various plans for asynchronous and synchronous versions. One interesting idea is the integrated form where the propulsion, levitation and lateral guide forces are produced by the same functional elements. [German]

Weh, H *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 9, Sept. 1975, pp 409-413, 1 Fig., 12 Ref.

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

11 129282

THE DYNAMIC BEHAVIOUR OF A LOW-SPEED ELECTRO-MAGNETIC SUSPENSION

A control system has been designed, constructed and tested which provides a suspension for a low-speed transport vehicle. The technical concepts have been investigated in great depth. It has been shown that the effects of the non-linearities inherent in the hardware can be minimised. Over a track with irregularities characterised by a secondary railway line the ride in the vehicle is equivalent to that obtained in conventional, modern urban transport vehicles. The physical constraints on the control system specification of the track has been shown to be suitable. of the track has been shown to be suitable.

Pollard, MG Williams, RA *Vehicle System Dynamics* Vol. 4 No. 2-3, 1975, pp 188-192

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

11 129283

DYNAMICS OF MAGNETICALLY LEVITATED VEHICLES ON FLEXIBLE GUIDEWAYS

Magnetically levitated vehicles have been discussed in recent years for application on personal rapid transit in highly populated areas and high speed transport over large distances. The magnetic suspension control of the vehicle has been usually designed assuming rigid guideways. On the other hand, the dynamics of the guideways has been investigated only for vehicles, with spring-dashpot suspension. However, the suspension control and the guideway dynamics are coupled resulting in a multivariable system. In this paper the complete vehicle-guideway system is considered.

Popp, K Schiehlen, W *Vehicle System Dynamics* Vol. 4 No. 2-3, 1975, pp 195-199

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

11 129285

AIR CUSHION SUSPENSION FOR AEROTRAIN THEORETICAL SCHEMES FOR STATIC AND DYNAMIC OPERATION

To improve lift power consumption, ride quality, ability to fit rough guideway specifications and short radius curves, Societe de l'AEROTRAIN and BERTIN & CO. had to develop pneumatic air cushion suspensions. The use of flexible lips bearing pannels is a common basic principle of these suspensions. Canvas arrangement and difference of pressure across the pannel governs its equilibrium; a point to point relationship is obtained between cushion load and suspension height. Theoretical and test results found on an articulated pannel version of these suspensions, the K-K sub B air cushion, are commented. A set of computer programs provides estimates of static and dynamic behaviour of K and K sub B suspensions. Agreement between theory and experiments is good enough such that the model may be used to improve the behaviour of existing cushions of prototypes and to design new cushion for future Aerotrain projects. Also improvements of the dynamic model are or progress to find how to avoid critical instabilities and to get best damping on fundamental modes. This will help us to get better performance of Aerotrain ride quality which is already of the best among transportation systems.

Morel, JP Bonnat, C *Vehicle System Dynamics* Vol. 4 No. 2-3, 1975, pp 178-187

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

11 129310

SHORT INDUCTOR LINEAR MOTOR. STAGE REACHED AND DEVELOPMENTS [Kurzstator-Linearmotoren. Stand und Entwicklung]

Short inductor linear motors vary in many respects from the corresponding rotating engines. The authors briefly mention the usual types of synchronous and asynchronous linear motors and then give details of certain specific points. [German]

Deleroi, W *Elektrotechnische Zeitschrift, Ausgabe B* Vol. 96 No. 9, Sept. 1975, pp 401-409, 5 Fig., 41 Ref.

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

12 052512

AUTOMATIC WARNING OF TRACK MAINTENANCE GANGS. ENQUIRY INTO THE USE OF ACOUSTIC AND VISUAL WARNING DEVICES

This report contains the evaluation of the enquiries addressed to the Member Administrations of ORE concerning the state of progress of different acoustic and visual devices to warn track maintenance gangs. Most of the acoustic warning devices are air operated. In addition to the oral horns with a sound intensity of about 80 to 100 dB, which are still frequently used, warning devices operated by manual pumps with an air reservoir and those with compressed air containers are employed. The sound radiated by them varies between about 110 and 120 dB. The frequencies of the warning signals differ very much. A few Railway Administrations also use visual warning signals. These are either variations in the illumination of the working site or flashing lights. The report also includes conclusions referring to the need for further studies.

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

International Union of Railways A124/RP3/E, Apr. 1973, 36 pp, 2 App.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: UIC Repr. PC

DOTL RP

12 091483

PIPELINE ACCIDENT REPORT-MICHIGAN-WISCONSIN PIPE LINE COMPANY, GAS TRANSMISSION LINE FAILURE, SOUTH OF MONROE, LOUISIANA

The report describes and analyzes a natural gas pipeline accident near Monroe, La., on March 2, 1974. A 30-inch pipeline failed at a girth weld inside a casing under a highway. A resulting fire burned 10 acres of forest, but no deaths or injuries resulted. The National Transportation Safety Board determines that the probable cause of the accident was the failure of a substandard girth weld due to repeated soil stresses. Contributing to the imposed stresses were the position of the pipe inside the casing and the heavy clay soil surrounding the pipe at each end of the casing. Recommendations are made to determine the effectiveness of using casing for pipelines beneath highways and railroads and to develop guidelines for the effective operation of automatic valves.

Pipeline Accident Report for March 2, 1974.

National Transportation Safety Board NTSB-PAR-75-1, Apr. 1975, 27 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-241988/5ST, DOTL NTIS

12 091887

TRANSIT FLAMMABILITY REQUIREMENTS

Control of the flammability characteristics of furnishings within a structure will reduce the fire hazard to the structure and enhance the life safety of its occupants. Flammability of materials should be considered along with comfort, cost and wear. Quantifying flammability, setting acceptable standards, identifying appropriate test procedures, and locating the material to satisfy the standards are steps taken by the Port Authority of New York and New Jersey.

Schafran, E
Transit Development Corporation, Incorporated Final Rpt.
TDC/500-74/3, June 1974, 11 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-241851/5ST, DOTL NTIS

12 091888

SMOKELESS CABLE

The transit industry embarked upon a program to realistically and comprehensively develop an understanding of fire safety in the use of electrical wire and cable insulations and jacketing materials. The New York City Transit Authority has devoted extensive time and effort to identify the potential dangers. The fire safety problem concerned with excessive heat characteristics is described.

Mombach, J Connell, WM
Transit Development Corporation, Incorporated Final Rpt.
TDC/500-74/2, June 1974, 12 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-241850/7ST, DOTL NTIS

12 092091

RAILROAD ACCIDENT REPORT: COLLISION OF ST. LOUIS-SAN FRANCISCO RAILWAY TRAINS 3210 AND 3211, MUSTANG, OKLAHOMA, SEPTEMBER 1, 1974

On September 1, 1974, at 1:44 to 1:46 p.m., the St. Louis-San Francisco Railway Company's eastbound freight train 3210 and westbound train 3211 collided head-on 1.7 miles west of Mustang, Oklahoma. The trains were scheduled to meet in Mustang. However, train 3211 passed Mustang ahead of schedule. As a result of the collision, 4 locomotive units were destroyed, 23 cars derailed, and hazardous materials caught fire in the wreckage. As a result of the fire, eight families were evacuated from their homes. A brakeman on train 3211 was killed, and the three other crewmembers of that train were injured seriously. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the crew of train 3211 to take preventive action after the train passed Mustang ahead of schedule.

National Transportation Safety Board NTSB-RAR-75-6, May 1975, 25 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242771/4ST, DOTL NTIS

12 092221

NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 6. RISK ANALYSIS OF JOINT PASSENGER/FREIGHT OPERATIONS

The objective of Task 6 was the assessment of the risk associated with the operation of a Northeast Corridor passenger system in the proximity of through and local freight. The report identifies two major categories of passenger/freight interaction and contains analyses of these factors as they apply to the various operational scenarios under consideration for the 1990 High Speed Rail Plan.

Prepared in cooperation with Battelle-Columbus Labs., Ohio. See also PB-243 419.

Bechtel Corporation, Federal Railroad Administration, Battelle
Columbus Laboratories Final Rpt. FRA/ONECD-75/6, Aug. 1975, 99p

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244066/7ST, DOTL NTIS

12 092224

VANDALISM SUPPRESSION BY HELICOPTER

The research project is a preliminary exploration into procedures, applications and effects of helicopter surveillance of commuter and freight railroad facilities in an urban environment. The project was conducted in the Philadelphia Metropolitan Area in the Spring and Summer of 1972 for the Federal Railroad Administration and with the cooperation of the Penn Central Transportation Company and the Reading Railroad. An attempt was made to document effects of the helicopter patrol and to provide insight into the requirements of a more exhaustive program to attain statistical validation of observed impact of helicopter use.

Aylworth, CE
Naval Ammunition Depot, Federal Railroad Administration Final Rpt.
FRA-OPP-74-1, Jan. 1973, 74 pp

Contract DOT-AR-20013

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244099/8ST, DOTL NTIS

12 092316

A METHODOLOGY FOR EVALUATING THE ECONOMIC IMPACTS OF APPLYING RAILROAD SAFETY STANDARDS. VOLUME I

The report presents a methodology for evaluating the economic impacts of applying railroad safety standards. The scope is considered broad enough to permit evaluation of all the safety standards thus far proposed by the Federal Railroad Administration and to allow for detailed analysis of individual equipment, track, and human factors standards. At the same time, the details and examples are fairly specific in order to present insight into the techniques and problems which might be encountered. Volume 2 of this report is the manual whose step-by-step procedures are intended for the implementation of economic impact analysis. Portions of this document are not fully legible.

See also Volume 2, PB-244 267.

Kennedy, RG, III Lloyd, FH Lowrey, R
Consad Research Corporation, Federal Railroad Administration Final Rpt. FRA/RP-41-Vol-1, Oct. 1974, 278 pp

Contract DOT-FR-20047

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244266/3ST, DOTL NTIS

12 092317

A METHODOLOGY FOR EVALUATING THE ECONOMIC IMPACTS OF APPLYING RAILROAD SAFETY STANDARDS. VOLUME II

This manual is intended as a working document for Federal Railroad Administration personnel, and provides step-by-step procedures which are intended for use in determining the economic impact of proposed railroad safety standards. It is a companion piece to Volume I, the Final Report. The procedural framework described is broad enough to encompass safety standards in equipment, track, and human factors standards. At the same time, the details and examples are fairly specific in order to present insight into the techniques and problems which might be encountered. In developing this manual, high priority was placed on presenting workable procedures that can be used immediately for economic impact evaluation. Special attention is given to accidents and accident prediction, discounting, quantification problems and the role of sensitivity analysis. A completely worked example is presented in the appendix. Portions of this document are not fully legible.

See also Volume 1, PB-244 266.

Lloyd, FH Crisafulli, RJ
Consad Research Corporation, Federal Railroad Administration Final Rpt. FRA/RP-41-Vol-2, Oct. 1974, 169 pp

Contract DOT-FR-20047

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244267/1ST, DOTL NTIS

12 092320

DEVELOPMENT OF THE RAIL SAFETY INSPECTION PROGRAM. VOLUME I

This Final Report, contained in two volumes, summarizes the results of a study which included an analysis of the present rail safety program, a review of similar governmental and private programs, the presentation of proposed alternative approaches to the inspection program, an analysis of the functional responsibilities of the organizations supporting the program and a description of the tasks required to implement the proposed improvements to the rail safety program. This volume of the report, Executive Summary, summarizes the project team findings and recommendations and outlines executive action items or decision points which must be considered by top level FRA and DOT management.

See also Volume 2, PB-244 276.

Feldman, S Becker, H Mendenhall, G Coffey, J
Young (Arthur) and Company, Federal Railroad Administration Final Rpt. FRA/RAD-75/1-Vol-1, June 1975, 24p

Contract DOT-FR-53060

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244275/4ST, DOTL NTIS

12 092321

DEVELOPMENT OF THE RAIL SAFETY INSPECTION PROGRAM. VOLUME II. FINDINGS AND RECOMMENDATIONS

This Final Report, contained in two volumes, summarizes the results of a study which included an analysis of the present rail safety program, a review of similar governmental and private programs, the presentation of proposed alternative approaches to the inspection program, an analysis of the functional responsibilities of the organizations supporting the program, a projection of the staffing requirements to support the program and a description of the tasks required to implement the proposed improvements to the rail safety program. This volume, Findings and Recommendations, contains the main body of the Final Report including proposed methodologies for the enhancement of the FRA safety effort and the evaluation procedures for measuring the program's success.

See also Volume 1, PB-244 275.

Feldman, S Becker, H Mendenhall, G Coffey, J
Young (Arthur) and Company, Federal Railroad Administration Final Rpt. FRA/RAD-75/1-Vol-2, June 1975, 164p

Contract DOT-FR-53060

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244276/2ST, DOTL NTIS

12 099182

RAILROAD ACCIDENT REPORT: HAZARDOUS MATERIALS ACCIDENT AT THE SOUTHERN PACIFIC TRANSPORTATION COMPANY'S ENGLEWOOD YARD IN HOUSTON, TEXAS, SEPTEMBER 21, 1974

About noon on September 21, 1974, 2 loaded "jumbo" tank cars, cars 17 and 18 of a 145-car complement, were uncoupled as a unit at the crest of the gravity hump in the Southern Pacific Transportation Company's (SP) Englewood Yard at Houston, Texas. The two cars passed through the hump master retarder and group retarder without being slowed and accelerated as they moved down the grade into bowl track 1. At a speed of 18 to 20 mph, the two tank cars impacted an empty tank car. Upon impact, the coupler of the empty tank car rode over the coupler of car 17 and punctured the tank head. Butadiene spilled from the car and formed a vapor cloud, which dispersed over the area. After 2 to 3 minutes, the vapor exploded violently; as a result, 1 person died and 235 were injured. Total damages amounted to about \$13 million, which included the destruction of 231 railroad cars and substantial damage to 282 others. The National Transportation Safety Board determines that the probable cause of the overspeed impact was the failure of the retarding system to slow the two coupled tank cars and the absence of a backup system to control cars which pass through the retarders at excessive speeds. The failure of the retarding system was caused by foreign substances on the wheels of the two cars that preceded the two tank cars through the retarders. Contributing to the accident was the failure of the Southern Pacific Transportation Company to enforce procedures to exclude cars with a foreign substance on their wheels from the humping system, and the Shell Oil Company's failure, after notification of the hazard, to eliminate spilled epoxy resin from the flangeways of their track.

This report contains Railroad Safety Recommendations R-75-28 through R-75-30.

National Transportation Safety Board NTSB-RAR-75-7, May 1975, 39 pp

ACKNOWLEDGMENT: National Transportation Safety Board, NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243598/0ST, DOTL NTIS

12 099814

SHIPPING HAZARDOUS MATERIALS

This special report is designed to give a balanced report on the significance of the passage of the Hazardous Materials Act. Included are the views of the Department of Transportation, motor carriers, railroads, barge lines and the military.

Davis, BO, Jr Burns, WJ German, JG O'Brien, CJ, Jr Geary,
JD Pratt, EJ *Defense Transportation Journal* Vol. 31 No. 4, Aug. 1975,
pp 6-75

PURCHASE FROM: National Defense Transportation Association 1612 K
Street, NW, Washington, D.C., 20006 Repr. PC

DOTL JC

12 125891

**RAILROAD ACCIDENT REPORT: COLLISION OF TWO PENN
CENTRAL COMMUTER TRAINS AT BOTANICAL GARDEN
STATION, NEW YORK CITY, JANUARY 2, 1975**

This report analyzes a rear-end collision between two Penn Central
commuter trains. The first train was moving at a speed of 15 mph when the
engineer of the following train failed to stop at a "stop-and-proceed" signal
and consequently collided with the train ahead. Four cars of the first train
were derailed; damage to the cars was minimal. Two hundred and sixty-five
persons were injured and three persons were hospitalized overnight. The
National Transportation Safety Board determines that the probable cause of
the collision was the failure of the engineer of train 528, while operating the
train in violation of the "stop-and-proceed" indication, to perceive the train
ahead in time to prevent a collision; and the lack of a backup system to
control the train in accordance with the signal indication when the engineer
failed to do so. The cause of the large number of injuries in this relatively
moderate collision was the poor design of seats and of other interior features.

National Transportation Safety Board, (1473A) NTSB-RAR-75-8, July
1975, 36 pp, Figs., 6 App.

ACKNOWLEDGMENT: National Transportation Safety Board
PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

12 126404

STATISTICAL STUDY OF TRAM DRIVER ACCIDENTS

Two basic hypothesis are considered; The accident proneness theory and the
spell theory. These 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. 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 tram drivers during the observation period.

Milosevic, S (Psychotechnic Laboratory, Yugoslavia); Vucinic, S *Acci-
dent Analysis and Prevention* Vol. 7 No. 1, May 1975, pp 1-7, 8 Ref.

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

DOTL JC

12 126415

**RISK ANALYSIS OF SHIPMENTS IN THE NUCLEAR POWER
INDUSTRY**

A study is undertaken to determine risks from the transportation of
radioactive materials generated in the production of electricity in the United
States for the period 1970-2020. Radiation exposures under conditions of
both routine transport and transport accidents are considered. Movements
of spent fuel, recycled plutonium, and high level radioactive solidified waste
are studied. The calculated gamma dose to the growing population from all
routine shipments of these materials is found to not exceed 50 persons-rem-
/yr by 2020.

Proceedings of the 4th Symposium, 22-27 September 1974.

Hodge, CV (Holmes & Narver, Incorporated); Baldoñado, OC
Packaging and Transp of Radioact Mater, Int Symp No. t2, pp 814-829,
6 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: NTIS Repr. PC

DOTL NTIS

12 126422

**IMPACT OF THE PROPOSED DISPOSAL OF HIGH-LEVEL
RADIOACTIVE WASTE AT THE NEVADA TEST SITE ON THE
TRANSPORTATION OF REACTOR WASTE PRODUCTS**

A recent concept proposes the conversion of high-level radioactive waste to
glass and its disposal at the Nevada Test Site (NTS). Application of this
concept has a certain impact on the packaging and transportation of the
high-level waste. The proposed storage sites are compared with the NTS in
terms of differences of transportation distances and certain other criteria.

Proceedings of the 4th Symposium, 22-27 September 1974.

Carter, MW (Georgia Institute of Technology); Moghissi, AA
Packaging and Transp of Radioact Mater, Int Symp No. t2, 1974, pp
785-797, 6 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: NTIS Repr. PC

DOTL NTIS

12 126435

**TRANSPORTING, LOADING AND UNLOADING OF
HAZARDOUS MATERIALS IN RAILROAD CARS**

Safer rail transportation of hazardous materials involves close cooperation
between the container manufacturer, shipper, rail carrier, and consignee so
as to minimize any hazard to the public. Standards under the Federal
Railroad Administration Railroad Safety Act are specifically presented.

Presented at the Joint Materials Handling Conference, Sheraton-Cleve-
land Hotel, Cleveland, Ohio: 23-25 September 1975.

Black, WF
Society of Manufacturing Engineers MS75-660, Sept. 1975

ACKNOWLEDGMENT: Society of Manufacturing Engineers
PURCHASE FROM: Society of Manufacturing Engineers 20501 Ford Road,
Dearborn, Michigan, 48128 Repr. PC

12 127048

**SAFETY IN URBAN TRANSPORTATION: GUIDELINES
MANUAL AND RESEARCH REPORT SUMMARY**

An investigation was carried out with the purpose of providing information
and reporting the results of analyses about the current level of safety and the
need for additional safety effort in urban mass transit. The Research Report
Summary outlines the steps followed in the investigation, and serves as an
introduction to the final report which is now in preparation and will contain
a full presentation of data on the safety performance of all passenger
transportation modes, comparative analyses of their safety problems, and
the rationale underlying the strategy and practice of safety management
recommended in the report and reflected in the guidelines manual. The
manual presents a series of organizational and technical safety guidelines
designed for use of the transit management community. The guidelines are
intended to show how the transit industry--supplier firms and operators--can
develop programs that will assure satisfactory operational safety levels. By
describing ways in which suppliers and operators can set logical safety goals
and establish organizations and engineering procedures to attain them, the
manual sets forth a model for industry management and for basing the
interaction, regarding safety, between pertinent Government agencies and
the transit industry. The manual covers the following topics in separate
chapters: foundations of safety in urban mass transportation; safety
management and planning; techniques for safety analysis; trade-off consider-
ations; system safety data base; safety standards and specifications; and
intermodal interface safety considerations. These guidelines are in the form
of suggested or recommended practices accompanied by explanation. They
are designed to have a considerable latitude of user interpretation so they
can fit the wide variety of specific situations found in the transit industry.

Contract also sponsored by UMTA.

Cheaney, ES Hoess, JA Thompson, RE Svehla, RL
Battelle Columbus Laboratories, Naval Underwater Systems Center,
(G-2460-1) UMTA RI06-0005-751.2, May 1975, 101 pp

Contract N00140-73-C-A394

ACKNOWLEDGMENT:
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245413/OST, DOTL NTIS

12 127358
TEST OF FIRE FIGHTING FOR LIVE LINE ELECTRIC EQUIPMENT

Fighting of fires in cars on electrified lines normally requires the cutting of power. Damage can be increased substantially while waiting for confirmation that power has been disconnected. This study was concerned with the possibility of fighting fires with the power system energized. Various equipment was sprinkled with differing nozzle patterns and using water and other extinguishing materials. The results are expected to be reflected in the fire fighting equipment to be provided in long tunnels and the extinguishers to be carried on electric cars and locomotives.

Arai, K Watanabe, H Furuhashi, T Tajima, T *Railway Technical Research Institute* Vol. 16 No. 2, July 1975, pp 92-93

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

12 127835
MOORGATE TUBE TRAIN DISASTER

This two-part article describes the medical aspects of the crash of a London Underground transit train in a dead end tunnel which resulted in 43 deaths and 72 injuries requiring hospital treatment. Part I describes the experience of the medical staff and reports a substantial advantage in using on-site medical teams that could offer anaesthetic facilities. Adequate communication between the accident site and hospital is important. Part 2 reviews injuries sustained by 113 casualties, showing the need for rapid evacuation. Recognition of the "crush syndrome" is important and a radical surgical approach is suggested. Chest injuries were common and contributed to many of the deaths.

Direct requests to J.O. Robinson.

British Medical Journal Vol. 3 No. 5986, Sept. 1975, pp 727-730

ACKNOWLEDGMENT: British Medical Journal
 PURCHASE FROM: St Bartholomew's Hospital Department of Surgery, London EC1A 7BE, England Repr. PC

12 127838
A SCHEME FOR RECOGNIZING CHEMICALS AND THEIR HAZARDS IN AN EMERGENCY

In recent years a number of potential emergency situations have arisen following traffic accidents, or fires involving chemicals. In an attempt to minimise the danger from such incidents in the U.K., an emergency advice scheme has been established by the Chemical Industries Association (CIA) in collaboration with Central Government. As part of the scheme, chemical companies are providing information to facilitate the identification of products and their hazards, and advice for their safe treatment in an emergency. The information is being organised so that it can easily be searched using a computer-based information retrieval system. The data being collected initially are related to the requirements of the public emergency services but they can be extended to meet the needs of other organisations. Indeed, the data bank is being augmented in this way under a contract from the E.E.C.

Cumberland, RF Hebden, MD *Journal of Hazardous Materials* Vol. 1 No. 1, Sept. 1975, pp 35-43

ACKNOWLEDGMENT: British Railways
 PURCHASE FROM: Elsevier Scientific Publishing Co., PO Box 211, Amsterdam, Netherlands

12 128146
A METHOD OF EVALUATING HUMAN LIFE FOR ECONOMIC PURPOSES

A method of estimating a monetary value of life which can be used for the evaluation of safety precautions is presented. People are willing to spend money to reduce the risk of accidents, or alternatively to increase the risk for some benefit. The method described endeavours to estimate the value of life which is consistent with such behaviour. The results obtained are compared with values given by discounted earning. The importance of perceived risk is also considered. Factors influencing perceived risk are discussed. (A) /TRRL/

Melinek, SJ (Fire Research Station, England) *Accident Analysis and Prevention* Vol. 6 No. 2, Oct. 1974, pp 103-114, 1 Fig., 3 Tab., 32 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 21442)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

12 129117
TUNNELING SAFETY-REGULATIONS AND REWARDS

The paper discusses recently introduced state and Federal requirements which can have the most powerful impact on tunneling operations. Five main areas are covered: pre-construction regulations, accident prevention programs, protective devices, inspection for deficiencies, and emergency plans. The California law is used as an example of state requirements.

Vergie, R (Fireman's Fund American Insurance Company)
 American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 495-501

ACKNOWLEDGMENT: EI
 PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

12 129150
DEVELOPMENT OF ANALYTIC FIRE MODELS

The hydrodynamic equations which include a turbulence model based on the work by Spalding's group have been derived along with the associated boundary and initial conditions. They have also been put into finite difference form, coded, and are currently being debugged. The soot chemical model has been determined and is included in the above formulation. A radiation code based on the long characteristics method has been prepared for inclusion into the code as a subroutine as has an equation of state package.

Sponsorship was from Federal Railroad Administration, DOT.

Schalit, L Schneyer, G Toor, J Laird, D
 Systems, Science, and Software, (SSS-R-74-2436) Prog. Rpt. FRA-OR&D 75-53, Oct. 1974, 66 pp, Figs., 50 Ref.

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

DOTL NTIS

12 129151
COMPUTER SIMULATION OF TANK CAR HEAD PUNCTURE MECHANISMS. CLASSIFICATION YARD ACCIDENTS

A number of railroad accidents have been aggravated by couplers puncturing the shell head of hazardous material tank cars. Development of means for identifying possible puncture mechanisms and quantifying the coupler forces involved is the subject of this report. A mathematical model, capable of simulating train action in the vertical plane, has been developed and used for simulation of three classification yard accidents. A detailed description of the model and the results of simulation are presented. The conclusions of this report must be considered tentative until the results of verification studies become available.

Sponsorship was from the Federal Railroad Administration, DOT.

Hohenemser, KH Diboll, WB Yin, SK Szabo, BA
 Washington University, St Louis, (64274) Prelim Rpt FRA-ORD&D-75-23, Feb. 1975, 74 pp, Figs.

Contract DOT-OS-40106

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

DOTL NTIS

12 129170
LIMITED ANALYSIS OF THE SAFETY IMPLICATIONS OF THE PRELIMINARY SYSTEM PLAN FOR RAILROAD CONSOLIDATION

This Study looks at the safety impact of the system changes resulting from the reorganization of the railroads of the Northeast and Midwest due to the reduction of ton-miles of freight transported by rail, the increase by truck, the elimination of rail-highway crossings, and the upgrading and improved maintenance of the system. The subjects considered are the rail system itself, interaction with its surroundings, and interaction with other types of transportation. Only the change in transport mode of freight originating or

terminating on the lines scheduled for abandonment is considered. Tables comparing safety performance for different transport modes are included.
Sponsored by USRA.

Allen, JD
Battelle Columbus Laboratories USRA-R-129, June 1975, 51 pp, 12 Ref.
Contract USRA-C-50039

ACKNOWLEDGMENT: United States Railway Association
PURCHASE FROM: NTIS Repr. PC, Microfiche PB-247368, DOTL NTIS

12 129302

ELECTRICAL PROTECTION AT THE SJ [Elskyddet vid SJ]

As a consequence of the large extension and the low placed 16 kV overhead equipment of the Swedish Railways there are relatively great difficulties in protecting the staff and outsiders against electrical accidents by unintentional contact with the electrical equipment. This article describes the problems and those edicts and instructions which are to be applied to the equipment and the maintenance and those technical and informing steps which have been taken in order to reduce the electrical accidents. [Swedish]

Askholm, C *Jarnvagsteknik* 1974, 5 pp, 3 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Jarnvagsteknik P.O. Box 265, S-10123 Stockholm, Sweden Repr. PC

12 129402

SHIFT WORK AND OCCUPATIONAL SAFETY [System pracy okresowej (turnusowej) a bezpieczenstwo pracy]

An analytical study of the effects of shift work on safety is followed by an explanation of the principles governing the duration of work for each job. The author describes the physiological and mental repercussions of such a system on the human body. He discusses the perturbations caused in the whole system and more particularly the senses of sight and hearing. He mentions several precautions to take so that the person retains the psycho-physiological capacity to adapt himself to shift work. He stresses the importance of the factor of fatigue, its causes and symptoms. He also emphasizes the importance of the type of lighting and its intensity for the well-being and productivity of the worker. [Polish]

Czech, A *Przegląd Kolejowy Przewozowy* Vol. 22 No. 2, Feb. 1975, pp 26-29, 1 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Wydawnictwa Komunikacji i Łączności U1 Kazimierzowska 52, Warsaw, Poland Repr. PC

13 092222

PENN CENTRAL ELECTRIFICATION NEW YORK TUNNELS 25 KV VS. 12.5/25 KV

The proposed conversion of the a-c electrified portion of the Penn Central Railroad to 25 kV, 60 Hz involves modifications to provide sufficient electrical clearance, particularly in the tunnels at New York, Philadelphia, Baltimore and Washington. The object of this study was to investigate the extent and cost magnitude of modifications to tunnels in the New York area, and compare them to alternative of providing dual-voltage equipment for all trains operating in this area.

Gibbs and Hill, Incorporated, Federal Railroad Administration Final Rpt. FRA/ONECD-75-51, Apr. 1975, 85p

Contract DOT-FRA-30065

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244067/5ST, DOTL NTIS

13 092391

NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT STUDY. TASK 5. ELECTRIFICATION

The report describes existing equipment and physical conditions within the Corridor. After establishing performance objectives and design standards for the upgrading of existing systems and the construction of new electrification facilities, it examines the voltage and frequency alternatives available and identifies the most cost-effective solution. Estimated costs, for each alternative are presented. Environmental aspects are referenced, alternative traction power supply and distribution systems are reviewed, and the status and dynamics of catenary systems are analyzed from first principles. The report closes with an economic analysis of the electrification alternatives.

See also report on Task 1 dated Apr 75, PB-243 419.

Sutcliffe, H Williams, JS Thomet, MA White, DW
Bechtel Incorporated, Federal Railroad Administration Final Rpt.
BECHTEL-11023-5, FRA/ONECD-75/5, May 1975, 291 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244445/3ST, DOTL NTIS

13 099770

RECTIFIER SUB-STATION FOR TRACTIVE UNITS [Sous-station de redresseur pour la traction]

Operating principles for a direct-current sub-station incorporating silicon diode rectifiers with three-phase axle connection having a unit power from 1,000 to 4,000 kW. Voltage limitation, obtained by electronic control, makes it possible to absorb the current generated during the regenerative-braking process, without the voltage at the traction-motor terminal exceeding the stipulated tolerances. [French]

Salzgeber, P *Brown Boveri Review* No. 11, Nov. 1974, pp 501-507, 9 Fig., 3 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Brown Boveri and Company, Limited Publicity Department, Baden, Switzerland Repr. PC

13 099830

ELECTRICAL SUBSTATIONS FOR PIPELINE PUMP AND COMPRESSOR STATIONS

The paper goes systematically through the problem of load selection, negotiating load supply details with the electric utility, electrical supply contract completion, and the design specification, construction, and maintenance of electrical substation facilities as applied to pipeline pump and compressor station. The "simple" type of substation is discussed, although component specifications and selection normally are the same regardless of substation complexity. An up-to-date list of applicable United States and Canadian Standards as well as a detailed list of required tests to be carried out on individual components are included in the Appendix.

Verhiel, AL *IEEE Transactions on Industry Applications* Vol. IA11 No. 4, July 1975, pp 409-429, 7 Fig., 7 Ref.

ACKNOWLEDGMENT: IEEE Transactions on Industry Applications

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

13 125816

ELECTRIC RAILROAD OPERATION OF THE WEST GERMAN RAILROAD SYSTEM IN 1974 [Der Elektrische Zugbetrieb der Deutschen Bundesbahn in Jahre 1974]

A status report is presented. Information is provided about electrified lines already in operation and about planned electrification. Types of vehicles in operation are described, along with power supply facilities. Cooperation with international and domestic electrical engineering organizations is reported. [German]

Bauermeister, K *Elektrische Bahnen* Vol. 46 No. 1, Jan. 1975, pp 3-14

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

13 125838

DYNAMICS OF A CURRENT COLLECTOR FOR A HIGH-SPEED RAILWAY

No Abstract.

Yoshida, K (Keio University, Yokohama); Manabe, K Shimogo, T
ASME Journal of Engineering for Industry Vol. 97 No. 2, 74-DET-75, May 1975, pp 731-738

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

13 125843

TRANSFORMER SUBSTATIONS-DOMINANT FACTORS IN THE DEVELOPMENT OF ELECTRIC POWER SUPPLY TO THE AUSTRIAN RAILWAYS [Die Umformerwerke-Dominanten in der Entwicklung der Oesterreichischen Bahnstromversorgung]

The demand for electrical energy to supply the Austrian Railways has quintupled over the last 25 Years. The Report describes the electricity generating equipment with special attention to the transformer substations, which provides the greater part of the electricity supply, and discusses the considerations which led to the construction of the St. Michael substation, of which some technical details are given. [German]

Wohlgemuth, J (Austrian Federal Railways) *Oesterreichische Z fuer Elektrizitaetswirtschaft* Vol. 28 No. 4, Apr. 1975, pp 245-254, 13 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

13 125852

COMPUTERIZED APPROACH TO SUBSTATION AND SWITCHING RELIABILITY EVALUATION

This paper presents a new approach for the evaluation of substation and switching station reliability performance in terms of outage frequencies and durations. All realistic component failure modes are included in the reliability predictions. The computer program described in the paper is fairly general. It performs failure modes and effects analysis and provides a concise and orderly description of the various combination of occurrences within the system that could result in an interruption. The application of the program is illustrated by considering two practical system examples. The concepts described are quite general and can be easily extended to the reliability evaluation of other power systems configurations.

Grover, MS (Saskatoon University, Canada); Billington, R *IEEE Transactions on Power Apparatus and Systems* No. 5, V PAS-93, Sept. 1974, pp 1488-97

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

13 126397

APPROXIMATION OF THE CORRELATION FUNCTION ESTIMATION IN THE ENERGY SUPPLY OF ELECTRIC RAILROADS [Akkroksimatsiya otsenok korrelyatsionnoi funktsii v energosnabzhenii elektricheskikh zheleznnykh dorog]

The reliability of estimating the ordinate of correlation functions during processing the observational results is analyzed by a direct model of the random process with given correlation function. Based on the results obtained, a recommendation for determining the parameters of the correlation functions in the study of random processes in the energy supply of electric railroads is given. [Russian]

Nikitin, YM *Elektrichestvo* No. 11, Nov. 1974, pp 81-82, 6 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

13 126398

USE OF DRAINING TRANSFORMERS IN CONJUNCTION WITH THE ELECTRIFICATION OF THE FREIGHT DETOUR TRAIN IN HAMBURG, WEST GERMANY [Einsatz von Saugtransformatoren bei der Elektrifizierung der Hamburger Gueterumgebungsbahn]

A 24-km long single-track railroad segment is described which serves to relieve certain overloaded tracks in the vicinity of Hamburg. The power supply facilities and practical implementations are discussed. Steps taken to minimize reverse current effects are considered. [German]

Lisson, P *Elektrische Bahnen* Vol. 46 No. 2, Feb. 1975, pp 28-32

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOLT JC

13 126414

CONSUMPTION OF THE WIRE IN CONTACT LINES IN RELATION TO INCREASES IN SPEED AND CURRENT [Il consumo del filo nelle linee di contatto in rapporto agli aumenti di velocita e di corrente]

An enquiry is made into the effects which the speed of trains and the current absorbed by them has on the consumption of the conductors. Speed and current are considered as independent parameters and their effects are considered through friction, insofar as speed is concerned, and through the joule effect with regard to the current. One reaches the definition of two coefficients, $K_{sub V}$ and $K_{sub I}$, which quantize the phenomena referring $K_{sub V}$ to an average speed $V_{sub O}$, whilst the coefficient $K_{sub I}$ is used to identify levels of wear, choosing as reference the value I of the coefficient $K_{sub I}$ calculated on the wear of the entire network. To the product $K_{sub V} \cdot K_{sub I}$, calculated line by line, is attributed the significance of the coefficient of wear of the line. The question is handled with a theoretical formulation and thus an experimental control is suggested. [Italian]

Capobianco, L *Ingegneria Ferroviaria* No. 2, Feb. 1975, pp 17-22

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

13 126449

SAR ELECTRICAL ENGINEERS GET NEW TEST CAR

South African Railways has put into service a new test car which is designed to speed the rate at which information may be gathered and processed. A roof bubble makes possible observation of overhead wire and pantograph interactions. The roof is fitted with its own pantograph for voltage measurements; radar equipment permits counting of wayside installations. Chart recorders, videotape and closed circuit television are also available. Parameters such as speed, acceleration, brake pipe pressure, can be recorded simultaneously. The test train, which includes also living facilities, it also used for substation testing.

Railway Engineering Vol. 71 No. 9, Sept. 1975, pp 14-15

PURCHASE FROM: Thomson Publications SA (PTY) Limited P.O. Box 8308, Johannesburg, South Africa Repr. PC

DOTL JC

13 126987

ELECTRIC AND DIESEL TRACTION ON THE MAIN BAIKAL--AMOUR RAILWAY LINE [BAM: elektricheskaja i teplovoznaja tjaga na Bajkalo--Amurskoj magistrali]

The article gives a technico-economic comparison of the two traction systems adopted for the BAM line: diesel and electric. It goes on to show the superiority of electric traction on sections with varied line profile, particularly that between Ust'-Kut and Majakan. [Russian]

Cepurkin, VV - Latunin, NI *Elektricheskaja i Teplovoznaja Tjaga* Vol. 18 No. 2, Feb. 1975, pp 4-7, 3 Fig., 2 Tab.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Elektricheskaja i Teplovoznaja Tjaga Moscow, USSR Repr. PC

13 126993

CONVERTERS AND THE LOAD ON THE MAINS SUPPLY [Zur Stromrichter-Netzbelastung]

When convertors are fed by the mains supply, the result can be decisive where certain applications are concerned. The effects of reactive power can be reduced or compensated and it is also possible to reduce the causes of reactive power by economical mountings, thereby minimising the repercussions on the mains. When current is single-phased, an effaceable convertor with a self-acting servo-system can be used; it is controlled by the mains. Problems still remaining in connection with measuring the power factor when a process is variable over a certain amount of time. The author mentions existing and planned installations. [German]

Forster, J *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 1, Jan. 1975, pp 52-57, 11 Fig., 19 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: ESL Repr. PC, Microfilm

13 127606

ELECTRIFICATION OF THE BLACK MESA AND LAKE POWELL RAILROAD

Computerized right down to its "toot-toot" at crossings, the world's first 50 kilovolt electric railroad began operation in late 1973 on a 78-mile line in northern Arizona on the Navajo and Hopi Indian reservations. Quietly rolling along through the bleak, lonely, but beautiful, Indian land, the train hauls 10,000 tons of coal three times daily from the Black Mesa area to Navajo Generating Station. Electrification, originally chosen for environmental reasons, has also proved economically advantageous in view of the increasing cost of diesel fuel. The train is powered by three electric locomotives supplied by General Electric. Each unit is capable of developing 6,000 horsepower (diesel-equivalent). Approximately 19,000 kilowatt-hours are required during each 156-mile round trip. Power is purchased from the Navajo Utility Authority and supplied to the engines through a series of overhead wires attached to specially built poles, called a catenary system. Ribbon rail in 1,440-foot sections is used over the entire route and is fabricated from 39-foot lengths flash-welded together. Concrete ties were used instead of wood because of considerably longer useful life. Automatic controls are part of the package purchased from GE. In addition to the controls and three engines, the package also included a 50,000 volt substation. Electronic sensors are installed between the concrete ties to give instructions to the onboard components of the locomotives. Most of the instructions deal with speed, but the computer also handles such functions as blowing the train's whistle at road crossings. An observer rides in the cab of the lead engine to assume control in the event of difficulties for which the computer cannot be programmed. Loading and unloading is done automatically by electronic control while the train is moving.

Symposium held February 19-21, 1974 and sponsored by the Electric Vehicle Council, New York, New York.

Pfister, J (Salt River Project)

International Electric Vehicle Symp & Expo, 3rd Proc Paper No. 7455, 1974, 8 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

13 127850

ELECTRIFICATION FOR ENVIRONMENTALISTS: 2

The author proposes consideration of d-c electrification and third-rail distribution for extensions of British Railway's Southern Region electrified

operation. With this he would expand the working of multiple-unit trainsets and introduce a tractor unit, a compromise between locomotive-hauled and true multiple-unit trains. He notes that ac electrification is favored if all trains are locomotive-hauled since substations are carried on the locomotives and can be utilized fully. For various reasons locomotive-hauled stock is not suitable for suburban service. He proposes an improved 1500-volt dc conductor rail mounted between the running rails and suggests solutions for problems occasioned by switchwork.

Ogilvie, J *Modern Railways* Vol. 32 No. 324, Sept. 1975, pp 370-374, Figs., Photos.

PURCHASE FROM: XUM Repr. PC

DOTL JC

13 128186

SHINKANSEN ELECTRIC POWER FACILITIES BETWEEN SHIN-OSAKA AND HAKATA

Shin Kansen electric power facilities have been constructed taking advantage of new technologies which have been developed in the ten years since the opening of the Tokyo-Shin Osaka segment. Problems of environmental protection have been taken into consideration and measures have been taken to prevent fires on board the trains. This article describes the heavy compound catenary system, the feeders and power transforming facilities and the overhead contact facilities in the Shin Kansen tunnels. Disaster prevention measures in tunnels are also described.

Terachi, K Takeishi, M (Japanese National Railways) *Japanese Railway Engineering* Vol. 15 No. 3/4, 1974, pp 20-22, 6 Fig.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

13 128192

A SYNTHETIC INSPECTION TRAIN FOR ELECTRIC AND TRACK FACILITIES OF THE SHINKANSEN

With extension of Shin Kansen to Hakata, JNR has put in service a seven-car train which can inspect the fixed facilities of the entire line at the revenue service speed of 210 kph. The cars have the following capabilities: Car 1--Measurement of communication, signal and catenary; Car 2--Measurement of electric power supply system and observation of pantograph action; Car 3--Power supply and data processing; Car 4--Power supply and crew facilities; Car 5--Measurement and data processing for track condition; Car 6--Storage and spare parts; Car 7--Measurement of Electric power supply system and of trolley wire.

Japanese Railway Engineering Vol. 15 No. 3/4, 1974, pp 23-24, 1 Tab.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

13 128201

REPORT ON THE VISIT TO THE USSR BY THE US ELECTRIFICATION DELEGATION

This report covers a two-week visit by a U.S. electrification delegation to the Soviet Union in May-June 1975 and is one of the technical exchanges between FRA and the Soviet Ministry of Railways. Since USSR Railways lead the world in electrification, the material in this report should be of interest to planners, managers and engineers. Major findings covered include: Extent of electrification, economics, voltage standards, locomotives, traction motor development, power conditioning, substations, power dispatching centers, pantograph/catenary. USSR Railways have 38,103 km of electrified route making up 27.7 percent of the total. Currently 51.2 percent of total traffic is carried on the electrified sections. Diagrams are given for many of the technical innovations studied.

Jacenko, D
Federal Railroad Administration 1975, 127 pp, Figs., 4 App.

ACKNOWLEDGMENT: FRA
PURCHASE FROM: FRA Repr. PC

DOTL RP

13 128862

IMPROVED SYSTEM FOR THE PROTECTION OF TROLLEY WIRES IN UNDERGROUND COAL MINES

This system requires continuous transmission of coded radio signals from the mobile vehicles, moving on the tracks, to an antenna wire. The antenna wire will be extended over the entire length of trolley wire, protected by a particular power circuit breaker. A receiver located at the circuit breaker and connected to the antenna wire, determines the total connected horsepower operating from that section of trolley wire. The receiver will then adjust the overcurrent trip setting of that circuit breaker to an appropriate level. The mobile vehicles will also be capable of transmitting an emergency signal which causes the receiver to trip and lock out the circuit breaker.

IEEE Ind Appl Soc, 9th Annual Meeting, Conf Rec, Pittsburgh, Pennsylvania, October 7-10, 1974.

Burr, J (Consol Coal Company)

Institute of Electrical and Electronics Engineers No. 1, 74 CHO 833-41A, 1974, pp 59-62, 3 Ref.

PURCHASE FROM: IEEE Repr. PC

13 128868

CURRENT WAVEFORM DISTORTION AT 25 KV SINGLE PHASE SUPPLY POINTS TO BRITISH RAILWAYS

The 132 kv current taken at the 132/25 kv substations supplying the British Railways 25 kv 50 Hz traction system is unbalanced, being single phase connected across two 132 kv system phases, and the waveform is distorted i.e. it contains harmonics. Both conditions can cause difficulties on the public supply network and require continuing investigation, since future expansion of the BR 25 kv electrified system is likely. However, this paper deals only with the harmonic aspects of the problem, the unbalance effects.

Prepared for meeting April 22-24, 1974.

Myles, A Howroyd, DC

Institution of Electrical Engineers No. 110, 1974, pp 241-245, 3 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

13 128869

STUDY OF TRANSIENT VOLTAGES IN TRANSIT SYSTEMS

Data on transient-voltage environment are needed for the specification and design of reliable transit-system electrical equipment, especially those containing semiconductor devices. Such data taken on the 600-v dc propulsion systems of the Chicago Transit Authority and the Long Island Railroad (LIRR) are presented. Transient-voltage counters, supplemented by an automatic cathode ray oscilloscope, were used to monitor transient voltages in substations, wayside switching stations and transit cars. The 37.5-v dc battery line was also monitored on board one transit car on the LIRR system. This program spanned a period of two and a half years. Theoretical analysis on the characteristics of transients caused by lightning and switching is also presented.

Chowdhuri, P (General Electric Company) *IEEE Transactions on Electromagnetic Compatibility* Vol EMC-17 N3, Aug. 1975, pp 140-149

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

13 129188

DESIGN CONSIDERATIONS FOR 25 KV TRACTION-SUPPLY TRANSFORMERS

Traction transformers are subjected to special stresses: irregular load conditions, imbalances of the three-phase supply network, short-circuits, over-tensions. Motive-power tension at pantographs must be maintained at a level which is as regular as possible. The article mentions a few constructional arrangements (electrical, mechanical, thermal), adopted for the transformers of BR's 25 kV traction network in order to withstand these service conditions without trouble.

Farr, JC Hall, AC *Institution of Electrical Engineers, Proceedings* Vol. 122 No. 7, July 1975, pp 727-732, 5 Fig., 1 Tab., 12 Ref.

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

DOTL JC

13 129189

INDUCTIVE EFFECT ON TELECOMMUNICATION LINES CAUSED BY A TRACTION NETWORK FED BY A 2 X 25 KV ELECTRIC SYSTEM [Induktivnoe vliyanie t'jagojov seti na linii svjazi pri sisteme elektrifikacii 2 X 25 kV]

The article describes a method of calculating the voltage induced in telecommunication lines and other communication media, by the traction network, in the case of a 2 x 25 kV electric supply system with line autotransformers on the occasion of a forced rating or a short circuit. The calculations show that the disturbing inductive effect, sometimes dangerous, due to a traction network fed by a 2 x 25 kV alternating current system, is several times less than that of an ordinary 25 kV traction network. [Russian]

Pavlov, IV *Vestnik Vniizt* Vol. 34 No. 4, 1975, pp 5-10, 1 Tab., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

13 129191

CALCULATIONS REGARDING CATENARY CARRYING CABLES IN RELATION TO WIND FORCE [Rascet provodov kontaktnoj seti na vetrovuju nagruzku]

The article examines wind speed pulsations during air turbulence, and the forced oscillations of catenary carrying cables under the action of random wind forces. A method is proposed for the dynamic calculation of cable displacement and the maximum permissible distances between catenary masts. [Russian]

Cucev, AP *Vestnik Vniizt* Vol. 34 No. 4, 1975, pp 14-17, 1 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

13 129193

ANALYSIS OF TELEMEASUREMENT ERRORS IN THE POWER SUPPLY SYSTEMS OF ELECTRIFIED RAILWAYS [K analizu pogresnostej teleizmerenij v sistemah energosnabzhenija elektrificirovannyh zeleznych dorog]

The article examines the uncertainties of the procedure for transmission of telemasurement data by coded impulses, and shows the possibility of determining the optimum interval of impulse discontinuity, for which it proposes the use of nomograms. [Russian]

Gorelov, GV *Vestnik Vniizt* Vol. 34 No. 4, 1975, pp 11-14, 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Vestnik Vniizt Moscow, USSR Repr. PC

13 129279

RESONANCE VIBRATIONS IN THE CATENARIES OF ELECTRIC RAILWAYS [Vibraciones resonantes en las lineas aereas de contacto de los ferrocarriles electricados]

In project 1-74, currently being undertaken by the AIT, a study is made of the problem of resonant vibration caused by high speeds. The article analyses the characteristics of this phenomenon, the reasons for its existence and the manner of coping with it. [Spanish]

Perez, G
Asociacion de Investigacion del Transporte No. 3, Apr. 1975, p 9-13

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Asociacion de Investigacion del Transporte Madrid, Spain Repr. PC

13 129301

POWER GENERATION AND DISTRIBUTION-LONDON TRANSPORT

The paper traces the evaluation of power generation, distribution and control from the days of the independent underground and tube railways to the present London Transport system. Describes current steam-raising and steam turbine and gas turbine practice with notes on the proposed future use of natural gas instead of oil. Other subjects include types of cable, substation rectifiers, remote control systems, protection, equipment, etc.

Presented to the Institution of Railway Signal Engineers, London, January 8, 1975.

Burgess, JM
Institution of Railway Signal Engineers 1975, 19 pp, 14 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Institution of Railway Signal Engineers 1 Ashborne Close, London W5, England Repr. PC

13 129405

TRACTION CONVERTERS WITH A HIGH POWER FACTOR [Bahn-Stromrichter mit gutem Leistungsfaktor]

Converters with delayed contact for train traction result in low losses, but do not have a satisfactory power factor through the whole operating range. As in the lower speed ranges, the value of the power factor is smaller than that in vehicles with amplifying current modulation, improvement is attempted by means of multi-impulse control. The authors explain: a non-controlled bridge connection with a d.c. converter inserted after it, which is synchronised with the mains frequency; a semi-controlled bridge connection with a special condenser circuit-breaking device; a bridge connection with adjustable valves, each side controlled separately. The disturbing current is less than I.A. The article describes the mains current behavior and the outlet voltage of these connections. [German]

Fick, H *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 96 No. 5, May 1975, pp 239-242, 8 Fig., 4 Ref.

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

13 129408

MEASURING SYSTEM FOR THE RECORDING OF THE CATENARY ZIG-ZAG PATTERN [Matsystem for registrering av kontaktledningens sick-sack tradforing]

A 15 kc/s current is fed to the contact wire by a high voltage capacitor connected to the pantograph on the measuring car. Two pairs of antennas on each side of the car symmetry line pick up the horizontal components of the magnetic field from the wire. The right and left hand side signals are separately transformed from the 16 kV level, filtered and rectified. The positive and negative sum of the signals and their difference signal are then fed to the servopotentiometer and the servo-amplifier of the recording system. [Swedish]

Artelius, B *Jarnvagsteknik* No. 43, 1975, pp 4-7, 4 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Jarnvagsteknik P.O. Box 265, S-10123 Stockholm, Sweden Repr. PC

13 129429

OVERHEAD CANTENARY TRACTION-SUPPLY FOR THE PARIS-LYON HIGH-SPEED LINE

Line tests with pantographs and catenary variations have established the characteristics required to suppress induced wave along the contact wire. The standard overhead design of the French National Railways has been found to be a sound one for speeds of 250 to 300 km/h. Already 200 km/h running is routine under such construction. Sectioning points and use of feeders at 50 kV in certain areas must still be established. It is concluded that reducing pantograph weight and increasing its flexibility may be most important.

Weber, O *Rail Engineering International* Vol. 5 No. 7, Oct. 1975, pp 264-266, 1 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

13 129431

ELECTRIC TRACTION DEVELOPMENT BOOSTS ECONOMY AND RELIABILITY

By 1975 USSR Railways operated 38,103 route-km of electrification with 2,000 km handling over 100 million net tons annually. After 50 years of progressive electrification, the pace of technical innovation is faster than ever, and the reliability of equipment has greatly improved in the past decade. Auto-transformer feeding on AC lines and the use of 6 kV DC are now seen as essential if 10,000-ton trains are to become general. Experience has shown that electrified lines, using either AC or DC, can cope with a considerably greater volume of freight traffic than was previously supposed, and technical developments described allow for further increase in line capacity.

Serdinov, SM (Soviet Ministry of Railways) *Railway Gazette International*
Vol. 131 No. 12, Dec. 1975, pp 453-457

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

13 129432

A 3000 V DC NETWORK COPES WITH OVERLOADING PROBLEMS

Fifty years after completion of South Africa's first mainline electrification, parts of SAR's 4,500-km network of 3,000 V DC lines have had to be heavily

reinforced to permit operation of 7,300-ton trains hauled by six units. This is in part why the the 1,625 route km authorized for immediate electrification after the 1973 oil crisis includes two major segments at 25 kV AC where fixed equipment is about half the cost of 3,000 V DC installations for the same heavy-load situation.

Winchester, AH (South African Railways) *Railway Gazette International*
Vol. 131 No. 12, Dec. 1975, pp 458-461, 2 Fig., 2 Tab.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

15 091488

INSTITUTIONS AND LIFE STYLES WORK PLAN. PHASE I, RESEARCH PLAN

Research plan outlining central institutions most likely to be affected by BART, most feasible for study, and most likely to produce findings of transferability to other settings for policy-related decisions. Second, selected aspects of various kinds of life-styles are reviewed and suggestions and hypotheses presented for further study of both institutions and life-styles (I&LS). The methodologies are designed to inter-connect from different angles in the study of the same problem, with a combination of ethnographic, observational, and survey research supplemented by document monitoring and analysis.

Prepared by Jefferson Associates, Inc., San Francisco, Calif.

Duster, T Fischer, C
Metropolitan Transportation Commission, Jefferson Associates, Incorporated PD-11-6-75, Jan. 1975, 22 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242-41/2ST, DOTL NTIS

15 092207

RETROSPECTIVE RAIL LINE ABANDONMENT STUDY

The study reports the results of a case examination of 10 rail abandonment proceedings conducted before the Interstate Commerce Commission in the early-to mid-1960's. The objectives of the research were to ascertain if analysis of the proceeding records in combination with field and telephone interviews with protestants, some five years after the abandonments, could be successfully employed to reveal (1) whether rail branch line abandonments had had a significant impact on communities or shippers formerly served by the branch and (2) whether the case record developed during the course of the proceedings provided a reliable predictive guide to the actual impacts of the abandonment.

See also PB-243 225.

Wheltle, B
Simat, Heliessen and Eichner, Incorporated, Department of Transportation
Final Rpt. 342-73, DOT-TPI-75-1, Mar. 1973, 75 pp

Contract DOT-OS-20108

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243224/3ST, DOTL NTIS

15 092208

ADDITIONAL RETROSPECTIVE RAIL LINE ABANDONMENT STUDIES

The study presents research findings which are the result of analyzing and assessing the impact of railroad line abandonments in several communities in the Northeast and Midwest.

See also PB-243 224.

Whelte, B
Simat, Heliessen and Eichner, Incorporated, Department of Transportation
Final Rpt. 400-74, DOT-TPI-75-2, Mar. 1975, 65 pp

Contract DOT-FR-4-5002

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243225/0ST, DOTL NTIS

15 099759

TRANSPORTATION AND URBAN AND REGIONAL DEVELOPMENT IMPACTS

In this paper, TOPAZ (Technique for the Optimum Placement of Activities in Zones) a mathematical programming technique is used to study long term effects of transportation systems on macro development patterns in urban and regional systems: for a Melbourne-Sydney regional corridor; and for the small town of Blacksburg in the United States. The first case is an objective function representing total costs and benefits for several alternative decentralized layouts of land uses and public service facilities. A gravity model is used to predict daily travel between town zones, and an iterative procedure produces the cheapest solution within certain constraints. In the second application, sub-models representing fuel consumption and pollution levels are added to the objective function, to ensure that they are reduced to a minimum. From these two studies, it can be concluded that the transportation, land use development, energy and air pollution components of urban and regional systems are highly interconnected.

Dickey, JW Sharpe, R *High Speed Ground Transportation Journal* Vol. 8 No. 2, 1974, pp 71-80, 3 Fig., 2 Tab., 6 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Planning[Transport Associates, Incorporated P.O. Box 4824, Duke Station, Durham, North Carolina, 27706 Repr. PC

DOTL JC

15 126407

IMPACT OF SHINKANSEN ON LOCAL COMMUNITIES-THE CASE OF OKAYAMA CITY AND ITS PERIPHERIES

The Shinkansen with its high speed and unique qualities has brought forth, as stated, some notable changes in the interrelationship between local areas and larger cities. It has combined the group of cities (Tokyo, Yokohama, Shizuoka, Hamamatsu, Toyohashi, Nagoya, Kyoto, Osaka, etc.) that came into being autogenesis-like on the Pacific Belt Zone into one vast megalopolis; and Tokyo and Osaka that have been the two essential political and economic centers of the country for over 100 years are brought into close proximity so that people in one city can travel to the other, do their business and return to their homes comfortably in the same day.

Yamaoka, M (Japanese National Railways) *Rail International* Vol. 6 No. 4, Apr. 1975, pp 263-276

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

15 129123

TRANSPORTATION DECISION-MAKING. A GUIDE TO SOCIAL AND ENVIRONMENTAL CONSIDERATIONS

This report presents an integrated approach for systematically incorporating social, economic, and environmental factors into transportation planning and design. Specific techniques are described for implementing the approach, together with examples illustrating their use in actual studies. Most of the techniques and procedures can be adopted without difficulty and many represent the current practice in several states. Taken together, however, the proposals reflect an approach to transportation planning and decision-making that is significantly different from what has been traditional.

Manheim, ML (Massachusetts Institute of Technology); Suhrbier, JH Bennett, ED Neumann, LA Colcord, FC, Jr Reno, AT, Jr
Transportation Research Board NCHRP Reports 156, 1975, 135 pp, 73 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: TRB Publications Off Repr. PC

DOTL JC

16 090976

FIVE YEAR PROGRAM PLANNING DOCUMENT FOR END USE ENERGY CONSERVATION, RESEARCH, DEVELOPMENT, AND DEMONSTRATION

Prepared by the Federal Energy Administration (FEA) with assistance from sixteen participating federal agencies, this Research, Development and Demonstration (RD and D) Program Planning Document represents the initial effort to organize the nation's resources into task forces under national government leadership. Report covers projects and funding needed for energy conservation studies in areas of transportation, industry, and building research.

Bauer, DC

Federal Energy Administration FEA/PD-226-D, June 1974, 259 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-240406/9ST, DOTL NTIS

16 091811

TECHNOLOGY ASSESSMENT OF PORTABLE ENERGY RDT AND P, PHASE 1

A technological assessment of portable energy research, development, technology, and production was undertaken to assess the technical, economic, environmental, and sociopolitical issues associated with portable energy options. Those courses of action are discussed which would impact aviation and air transportation research and technology. Technology assessment workshops were held to develop problem statements. The eighteen portable energy problem statements are discussed in detail along with each program's objective, approach, task description, and estimates of time and costs.

Spraul, JR

TRW Systems Group Final Rpt. NASA-CR-137653, Apr. 1975, 240 pp

Contract NAS2-8445

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
N75-22902/1ST, DOTL NTIS

16 091812

TECHNOLOGY ASSESSMENT OF PORTABLE ENERGY RDT AND P, PHASE 1 [Executive Summary Report]

A technology assessment of transportation energy research, development, technology, and production was undertaken to assess the technical, economic, environmental, sociopolitical issues associated with transportation energy options, and to determine those courses of action impacting aviation and air transportation research and technology. A technology assessment workshop was used to determine the problem statements that would be considered. Study tasks are summarized along with the problem statements.

Executive Summary Report.

Spraul, JR

TRW Systems Group NASA-CR-137654, Apr. 1975, 13 pp

Contract NAS2-8445

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
N75-22901/3ST, DOTL NTIS

16 092024

PER PASSENGER-MILE ENERGY CONSUMPTION AND COSTS FOR SUBURBAN COMMUTER SERVICE DIESEL TRAINS

Results presented in this report are based on data obtained from Chicago, Illinois' three diesel commuter railroads. Operations and equipment are described, particularly in terms of energy consumption and pollutant production. Service characteristics, such as average occupancy and average trip distance, and energy consumption results are presented and discussed.

Walbridge, EW

Illinois University, Chicago, Urban Mass Transportation Administration Final Rpt. RR-12, UMTA-IL-11-0006-74-1, Aug. 1974, 65 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242232/7ST, DOTL NTIS

16 092310

RAILROADS AND THE ENVIRONMENT: ESTIMATION OF FUEL CONSUMPTION IN RAIL TRANSPORTATION, VOLUME I. ANALYTICAL MODEL

The report describes an analytical approach to estimation of fuel consumption in rail transportation, 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 locomotive 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, Federal Railroad Administration Final Rpt. DOT-TSC-FRA-75-16-I, FRA/ORD-75/74.I, May 1975, 84p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244150/5ST, DOTL NTIS

16 092332

JOINT STRATEGIES FOR URBAN TRANSPORTATION, AIR QUALITY AND ENERGY CONSERVATION. JOINT ACTION PROGRAMS

This report develops an integrated approach for resolving problems created by traffic congestion, air pollution, and petroleum shortages. In Part I, the basic relationships among the strategies and actions are summarized in a matrix display. Each item is ranked to access its impact on six subgoals, or phenomena, in the near or long term: improved auto alternative, improved vehicular flow; reduced auto use; reduced travel demand; reduced vehicular emissions; and reduced vehicular petroleum consumption. Two synergistic joint action programs are presented. Part II contains an information review of experience, impacts on goals (mobility, air quality, energy conservation), and an overall evaluation of 54 specific actions.

Prepared in cooperation with Naval Underwater Systems Center, Newport, R.I.

Krzyczkowski, R Henneman, SS Hudson, CL Putnam, ES Thiesen, DJ

Interplan Corporation, Urban Mass Transportation Administration, Naval Underwater Systems Center, (UMTA-RI-06-0005) 7346-R, UMTA-RI-06-0005-75-1, Dec. 1974, 378p

Contract N00140-74-C-6026

ACKNOWLEDGMENT: NTIS, UMTA

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244473/5ST, DOTL NTIS

16 092347

MULTIREGIONAL ECONOMIC IMPACTS OF ENERGY AND TRANSPORTATION POLICIES

The report presents a multiregional empirical analysis of energy and transportation. The study shows how the multiregional input-output (MRIO) model for the United States can be used to analyze energy and transportation policies in general. A specific study deals with the economic interaction between electricity, coal, and freight transportation created by changes in the regional technologies of generating electricity as well as alterations in the interregional shipments of coal. Recommendations are given for extending the MRIO data base and modifying the MJRIO model to increase its usefulness for the study of energy and transportation at the regional level.

See also PB-244 587.

Polenske, KR Levy, PF

Massachusetts Institute of Technology, Department of Transportation No. 8, Mar. 1975, 128p

Contract DOT-OS-30104

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244586/4ST, DOTL NTIS

16 092729

FUEL CONSERVATION MEASURES: THE TRANSPORTATION SECTOR. VOLUME II

The magnitude of total transportation fuel consumption in Texas is discussed and that portion of total transportation fuel used for intercity travel is identified. Intercity movement of people and goods is covered along with the fuel efficiency of the intercity travel modes. An estimate is provided of existing and future passenger-miles and ton-miles of intercity travel in Texas. From these data, estimates of fuel consumption are formulated. Indications of the magnitude of fuel savings that might result from modal shifts are also presented.

Prepared in cooperation with Texas Transportation Inst., College Station. See also Volume I, PB-243 324.

Holder, R

Texas Governor's Energy Advisory Council, National Science Foundation, Texas Transportation Institute, (S/D-9) Final Rpt. NSF/RA/N-74-230, Jan. 1975, 97p

Grant NSF-GI-44085

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243335/8ST, DOTL NTIS

16 092789

ANALYSIS OF ENERGY RESOURCES AND PROGRAMS OF THE SOVIET UNION AND EASTERN EUROPE. APPENDIX A: FRAMEWORK OF ENERGY SUPPLY AND DEMAND

The report presents detailed information on the economic base, relation of economic growth and energy demand, and energy demand by type of energy of the Soviet Union and Eastern Europe.

See also Appendix D, AD-A012 971.

Hopkins, GD Korens, N Schmidt, RA Trexel, CAJ

Stanford Research Institute, Rome Air Development Center, Defense Advanced Research Projects Agency Final Rpt. Appendix A, RADC-TR-74-204-App-A, Dec. 1973, 232p

Contract F30602-73-C-0200

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
AD-A012970/0ST, DOTL NTIS

16 093067

THE PUBLIC'S ATTITUDES TOWARD AND KNOWLEDGE OF ENERGY-RELATED ISSUES. HIGHLIGHT REPORT. VOLUME XI

This report is part of a series of studies dealing with general public behavior and attitudes towards energy conservation. It concentrates on attitudes toward nuclear power plants, the impact of school programs on home energy consumption, factors affecting the public's use of mass transit, and company efforts at energy conservation. Some of the following questions are considered: role of the school in emphasized energy conservation; efforts of children to conserve at home; efforts of children to recycle; car pooling in relationship to long distance mass transit; availability of public transportation; interest in public transit for shopping; drawbacks to using public transportation; likelihood of using buses if special lanes were provided for them; impact of increased travel time; type of mass transit most needed; and money for mass transit vs. highways.

See also Volume 10, PB-244 988, and Volume 13, PB-244 990.

Rappeport, M Labaw, P

Opinion Research Corporation, Federal Energy Administration FEA/D-75/511, June 1975, 32 pp

Contract DI-14-01-0001-1714

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244987/4ST, DOTL NTIS

16 099760

THE ENERGY CRISIS AND ENERGY CONSUMPTION FOR FREIGHT TRANSPORT BY ROAD. A RAIL/ROAD COMPARISON [La crise de l'energie et la consommation energetique du transport de marchandises par la route. Comparaison rail/route]
No Abstract. [French]

Union Internationale des Transports Routiers Sept. 1974, 32 pp, Tabs., 2 App.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

SNCF cat. No. 01N75

16 099779

WEIGHTED DIGRAPH MODELS FOR ENERGY USE AND AIR POLLUTION IN TRANSPORTATION SYSTEMS

Prepared for the National Science Foundation as part of a study of Evaluation Measures to Conserve Energy, this report proposes use of the graph theory to analyze the complex interactions underlying the growing demand for energy. The graph theory application presents two problems: constructing a digraph model for a given system and analyzing the model. Rand reports R-927/1-NSF and R-927/2-NSF deal with construction of a digraph model and R-926-NSF is concerned with its analysis. This report considers the construction of weighted and double-weighted digraphs for the transportation system of a hypothetical metropolitan area similar to San Diego. It analyzes these digraphs with regard to fuel consumption and air pollution and it makes some assumptions underlying the techniques of digraph analysis. It also describes potential areas of applicability of the digraph methodology.

Roberts, FS

Rand Corporation R-1578-NSF, Dec. 1974, 97 pp, 28 Fig., 10 Ref.

ACKNOWLEDGMENT: High Speed Ground Transportation Journal

PURCHASE FROM: Rand Corporation 1700 Main Street, Santa Monica, California, 90401 Repr. PC

16 099780

TRANSPORTATION ENERGY USE IN THE UNITED STATES: A STATISTICAL HISTORY 1955-1971.

Another report in the Rand research program on The Growing Demand for Energy, this study summarizes United States transportation energy consumption data which had not previously been available in a single source. The author states that careful estimates of these data are included in this work, which he feels should be of interest to researchers, students, legislators, policymakers, and others involved in energy and transportation activities. The study includes total water, railroads and military transportation. An appendix deals with conversion factors.

Related Rand reports are listed as: R-804-NSF, The Effect of Fuel Price Increases on Energy Intensiveness of Freight Transport, by W. E. Mooz (Dec. 1971); R-988-NSF, Methods for Estimating the Volume and Energy Demand of Freight Transport, by D. P. Tihansky (Dec. 1972); and R-1360-NSF, The Potential for Energy Conservation in Commercial Transport, by J. J. Mutch (Oct. 1973).

Mutch, JJ

Rand Corporation Dec. 1973, 44 pp, Tabs., 24 Ref., 1 App.

ACKNOWLEDGMENT: High Speed Ground Transportation Journal

PURCHASE FROM: Rand Corporation 1700 Main Street, Santa Monica, California, 90401 Repr. PC

16 099809

COMING: THE REAL ENERGY CRISIS

While most of the attention given to the energy crisis has been on short term fuel supply problems, the steady construction of buildings and development of systems which are energy intensive can only create extremely difficult problems in years ahead. It is proposed that there be a dramatic reduction in total energy needs. The major deterrent to change is that political and economic forces which determine decisions and actions are controlled by the short-range influences of the economic marketplace. Institutions seem incapable of responding to long-range problems and needs. The author concludes that this generation will have to depart from the previous practice of passing the hard problems on to the next generation.

Conta, LD (Rhode Island University, Kingston) *ASME Journal of Mechanical Engineering* Vol. 97 No. 8, Aug. 1975, pp 18-25

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 125023

FUTURE TRANSPORT-THE IMPORTANCE OF SAVING FUEL

In an article on future forms of public transportation, the author presents his views on a possible course of transport development in the UK. Systems now being developed for long-term use should in general be based on more efficient use of fuel and environmental improvement. Potentially the railways could be the most advanced form of transport and, within the next decade, this method of transport is likely to be developed as an energy-conserving, computer-controlled way of moving people and freight, thus reducing dependence on road transport. In such a system the car would cease to be privately owned and would be used only at the beginning and end of long rail journeys on a hire basis and would probably be electrically propelled. Following a brief discussion of the economics of high-speed flight and whether the energy so used is fully justified, the author advocates the use of more efficient and accessible energy conserving forms of public transport such as a form of tramcar for city centre use. /TRRL/

Symes-Schutzmann, R *Design Engineering* Sept. 1974, pp 16-19, 2 Fig., 3 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213053)

PURCHASE FROM: ESL Repr. PC, Microfilm

16 125024

ENERGY CONSERVATION IN THE UNITED KINGDOM. ACHIEVEMENTS, AIMS AND OPTIONS

This report examines broadly the possibilities for conservation of energy in the most important sectors of the economy. There are chapters on patterns of energy consumption, domestic energy, commercial and public buildings, transport, industry (five important sectors in particular), energy industries, efficiency of energy utilisation, environmental and social aspects, and routes towards energy conservation. Transport has, from 1960 to 1972, kept to about 15% of the national energy consumption. Efficiency of energy usage by railways, in changing from coal to oil, has increased five-fold. In the same time, use of oil for road transport doubled. Shifting freight from road to rail would yield relatively little saving. Use of car-pooling or bicycling for work journeys could save 10-20% of all car mileage. Greater use of buses would also be beneficial. Diesel, or improved petrol engines could cut cars' fuel consumption, as would lighter cars. A standard driving cycle should be used in stating petrol mileage for new cars. Applications of new technology, such as battery cars, should be studied. Recommendations are made for improving conservation: there should be greater coordination among the many areas with mutual influence; the new advisory council on energy conservation will aid this objective. Inter-disciplinary collaboration should increase in studies of related social, economic and technological aspects of better use of energy. /TRRL/

Her Majesty's Stationery Office R&D Rept. Dec. 1974, 114 pp, 1 Fig., 57 Tab., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212846)

PURCHASE FROM: Her Majesty's Stationery Office P.O. Box 569, London SE1 9NJ, England Repr. PC

16 125557

FREIGHT TRANSPORT BY ROAD AND RAIL: A COMPARISON OF RESPECTIVE ENERGY CONSUMPTION [Irasporto merci per ferrovia e per strada: Comparazione dei rispettivi consumi di energia]

This article challenges the assumption that rail transport is more economic in energy consumption than road transport. It is argued that though this may be true for some types of traffic, it is false for others. With regard to freight transport, where the assumption may be true, it is pointed out that the ratios between rail and lorry consumptions are lower than many quoted figures, including the 1:3.5 calculated by the Battelle Institute for the American Railroad Association, and adopted by the UIC (Union Internationale des Chemins de Fer) in Europe. It is argued that: (a), the criterion of energy consumption per ton/km between railway stations is false, since it

ignores energy consuming activity and movement before and after the station to station journey; (b), empty or partially loaded trips by both rail and road transport are ignored; and (c) the ratio of dead weight to useful load is higher in rail than in road transport. /TRRL/ [Italian, French/German]

Vita, REV *Automobilismo E Automobilismo Industriale* No. 5-6, May 1974, pp 66-70

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212619)

PURCHASE FROM: Automobile Club of Italy Via Marsala 8, 00185 Rome, Italy Repr. PC

16 125792

WORLD ENERGY RESOURCES: A SURVEY

The World Energy Conference published "Survey of energy resources 1974" in September 1974 to coincide with the 9th WEC meeting, held in Detroit. This is the third in a series of surveys by WEC, the previous volumes having been published in 1962 and 1968. Solid fuels, coals and liquites, peat and noncommercial fuels, petroleum oil, oil from natural gases, natural gas, hydraulic energy, nuclear energy, geothermal energy, tidal power, ocean thermal gradients, wind power, and solar energy are all discussed.

Parker, A *Energy Policy* Vol. 3 No. 1, Mar. 1975, pp 58-66, 5 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 125817

CONTRASTS IN SOVIET AND AMERICAN ENERGY POLICIES

The view is advanced that West Europeans, Japanese and Americans are accustomed to thinking of their own market based economic systems as more flexible, hence more rational, than the rigid central planning systems employed in most Communist countries. The author contends that Communist planners are, by and large, pursuing a course of cautious, deliberate, rational energy decisions based (both domestically and internationally) on relative cost and price. In contrast, capitalist governments have shown a pattern of draconian measures involving quantitative restrictions, suspension of the market mechanism, government manipulation of prices, encouragement and protection of monopoly-and even the attempted central planning of crude oil and refined products.

Wright, AW (Massachusetts University, Amherst) *Energy Policy* Vol. 3 No. 1, Mar. 1975, pp 38-46, 4 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 125821

POTENTIAL OF COAL TO MEET THE ENERGY CRISIS

The author emphasizes that, although the energy crisis has demonstrated the need for greatly increased coal production, the coal industry's efforts to meet new demand challenges must be supported by a national commitment to coal development, enforced by favorable government energy policies. For a climate of growth, the industry requires not only internal strengthening-labor stability, financial incentives and long-term market assurances-but also relief from restrictive environmental legislation effecting both the production and utilization of vitally needed coal.

Bagge, CE *Energy Systems and Policy* Vol. 1 No. 1, Sept. 1974, pp 31-39

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

16 125822

TRENDS IN DIESEL ENGINE LUBRICANTS-1. CRANKCASE OILS FOR MEDIUM AND HIGH SPEED ENGINES

This paper describes the trends in crankcase lubricants for medium and high speed diesels widely used in marine, railroad, vehicular and stationary applications in the western hemisphere. The builder and user requirements, laboratory evaluation and field studies are discussed. The newest crankcase oils for medium speed engines (Class III) are "third generation" products with high TBN and improved detergency. They have shown improved wear

protection, less engine deposits and better alkalinity retention than the older products in severe service. An interesting development for the high speed engines is the universal-type oil.

Prepared for meeting 6-10 April 1975.

Younghouse, EC (Exxon Research and Engineering Company); Steere, DE Lowe, FW
American Society of Mechanical Engineers Paper 75-DGP-17, Apr. 1975, 13 pp, 21 Ref.

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

16 125841
SLUDGE FORMATION IN STORAGE OF DIESEL OIL WITH ADDITIVE

During prolonged storage of DS-11 oil with 5% TsIATIM-339 additive, sludge accumulates on the tank bottoms; this sludge is an emulsion of water and oil, stabilized by the surface-active components of TsIATIM-339, including the stable free radicals present in the additive. The emulsion sludges consist of 90-99% oil, 1.4-5.5% solid component, and 0.8-8.6% water. The solid component consists of 75-83% ash elements, including 31-54% barium. The number of paramagnetic particles per gram of solid component of the sludge may vary from 3-10 to the 17th power to 6-10 to the 18th power. Oil losses during long-term storage due to sludge formation may amount to 0.03-0.08% in above ground tanks and 0.18-0.19% in trench tanks, which exceeds the established standard by a factor of 5-10. Analytical data are tabulated.

Sorokina, NA Shimonae, GS Marinchenko, NI *Chemistry and Technology of Fuels and Oils* Vol. 10 No. 5-6, May 1974, pp 473-474, 4 Ref.

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

16 125844
ENERGY-ECONOMY PROBLEMS ASSOCIATED WITH HIGH-CAPACITY EXPRESS TRAINS [Energiewirtschaftliche Fragen bei Hochleistungs-schnell-bahnen]

Relationships between train speed and resulting expenditures of energy and costs are discussed from the viewpoint of minimizing both latter aspects. Characteristic energy and economic aspects are illustrated by means of examples. Various pertinent parameters are analyzed. [German]

Kother, HK *Elektrische Bahnen* Vol. 46 No. 3, Mar. 1975, pp 65-68, 5 Ref.

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

DOTL JC

16 125856
COMPARISON OF ENERGY CONSUMPTION BETWEEN ROAD AND RAIL

This study is a report on the present situation concerning traffic in which road and rail means can be considered as competitive, that is a domain in which transfers from one type of traffic to the other could be envisaged. This study is based on a long distance traffic (310 miles) and excludes distribution traffic over short distances for which rail is badly placed compared to road facilities as well as bulk transportation in big amounts such as minerals which cannot be transported by road. [French]

Blane, G *Transports* No. 200, Mar. 1975, pp 91-98

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Transports Paris, France Repr. PC

16 126405
INFLUENCE OF LOW-MOLECULAR-WEIGHT COPOLYMERS OF ETHYLENE WITH VINYL ACETATE ON THE LOW-TEMPERATURE PROPERTIES OF DIESEL FUEL

In the reported investigation, low mol.-wt copolymers of ethylene with vinyl acetate have been synthesized for use as pour-depressants in diesel fuels. It is demonstrated that the greatest depressant action is given by a copolymer with a mol. wt of approximately 2000, containing 30-40% vinyl acetate units by weight. This copolymer-depressant, in comparison with the other

copolymers that were investigated, gives a greater depression of solid point for a diesel fuel with equal content of paraffinic hydrocarbons, and identical depression with a greater content of these hydrocarbons. The efficiency of depressant action for the copolymers in diesel fuel increases with increasing mol. wt of the paraffinic hydrocarbons present in the fuel.

Krasnyanskaya, GG Gryaznov, BV Kryunina, VA Lyubimova, SL Monastyrskii, VN Terteryan, RA *Chemistry and Technology of Fuels and Oils* Vol. 10 No. 7-8, July 1974, pp 615-618, 2 Ref.

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

16 127370
INCREASE IN THE ROLE OF THE RAILWAYS IN THE FUTURE, AS A RESULT OF DECREASING COSTS OF TRANSPORT AND ENERGY CONSUMPTION

Rail transport costs, even in the case of combined transport, are lower than those for direct road transport, with effect from a certain distance carried. Taking into account energy consumption, rail transport is more profitable in most cases. The increase in the price of energy is giving rise to a diminishing sphere of action of the motor car, even from the economic point of view. The railway is able to use electrical energy for traction purposes, which can be obtained from primary energy sources other than liquid fuels. This possibility is not open to the motor car, and it will still be obliged to make use of liquid fuels for a long time to come. The advantage of road vehicles for freight conveyance over long distances (300 to 500 km) at fairly high speeds can be counteracted to a large extent by containerization. The above conclusions fully justify the forecasts concerning the development of the role of the railways in the next ten to twenty years, in the field of freight transport.

Turbut, G Spirea, E *Rail International* No. 7, July 1975, pp 621-625, 3 Fig.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 127383
PROSPECTS OF IMPROVING THE FREIGHT TRAFFIC INSTALLATIONS OF THE USSR RAILWAYS

In the USSR, the rapid development of the national economy and the continually expanding economic relations between the different Republics, reflected in the supplies of industrial products and agricultural produce, have led to a considerable increase in the traffic carried by all the modes of transport. In handling the transports, the railway is playing a leading part, dealing with more than 3,000,000 million t/km per annum (representing 65% of the total freight traffic) and with nearly half of the passenger traffic in the country. One of the basic conditions for coping with the increasing freight and passenger traffic has been the realization of certain previously planned measures for a thorough technical remodelling of railway transport on the basis of extensive electrification and dieselization schemes. With the successful realization of this programme, the total route length of lines operated by progressive modes of traction has increased to 124,600 km, including 37,100 km of electrified lines and 87,500 km of dieselized lines. At present, the high-capacity electric and diesel locomotives cater for the lines with the heaviest freight traffic, representing 99.4% of the total freight traffic (viz. 50.9% on electrified lines and 48.5% on dieselized lines). The transition to electric and diesel traction has been associated with a whole complex of ancillary works designed to strengthen other branches of railway operation. There have been considerable changes in the fleet of wagons, and virtually all of the two-axled wagons have been scrapped. They have been replaced by new, improved heavy goods wagons with four or eight axles, equipped with automatic couplings and modern automatic brakes.

Kozlov, VE *Rail International* No. 8, Aug. 1975, pp 687-693, 4 Fig., 1 Tab., 3 Ref.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 127395
ENERGY PRIMER

This is a general-interest publication, introductory in nature, designed to aid the user in gaining basic familiarity with, and understanding of transporta-

tion energy. An immense amount of information has been generated in recent years regarding current and forecast energy situations in the U.S. Energy statistics, supply and utilization forecasts and evaluations of conservation alternatives are the topics emphasized. Ten abstracts were selected from recent literature. Each includes as much as possible of the author's data to save time by allowing the user to consult this Primer rather than scattered original reports. Numerous authors' tables have been retained with the abstracts.

Transportation Systems Center No Date

PURCHASE FROM: TSC Repr. PC

16 127622
NATIONAL MATERIALS POLICY

The volume contains 28 papers presented at a joint meeting of the National Academy of Sciences and the National Academy of Engineering, presented in an edited form, with discussions of the materials that are sources of energy. The papers are grouped under following titles: Goals and policies; Resources and reserves; Nonrenewable reserves and new technology; Options for unconventional resources; Options for materials technology policies; and Men, institutions and needs.

Meeting held in Washington, D.C., October 25-26, 1973. Direct requests to the NAS Printing and Publications Office.

National Academy of Sciences Proc Paper 1975, 215 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: National Academy of Sciences 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr. PC

16 127859
ENERGY CONSIDERATIONS IN URBAN TRANSPORTATION PLANNING

Energy consumption of urban transportation systems may soon be a major factor in planning--a situation which has not been explicitly considered to the present. Urban transportation energy demand is expected to increase substantially and remain heavily dependent upon petroleum-based fuels. The modal-split models in this article establish what the choice should be to achieve a specified level of energy consumption and to define modal split to minimize energy consumption while satisfying accessibility standards. The article also proposed use of curves of energy use which vary with passenger load factors and modal-splits to analyze the energy consequences of alternative transportation plans, policies and programs.

Yunker, KR Sinha, KC *Traffic Quarterly* Vol. 29 No. 4, Oct. 1975, pp 571-592, 6 Fig., 4 Tab.

ACKNOWLEDGMENT: Traffic Quarterly
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 128202
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 sq in. and power ratings from 2000 to 4000 brake horsepower. The study that is the subject of this report utilizes 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). The conclusions reached at the end of Phase I of the program resulted in several recommendations for additional investigation or evaluation by actual testing in Phase II.

This project was sponsored by the U.S. DOT, Office of the Secretary and

US Coast Guard, Office of R&D.
Stormont, JO Wood, CD Mathis, RJ
Southwest Research Institute, (DOT-TSC-OST-75-41) Intrm Rpt.
DOT-TSC-OST-75-41, CG-D-124-75, Sept. 1975, 118 pp, 18 Fig., 7 Tab., 40 Ref., 2 App.

Contract DOT-TSC-920

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

DOTL RP

16 128897
STORING ELECTRICAL ENERGY ON A LARGE SCALE

World energy consumption for land, sea, and air transport is analyzed. Unfortunately, from an energy point of view, railways provide only a relatively small proportion of the world's transport effort--about 17% of the revenue load-t-km operated in the western world. Because modern railways use energy relatively efficiently for the work they do--in spite of the substantial losses in the electrical transmission--railways consume only some 3% of the total energy used in transport. By contrast, road transport (which uses about 78% of the energy consumed in transport as a whole for the production of 16% of the load-t-km) and air transport (which uses about 12-1/2% of the total energy for 0.3% of the load-t-km) are wholly dependent on oil, as is shipping to complete the total. Each mode of transport is evaluated in terms of its efficiency in using energy; and suggestions are made as to what forms of public transport would provide the best use of energy for journeys of different lengths. The interesting point is made that, within economic limits, history has shown that the public prefers to limit travel time to four to five hours, a concept which can account for the loss in popularity of transcontinental rail travel and scheduled ocean voyages.

Gardner, GC Hart, AB Moffitt, RD Wright, JK *Energy Digest* Vol. 4 No. 3, June 1975, pp 38-45

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

16 129099
PREDICTED ENERGY PATTERNS--THE ROLE OF COAL

General circumstances concerning the role of coal are discussed, along with improvements in utilization and future coal conversion processes. It is concluded that coal will remain a very important energy source on a world scale for many decades. In the UK there is the potential at least to maintain present levels of output. In other parts of Western Europe, although capacity has been lost more rapidly than in the UK, there is also the possibility of changing this trend in some places.

Presented at a meeting held in London, May 6-9, 1974.

Grainger, L (National Coal Board, England)
Institution of Electrical Engineers Conf Publ 112, 1974, pp 170-177

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

DOTL JC

16 129100
PREDICTED ENERGY PATTERNS

A brief review is presented on trends in the consumption of energy, particularly electric energy, in the world with emphasis on Western Europe and the United States. Projections for future developments are presented. Primary energy sources for generation of electricity in the coming decades are discussed.

Presented at a meeting held in London, May 6-9, 1974.

Angelini, AM
Institution of Electrical Engineers Conf Publ 112, 1974, pp 93-101

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

DOTL JC

16 129275
THE SNCF AND ENERGY

Under this title the SNCF has recently published a document which contains details of the amount of energy consumed by each mode of transport and gives statistics on the railway's position in this problem which affects directly

the country's economy. The first chapter explains the energy situation in France and how it has developed over the last twenty years. The second chapter deals with the importance of the transport sector in the economy and its characteristics (the 26.5 per cent transport share is comparable to that of the domestic and tertiary sector, and to that of industry). It is stated in the document that it seems essential to direct traffic to the most economical modes so as to limit the rise of energy consumption in the transport sector. In the third chapter (reproduced in full in this issue) are given the consumption figures for the different modes of passenger and freight transport. The document then mentions the three essential factors that explain the railway's advantages in the sphere of energy, a very large portion of its traffic being hauled by electric traction. Reference is made finally to the importance of economising oil which may entail, in the next decade, transferring traffic from high-consumption transport modes to the most economic mode, thereby ensuring a better equilibrium of investments and a better use of the railway's [French]

Revue Generale des Chemins de Fer Vol. 94 Sept. 1975, pp 539-544

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

16 129317
UNITED STATES ENERGY THROUGH THE YEAR 2000
(REVISED)

This report is an update of earlier energy forecasts of the Bureau of Mines. 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, WG, Jr Corsentino, JS
Bureau of Mines Dec. 1975, 65 pp, 9 Fig.

ACKNOWLEDGMENT: Bureau of Mines
PURCHASE FROM: Bureau of Mines 4800 Forbes Avenue, Pittsburgh, Pennsylvania, 15213 Repr. PC

16 129331
HOW THEY COMPARE: ENERGY EFFICIENCY OF
TRANSPORT MODES

A graphic comparison of the energy efficiency of all transport modes, illustrating specifically: (a) passenger transport energy intensiveness; (b) passenger ground transport energy consumption; (c) drive systems efficiency; (d) freight energy intensiveness; (e) freight transport energy consumption; (f) HP requirements TOPC and improved CDFC; (g) Truck-MPG vs. velocity; (h) transport efficiency, TIFC vs. advanced design CDFC.

Roberts, R *Modern Railroads* Vol. 30 No. 11, Nov. 1975, pp 52-56, 8 Fig.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

17 052670

IDENTIFICATION OF WAGON NUMBERS. A REVIEW OF THE MICROWAVE IDENTIFICATION SYSTEM

The report gives an account of the present state of research into the application of the microwave system for automatic car identification purposes. Special emphasis is put on the following points:-new coding of transponders,-the possibility of connecting several antenna units to one processing unit,-mounting of responders,-the influence of these factors on cost. Furthermore, the report gives a list of technical terms and describes the present state of negotiations with Siemens about licensing arrangements.

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

International Union of Railways A97/RP 5/E, Apr. 1975, 23 pp, 36 Fig., 1 Tab., 8 App.

ACKNOWLEDGMENT: UIC

PURCHASE FROM: UIC Repr. PC

DOTL RP

17 052678

GENERAL PRINCIPLES FOR ESTABLISHING AND OPERATING DATA TRANSMISSION NETWORKS FOR USE BY THE RAILWAYS

No Abstract.

International Union of Railways DOC 22, 54 pp, 10 Fig., 1 Ref.

ACKNOWLEDGMENT: UIC

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

DOTL RP

17 091910

A MINIMAX LOCATION PROBLEM ON A NETWORK

We consider a network model of a system of transportation links, with nodes representing locations of existing facilities, and study the problem of finding a new facility location on the network that minimizes the maximum of linear increasing functions of the 'network distances' between the new facility and the existing facilities. The problem is formulated with respect to a metric space which is defined on the network, and a number of properties of the problem are developed. The properties lead to a new, simple algorithm for solving the problem when the network is a tree, and to a new, equivalent spanning tree problem for a general network. (Author)

Availability: Pub. in unidentified publication, p333-343.

Dearing, PM Francis, RL

Florida University, Gainesville, Army Research Office, Cornell University
Oct. 1973, 12p

Contract DAHC04-68-C-0002

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

AD-A010685/6ST

17 092150

AUTOMATION OF PERIODIC REPORTS

The manual is a user's guide to the automation of the 'Summary of National Transportation Statistics.' The System is stored on the in-house PDP-10 computer to provide ready access and retrieval of the data. The information stored in the system includes 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, as well as supplementary data on transportation and the economy. Included in the user's guide is: an explanation of the coding system developed for the different transportation modes; sample outputs and instruction on the use of the reports and plots developed; a listing of the information contained in the system.

Kaprelian, AS Folan, R Condell, H

Transportation Systems Center, Office of Policy, Plans and International Affairs Report DOT-TSC-OST-75-19, June 1975, 60 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243444/7ST, DOTL NTIS

17 092297

PRELIMINARY FUNCTIONAL SPECIFICATION FOR A PROTOTYPE ELECTRONIC DATA INTERCHANGE SYSTEM

A preliminary specification is presented for electronic data interchange of transportation information between shippers, carriers, forwarders and banks. This specification was prepared in conjunction with working groups from transportation industry participants.

Carley, J Notto, RW Bass, EJ Probst, LA Guilbert, EA

Transportation Data Coordinating Committee, Department of Transportation Final Rpt. TDCC-75-201, Ph1, DOT/OS-50017-1, July 1975, 439p

Contract DOT-OS-50017

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244092/3ST, DOTL NTIS

17 093156

NETWORK FLOWS (A BIBLIOGRAPHY WITH ABSTRACTS)

The bibliography cites research on the practical and theoretical applications of network flows to problem solving. Studies on job sequencing, transportation models, insurance, water resources, communication systems, data processing, waste disposal, and circuit analysis are included. (Contains 138 abstracts).

Supersedes NTIS/PS-75/065.

Grooms, DW

National Technical Information Service Bibliog. Sept. 1975, 143 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PS-75694/0ST, DOTL NTIS

17 099773

METHODOLOGY AND PROGRAMMING PACKAGE FOR RAILWAY TRACTION SIMULATION

The Yugoslav Railway Union wished to have a tool which would solve quickly and precisely all problems linked with train traction. It is made up of: (1) a model designed for all the differential, algebraic and physical equations that govern phenomena; (2) a programming algorithm with its logic and optimization criteria; and (3) a data bank, containing characteristics for locomotives; wagons, routes, running constraints and traffic rostering. Output data are speeds, accelerations, timings, power, tractive strength, energy consumption, heating of electrical equipment. The man/-machine relationship is easy, and does not require technical experts; the system provides a possibility for solving a wide range of operating problems.

Paper presented at the 2nd Symposium organized by the French Association for Economical and Technical Cybernetics in Monte-Carlo from 16 to 21 September 1974.

Vuskovic, M Lusicic, B

AF CET-Traffic Control and Transportation Systems 1974, pp 453-466, 1 Fig., 1 Tab., 11 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of

PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

UIC cat. No. 65N7

17 099774

AUTOMATED MANAGEMENT OF RAILWAY ROLLING STOCK [Cockerill. Gestion automatisee d'un parc ferroviaire]

Organizing a daily traffic of 2,500 wagons and 72 locomotives scattered over 700 tracks forming a private network of 186 kms, is the task which the Traction Department of the Cockerill works at Liege was to face every day. The author explains how automatic management of this Traction Department has been facilitated: the accurate and rapid location of rolling economical vehicle turnaround, more rational rolling-stock and track maintenance, correct inputting of transport costs, and a significant reduction in paperwork. [French]

IBM-Information No. 75, Jan. 1975, pp 44-47

ACKNOWLEDGMENT: International Railway Documentation, Selection of

PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

17 099801

COMPUTERS GO "ON TRACK"

This is a report of an IBM seminar on computerized management of track maintenance. Discussions centered on the use of a data base in which the computer can sort, store, combine and compute information and run simulations of maintenance strategies. The experience of several railroads was reported, along with the use of computer studies of track problems confronting the United States Railroad Association in its restructuring of the Northeast railroads. It is noted that the computer input has frequently been gathered and compiled manually by railroads, but only the barest use of such information could be made. Computer technology is changing all this.

Progressive Railroading Vol. 18 No. 8, Aug. 1975, pp 27-30, 1 Fig., 3 Phot.

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

17 099824

RESEARCH EFFORT SHIFTS FROM HARDWARE TO CYBERNETICS

The train and traffic control areas are seen as the targets where future research can have the most impact. The research initiative of the 1960s demonstrated that railways are far from the limits of development; improvements which cybernetics can bring in capacity and productivity will assure British Railways a vital role well into the next century. The author warns that if railways are to survive as a substantial form of transport in industrialized nations, the fullest use of existing rights-of-way and the most effective methods of controlling traffic must have first priority.

Jones, S *Railway Gazette International* Vol. 131 No. 7, July 1975, pp 255-258, 3 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

17 099832

N&W AUTOMATES INVENTORY CONTROL

Since 1970 Norfolk & Western has been introducing a computerized approach to materials control. The computer had already made it possible to improve train operations and similar results were sought in the materials management function. In two years a \$10 million reduction in inventory had been achieved and processing had been speeded substantially. The system has been a boon to maintenance of way activities and the Material Management System is being expanded to cover on-line access to field for production of standard purchase orders, price inquiries, vendor performance reports and forecasts to vendors of future needs.

Progressive Railroading Vol. 18 No. 7, July 1975, pp 49-50, 1 Phot.

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

17 099848

TRAIN DISPATCHING SIMULATION MODEL USER'S MANUAL

This report documents the use of the Train Dispatching Simulation (TDS) model developed for FRA under this contract. The model is programmed in PL/I for use on an IBM/360 or IBM/370. The general operation of the model is described. The necessary job control language to access and use the model is given. Model input conventions and requirements are described in detail for application of the model to conventional or hypothetical rail lines. Interpretations of error messages are provided and suggestions for effective use of the model are included. Finally, a case study application of the model illustration and application of the model to an existing line.

This report is a result of the study entitled "Parametric Analysis of Railway Line Capacity" RRIS #21A 058275 in Bulletin 7501. Final report, FRA-OPPD-75-1, was issued August 1975.

Prokopy, JC

Peat, Marwick, Mitchell and Company Final Rpt. DOT-FR-4-5014-1, Mar. 1975, 61 pp

Contract DOT-FR-4-5014

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC

DOTL NTIS

17 125874

THE SNCF INFORMATION PROCESSING NETWORK PRESENT POSITION

The information processing network comprises data transmission telecommunications lines and nodes where the concentrations and connections specific to the field of information communications are made. Such a network has existed on the SNCF since 1968, and its organisation and operation were the subject of two articles published in the RGCF in March 1971 and November 1972. The authors of this article, who are members of the Information Processing Department's staff, summarise the experience acquired on the subject. They deal first with the structure of the network and then consider in turn its main components, the most important of which is the Message Control Centre connected on one hand to the Computer Centres by the high-speed network and, on the other, to the Concentrators/-Distributors by the medium-speed network, which in turn are connected to the Terminals by the low-speed network. The manner in which the network is monitored and operated is then described, as well as the characteristics of the traffic handled and the capacity available. In conclusion, the authors state that the results show that the objectives set have been attained and proper provision has been made for necessary developments in the future. An appendix provides ample details of the exchange procedures between the main units.

Duthoit, JP Petiot, JC *Revue Generale des Chemins de Fer* Apr. 1975, p 222

ACKNOWLEDGMENT: Revue Generale des Chemins de Fer
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

17 126434

AUTOMATIC IDENTIFICATION EQUIPMENT

In late 1967, the Association of American Railroads adopted optical scanning and a multi-digit, machine readable label as the primary elements of a standard for Automatic Car Identification (ACI) throughout North America. The impact of this technology now extends to the supermarket checkout counter. This session will examine developments in scanning with emphasis upon the coding, code reading and control outputs peculiar to its employment in contemporary rail, marine, trucking and heavy industrial material handling applications. Case histories from each area will be included.

Presented at the Joint Materials Handling Conference, Sheraton-Cleveland Hotel, Cleveland, Ohio, 23-25 September 1975.

Collins, DJ (Computer Identics Corporation)

Society of Manufacturing Engineers MS75-647, Sept. 1975

ACKNOWLEDGMENT: Society of Manufacturing Engineers

PURCHASE FROM: Society of Manufacturing Engineers 20501 Ford Road, Dearborn, Michigan, 48128 Repr. PC

17 126980

THE DB'S "DO-IT-YOURSELF" TRAIN INFORMATION SERVICE [Kundenbedientes Reisezugauskunftsgeraet der DB]

The DB is using its electronic train data processing system to lighten the work in its passenger information bureaus. The client can make routine enquiries on the running of trains for himself, by using the "do-it-yourself" equipment provided in 24 major stations. The enquirer is connected "on line" with the computer in Frankfurt. The article describes the outward appearance of the equipment, its construction, operation, and method of use. In order to extend the information available to all railway connections between any existing stations, the computer has access to a data bank where the whole timetable is recorded. [German]

Gross, HH *Signal und Draht* Vol. 67 No. 1, Jan. 1975, pp 2-8, 9 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

17 127003

RELIABILITY STUDIES AT THE SNCF [Les etudes de fiabilite a la SNCF]

This article underlines the value of the methods of calculating and determining reliability in the different sectors that concern the SNCF. After dealing with the principle of the methods of calculation and experimental

determination of reliability and of availability which is closely connected with the notion of maintenance, some examples of application are given, making special reference to the studies carried out by the SNCF. [French]

Autruffe, H *Revue Generale des Chemins de Fer* Vol. 94 Jan. 1975, 20 pp

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

17 127006

**THE ASUZT: OBJECTIVES, SPECIFICATIONS AND PROSPECTS
[ASUZT--Zadaci trebovanija perspektivy]**

The ASUZT, multi-purpose automatic management system for rail transport, will have a three-tier structure resting on: the Computer Centre at the USSR Ministry of Communications; the Computer Centres of the various soviet networks; the Computer Centres of the main railway complexes (sections) equipped with a developed data-transmission network. The Computer Centre at the Ministry will concentrate on solving, at national level, all problems relevant to the various soviet networks: accountancy, analysis, standardization, planning and administration. This Centre will also carry out the processing of technico-economic data from other Ministries and Departments, and these data will be used by the Ministry of Communications when preparing work plans for the networks and undertakings under its direct control. The Computer Centres of the different networks will deal with problems at the level of the individual networks, and partly at that of sections and undertakings. Furthermore, these Centres will ensure coordination between rail transport and the other transport modes as well as industrial and agricultural undertakings. The Computer Centres of the main rail complexes and industrial undertakings will primarily be responsible for solving problems linked with the production process, technico-material accountancy and salary calculations. They will also process part of the other routine data relating to the administration of undertakings. [Russian]

Gundobin, NA *Zeleznodoroznij Transport* Vol. 57 No. 2, Feb. 1975, pp 2-10, 7 Phot.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: Zeleznodoroznij Transport Moscow, USSR Repr. PC

17 127351

**INFORMATION PROCESSING SYSTEM OF MARSHALING
YARD**

The totally automated classification yard has information processing of two types--management information for scheduling of operations and data processing and field operations data concerning freight car routing and speed control. The former is information processing and the latter the process control system. This article describes the basic principle, composition and outline of the information processing which was used at the basis of the total automated Musashino marshalling yard first opened in October 1974.

Sato, A Shioya, A Nozue, N Hachiga, A *Railway Technical Research Institute* Vol. 16 No. 2, June 1974, pp 79-87, 8 Fig.

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

17 127620

**COMPUTER APPLICATIONS IN CIVIL ENGINEERING DESIGN
AND MAINTENANCE--WESTERN AUSTRALIAN GOVERNMENT
RAILWAYS**

The use of computers in the Western Australian Government Railways dates back to 1966 when an IBM 360/30 computer was installed. In the next five years the computer was used for non-scientific work including data processing. The Civil Engineering Branch made use of these techniques for financial control of large projects. Since early 1973 both scientific and non-scientific programs have been processed and some progress has been made toward the use of minicomputers for data capture and toward the use of terminals for on-line calculations. Programs to solve the following problems have now reached the production stage: realignment of compound curves; structural analysis; waterway design; earthworks & surveying; estimating; rail wear monitoring; and metrication records.

Presented at the Conference on Computers in Engineering, Sydney, May 16-17, 1974 and contained in Nat'l Conference Publication No. 74/1.

Sutton-Mattlocks, KD (West Australian Government Railways)
Institute of Engineering Proc Paper 1974, pp 168-172

ACKNOWLEDGMENT: EI

PURCHASE FROM: Institute of Engineering Sydney, Australia Repr. PC

17 127725

**COMPUTER SIMULATION OF A HIGH-VOLUME RAIL
GATEWAY**

The St. Louis-East St. Louis terminal comprises over 60 yards belonging to 16 linehaul railroads and three terminal companies. The daily handling of 10,000 cars for a 12-day period through this complex was simulated using the AAR Network Simulation System. The project demonstrated that with proper advance instructions, railroads can provide a data base which is usable and reliable. The AAR model was demonstrated to be a sensitive tool for terminal studies. Successful simulation the St. Louis gateway demonstrated the analytical advantages offered by network simulation models in study of large rail terminals.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Hoover, T (Parsons, Brinckerhoff, Quade and Douglas, Inc); Minger, WK (Association of American Railroads)
Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 139-147, 5 Fig., 1 Tab.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

17 128180

PARAMETRIC ANALYSIS OF RAILWAY LINE CAPACITY

The problem of analyzing the capability of a rail line to absorb additional traffic has become increasingly important recently as various means of consolidating and expanding usage of the rail systems have been proposed. This report develops a systematic procedure for evaluating the potential capacity of a wide variety of rail line haul facilities under a number of operating conditions and policies. The procedure is based upon a parametric analysis of a series of rail line cases or operating and physical plant scenarios simulated using a computer train dispatching model. This report first briefly describes the simulation model. Next the structuring of the approach to the analysis is presented along with a description of the cases and the results of the case simulations. Then a parametric analysis of the results is described and procedures for applying the analysis to other conditions are developed concluding with a sample application. Finally, concluding observations are discussed and recommendations for application of the results and for further research are presented.

This project was sponsored by FRA, Economic Programs Division.

Prokopy, JC Rubin, RB
Peat, Marwick, Mitchell and Company, (289-51849-30) Final Rpt.
FRA-OPPD 75-1, Aug. 1975, 84 pp, 8 Fig., 7 Tab.

Contract DOT-FR-4-5014

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-247181/AS, DOTL NTIS

17 128193

SHINKANSEN MANAGEMENT INFORMATION SYSTEM (SMIS)

This article describes the electronic data processing systems adopted by JNR for the Shin Kansen to handle data on transport, train operation, rolling stock, track and structures, electric equipment, personnel, finance, accounting and purchasing and stores. The data collected and analyzed can be coordinated and can be the basis for fast, accurate decisions on operations and maintenance and makes possible better management. SMIS is designed for easy retrieval. Not all areas are yet covered by SMIS and this is now the goal. Methods for statistical analysis of the data stored are now being developed.

Sawada, M (Japanese National Railways) *Japanese Railway Engineering*
Vol. 15 No. 3/4, 1974, pp 25-27, 1 Fig.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

17 128837

AND NOW, TRAIN II

Now fully operational, TRAIN II will keep track of about two million freight cars, helping to form a national transportation system of sixty-six diverse railroads, and provide quick reference on car inventories. The system handles 300,000 reports/day plus information on empty placements and destinations; it produces daily reports on fleet disposition: placement, loading, origin and destination, interchanges, regional boundary crossings, arrivals at destination, unloading, bad order/storage/holds, and empty car destinations. Access to the information is on a 44 Model 3270 CR7 terminal, the visual display eliminating the need for quicker reports. Security is ensured with each railroad having a unique address to access the computers. TRAIN II should help railroads to utilize their fleets more.

Progressive Railroading Vol. 18 No. 8, Aug. 1975, pp 39-40, 1 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

17 129286

A GENERAL FORTRAN PROGRAM FOR TIME TABLING OF LONG DISTANCE TRAINS

After a presentation of the formulae and elements obtained from programming, an appendix gives the complete program run on IBM 1620 computer.

Nayak, SS *Indian Railway Technical Bulletin* Vol. 31 No. 193, May 1974, 14 pp

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Research design and Standards Organization Alambagh, Luchnow 5, India Repr. PC

17 129309

USE OF COMPUTERS IN CONTAINER TRANSPORT [Der Einsatz der EDV fuer den Grosscontainer transport]

The improvement of container transport must be attributed especially to the introduction of modern information and monitoring systems based on electronic data processing. The author discusses the structure of such a system: the plan of the network, large container handling, forwarding, calculating and settlement of freight charges. [German]

Weinhold, A *DET Eisenbahntechnik* No. 8, Aug. 1975, pp 369-372, 1 Fig., 3 Tab., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

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

18 052673

OPTIMUM SERVICE LIFE OF ROLLING STOCK

This leaflet sets out the results of the studies of the UIC 6th Committee regarding the calculation of the optimum service life of rolling stock, taking into account all the technical and economic factors which can be reproduced in figure form. It represents a synthesis of the work carried out so far, aimed at using modern methods to solve this problem.

International Union of Railways DOC 2, Jan. 1966, 10 pp, 3 Tab.

ACKNOWLEDGMENT: UIC

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

DOTL RP

18 072173

ILLUSTRATED TRANSPORT ECONOMY OF JAPAN 1974

This is a fully illustrated version of the 1974 transport economy of Japan. It includes chapters on economic and social activities; aspects of domestic goods transport; domestic passenger transport; international transport; transport energy; large city traffic, including bus lanes, subsidies for local buses and coaches; improvement of transport facilities with a chart reflecting underground railways; management and labor aspect of transport enterprises; modernization of transport showing charts on expansion of the freightliner network and modernization of aircraft. Chapter 10, which discusses traffic accidents and environmental pollution by transport, contains charts on causes of death; railway accidents; road traffic accidents; marine accidents; air accidents; composition of exhaust gas from motor vehicles; airport noise; and deaths caused by traffic accidents in the world's major countries.

Japan Transport Economics Research Center

ACKNOWLEDGMENT: TSC

PURCHASE FROM: Japan Transport Economics Research Center (105) 1, Shibakotohira-cho, Minato-ku, Tokyo, Japan Repr. PC

DOTL HE277.J3753

18 092238

STUDIES IN RAILROAD OPERATIONS AND ECONOMICS.**VOLUME 13. COSTING IN RAILROAD OPERATIONS: A PROPOSED METHODOLOGY**

The report identifies, evaluates and recommends criteria for the application of economic analysis in areas relating to data and information requirements in railroad freight operations. The demonstrated need for a more consistent and comprehensive application of this analysis resulted in the accumulation of additional data from which cost functions were estimated which might be used by railroad managements and government agencies as a basis for subsequent policy decisions. This research which was conducted at both interfirm and intrafirm levels of analysis produced a set of models calibrated from selected data encompassed in a matrix which were used to estimate production functions and appropriate long run cost functions. These models hopefully will provide valuable assistance to railroad companies as additional sources of information regarding the cost performance of their operation.

See also Volume 12, PB-244 129, and Volume 15, PB-244 131.

Kneafsey, JT

Massachusetts Institute of Technology, Federal Railroad Administration Final Rpt. MIT-R75-15, FRA/RPD-75/1.12, Mar. 1975, 79 pp

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244130/1ST, DOTL NTIS

18 092694

A MEAN COST APPROXIMATION FOR TRANSPORTATION PROBLEMS WITH STOCHASTIC DEMAND

Among the many tools of the operations researcher is the transportation algorithm which has been used to solve a variety of problems ranging from shipping plans to plant location. An important variation of the basic transportation problem is the transportation problem with stochastic demand or stochastic supply. This paper presents a simple approximation technique which may be used as a starting solution for algorithms that

determine exact solutions. The paper indicates that the approximation technique offered here is superior to a starting solution obtained by substituting expected demand for the random variables. (Author)

Availability: Pub. in Naval Logistics Quarterly, v22 n1 p181-187 Mar 75.

Wilson, D

Arizona Health Planning Authority 1974, 8 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

AD-A013711/7ST, DOTL NTIS

18 099758

TRANSPORT-INFRASTRUCTURE INVESTMENT COORDINATION--ANALYSES, RECOMMENDATIONS, PROCEDURES [Coordination des investissements en infrastructures de transport--Analyses, recommandations, procedures]

This report, commissioned by the EEC from Professors K.M. Gwilliam, S. Petriccione, F. Voigt and J.A. Zighera, focuses on the methodological aspects of assessing transport- infrastructure investment. The difficulties, stemming from comparison of transport infrastructure investments, are examined against the background of a community policy. Three questions are dealt with: the study of basic factors intervening in investment selection and the corresponding user tariffing; the cost and assessment of the advantages (location of activities, actualized cost-benefit); the procedures to be followed in assessing savings. [French]

European Economic Communities Transport Series #3, 1973, 90 pp, 3 Tab., 6 Ref., 5 App.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

SNCF cat. No. 23N59

18 099761

RAILWAY FORECASTING

This manual contains information intended for readers with no specific economic background to facilitate the application of complex economic forecasting techniques. The first part of the manual defines the objectives that can be assigned to forecasting in the short and long term, and gives notions of the factors to be taken into account for forecasting and decision-making. The second part contains a critical appraisal of the methods currently employed which fall into three categories: (1) trend methods; (2) voluntaristic methods; and (3) subjective methods. Eight appendices refer to a few of the mathematical tools used for statistics and some forecasting study models, in particular the "price-time" model for research into competition between railways and aviation.

International Union of Railways 1974, 80 pp, 8 Fig., 5 Tab., 33 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

UIC cat. No. 20N31

18 099816

DETERMINING AND INFLUENCING THE TRAIN RUNNING COSTS AND TRACTION ENERGY PROBLEMS

The cost increases in all spheres of the economy make it necessary for every undertaking to monitor their costs continually. In many cases, it is sufficient to monitor these costs at the time when they arise; for certain undertakings such as the German Federal Railway (DB), however, whose means of production have a long service life and whose specific capital investments may be very high, it is of special importance to prepare cost estimates at the time of planning. As the construction and delivery periods extend over several years, investment decisions may be greatly influenced by long-term forecasts concerning the trend of the costs of labour, materials (including energy) and capital. In addition to a knowledge of costs and their trends, however, there is a need for special investigations as a basis for the introduction of cost-reducing measures.

Binnewies, H *Rail International* No. 6, June 1975, pp 507-535, 18 Fig., 2 Tab.

ACKNOWLEDGMENT: Rail International

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

18 099857

A RENEWAL OF MARGINAL COST PRICING

Welfare economics deals with the formulation of criteria on the basis of which a comparison may be made among economic alternatives open to the society in order that the "best" one may be chosen. Many students of welfare economics in their attempt to define the optimum range of welfare possibilities open to society, from which a choice should be made, were led to the study of the optimum conditions of social welfare, and the conditions for the optimum allocation of resources. A major controversial issue developed on the relation of price to marginal cost as a condition to the optimum allocation of resources. The discussion focuses on this issue.

Haritos, Z

Canadian Transport Commission No. 26, Dec. 1971, 12 pp

ACKNOWLEDGMENT: Canadian Transport Commission

PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
DOTL RP

18 099869

PRODUCTIVITY TRENDS IN THE CANADIAN RAILWAYS

This study is intended to convey a picture of the efficiency of all common railway carriers in Canada in a period of a considerable growth in the economy of the country. The study involved the extraction and analysis of a multitude of pertinent data in various fields of railway technology and economics.

Mendelsohn, M

Canadian Transport Commission Nov. 1973, 90 pp, Tabs., 21 Ref.

ACKNOWLEDGMENT: Canadian Transport Commission

PURCHASE FROM: Canadian Transport Commission Economic and Social Analysis Branch, 275 Slater Street, Ottawa, Ontario K1A 0N9, Canada Repr. PC
DOTL RP

18 125797

RAIL TRANSIT OPERATING COST GUIDELINES

Operating costs may be estimated at several levels of detail, ranging from the simple application of unit costs per car-mile or car-hour, to the preparation of a complete manning table and other refinements, depending on the level of accuracy required for the individual application. The need for this type of estimate prompted the development of the set of guidelines that forms the subject of this paper. The so-called "yardstick concept" that evolves utilizes unit measures of work and cost derived from actual operating systems to estimate generalized manpower requirements and operating costs for planned urban rail systems. Following an analysis of present transit accounting practices, factors affecting operating costs, and the development of the yardstick concept, an estimate prepared for Atlanta with the aid of the guidelines is presented.

Gilcrease, EE, Jr (Metropolitan Atlanta Rapid Transit Authority);

Kudlick, W Padron, M *ASCE Journal of Transportation Engineering*
Vol. 101 No. 2, May 1975, pp 365-381, 3 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

18 125888

AN EVALUATION OF THE EMPLOYEE STOCK OWNERSHIP PLAN AS APPLIED TO CONRAIL

This study analyzes an Employee Stock Ownership Plan (ESOP) for Conrail as outlined in the Rail Reorganization Act. It considers corporate financing, employee motivation, employee stock ownership, and total compensation. In all four areas no advantages were seen for an ESOP, and alternatives were considered. The Appendix includes the Towers, Perrin, Forster & Crosby report on Employee Stock Ownership Trust, the E.F. Hutton report on corporate finance, and the executive summary of the Gellerman report on employee motivation.

Sponsored by USRA.

Towers Perrin, Forster and Crosby, United States Railway Association
USRA/R-064, May 1975, 146 pp

Contract USRA-C-50108

ACKNOWLEDGMENT: United States Railway Association, NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243983/4ST, DOTL NTIS

18 127008

ECONOMIC CHOICE OF RAILWAY TRACTION

A detailed explanation of the problem of choice between electric and diesel traction, viewed from all aspects. The optimum solution is reached by defining the following factors: defining output of railway services, expressed in tonne/km per day or year, without attempting to differentiate between the commodities; determination of "inputs", which include initial investment costs (heavier for electric traction) maintenance (heavier for diesel), relative performance and availability, economic life, operating costs (oil or electricity costs); finding out the true "social cost" of the inputs to the national economy by eliminating distortions in the market prices to give "accounting prices"; final selection of the form of traction by "optimisation process", through mathematical programming to arrive at the "minimum cost" solution. He also mentions in passing "externalities" difficult to quantify, such as effect on environment and time saving.

Proceedings of the International Conference on Transportation Research, Bruges, Belgium, June 1973.

Majundar, J

International Conference on Transport Research Proceeding June 1973,
pp 834-848, 4 Tab., 15 Ref.ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey,
75015 Paris, France Repr. PC

18 127014

INTRODUCTION OF A SYSTEM OF INFRASTRUCTURE USER CHARGING AS PART OF THE JOINT TRANSPORT POLICY

[L'instauration d'un systeme de tarification de l'usage des infrastructures dans le cadre de la politique commune des transports]

In 1971, the Commission of the European Communities submitted a general plan to the Council for the introduction of a system for charging the users for the cost of the infrastructures. The paper explains the objectives and general principles of the proposed system, and the measures of enforcement envisaged for each mode of transport concerned. The objectives were to promote the most efficient possible use of existing infrastructures, and to make the users bear the full financial burden relating to the creation and operation of infrastructures. The means of reaching these objectives were, first of all, the modulation of tariffs according to marginal social cost; and secondly, the constraint of budgetary equilibrium. As both objectives could not be reached at the same time, due to the fact that the infrastructures are a sector in which the returns grow in proportion to use, the Commission studied the effects of the various regulations possible. The author describes this study, and then gives details of the different systems of infrastructures user charges proposed for road, waterway and railway traffic, with the method of calculation, and the temporary provisions during the 10-year period planned for the progressive introduction of the system. In conclusion, he stresses the great importance of the programme proposed by the Commission, its many repercussions, and the danger that, in the event of failure, the liberal model of transport economy might have to be replaced by rigid economic planning. [French]

Proceedings of the International Conference on Transportation Research, Bruges, Belgium, June 1973.

Georgen, R

International Conference on Transport Research Proceeding June 1973,
pp 33-44ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey,
75015 Paris, France Repr. PC

18 127345

THE IMPACT OF THE INTERSTATE COMMERCE COMMISSION'S COST SECTION'S STUDIES ON RAILROAD FREIGHT RATES IN THE UNITED STATES

In its 35 years of existence the Cost Finding Section of the ICC has worked to fulfill its mandate of developing costs for all modes of transportation on a sound, logical basis. This article discusses three studies prepared to develop line-haul rail costs and cost/rate comparisons. It is concluded that Rail

Form A, the Carload Cost Scales and the so-called burden studies have had a significant impact on the railroad's line haul rates. Suggestions are made for further investigation of the data input for such studies.

Parr, GJ *ICC Practitioners' Journal* Vol. 42 No. 6, Sept. 1975, pp 707-717

PURCHASE FROM: Association of Interstate Commerce Comm Pract 1112 ICC Building, Washington, D.C., 20423 Repr. PC

DOTL JC

18 127706

TRANSPORTATION COSTS AND COSTING, 1917-1973

Transportation costs account for a considerable percentage of the gross national product of countries. This bibliography is intended to put at the disposal of those concerned with transportation activities a listing of literature on costs and costing. Included are books, papers, technical reports, journal articles and dissertations. Entries are under blocks of chronological dates in each mode of transport and are grouped under subject headings such as accounting, competition, costs, fares, finance, insurance, management, operation costs, pricing, rates, securities, statistics, taxation, tolls and wages. In addition to the modal classification, there is a section on Freight Transport which has all entries on freight and cargo handling.

Ocran, EB, Jr

Garland Publishing, Incorporated 1975, 751 pp

PURCHASE FROM: Garland Publishing, Incorporated New York, New York, Orig. PC

DOTL Z7164.T8048

18 127728

CROWNSNEST PASS GRAIN RATES: TIME FOR A CHANGE?

The Crownsnest Pass rates, set by statute in 1925 at 0.5 cents per mile and still at that level, apply on grain products moving from Canada's Prairie region to the East and on virtually all export grain traffic. The original agreement dates from 1899. Since the 1960s there has been a subsidy to railroads, although not specifically to cover losses incurred by maintaining grain rates at low levels as a matter of national policy. Statutory grain rates have had major effects on transportation, agriculture and regional development. While the Crownsnest rates subsidize export grain, this is not the only or best means for maintaining an international competitive position. The author suggests the public allow investigation of true economic costs and railroads make their real costs more accessible to unbiased study.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Nachtigall, CD Skinner, GF Tychniewicz, EW (Manitoba University)

Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 269-276

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

18 127862

RATIONALITY OF THE CURRENT STRUCTURE OF RAILROAD RATES

While railroad rates vary with commodity, distance, size of load and type of car, this article investigates how rates on specific commodities vary with distance. Raw data came from the ICC one percent waybill sample for 1965. The movement accounting for the largest number of carloads was selected for detailed investigation. Methods of least squares analysis and regression were used to produce rate and distance relationships that were then examined with regard to terminal charges and total shipment charges. The implications for railroad rate-making policy and for railroad profits are then discussed.

Miller, EM *Traffic Quarterly* Vol. 29 No. 4, Oct. 1975, pp 499-514, 1 Tab.

ACKNOWLEDGMENT: Traffic Quarterly

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

18 128194

TRACKAGE RIGHTS STUDY

The objective of this study is to better quantify the economics of trackage rights agreements (TRA's) and to structure negotiated contracts which are

equitable and fair. Maintenance-of-way costs and operating cost factors such as traffic densities and train delays are discussed. Alternative methods for developing TRA costs are given. Eleven current representative trackage rights agreements were reviewed. The major elements of these TRA's are summarized in a table. A pre-negotiation check list of factors for owner and tenant is developed. Models for TRA's for commuter and freight territory are in Appendix C.

This study was sponsored by United States Railway Association.

Dyer (Thomas K), Incorporated USRA-R-126, Aug. 1975, 125 pp

Contract USRA-C-50095

ACKNOWLEDGMENT: United States Railway Association

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

18 128637

TRANSPORT FLEET PLANNING FOR MULTI-PERIOD OPERATIONS

A model is developed for planning the acquisition and disposal of equipment in a transport fleet. It deals specifically with the composition over time of a commercial airline fleet. But it can be applied generally to any problem of fleet planning when technological change together with budgetary constraints on interrelated projects and items that deteriorate with use are dealt with. A number of previous models are examined each of which deals separately with a different element of the problem. A realistic and workable model is developed by analysis of the theoretical background of some of these elements. The size and composition over time of a fleet are considered as a set of interrelated capital investment projects subject to demand, availability, and budgetary and technological constraints. A simple numerical illustration is formulated and solved, and the solution is discussed.

New, CC *Operational Research Quarterly* Vol. 26 No. 1, Apr. 1975, pp 151-166

PURCHASE FROM: Pergamon Press, Incorporated Maxwell House, Fairview Park, Elmsford, New York, 10523 Repr. PC

DOTL JC

18 128639

FREIGHT CAR PLANNING

This report uses the financial results from the Final System Plan forecasts to evaluate freight car planning for four potential Conrail entities. The entities are MARC-EL, Penn Central/Ann Arbor, Conrail IV, and Conrail V. Changes in assumptions and data sources for freight car equipment forecasts are included. Final System Plan forecasts, the interim financials, and the increase of the two are given. Financial summary and equipment utilization for 1976-1985 are forecasted. Updates earlier volume (PB 239-037) dated January 1975.

Sponsorship was from U.S. Railway Association.

Strong, Wishart and Associates, Incorporated USRA-R-007.2, June 1975, 27 pp

Contract USRA-C-50054

ACKNOWLEDGMENT: United States Railway Association

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-245667, DOTL NTIS

18 129171

THE USE OF COSTS IN RAILWAY DECISION MAKING

These notes summarize the use of costs in railway accounting and then raise some issues related to the use of costs. The costs discussed are Long Term Variable Unit Costing techniques as differentiated from budget/Financial Expense Accounting. While emphasis has been placed on what costs are or were, more time must be spent in establishing cost trends and on "resource input substitution" as tools in estimating future costs. The particular problems of accounting as required by regulation in Canada are mentioned. The author concludes with eight issues which he claims are vital in realistic rail pricing.

Presented at the Transportation Research Forum, Toronto, Nov. 4, 1975.

Buchholz, E

Canadian National Railways 1975, 10 pp

PURCHASE FROM: Canadian National Railways 935 La Gauchetiere Street,
West, Montreal, Quebec, Canada Repr. PC

DOTL RP

18 129261

**FREIGHT CAR TRUCK DESIGN OPTIMIZATION.
METHODOLOGY FOR A COMPREHENSIVE STUDY OF TRUCK
ECONOMICS**

As a part of the Federal Railroad Administration's Truck Design Optimization Project (TDOP) a determination of the economics associated with particular freight car truck designs is needed. Although TDOP centers around the development of performance and testing specifications for rail freight car trucks the methodology for evaluating the economic benefits to be derived from efficient truck designs is not at hand. Accordingly, it has been necessary to develop a systematic approach to identifying the cost elements associated with truck ownership. A methodology is proposed for developing the necessary truck economic data first through a pilot study and subsequently through the collection and verification of the data from a wide base of sources. A subsequent report is to outline the findings of this research.

Sponsorship was from Federal Railroad Administration, DOT.

April, D

Southern Pacific Transportation Company, (TDOP 75-1) Tech Rpt.
FRA-OR&D 75-58, Apr. 1975, 27 pp, 2 App.

Contract DOT FR-40023

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-248832/AS, DOTL NTIS

18 129294

**ON THE HEIGHT OF A RAILWAY BRIDGE WEIGHING
ECONOMICS FOR NAVIGATION AGAINST COST OF
RECONSTRUCTION. TWO SIMULATION STUDIES**

This study deals with the navigation costs associated with the selection of an optimum height for the railway draw bridge at Dordrecht (Holland). A fixed daily schedule of operation allowing large ships to pass through the bridge implies waiting time for the ships. Initial theoretical considerations of a general nature indicate the suitability of Monte Carlo simulation approach in this study. The waiting time problem and the effect of the bridge height on the navigation costs, which include costs of waiting and those of making a detour, are treated. The capitalized savings in navigation costs resulting from an increase in the height are compared with the associated investment costs. The volume includes a description of the necessary computer programs.

Daal, J van Doeland, F van
University Press 1974, 124 pp, Figs., Tabs., Refs.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: University Press Rotterdam, Netherlands Repr. PC

18 129307

**ASSESSMENT OF OVERALL PRODUCTIVITY OF CAPITAL
INVESTED IN THE CONSTRUCTION OF A LINE [Ocenka obscej
effektivnosti stroitelstva novyh linij]**

The article discusses the problems of this assessment. For instance, it indicates the means for subsequent improvement in the methods of economic justification of the construction, it gives data on the economic efficiency of newly constructed lines. The overall efficiency indices for the construction of a line should be calculated both at the design stage of the proposed line and at the subsequent operation stage. At the project design stage, the calculation of overall efficiency indices should provide the optimum solution by comparative efficiency methods, and determine the economic productivity of investments. For a previously constructed line, the calculation of the overall efficiency of its construction should reveal the true productivity of investments, with a view to study and research on the means of improving the efficiency of the line. [Russian]

Barkov, NN Pugaceva, AA *Zelezodoroznij Transport* Vol. 57 No. 7,
1975, pp 70-74, 2 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Zelezodoroznij Transport Moscow, USSR Repr. PC

18 129417

**A WARNING: "INCREASED APATHY TOWARD RAIL
INVESTMENTS IS MORE AND MORE EVIDENT"**

Imposition of the Conrail reorganization plan is said to have demoralized the market for rail obligations and dried up the capital markets to the railroad industry which is so capital intensive. This has occurred at a time when the industry needs may exceed \$3 billion annually and another \$1 billion will be needed to refinance maturing non-equipment debt. This is the result of USRA's valuation system, and the proposed compensation on the basis of discounted net liquidation value. The long-term effect on the private sector capital markets for rail securities may require that capital in volume can come only from the government, ultimately resulting in general nationalization.

Benham, IH (Shearson Hayden Stone Incorporated) *Railway Age* Vol. 176
No. 21, Nov. 1975, pp 34-35

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

19 096642

THE TRANSPORT REVOLUTION FROM 1770

Inland navigations, roads, coastal shipping, railways, air, and motor transport are treated at all stages of their development since 1770. There is an entire chapter on the social and economic effects of the railways, another on the rail-canal rivalry and its consequences for both modes of transport, and three chapters on national transport policies, the last two of which cover the period 1914-70. By surveying all forms of transport and their interactions over the last 200 yr, the book provides the matter with which to see clearly the errors of past transport policy and to draw some obvious conclusions about the future.

Bagwell, S

Barnes and Noble Books 1974, 460 pp

ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering

PURCHASE FROM: Barnes and Noble Books 10 East 53rd Street, New York, New York, 10022 Orig. PC

DOTL JC

19 125846

ELECTRIC RAILROAD OPERATION AND ITS PERFORMANCE 50 YEARS AGO AND TODAY [Der Elektrische Zugbetrieb und Seine Leistungsfähigkeit vor 50 Jahren und Heute]

A historical review is presented relating to developments in the electrification of the German railroad system. Electric power supply and distribution facilities are discussed. Comparative developments in other European countries are also considered. [German]

Bauermeister, K. *Elektrische Bahnen* Vol. 46 No. 3, Mar. 1975, pp 52-56

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

19 125877

HISTORICAL DEVELOPMENT OF JNR ELECTRIC ROLLING STOCK

Japanese National Railways, which opened commercial service in 1872, began to operate electric cars in Tokyo in 1906 and started regular operations of electric cars on the Yamate Line in 1909. In 1912, an Abt system locomotive was introduced on the Shin-etsu Line, between Yokogawa and Karuizawa with the steepest gradient in JNR (6.67%). With the subsequent expansion of transport demand, the lines were gradually electrified, but it was only after World War II that electrification was developed on a large scale. At the present time 7,000 km of line have been electrified (30% of JNR lines) and different kinds of electric rolling stock, including the Shin Kansen are operating on those lines.

Mochizuki, A (Japanese National Railways) *Japanese Railway Engineering* Vol. 15 No. 2, 1974, pp 15-18, 1 Fig., 2 Tab.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chiyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

20 072131

INTERNATIONAL GOODS TRANSPORTATION OF THE FEDERAL REPUBLIC OF GERMANY-1990 [Grenzueberschreitender Gueterverkehr-1990]

The Battelle Institute and Transconsult studied the long-term development of international freight transportation arranged by sea, waterways, air and ground transportation with special consideration of combined transportation. International trade statistics were used as a basis for an econometric model of international trade and transportation projections. This report contains analyses and projections of: 1) international freight transportation for all imports and exports, goods movements by countries or groups of countries and by types of goods; 2) the modal split between rail, trucks, inland vessels, sea vessels and pipelines; 3) air freight; 4) the percentage of containerized freight in international freight transportation by 1990. Tables and figures illustrate all stages of the study.

Ministry of Transport, West Germany No. 46, No Date, 86 pp, 16 Fig., 36 Tab.

ACKNOWLEDGMENT: TSC

PURCHASE FROM: Ministry of Transport, West Germany Bonn, West Germany Repr. PC

DOTL HE64.A36

20 092033

A GUIDE FOR USERS OF THE U.S. MULTIREGIONAL INPUT-OUTPUT MODEL (REVISED VERSION)

The purpose of the report is to provide a practical guide for users of the multiregional input-output (MIRO) data assembled at the Harvard Economic Research Project and the model implemented at the Massachusetts Institute of Technology using those data. In the first part, a general description of the multiregional accounting system is given. The second part contains a description of the basic data used to set up the multiregional model for the base year, 1963, and provides the detail and some of the rationale for the methods used to obtain the necessary consistencies, both internally within the MRIO accounts and externally with the national input-output figures. The third part is intended as a guide for the actual implementation of the multiregional input-output model.

Supersedes PB-213 550.

Polenske, KR Anderson, CW Shirley, MM

Massachusetts Institute of Technology, Department of Transportation Rept. No. 2, Mar. 1974, 225 pp

Contract DOT-OS-10058

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242558/5ST, DOTL NTIS

20 092143

MOTOR COMMON CARRIER FREIGHT RATE STUDY FOR NINE WESTERN STATES

The purpose of the study is to develop and analyze data about the availability of interstate motor freight carrier services and the structure of their freight rates in nine western states. Motor freight and other carrier service is reported at 1032 points in the states of Colorado, Idaho, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Utah, and Wyoming. Questionnaires circulated in Idaho, Wyoming, and Utah indicate a possible 55 percent unfavorable/45 percent favorable reaction to local motor carrier services. Surveys in North Dakota and Wyoming indicate motor carrier service at outlying points is not as extensive as what carriers are certificated for. Economic impact of rate inconsistencies is probably heaviest on small businessman in small town, but lack of backhaul causes carriers to publish attractive outbound commodity rates which is a plus factor for industrial location.

McElhiney, PT

Federation of Rocky Mountain States, Incorporated, Department of Transportation Final Rpt. May 1975, 258 pp

Contract DOT-OS-40071

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243124/5ST, DOTL NTIS

20 092146

ANALYSIS OF THE COLUMN COEFFICIENT VERSION OF THE MULTIREGIONAL INPUT-OUTPUT MODEL FOR THE UNITED STATES

Analyses are made of the regional distributions of production and consumption of the eight transported commodities and of the interregional trade components (crosshauls, crossflows, net transfers, outflows, and inflows) for selected commodities. The most intensive analysis is made for three commodities: mining, fabrics and textiles, and transportation equipment and ordnance, with special emphasis placed upon the interregional trade flows to and from two regions: the East North Central and the West North Central.

Shalizi, Z

Massachusetts Institute of Technology, Department of Transportation Final Rpt. DOT/TST-75/20, Oct. 1974, 194 pp

Contract DOT-OS-10058

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243395/1ST, DOTL NTIS

20 092239

STUDIES IN RAILROAD OPERATIONS AND ECONOMICS. VOLUME 15. A MODEL OF RAIL/TRUCK COMPETITION IN THE INTERCITY FREIGHT MARKET

The report proposes a model based on the logit function to predict the rail and truck market share for specific city pairs and commodity groups. Effort was devoted to the problem of introducing both transport service variables and shipper's logistic variables into the model. The model was calibrated with data from the 1967 Census of Transportation and from various carriers. Significant regressions were obtained from linear logit models once the proper variables were identified. Theoretical monetary values of carriers' services were compared to the empirical values in the model, indicating that shippers pay more for quality service than predicted; this result may be due to bias in the model introduced by use of aggregated and unreliable data. It is concluded that further research using this model form with more disaggregate data could yield significant improvements in results and provide valuable information for public and private transportation planning.

See also Volume 13, PB-244 130.

Kullman, BC

Massachusetts Institute of Technology, Federal Railroad Administration Final Rpt. MIT-R74-35, FRA/RPD-75/1.14, Dec. 1973, 318p

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244131/9ST, DOTL NTIS

20 092646

ANALYSIS OF STEAM COAL SALES AND PURCHASES

This report provides specific information on the steam coal market. It investigates: coal purchasing and sales practices, factors influencing coal prices, and current and future contractual relationships between buyers and sellers. Potential problems in coal use and production and recommendations for solving these problems are identified.

Lethi, MT Elliott, J Ellis, D Krajewski, EP

Mitre Corporation, Federal Energy Administration, (MITRE-2570) MTR-6878, FEA/G-75/348, Apr. 1975, 139 pp

Contract FEA-C-05-50110-00

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243575/8ST, DOTL NTIS

20 092733

ECONOMIC ANALYSIS OF COAL SUPPLY: AN ASSESSMENT OF EXISTING STUDIES

This report surveys existing studies and work in progress on the economics of coal mining and the factors affecting these economics. Topic areas covered include: Model mine cost studies; The economic impact of public policy on the Appalachian coal industry and the regional economy; Price and

availability of western coal in the midwestern electric utility market, 1975-1982; Forecasts of coal supply functions in Southern West Virginia; Coal availability and supply; U.S. coal and the electric power industry; Low sulfur coal: A revision of reserve and supply estimates; Coal surface mining and reclamation; and The demand and supply of manpower in the bituminous coal industry for the years 1985 and 2000.

Gordon, RL
Pennsylvania State University, University Park, Electric Power Research Institute, (EPRI-335) May 1975, 179p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243220/1ST, DOTL NTIS

20 092734
**NORTHERN GREAT PLAINS RESOURCE PROGRAM,
NATIONAL AND REGIONAL ENERGY CONSIDERATIONS
WORK GROUP REPORT**

This analyzes the energy resources in the states of North Dakota, South Dakota, Montana and Wyoming and presents data on the potential for these resources to provide a share of the total national energy demand. Analyses in the following seven principle areas are presented: (1) Status of current development; (2) Energy use forecasts by region, state, sector and source; (3) Energy conservation; (4) Coal gasification and coal liquidification; (5) Transportation of energy from the region; (6) Electrical generation; (7) Status of technology; and (8) Future alternated energy sources. Data are also presented on three alternative hypothetical rates of coal development; minimum, intermediate and maximum rates.

Prepared in cooperation with Department of Agriculture, Washington, D.C., Department of the Interior, Washington, D.C., and Environmental Protection Agency, Washington, D.C. See also PB-243 154, and PB-243 156.

Northern Great Plains Resource Program, Department of Agriculture, Department of the Interior, Environmental Protection Agency
NGPRP/CD-74/600, Feb. 1974, 563p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243155/9ST, DOTL NTIS

20 092735
**NORTHERN GREAT PLAINS RESOURCE PROGRAM, MINERAL
RESOURCES WORK GROUP REPORT**

The report discusses coal development, resources, legislation, chemistry, current and potential coal mining methods, effects of surface and underground mining, and constraints to increased coal production. The noncoal mineral resources within the Northern Great Plains are discussed and conclusions and recommendations for areas of additional investigation are listed.

Prepared in cooperation with Department of Agriculture, Washington, D.C., Department of the Interior, Washington, D.C., and Environmental Protection Agency, Washington, D.C. See also PB-243 150 and PB-243 152.

Northern Great Plains Resource Program, Department of Agriculture, Department of the Interior, Environmental Protection Agency
NGPRP/CD-74/300, Feb. 1974, 225p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243151/8ST, DOTL NTIS

20 092764
**AUTOMOBILE DISPOSAL. A NATIONAL PROBLEM. CASE
STUDIES OF FACTORS THAT INFLUENCE THE
ACCUMULATION OF AUTOMOBILE SCRAP**

Following interagency discussions in which the objectives and methods were developed, the Bureau of Mines was authorized to conduct a fact-finding survey of the auto wrecking industry, the ferrous scrap processing industry, and other factors in the junk automobile situation. The results are reported. As these industries are large, the problems complex, and the time very limited, a sample survey was designed. A total of 54 case study districts was selected, representative of a variety of urban, suburban, and rural conditions in various parts of the United States. In these areas scrap processors and auto wreckers were interviewed, and the prevalence of auto graveyards and abandoned automobiles was appraised. Inquiries were addressed to local

and State government agencies regarding their statutory regulations that apply to these industries. Major consumers and trade associations also provided significant information.

Bureau of Mines Spec. Pub. 1967, 484p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243157/5ST, DOTL NTIS

20 092828
**EVALUATION OF MINING CONSTRAINTS TO THE
REVITALIZATION OF PENNSYLVANIA ANTHRACITE**

The objective of this research was to evaluate the technical and economic constraints on the extraction and utilization of anthracite coal and to determine the research and development needed in order to make anthracite coal more fully used as a premium energy resource. The report examines in detail the anthracite industry both past and present and evaluates market possibilities. Anthracite reserves and resources are analyzed and tabulated, and the problem of pumping and drainage from the flooded anthracite fields is covered. Current technology is considered in detail with a discussion of production techniques with potential for improvement. The contractor concludes the report with a summary of constraints on the anthracite industry and the contractor's recommendations for effecting a revitalization of that industry. An estimated production of 17 million tons annually by 1990 can be anticipated if adequate planning, research, and development to overcome present constraints are initiated in the near future.

Prepared in cooperation with Reidel (A. B.) Associates, Harrisburg, Pa.

Berger Associates, Bureau of Mines, Riedel (AB) Associates Open Rpt.
BUMines-OFR-47-75, Mar. 1975, 375p

Contract S0241039

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242580/9ST, DOTL NTIS

20 093087
**RESOURCE AND LAND INVESTIGATIONS (RALI) PROGRAM:
AN APPROACH TO ENVIRONMENTAL ASSESSMENT WITH
APPLICATION TO WESTERN COAL DEVELOPMENT**

Use of the coal reserves in the western part of the U.S. is being considered as a possible means of achieving a measure of energy self-sufficiency. In addition to strip mining, the development of western coal can include mine-mouth electricity generation or coal gasification as well as the shipment of energy via unit trains, slurry pipelines, or overhead transmission lines. This report describes an approach for evaluating the environmental impacts of the various coal-development projects. Each project is composed of a number of activities and the primary as well as high-order impacts of these activities are linked by means of key-word cross referencing.

Bisselle, A Binder, A Holberger, R Morrow, L Pagano, R
Mitre Corporation, Geological Survey Final Rpt. MTR-6988,
USGS-LI-75/006, Aug. 1975, 617 pp

Contract DI-14-08-0001-15105

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244632/6ST, DOTL NTIS

20 093088
**ENERGY SUPPLY/DEMAND ALTERNATIVES FOR THE
APPALACHIAN REGION**

This study (1) develops an analytical methodology for assessing various regional energy supply-demand projections and their related impacts and (2) projects for the Appalachian Region in the years 1985 and 2000, fuel requirements, potential coal production, energy infrastructure requirements and the socioeconomic and environmental impacts of energy-related development. The report reviews 7 scenarios each describing a set of national energy-environmental policies and examines their implications for future Appalachian development.

See also PB-242 944.

Resource Planning Associates, Council on Environmental Quality,
Appalachian Regional Commission, National Science Foundation Final
Rpt. RA-74-18, EQ-4AC022-V2, Mar. 1975, 634 PP

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244621/9ST, DOTL NTIS

20 093135
WESTERN COAL DEVELOPMENT AND UTILIZATION. A POLICY ORIENTED, SELECTED BIBLIOGRAPHY WITH ABSTRACTS

This bibliography is an aid to the identification and understanding of policy issues related to the development and use of western coal. It provides a means of facilitating communication among those involved in the related research. The research cited is directed at the states most affected by the expanded development of western coal resources. In addition, research is included which, while not directly addressing western coal, assists in the understanding of policies and problems related to its increased production.

Ellis, D Bercal, T
Mitre Corporation, National Science Foundation Final Rpt. MTR-6963,
July 1975, 465 pp

Grant NSF-C925

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244271/3ST, DOTL NTIS

20 093139
ANALYSIS OF A NATIONAL COAL RESERVE PROGRAM

This report examines the establishment of a National Coal Reserve containing the equivalent of six months of domestic coal production as suggested in Congressional legislation. The purpose served was to test the impact of the production, transport, and storage of that amount of coal.

Bhutani, J Brice, A Clark, J DeCarlo, J Elliott, J
Mitre Corporation, Federal Energy Administration MTR-6877,
FEA/G-75/430, Apr. 1975, 122 pp

Contract FEA-C-05-50110-000

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244180/6ST, DOTL NTIS

20 093141
PRELIMINARY MINERAL EVALUATION OF LIGHT DENSITY LINES NOT INCLUDED IN CONRAIL. PART III

Part 3 gives information on rail lines and mineral operations in Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York, Rhode Island, and Virginia.

Open File Report. Paper copy also available in set of 3 reports as PB-244 168-SET, PC\$14.00.

Bureau of Mines BuMines-OFR-62(3)-75, May 1975, 126 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244171/5ST, DOTL NTIS

20 093142
PRELIMINARY MINERAL EVALUATION OF LIGHT DENSITY LINES NOT INCLUDED IN CONRAIL. PART II

Part 2 gives information on rail lines and mineral operations in Ohio, Pennsylvania, and West Virginia.

Open File Report. Paper copy also available in set of 3 reports as PB-244 168-SET, PC\$14.00.

Bureau of Mines BuMines-OFR-62(2)-75, May 1975, 121 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244170/7ST, DOTL NTIS

20 093143
PRELIMINARY MINERAL EVALUATION OF LIGHT DENSITY LINES NOT INCLUDED IN CONRAIL. PART I

On April 3, 1975, the Eastern Field Operation Center of the Bureau of Mines was directed to evaluate the United States Railway Association's Prelimi-

nary System Plan with regard to the impact that the Plan would have on minerals. The three reports represent the Bureau's preliminary evaluation of the impact that the loss of service on specified lines would have on mineral operations and mineral production potential. Part 1 gives information on rail lines and minerals operations in Illinois, Indiana, and Michigan.

Open File Report. Paper copy also available in set of 3 reports as PB-244 168-SET, PC\$14.00.

Bureau of Mines BuMines-OFR-62(1)-75, May 1975, 111 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244169/9ST, DOTL NTIS

20 093204
ANALYSIS OF INTERNATIONAL GREAT LAKES SHIPPING AND HINTERLAND

The study is concerned with both a geographic and commodity-specific description of the hinterland of the Great Lakes. Using as a source report a sampling survey of export and import traffic entitled Domestic and International Transportation of U.S. Foreign Trade: 1970, issued by the Bureau of Census, the authors sought to obtain new data on the domestic leg of U.S. foreign trade and to link those with previously collected information on the international leg of 'liner-type' commodity flow. Detailed analyses constitute the bulk of the report, including specific analyses of 28 commodities and major Great Lakes ports. It is stressed that the source material was biased toward shipment weight for vessel movements and therefore the inadequacy of the sampling procedure should be taken into consideration before specific conclusions are to be drawn.

Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant.

Balfe, M Heilmann, R Johnson, J Wendling, W
Wisconsin University, Milwaukee, National Oceanic and Atmospheric Administration Special Rept. #23, NOAA-75072210, Apr. 1975, 385 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
COM-75-11093/2ST, DOTL NTIS

20 099786
BASIC ESTIMATED CAPITAL INVESTMENT AND OPERATING COSTS FOR UNDERGROUND BITUMINOUS COAL MINES: MINES WITH ANNUAL PRODUCTION OF 1.06 TO 4.99 MILLION TONS FROM A 72-INCH COALBED.

This study estimates capital investment, operating costs, and selling prices for four underground bituminous mines producing coal with annual production ranging from 1.06 to 4.99 million tons. It is assumed that the mines have a 20-year life. Wages and union welfare payments are considered as of December 6, 1974., under the Bituminous Wage Agreement of 1974, and costs for material and equipment are based on 1975 indexes. Initial capital investment ranges from \$23,629,500 for the 1.06-million-ton-per-year (MM tpy) mine to \$79,907,500 for the 4.99-MM-tpy mine. Total capital investment ranges from \$35,336,500 to \$118,863,500 for the same mines. Corresponding selling prices for the coal range from \$13.57 to \$11.36 per ton, assuming a 15-percent discounted cash flow rate of return after Federal income taxes.

Katell, S Hemingway, EL Berkshire, LH
Bureau of Mines 1975, 41 pp, 1 Fig.

ACKNOWLEDGMENT: Bureau of Mines
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

024-004-00236-1

20 099787
MINERALS IN THE U.S. ECONOMY: TEN YEAR SUPPLY-DEMAND PROFILES FOR MINERAL AND FUEL COMMODITIES

The Bureau of Mines has prepared supply-demand diagrams and tables to highlight the flow of minerals through the U.S. economy. The selected mineral supply-demand tables and flow diagrams comprise one output from the information and data collected and compiled by the Bureau of Mines on a continuing basis covering mineral production, consumption, prices, shipments, imports, exports, and stocks, as well as industry activities in all

States and abroad. The 10-year data base terminates with 1973 figures because adequate world information was not available beyond that data. Moreover, 1974 was an anomalous year with respect to prices, supply, and demand for many commodities.

Bureau of Mines 1975, 96 pp, 92 Fig.

ACKNOWLEDGMENT: Bureau of Mines
PURCHASE FROM: Bureau of Mines Publications Distribution Branch 4800 Forbes Avenue, Pittsburgh, Pennsylvania, 15213 Repr. PC

20 099788

THE RESERVE BASE OF COAL FOR UNDERGROUND MINING IN THE WESTERN UNITED STATES

The coal reserve base in the Western United States is presented for coalbeds amenable to extraction by underground mining methods. The Federal Bureau of Mines has abstracted data on the quality and quantity of coal resources/reserves from numerous State and Federal publications and modified such data as necessary to allow computer storage and retrieval. Tonnages are compiled by State, country, coalbed, and rank, and allotted to sulfur categories by statistical apportionment. The coal reserve base in those States west of the Mississippi River, amenable to underground mining, is estimated to be approximately 131 billion tons. Of this total, about 30.9 billion tons are bituminous coal, 100.2 billion tons are subbituminous coal, and 126.4 million tons are anthracite. Lignite is not considered for underground mining in this report. Included in this report is a glossary of terms applicable to a classification system for coal resources and reserves as jointly defined by the Bureau of Mines and U.S. Geological Survey. The purpose of this system is to provide for direct comparison or compilation of various resource/reserve data.

Matson, TK White, DH, Jr
Bureau of Mines 1975, 238 pp, 3 Fig.

ACKNOWLEDGMENT: Bureau of Mines, NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244909/8ST

20 099821

FACTORS DETERMINING THE COMPETITIVE POSITION OF THE RAILWAY. IMPORTANCE OF THE DIFFERENT QUALITY FEATURES AND OF THE FREIGHT CHARGES IN RELATION TO EACH OTHER AND TO THE COMPETITORS. CONSEQUENCES FOR THE RAILWAY

In industrialised countries, the railway, road haulage, inland navigation, and often also coastal navigation and pipelines are normally in competition with each other as far as goods traffic is concerned. Their capabilities and services differ greatly from each other. If it is assumed that, for each of the modes: rail/road/shipping, a more or less satisfactory infrastructure is available, the service characteristics relevant to the competition can be described as follows. A railway with modern equipment, with an infrastructure (i.e. sections of line and junctions) properly adapted to goods traffic, planning and producing its goods services in keeping with the intrinsic advantages of the system and without yielding priority to passenger services, and making the most of its service advantages through a consistent marketing policy, will logically enjoy a competitive power matching its favourable physical conditions as land-bound mode of transport. Given equitable conditions of competition and a corresponding productivity of the staff, the railway is far superior to inland navigation and also able to compete with pipelines as long as the traffic volume in the relation concerned is not exceptionally high. The railway is able to cope with large quantities of goods at favorable prices and therefore to serve the locations of any kind of industry. Within this framework, the railway is able to influence the elasticity of demand for transport services in its own favour.

Uebelacker, K *Rail International* No. 5, May 1975, pp 357-362

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

20 099850

RESEARCH BASE FOR DEVELOPMENT OF A NATIONAL CONTAINER POLICY. PHASE II. VOLUME 1

The Phase II report consists of three volumes on the following subjects: container trade potential, a computer evaluation model, and topics on

container transport in overseas trade. Together, these volumes provide a research base to assist with the development of a national container policy for Canada. The Volume 1 report, "Container Trade Potential" contains forecasts of commodity flow growth rates to 1980 and provides a preliminary container trade potential data base and estimates of 1980 flows.

This report together with Volumes 2 & 3 completes the second phase of a 3 phase research program undertaken by the Systems Analysis Branch of the Canadian Transport Commission.

Swan Wooster Engineering Company Limited, (2285) No. 55, Nov. 1972, 35 pp, Tabs., 5 App.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Repr. PC
DOTL RP

20 099851

RESEARCH BASE FOR DEVELOPMENT OF A NATIONAL CONTAINER POLICY. PHASE II. VOLUME 2

The Phase II report consists of three volumes on the following subjects: container trade potential, a computer evaluation model, and topics on container transport in overseas trade. Together, these volumes provide a research base to assist with the development of a national container policy for Canada. This report completes the second phase of a three phase research program undertaken by the Systems Analysis Branch of the Canadian Transport Commission. The Volume 2 Report, "Container Systems Transportation Evaluation Model" details the concept of a systems analysis computer model and the data required for its implementation.

This report together with Volumes 1 & 3 completes the second phase of a 3 phase research program undertaken by the Systems Analysis Branch of the Canadian Transport Commission.

Swan Wooster Engineering Company Limited No. 56, Nov. 1972, 87 pp, Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Repr. PC
DOTL RP

20 099852

RESEARCH BASE FOR DEVELOPMENT OF A NATIONAL CONTAINER POLICY

The Volume 3 Report includes chapters on the potential diversion of Canadian and U.S. overseas trade, the impact of container transport on labour and regional economies and other relevant topics including terminal charges, shipping rates and conference influences, container inventories, utilization and ownership and the legal and regulatory environment for the transport of containers.

This report together with Volumes 1 & 2 completes the second phase of a 3 phase research program undertaken by the Systems Analysis Branch of the Canadian Transport Commission.

Swan Wooster Engineering Company Limited, (2285) No. 57, Nov. 1972, 139 pp, Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Repr. PC
DOTL RP

20 099853

RESEARCH BASE FOR DEVELOPMENT OF A NATIONAL CONTAINER POLICY. PHASE III. APPLICATION OF EVALUATION PROGRAM TO MINI-LANDBRIDGE SCENARIO

This report volume completes the third and final phase of a research program undertaken by the Canadian Transport Commission. The underlying objective of the study program has been to provide a research base to assist with the development of a national container policy for Canada. The primary objective of the Phase III study is to apply and analyze the computer based evaluation model to one selected container routing pattern scenario which could produce significant changes in the flow of Canada's overseas container trade patterns and associated port activities.

Swan Wooster Engineering Company Limited, (2285) May 1973, 117 pp, Tabs., 3 App.

ACKNOWLEDGMENT: Canadian Transport Commission
 PURCHASE FROM: Canadian Transport Commission Systems Analysis
 Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Repr. PC
 DOTL RP

20 099854

MAJOR CENTRE TRAFFIC FLOW, CANADIAN RAILWAYS 1970
 The movement of freight between the largest traffic centres in Canada, by commodity, number of carloads, and average length of haul, is of interest to users of transport statistics. It has been compiled from 1969 to 1972. The "Waybill Analysis Carload All-Rail Traffic" was the basis of this study. It is a one percent sample of all domestic carload movement compiled by the Canadian Transport Commission each year and can be obtained through Information Canada. A "major traffic centre" was designated as a railway station-or-in metropolitan areas-a group of railway stations where the sum of the total outbound and inbound traffic exceeded 100 sample carloads in any one year between 1969 and 1972. "All other Stations" were grouped by province in order to obtain a better appreciation of the geographic distribution. In choosing commodities for inclusion in the study the same criteria applied, and the remainder were included in the designation of "other commodities".

Smith, E
 Canadian Transport Commission Vol. 2 Oct. 1973, Figs., Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
 PURCHASE FROM: Canadian Transport Commission Research Branch, 275
 Slater Street, Ottawa, Quebec K1A ON9, Canada Repr. PC
 DOTL RP

20 099855

MAJOR CENTRE TRAFFIC FLOW, CANADIAN RAILWAYS 1971
 In this study an attempt has been made to assess the railway freight flow between the largest traffic centres in Canada. The "Waybill Analysis, Carload All Rail Traffic, 1971" formed the basis of this exercise. It is a one percent sample of all domestic carload movements. The material extracted consisted of detailed transportation characteristics for 27,487 carloads, the movement of which was traced between individual Canadian stations for each of a number of selected commodities.

See also Volumes 1 & 2, RRS 20 099856 and 20 099854 in Bulletin 7601.

Smith, E
 Canadian Transport Commission Vol. 3 Dec. 1973, Figs., Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
 PURCHASE FROM: Canadian Transport Commission Economic and Social
 Analysis Branch, 275 Slater Branch, Ottawa, Ontario K1A ON9, Canada
 Repr. PC
 DOTL RP

20 099856

MAJOR CENTRE TRAFFIC FLOW, CANADIAN RAILWAYS 1969
 The movement of freight between the largest traffic centres in Canada, by commodity, number of carloads, and average length of haul, is of interest to users of transport statistics. It has been compiled from 1969 to 1972. The "Waybill Analysis Carload All-Rail Traffic" was the basis of this study. It is a one percent sample of all domestic carload movement compiled by the Canadian Transport Commission each year and can be obtained through Information Canada. A "major traffic centre" was designated as a railway station-or-in metropolitan areas-a group of railway stations where the sum of the total outbound and inbound traffic exceeded 100 sample carloads in any one year between 1969 and 1972. "All other Stations" were grouped by province in order to obtain a better appreciation of the geographic distribution. In choosing commodities for inclusion in the study the same criteria applied, and the remainder were included in the designation of "other commodities".

See also Volumes 2 & 3, RRS 20 099854 and 20 099855 in Bulletin 7601.

Smith, E
 Canadian Transport Commission Vol. 1 June 1974, Figs., Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
 PURCHASE FROM: Canadian Transport Commission Economics Branch,
 Ottawa, Ontario K1A ON9, Canada Repr. PC
 DOTL RP

20 099859

THE CANADIAN POTASH INDUSTRY

This report is a study of the Canadian potash industry-its activity, organization, history, and future. It is intended as background material for an analysis of the transportation of Canadian potash. Aspects covered include the importance of Canada in the world potash industry, the uses of potash, Canadian potash developments since the start of Canadian production in the early 1960's, and an assessment of the markets for Canadian potash in the 1970's. In addition, the implications of the findings of this study with respect to Canada's potash transportation system are discussed.

Litvack, BM
 Canadian Transport Commission No. 62, Sept. 1973, 65 pp, Figs., Tabs.,
 Refs., 3 App.

ACKNOWLEDGMENT: Canadian Transport Commission
 PURCHASE FROM: Canadian Transport Commission Systems Analysis
 Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Repr. PC
 DOTL RP

20 125828

ORE GRADE, METAL PRODUCTION, AND ENERGY

The tonage required to mine and mill ores to obtain one unit of metal is a hyperbolic function of the grade, and as the tonnage increases hyperbolically, so does the energy consumed. For copper, this ratio suggests that deposits with grades inferior to 0.20-0.25 percent will not be mined for common electrical and construction uses. Curves and tables show these calculations for other metals as well.

Page, NJ Creasey, SC *Geological Survey, Research Journal* Vol. 3 No. 1,
 Jan. 1975, pp 9-13, 8 Ref.

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

20 125880

AN ECONOMETRIC MODEL TO FORECAST PRICE INCREASES FOR THE RAIL AND MOTOR TRUCK INDUSTRIES

Summarizes the economic outlook to 1985 for the U.S. using factors such as population, GNP, and labor. Includes equations pertinent to facets of the railroad industry. Develops projections for future prices, costs, interest rates, revenue, benefits, taxes, employment and others.

Sponsored by USRA. A revision of PB-239020.

Chase Econometric Associates, Incorporated, United States Railway Association
 USRA/R-061, May 1975, 80 pp

Contract USRA-C-50116

ACKNOWLEDGMENT: United States Railway Association, NTIS
 PURCHASE FROM: NTIS Repr. PC, Microfiche
 PB-243926/3ST, DOTL NTIS

20 126421

STRUCTURAL ANALYSIS AND ORGANIZATION OF RAILWAY FREIGHT TRANSPORT ORIGIN DESTINATION TABLE

No Abstract. [Japanese]

Uchida, T *Japan Society of Civil Engineers, Proceedings* No. 236, Apr.
 1975, pp 155-162

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

20 126423

THE OWNER-OPERATOR: INDEPENDENT TRUCKER

This is an in-depth study of the independent trucker, his operations, his problems, his economics, even his independent personality. This book has serious implications for the railroad industry. The book states, then demonstrates, that the owner-operator is the true competitor of the railroads. Two chapters are devoted to railroad problems from this competition and the railroad responses to this competition. The need for improved rail service and improved rail capital productivity is stressed, as is the fallacy of the railroads gearing their responses to the common carrier motor carriers.

Wyckoff, DD Maister, DH (Harvard University)
 Lexington Books 1975, 167 pp, 2 App.

PURCHASE FROM: Lexington Books Lexington, Massachusetts, Repr. PC
DOTL TEA455.T8W93

20 127004

MODAL CHOICE IN FREIGHT TRANSPORT

A general review in condensed form of the work of the Netherlands Institute of Transportation on this subject. The paper describes: sets of equations determining the market equilibrium, and the influence of transportation costs on the quantity of goods sold and their regional distribution; the modal split models for 15 commodity groups, to determine the volume of freight transport per commodity group for each mode (rail, road, inland navigation). These models are developed in various forms, based on interregional transport flows, non-aggregated consignments, macromodal split models, sub-models: three alternative methods of analysis: discrete regression, probit analysis, logit analysis. The authors finally evaluate the models based on interregional transport flows and on non-aggregated consignments, and their use for forecasting purposes.

Proceedings of the International Conference on Transportation Research, Bruges, Belgium, June 1973.

Es, J van Ruijgrok, CJ

International Conference on Transport Research Proceeding June 1973, pp 585-598

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

20 127009

INTERCITY TRANSPORT CAPACITY IN THE FUTURE

The author uses DODOTRANS (Decision Orientated Data Organised Transport Analysis System) models to study the Danish transport network, the European network, and the intercontinental network. The Baumol-Quabdt link used is an abstract mode model with no cross elasticity, which the author describes briefly. It was used to forecast the distribution of traffic according to mode, and results are compared with statistics and forecast tables for transport volume in 1980 or 1985, based on various assumptions as to speed and quality of service.

Proceedings of the International Conference on Transportation Research, Bruges, Belgium, June 1973.

Rallis, T

International Conference on Transport Research Proceeding June 1973, pp 253-261, 11 Tab., 18 Ref.

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

20 127382

TARIFF AND ORGANIZATIONAL CONSIDERATIONS CONCERNING THE DEVELOPMENT OF TRANSPORTS BY COMPLETE TRAIN LOADS AND THEIR INTEGRATION WITH ROAD SERVICES WITH A VIEW TO ACHIEVING A QUALITATIVE AND QUANTITATIVE IMPROVEMENT IN THE TRAFFIC

A first definition of a complete train load might read: "a train scheduled and organized for the account of a single client". The most significant point in this definition is the fact that a previous agreement between client and railway is specified. This is a particularly important point as it emphasises a fundamental requirement for realising and developing this interesting transport technique: the collaboration between client and railway administration. A widespread introduction of the service to which this study had been devoted will demand, from the basic industry, from commerce and from the channels for the distribution of the production, the solution of a range of technical and organizational problems of great importance; among them one should not overlook the problem of concentrating the activities of small and medium-sized undertakings throughout the country which are particularly concerned with handling and transport of their products, especially those destined for export. As far as the railway is concerned, an appropriate adaptation of the regulations and tariffs in force is no doubt desirable so that the clientele can be encouraged to forego isolated consignments in favour of a concentration of their despatches. Finally, the process of collaboration between transport operators, where the complete train represents one of the fundamental poles of development, should be

pursued and encouraged at governmental level by updating the laws and regulations with a view to adapting them to the dynamics of a sector of activities which is constantly expanding.

Bagnai, C Baeri, N *Rail International* No. 8, Aug. 1975, pp 643-661, 7 Fig., Refs.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

20 127387

GOODS TRANSPORTS IN BULK AS A DYNAMIC FACTOR IN THE DEVELOPMENT OF RAILWAY TRANSPORT IN POLAND

Within the next 20 years, Poland will be able to meet the requirements of a modern society of the 21st Century. The country's coming shape will represent a transformation of present-day Poland. Although railway transport is going to be partly superseded by pipelines in the conveyance of petroleum and petroleum products, and by inland navigation in the conveyance of bulk goods such as coal, metal ore, aggregates, fertilisers, etc. between Silesia and Stettin, such abstraction of traffic from the railway will not be important enough to cause any significant changes in the rate of development of the railway transport potential. It is estimated that, in the 1990s, the annual volume of freight traffic by rail will amount to about 900-950 million t. These considerations show that, in view of the predicted intensive increase in the country's traffic demand, railway transport in general, and freight transport in particular, will develop in a way which will be mainly governed by the need for rationalizing the transport of freight in bulk. These transports will have a decisive influence on the geographical development and the technical standard of the infrastructure as well as on the wagons to be commissioned.

Nowosielski, L Ratajczak, K *Rail International* No. 7, July 1975, pp 557-564, 2 Fig.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

20 127608

WESTERN COAL TRANSPORTATION--A CHALLENGE

Western coal will be moving by tens of millions of tons south and midwest, and from Wyoming alone 30 to 40 million tons annually are anticipated for export in 1980. Railroad and waterways development, both combined, and construction of coal-slurry pipelines will require a 3 to 5 billion dollars investment to move western coal.

Presented at the Mining Conv/Expo, Las Vegas, Nev., Oct. 7-10, 1974.

Martinka, PD (American Electric Power Service Corporation); Ross, BA

American Mining Congress Preprint 1974, 14 pp

ACKNOWLEDGMENT: EI
PURCHASE FROM: American Mining Congress Ring Building, 1200 18th Street, NW, New York, New York, 10017 Repr. PC

20 127625

SCRAP: PRICES AND ISSUES

An economic model of the scrap market could play an important role in decisions affecting the future course of the steel industry. The difference between simulated scrap prices indicates that direct reduction would have had a steadily increasing downward impact on prices. The greatest impact occurs in the last two years with the advent of the merchant sponge iron market which causes the price decrease to accelerate from 4.3% of actual price in 1970 to 20.9% in 1972. Although the comparisons cannot be translated directly into an analysis of future price impacts of direct reduction, they do indicate that as the merchant sponge iron market grows, direct reduction growth will be an increasingly important factor in the determination of future U.S. scrap prices.

Wise, KT (Charles River Associates, Incorporated) *Iron Steelmaker* Vol. 2 No. 5, May 1975, pp 23-32

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

20 127626

FUTURE RAW MATERIALS NEEDS OF THE AMERICAN STEEL INDUSTRY

The recent difficulties with supplies of energy are also stimulating a concern about future supplies of raw materials and fuels necessary to support the domestic production of steel which is essential to the well-being of the U.S. economy. This paper reports a portion of the results of an extended study of the future needs of the American steel industry for raw materials and fuels. The study is a continuing program on the matter which is supported by the U.S. Bureau of Mines at the MIT. The work includes the development of a model to determine the requirements for raw materials by the domestic steel industry. This contribution contains an analysis of major factors that may determine the needs of the industry for supplies of iron-bearing raw materials and hot metal in the next 2 to 15 years. The analysis indicates that a number of the trends in the steel industry will probably result in a decrease in the annual net available scrap in the years ahead as compared to conditions existing in 1970-1972. If the industry installs blast furnace capacity to match the needs of new steelmaking units in the ratio of BOF to EF = 3 to 1, there will be a modest decrease in the net available scrap by 1979-1980. This decrease will be about the same for growth rates of two to three percent in the consumption of finished steel.

Elliott, JF (Massachusetts Institute of Technology) *Iron Steelmaker* Vol. 2 No. 4, Apr. 1975, pp 33-42, 7 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

20 127638

IMPACT OF THE RAILROAD INDUSTRY ON MINING

Mining, especially coal, has a large part of the railroad business. These two industries complement each other in a way. Lately, Union Pacific Railroad has been investing in the coal gasification and coal liquefaction industries.

Presented at the Mining Conv/Expo, La Vegas, Nev., October 7-10, 1974.

Graves, TB, Jr (Union Pacific Railroad)

American Mining Congress Preprint 1974, 16 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Mining Congress Ring Building, 1200 18th Street, NW, Washington, D.C., 20036 Repr. PC

20 127718

FREIGHT TRANSPORT DEMAND. AN ECONOMETRIC STUDY

This paper presents a multi-modal medium term freight transport demand forecasting project carried out under joint sponsorship of the Canadian Ministry of Transport and Canadian Transport Commission. In addition to accounting for regional differences in freight demand, the model attempts to take into account changes in the structure of the economy. These could include exploitation of new mineral resources, expansion or contraction in agricultural production or changing consumption patterns.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 63-71, 20 Ref.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

20 127722

METHODS TO IMPROVE CAR UTILIZATION THROUGH DEMAND FORECASTING

This paper summarizes results of a study on the utilization of general service freight cars, primarily plain boxcars, on Penn Central. The study, funded by FRA, included analysis of utilization trends in the U.S. and on Penn Central for all car types, an examination of existing PC car distribution and car information systems attempts at forecasting plain boxcar supply and demand, analysis of questionnaires regarding box car use sent to 812 shippers, results of a pilot program soliciting forecasts of boxcar needs from 15 shippers and a proposed car distribution system presently being tested on PC's Eastern Region.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Folk, JF Forrester, JL (Penn Central Transportation Company)
Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 117-124

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

20 128617

FORECAST OF TRAFFIC AND REVENUE 1975-80, 1985

This report revises the forecast of traffic and revenue based on a third forecast of economic activity. This revision includes a re-evaluation of its projection of Trailer on Flat Car (TOFC) traffic, a revised forecast of production volume of major railroad commodities, a revised forecast of tonnage and revenue by commodity class for the eleven major eastern railroads, and a revised forecast of tonnage and carloads by commodity class for Eastern, Western Southern district railroads.

Temple, Barker & Sloane, Incorporated USRA-R-002.4, Apr. 1975, 49 pp

Contract USRA-C-50000

ACKNOWLEDGMENT: United States Railway Association

PURCHASE FROM: NTIS Repr. PC, Microfiche PB-246679, DOTL NTIS

20 129157

THE RESERVE BASE OF U.S. COALS BY SULPHUR CONTENT (IN TWO PARTS). 2. THE WESTERN STATES

This Bureau of Mines report delineates the coal reserve base of anthracite, bituminous and subbituminous coals, and lignite, by mining method and sulfur content, for coal-bearing States west of the Mississippi River. The parameters used to establish the reserve base definition are the result of a joint agreement by the Federal Bureau of Mines and the U.S. Geological Survey. The reserve base of low-sulfur coal, greater than or equal to 1.0 percent sulfur, is 167,324.5 million tons; medium-sulfur coal, 1.1 to 3.0 percent sulfur, is 37,531.5 million tons; and high-sulfur coal, less than 3.0 percent sulfur, is 11,244.1 million tons. The reserve base of coal with an unknown sulfur level is 18,323.0 million tons. The percentages of deep and stripable coal are 56 percent and 44 percent, respectively. The basis for reserve base estimates and analytical data for this report was the Fuels Availability System, a Bureau of Mines data bank containing numerous data on fossil fuels. Information contained in the system was obtained from publications of the Bureau of Mines, U.S. Geological Survey, State agencies, private publications, and company data.

Hamilton, PA White, DH, Jr Matson, TK
Bureau of Mines 1975, 322 pp, 7 Fig.

ACKNOWLEDGMENT: Bureau of Mines

PURCHASE FROM: Bureau of Mines Publications Distribution Branch 4800 Forbes Avenue, Pittsburgh, Pennsylvania, 15213 Repr. PC

20 129206

STUDIES (NOTABLY FROM THE ECONOMETRIC APPROACH) OF FACTORS DETERMINING THE DEMAND FOR FREIGHT TRANSPORT

This study explores the causes, functional dependencies, motives and conditions for the main forms in which transport demand occurs. The main headings are: (1) Purpose and structure of the study; (2) Conceptual, Statistical and subjective definitions; (3) Transport demand explained by determinants based on quantitative analyses; (4) Supply-related determinants, and (5) Prospects.

Report of the Sixteenth Round Table on Transport Economic, Paris, France, March 22-24, 1972.

Schneider, WL

European Conference of Ministers of Transport Mar. 1972, 49 pp

PURCHASE FROM: European Conference of Ministers of Transport 33 rue de Franqueville, Paris 75775, France Repr. PC

DOTL RP

20 129207

AN ECONOMIC ANALYSIS OF THE EXPORT MARKET FOR MONTANA WHEAT

The objectives of this study are: (1) To determine the amounts of Montana spring and winter wheat which are entering the export market. (2) To review

Freight Transport Demand Analysis

the world market for wheat exports. (3) To examine the United States position in the Japanese wheat import market by means of an elasticity of substitution approach. Accomplishment of the first objective involved data collection from both primary and secondary sources to arrive at an estimate of Montana's wheat exports. The fulfillment of the second objective included a general description of the world wheat market, and utilization of a market share analysis of United States exports. To determine the elasticity of substitution between wheat exports from the United States and exports from competing exporters in the Japanese market, least squares linear regression was run using quantity ratios as dependent variables and price ratios as independent variables. Since much of this research concerns Japanese wheat importation, the remainder of this report reviews the history and procedures of Japanese wheat imports.

Ochsner, GL Cramer, GL

Montana State University, Bozeman Bulletin 679, Mar. 1975, 37 pp, 31 Tab.

ACKNOWLEDGMENT: Montana State University, Bozeman

PURCHASE FROM: Montana State University, Bozeman Agricultural Experiment Station, Bozeman, Montana, 59715 Repr. PC

DOTL RP

20 129262

INDUSTRIAL SHIPPER SURVEY-PLANT LEVEL

This report presents the findings of the Industrial Shipper Survey which was undertaken as part of the 1974 National Transportation Study. The survey was designed to provide a better understanding of industrial users' problems, motivations, expectations, and levels of satisfaction associated with the Nation's transportation system. Data were obtained from a nationwide sample of manufacturers by means of a questionnaire-interview process. All modes of transportation used in moving freight were studied with exception of pipelines. Four performance measures were employed in the study: on-time pickup, on-time delivery, loss, short or damage, and equipment availability. Other areas of inquiry included: private transportation, speed vs. reliability in freight transportation, projected modal split, and shipper and government relations.

Jones, JR

Office of the Secretary of Transportation DOT P 5010.1, Sept. 1975, 120 PP

ACKNOWLEDGMENT: OST

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

21 052677

STANDARDIZATION OF WORKING PROCEDURES AND OF MEANS FOR INCREASING THE CAPACITY OF MARSHALLING YARDS

The application of modern organization systems and techniques should enable the Railways to increase the quality of their service and to exploit to the full all the resources at their disposal. Marshalling yards play an essential part in organizing the transport of goods traffic; for this reason, it is necessary to increase their capacity by accelerating operations in marshalling yards and by reducing costs. The purpose of this leaflet is to recommend certain measures in the organizational fields, and methods of operation designed to achieve this end.

International Union of Railways DOC 19, Jan. 1968, 28 pp, 1 Ref.

ACKNOWLEDGMENT: UIC

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

DOTL RP

21 090743

MANUAL OF TRAFFIC STUDIES FOR MARINE CONTAINER TERMINALS

The manual is intended as a guide for personnel concerned with traffic analysis of motor vehicles, including trucks and trailers, entering and leaving container terminals.

Policy Planning Consultants, Maritime Administration Oct. 1974, 55p

Contract C-1-43390

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Microfiche, Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC
COM-75-50168/4ST, DOTL NTIS

21 091762

MARKET ENVIRONMENT AND CONTAINER SYSTEM PRODUCTIVITY

The study examines the extent to which containerization has spread, both geographically and in terms of commodities moving in containers. Penetration by U.S. carriers in the container market is explored and load factors on major trade routes are estimated. The relationship between load factor and unit cost is investigated and conclusions derived as to the competitive abilities of U.S. container carriers. Among the conclusions reached in the study are: Containerized service in international trade has grown about 140% from 1969 through 1972, with varying growth patterns in different areas and varying penetration in different commodities; containerization has a relatively lower penetration in Southern and Gulf Coast States, reflecting a potential market opportunity.

McCaul, JR

National Maritime Research Center, Kings Point, (NMRC-273-04-04-000)
Final Rpt. NMRC-KP-109, 1974, 146 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
COM-75-10764/9ST, DOTL NTIS

21 092226

STUDIES IN RAILROAD OPERATIONS AND ECONOMICS. VOLUME 1. RAILROAD CAR MOVEMENT RELIABILITY: A PRELIMINARY STUDY OF LINE-HAUL OPERATIONS

Data on road train delays due to various types of mechanical failures and derailments and on the duration of these delays were collected for a total of 1,065 trains operating over a single main-line division during a two-month period. These delays were classified by major type (brake, coupler, and other types of failures-not including engine failures) and by possible causal factors (train length, trailing tonnage, and track profile) operative at the time of the failure.

See also Volume 2, PB-244 119. Prepared in cooperation with Federal Railroad Administration, Washington, D.C., Union Pacific Railroad Foundation, Omaha, Nebr., and Burlington Northern Incorporated, St. Paul, Minn.

Lang, AS Reid, RM

Massachusetts Institute of Technology, Federal Railroad Administration, Union Pacific Railroad Foundation, Burlington Northern, Incorporated

Final Rpt. MIT-R70-74, Oct. 1970, 33 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244118/6ST, DOTL NTIS

21 092227

STUDIES IN RAILROAD OPERATIONS AND ECONOMICS. VOLUME 2. RAIL TRIP TIME RELIABILITY: EVALUATION OF PERFORMANCE MEASURES AND ANALYSIS OF TRIP TIME DATA

After evaluating alternative measures within a logistics framework, this report recommends two measures of reliability, the maximum percentage of cars whose trip times fall in a consecutive two or three day period of the trip time distribution (the 2-or 3-day%) and the percentage of cars arriving after this period (the %-late). Nevertheless, a dialogue with shippers is necessary before the most appropriate measures can be determined for a specific situation. Using these measures, origin-to-destination (O-D) data for three railroads are analyzed to discover the nature of O-D reliability. Although yard classifications are found to affect reliability much more than does distance, detailed train information is necessary to predict the nature of this impact for a particular O-D pair. Reducing the number of classifications or improving yard operations will improve both reliability and mean trip times.

See also Volume 1, PB-244 118, and Volume 3, PB-244 120.

Martland, CD

Massachusetts Institute of Technology, Federal Railroad Administration
Final Rpt. MIT-R72-37, FRA/RPD-75/1.1, June 1972, 110 pp

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244119/4ST, DOTL NTIS

21 092228

STUDIES IN RAILROAD OPERATIONS AND ECONOMICS. VOLUME 3. DETERMINANTS OF LINE HAUL RELIABILITY

The authors look in detail at the variance in arrival time and its components for a total of 1197 trains operating over three different runs (of a single railroad) varying from 150 to 270 miles in length. Their data showed standard deviations of arrival times which typically ranged from 1 to 3-1/2 hours for trains operating on a half dozen different schedules. More important, the analysis of their data showed that the variability in departure time, in running time (excluding stops and delays), and in intermediate yard time were the major contributors to arrival time variance. Standard deviations of departure times (from initial terminal) were on the order of 45 minutes to 1-1/2 hours, of running times from 45 minutes to 2-1/2 hours, and of intermediate yard times from 1/2 hour to 1 hour.

See also Volume 2, PB-244 119, and Volume 4, PB-244 121.

Belovarac, K Kneafsey, JT

Massachusetts Institute of Technology, Federal Railroad Administration
Final Rpt. MIT-R72-38, FRA/RPD-75/1.2, June 1972, 97 pp

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244120/2ST, DOTL NTIS

21 092229

STUDIES IN RAILROAD OPERATIONS AND ECONOMICS. VOLUME 4. THE IMPACT OF CLASSIFICATION YARD PERFORMANCE ON RAIL TRIP TIME RELIABILITY

Yard reliability emerges as a problem of central importance to overall movement reliability. Detailed studies of three yards suggest that 10 to 20% of all cars miss their most appropriate outbound train connections, although performance varies not only between yards, but between inbound-outbound train pairs at the same yard. It is possible to express the probability of making a connection as an increasing function of the time available to make the connection, since the extra time offsets both arrival delays and congestion delays. The greatest cause of delay, however, is the cancellation of outbound trains or blocks. Extraordinary delays caused by rips and no-bills appear to be a relatively small problem.

See also Volume 3, PB-244 120, and Volume 5, PB-244 122.

Reid, RM O'Doherty, JD Sussman, JM Lang, AS
Massachusetts Institute of Technology, Federal Railroad Administration
Final Rpt. MIT-R72-39, FRA/RPD-75/1.3, June 1972, 72 pp

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244121/0ST, DOTL NTIS

21 092231
STUDIES IN RAILROAD OPERATIONS AND ECONOMICS.
VOLUME 6. SOME ANALYSES OF RAILROAD DATA

The report presents data from several railroads on yard, link, and total origin-to-destination performance. Topics analyzed include train arrivals as functions of train length and the day of the week, line haul times, departure times, receiving yard delays, total yard times, missed connections, and trip time standard deviations. Such data analysis is necessary to insure a realistic choice of parameter values and modelling concepts in conjunction with the simulation models discussed in Volume 5, Models for Investigating Rail Trip Time Reliability. The data and results given in this report can also be helpful to future work on railroad reliability.

See also Volume 5, PB-244 122, and Volume 7, PB-244 124.

Folk, JF
Massachusetts Institute of Technology, Federal Railroad Administration
Final Rpt. MIT-R72-41, FRA/RPD-75/1.5, June 1972, 78 pp

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244123/6ST, DOTL NTIS

21 092232
STUDIES IN RAILROAD OPERATIONS AND ECONOMICS.
VOLUME 7. A BRIEF REVIEW OF VARIOUS NETWORK
MODELS

In the past decade, the railroad industry has developed various types of models to investigate different operating problems and policies, as well as proposed changes in the physical plant of a railroad. This report presents a review of the railroad network models. Two basic types of network models are reviewed: simulation models and optimization models. In the network simulation models reviewed, car movements through a network are simulated for a fixed set of train schedules and route structures. Changes in operating policies are tested by making appropriate changes in either the input data deck or the internal logic of the simulation program. The network optimization models reviewed optimize train schedules (or in one case, a railroad network) for a fixed traffic demand. Quantities one might vary in a optimization model include traffic levels, network configuration, cost indexes, and parameters such as train speeds and processing rates at yards.

See also Volume 6, PB-244 123, and Volume 8, PB-244 125.

Folk, JF
Massachusetts Institute of Technology, Federal Railroad Administration
Final Rpt. MIT-R72-42, FRA/RPD-75/1.6, June 1972, 96 pp

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244124/4ST, DOTL NTIS

21 092233
STUDIES IN RAILROAD OPERATIONS AND ECONOMICS.
VOLUME 8. RELIABILITY IN RAILROAD OPERATIONS

Line-haul and trip time data were analyzed from eight railroads and found that unreliability is evident in all phases of rail operations. Yard delays, many of which are caused by unreliable train operations, are the greatest cause of trip time unreliability. Changes in operations, capital improvements, and institutional changes can all help improve reliability. Moreover, capital investment especially in improved mechanical reliability of equipment, will have a less significant and immediate impact than operating changes such as through-blocked trains and increased schedule adherence. A dialogue between shippers, railroads, labor, and management is critical to the success of a program for improving reliability.

See also Volume 7, PB-244 124, and Volume 9, PB-244 126.

Lang, AS Martland, CD
Massachusetts Institute of Technology, Federal Railroad Administration
Final Rpt. MIT-R72-74, FRA/RPD-75/1.7, Oct. 1972, 96p

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244125/1ST, DOTL NTIS

21 092235
STUDIES IN RAILROAD OPERATIONS AND ECONOMICS.
VOLUME 10. IMPROVING RAILROAD RELIABILITY: A CASE
STUDY OF THE SOUTHERN RAILWAY

The report serves three major functions: it analyzes O-D yard, and line-haul performance over a large portion of the Southern system; it summarizes a set of procedures for improving reliability on any railroad, and it describes in detail the test program carried out on the Southern. The major product of this research, this test program demonstrated that reliability can be improved in the short run, that this need not initially involve added capital or operating expense and that this will also result in lower trip times. By changing train schedules and operating procedures for three traffic flows, involving 300 cars/day, Southern improved reliability about 15%, reduced trip times by nearly a day, and save approximately \$25,000/month in car utilization expense.

See also Volume 9, PB-244 126, and Volume 11, PB-244 128.

Martland, CD
Massachusetts Institute of Technology, Federal Railroad Administration
Final Rpt. MIT-R74-28, FRA/RPD-75/1.9, Mar. 1974, 167 pp

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244127/7ST, DOTL NTIS

21 092237
STUDIES IN RAILROAD OPERATIONS AND ECONOMICS.
VOLUME 12. PROCEDURES FOR IMPROVING RAILROAD
RELIABILITY

The report defines an experimental procedure with which any railroad can start to improve reliability. The success of the test program implemented by the Southern Railway (See Volume 10) demonstrates that the procedure not only works, but offers potential operating and economic benefits to railroads that adopt it. In addition to describing the basic procedures, this report discusses data processing capabilities alternatives for improving reliability, and methods for evaluating these alternatives. The report closes with recommendations to the government and to the industry for improving railroad reliability.

See also Volume 11, PB-244 128, and Volume 13, PB-244 130.

Martland, CD
Massachusetts Institute of Technology, Federal Railroad Administration
Final Rpt. MIT-R74-30, FRA/RPD-75/1.11, Mar. 1974, 82p

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244129/3ST, DOTL NTIS

21 092759
SCHEDULING RULES FOR A CLASS OF FIXED ROUTE
FREIGHT SCHEDULING PROBLEMS

While scheduling problems have received prominent attention in the airline industry, comparatively little analytical work has been done concerning such problems in the railroad industry. In this report, problems involving both a scheduling and routing aspect are considered based on the movement of freight on railroads. Viewing the freight as jobs to be processed and the trains as a system of parallel processors allows one to develop optimal scheduling rules for transporting the freight on fixed route railway networks for various optimality criteria. Rules are presented for cases when the route consists of a single track serviced by one or more trains operating on a fixed schedule. Cases in which the jobs and/or trains may be subject to certain availability restrictions are also considered.

Martin-Vega, LA Ratliff, HD
Florida University, Gainesville, Army Research Office, Office of Naval
Research, (NR-047-136) Res. Rept. RR-75-3, July 1975, 23p

Grant

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
AD-A013013/8ST, DOTL NTIS

21 092779
DAILY PLANNING OF TRUCK HAULAGE (A PRACTICAL GUIDE)

The report contains a detailed analysis for planning daily freight haulage by trucks. Topics discussed include planning methodology, container freight and the transport of packaged and bulk cargo.

Trans. of mono. Sutochnoe Planirovanie Gruzovikh Avtomobilnykh Perevozok (Prakticheskoe Posobie), Moscow, 1974 57p.

Erofeevskii, NP
Joint Publications Research Service June 1975, 55p

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
JPRS-65050, DOTL NTIS

21 093097
CRIME AND LAW ENFORCEMENT IN TRANSPORTATION SYSTEMS (A BIBLIOGRAPHY WITH ABSTRACTS)

Studies are cited on the following topics: Cargo security, motor vehicle accidents involving crime, traffic law enforcement, the criminal justice aspects of motor vehicle operators who use drugs or alcoholic beverages, and other related topics. (Contains 48 abstracts).

Shonyo, C
National Technical Information Service Bibliog. Sept. 1975, 53 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PS-75732/8ST, DOTL NTIS

21 093132
UNIT TRAIN TRANSPORTATION OF COAL. TECHNOLOGY AND DESCRIPTION OF NINE REPRESENTATIVE OPERATIONS

The Bureau of Mines surveyed unit trainloading and storage installations in the midwestern, eastern, and southeastern coalfields. Nine individual operations were studied in detail as a representative cross section of unit train operations in these areas. Of the nine operations studied, three were in Illinois, two in Kentucky, and one each in West Virginia, Tennessee, Ohio, and Pennsylvania. Information was obtained from coal producers, coal sale agencies, railroads, construction and equipment companies, and power companies.

Prepared in cooperation with Bureau of Mines, Twin Cities, Minn., Bureau of Mines, Pittsburgh, Pa., and Bureau of Mines, Knoxville, Tenn.

Glover, TO Hinkle, ME Riley, HL
Bureau of Mines Info Circ. BuMines-IC-8444, 1970, 119 pp

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244319/0ST, DOTL NTIS

21 093133
LABOR PRODUCTIVITY AND LOCAL MANAGEMENT CONTROL IN THE PHILADELPHIA AND CINCINNATI TERMINALS OF THE PENN CENTRAL TRANSPORTATION COMPANY

Terminal labor productivity, analysis, and planning of Cincinnati and Philadelphia terminals are studied. Crew assignments are listed for each. The impact of labor contracts, agreements, compensation, and attrition are discussed. Throughout the report improved supervision and work methods are emphasized. It is recommended that a long-term local management control plan be implemented. Function and Task identification of terminal activities with time frames and frequencies is included in the Addendum.

Hines (RL) Associates, Incorporated, United States Railway Association
USRA/R-102, July 1975, 477 pp

Contract USRA-50101
ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244300/0ST, DOTL NTIS

21 096833
HIGH-PRESSURE PNEUMATIC TRANSPORT [El Transporte Neumatica A Alta Presion]

Conventional compressed air transport, which uses low and medium pressure, has the following disadvantages: erosion of pipes and valves, changes in the particle size distribution of the materials, obstruction of pipes and valves, and high air consumption. These disadvantages can be significantly reduced if high-pressure air is used. This article describes a high-pressure transport system. The propulsion plant comprises five parts: (1) storage silos and pits for materials coming from the supplier, (2) propulsion device, (3) pipes, (4) arrival depots with a system for filtering and unloading the material, and (5) electromagnetic driving equipment and control equipment. /TRRL/ [Spanish]

Revista Tecnica Maq Canteras Y Minas No. 63, May 1972, pp 22-32, 9 Fig., 3 Tab., 1 Phot.

ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain, Laboratoire Central des Ponts et Chaussees, Transport and Road Research Laboratory (IRRD 100873)
PURCHASE FROM: Revista Tecnica Maq Canteras Y Minas Madrid, Spain Orig. PC

21 099777
INTEGRATED TRANSPORT CONTROL ON RAILWAYS

Through transport entails: consignment with appended tariff, loading, forwarding, unloading and delivery. However, according to the author, it was established that 93% of the data required for computing the consignment note was also required for transport control. This discovery led to the idea of integrated transport control. The author presents its economic advantages, and shows the organization of the "Hanover Cybernetic Island". He describes: (1) the data capture which automates the task of the Commercial Departments; (2) the operational control of a marshalling yard, which is facilitated, anticipated and allows for forecastings on train movements; and (3) the interface between marshalling yard control and running on line traffic. One figure presents the data processing layout of the Island. To conclude, the author presents some ideas on future developments of the system and the DB's future prospects.

Paper presented at the 2nd Symposium organized by AFCET in Monte-Carlo from 16 to 21 September 1974.

Wunderlich, WM
AFCET-Traffic Control and Transportation Systems 1974, pp 491-503, 10 Fig., 1 Tab.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

UIC cat. No. 65N7

21 099778
PRACTICAL CONDITIONS FOR FREIGHT TRANSPORT IN LARGE CONTAINERS [Conditions materielles du transport de marchandises en gros conteneurs]

This report drafted for the United Nations Department of Economic and Social Affairs, is intended to provide information about the technical possibilities of combined freight transport in large containers (ISO or non-standardized containers, 6 to 12 m. long). Details are given of the characteristics of the containers transport and handling methods, waterway, road or rail transport conditions, estimated production, installation, equipment and transfer cost for each of the techniques described. The report which is centered on the needs and requirements of developing countries, could be of interest to any body concerned with such matters. [French]

United Nations 1974, 124 pp, 121 Fig., 108 Tab., 34 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of
PURCHASE FROM: United Nations Publications New York, New York, Repr. PC

21 099798

COAL BY PIPELINE: A CHALLENGE TO THE UNIT TRAIN

Proposals for slurry pipeline delivery of western coal to the South and Midwest are being watched by railroads which are operating unit coal trains. Burlington Northern sees high-capacity pipelines as competitive with rail haulage; small diameter lines would not be. For delivery from arid western regions, water supply would be a critical factor and the handling of large volumes of contaminated water at destination must also be faced. The problem of eminent domain for a non-common carrier pipeline remains to be faced. The two coal slurry pipelines which have operated in the U.S. are discussed.

Welty, G *Railway Age* Vol. 176 No. 9, May 1975, pp 16-17

PURCHASE FROM: XUM Repr. PC

DOTL JC

21 099806

A RAILROADER'S BAD DAY AT BLACK MESA

The coal-hauling Black Mesa and Lake Powell Railroad has encountered numerous technical problems as it has attempted to move to the level of operations for which it was designed. Problems with the automatic control system, the concrete ties, the crushed river rock ballast, and with wheel and rail wear are all combining to force a complete redirection of the operation. It is estimated that up to \$10 million could be required for the locomotives, cars and track changes to permit the level of train operations that will properly fuel the generating station for which the new electric railroad was built. The 78-mile railroad opened in 1974 is due for a major redesign.

Business Week Aug. 1975, pp 69-70

PURCHASE FROM: McGraw-Hill, Incorporated 1221 Avenue of the Americas, New York, New York, 10020 Repr. PC

DOTL JC

21 099823

CONTAINERIZATION: A NEW OPPORTUNITY FOR A NEW RAILWAY

The world of transport has undergone important changes in the last decade. The following three large trends have given rise to this evaluation: the development of market research, the concept of physical distribution and the appearance of the large container. After eight years of trial and error and of experimenting, the European railways have now arrived at a decisive turning-point. They can either restrict themselves essentially to acquiring previously containerised sea traffic, as has generally been the case so far, or they can also seek to develop containerisation at continental level. However, with this second option, a genuine desire of the railways to go in this direction is an indispensable condition.

Welters, HWH *Rail International* No. 5, May 1975, pp 363-369, 2 Phot.

ACKNOWLEDGMENT: Rail International

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 099829

NEW DIMENSIONS

While industry efforts will produce future major benefits in terms of car utilization, several of the immediate improvements are described. Included are steps taken by Chicago & North Western to assure the quality of cars placed for shippers' loading; Missouri Pacific's efforts to improve the quality of input to its computerized car control system; Denver & Rio Grande Western's drive to assure return loads for its cars when off-line; and achievements of a private boxcar pool operator, National Railway Utilization Corp.

Shaffer, FE *Modern Railroads* Vol. 30 No. 7, July 1975, pp 54-55, 1 Tab., 1 Phot.

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

21 099831

GRAVEL TRAVELS BY RAIL-AT LOWEST COST

A 30-car unit train of Rapid Discharge hopper cars is used to supply gravel to a Denver, Colo., paving company. The train makes a five-hour, 86-mile

round trip over Burlington Northern to the pit for loading and return to the elevated unloading trestle at Western Paving Company. Thirty trucks operating nine hours daily and consuming over 2,000 gallons of fuel would be required to perform the same function as the train which consumes only 400 gallons of fuel. The train, trestle and loading facility were designed as a system.

Progressive Railroading Vol. 18 No. 7, July 1975, pp 45-46, 3 Phot.

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

21 099846

HIGHWAY SUBSIDIARIES STUDY

This report studies Conrail Corporation's trucking requirements and its growth opportunities in truck transportation. The operations of two highway subsidiaries Pennsylvania Truck Lines (PTL) owned by Penn Central Transportation Company and the Reading Transportation Company (RTC) owned by Reading Company were evaluated through use of interviews of key personnel, observation of facilities, and review of financial and operational performance. It recommends that CRC acquire PTL and RTC, enter the less than truckload market in the New York to Chicago lane, retrieve, if possible, New England Transportation, and undertake studies to blend truck-rail management.

Sponsored by USRA.

Kearney (AT) and Company, Incorporated, United States Railway Association Final Rpt. USRA/R-060, July 1975, 133 pp

Contract USRA-C-50117

ACKNOWLEDGMENT: United States Railway Association, NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243845/5ST, DOTL NTIS

21 099847

INDIANAPOLIS TERMINAL PLANNING STUDY

The objective of this study was to determine the terminal's true potential for improvement. Some areas considered were labor utilization and effectiveness, operations performance, budget control, and profit improvement. A definite need for modern management methods, and information system to aid in decision-making, and the training of supervisors to use these tools was found. A new terminal management system was outlined. Recommendations were made for specific operations based on management improvement. Continuous time studies and work samplings were used to evaluate labor utilization. Analyses of terminal operational data was used to evaluate terminal effectiveness. Management Center Reports were used for analysis of operating expenses.

Management Science Associates, United States Railway Association Final Rpt. USRA/R-047, June 1975, 158 pp

Contract USRA-C-50102

ACKNOWLEDGMENT: United States Railway Association, NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243840/6ST, DOTL NTIS

21 099860

SLURRY PIPELINE RESEARCH INFORMATION CIRCULAR # 1

This is a document to convey the position of the Canadian Transport Commission with regard to slurry pipeline research. The content of this paper is in no way intended to represent CTC'S official policy on commercial solids pipelines in the future. CTC has prepared this document to inform the Canadian public. The subjects involved dwell mainly on the research being carried out at the Saskatchewan Research Council (SRC) under the sponsorship of the CTC. The justification, purpose, objectives, and intent are specified in detail. Due to sheer bulk and complexity, the nature of the tests and analyses to be carried out are presented in a general form.

Weinberg, E McLaughlin, GM

Canadian Transport Commission No. 13, Apr. 1971, 29 pp, 2 App.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
DOTL RP

21 099863

THE CONTAINER STUDY IN SUMMARY

In October 1969, the Canadian Transport Commission initiated a 3-phase study; to investigate the future potential for container services, to develop methodologies for the analysis of container systems, and to prepare sources of information and data required for an assessment of the various impacts of containerization. This report serves two purposes, one to summarize the results of the whole study, and the other to present the principal results of the final phase which was concerned with an illustrative application of the computer programs developed in the second phase.

Bunting, PM O'Connell, LM
Canadian Transport Commission No. 70, Nov. 1973, 156 pp, Figs., Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
DOTL RP

21 099864

APPLICATIONS, TECHNOLOGY AND ECONOMICS OF SLURRY PIPELINING

The transportation of bulk commodities over long distances by means of slurry pipelines holds great promise in the future. Slurry pipelining is a relatively new mode of transportation which has proven successful in a few unique applications and appears to be technically feasible and to offer economic benefits in many as yet untried circumstances. This paper presents a discussion of the applications, technology and economics of slurry pipelines and conveys a general appreciation of the problems facing transportation analysts attempting to determine the long-range potential and impact of slurry transportation.

McLaughlin, GM
Canadian Transport Commission No. 50, Oct. 1972, 15 pp, 2 Fig., 1 Tab., 6 Ref.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
DOTL RP

21 099865

ECONOMIC COMPARISON OF RAIL AND SLURRY PIPELINE FOR THE DOMESTIC MOVEMENT OF WESTERN CANADIAN COAL TO CENTRAL CANADIAN MARKETS

This report summarizes a detailed evaluation of the potential of coal slurry pipeline systems to compete with existing Canadian rail facilities. The evaluation comprises a technical feasibility and economic viability assessment of slurry transport systems servicing future movements of coal from Alberta to the Lakehead for subsequent transshipment to Ontario Hydro plants and perhaps Ontario steel plants. The pipeline system costs are derived from complete pipeline designs for each level of coal movement and detailed capital and direct operating cost estimates of each of the components of the systems so designed. These costs are evaluated for a number of possible financial conditions to derive pipeline operating expense. A comparison of the operating expenses of the rail alternative and the pipeline is made within the demands of probable financial conditions and for various levels of coal throughput to determine the conditions where the pipeline system is most viable.

Canadian Transport Commission No. 123, Aug. 1974, 79 pp, Figs., Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
DOTL RP

21 099870

RESEARCH BASE FOR DEVELOPMENT OF A NATIONAL CONTAINERIZATION POLICY, PHASE I. VOLUME 1.

This volume is one of two related volumes comprising an exploratory study of containerization in Canada. The other volume, published separately, is an

annotated bibliography. In total, the two volumes form a base for a more detailed study of the alternatives for development of a national containerization policy.

See also Volume 2, RRIS 26 099888.

Matson Research Corporation, (269-116) No. 4, Sept. 1970, 180 pp, Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC

21 125122

JANE'S FREIGHT CONTAINERS: PORTS; OPERATORS; MANUFACTURERS; 1973-74. SIXTH EDITION

The publication is an inventory of ports, with details of inland transport and terminals; ship operators, routes and frequency of services; non-vessel operating carriers; container leasing companies; manufacturers of containers, container handling equipment, and components; container filling and associated services; container repair, testing and cleaning services; international road and rail- regulations and organisations; air freight-iata regulations, and lists of manufacturers of air cargo equipment; international container standards-iso regulations and recommendations; future trends within the freight industry, and military supply. A general and a ships' index are included. /TRRL/

Finlay, P
BPC Publishing, Limited Textbook No Date, 662 pp, Figs., Tabs., Photos.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 211986)

PURCHASE FROM: BPC Publishing, Limited Saint Giles House, 49-50 Poland Street, London W1A 2LG, England Repr. PC

21 125864

THE USE OF SIMULATION TO DETERMINE THE CAPACITY OF SINGLE-TRACK RAILWAY LINES

The assessment of various upgrading alternatives is presented here in terms of the capacity of the line. Several definitions of single-track line capacity are given; the capacity definition based on weighted delay computations and differentiated by train class is shown to be a promising approach. However, more research is needed into the ways of determining the weighting factors and delay costs of various classes of trains.

Walker, AEG Jones, JCM *Transport Economics and Operational Analysis* No. 1, Mar. 1975, pp 1-13

ACKNOWLEDGMENT: British Railways

21 125865

COMBINED RAIL/ROAD TRANSPORT

Present events, and especially the energy shortage and its high cost, have among other results, placed combined rail-road transport in the forefront of present considerations. However, this is a permanent solution to problems which go way beyond present energy difficulties. Road transporters are now obliged to better organize themselves by respecting schedules, procedures and rules and by doing away with over-loading as the vehicles are weighed to calculate transportation prices. Problems such as speeding and too long stretches at the wheel are also being done away with. All this contributes to the progressive creation of conditions for genuine cooperation between rail and road without excluding health competition. This study deals with the reasons for combined rail-road transport and outlines basic principles, techniques, delivery methods and international traffic. It ends with a presentation of some statistics and perspective for the future. [French]

Mathieu, J *Transports* No. 199, Feb. 1975, pp 53-62

ACKNOWLEDGMENT: British Railways
PURCHASE FROM: Transports Paris, France Repr. PC

21 125871

SHIPPING CONTAINERS AS ORIGINAL PACKAGES: ARE CONTAINERIZED IMPORTS IMMUNE FROM STATE TAXATION

Technological innovation has occurred in the shipping industry which may soon be the source of widespread litigation involving the application of the original package doctrine. Prior to the advent of containerization, the only

packages involved were the actual boxes or cases in which the goods were shipped. After arrival at the warehouse of the importer, if these boxes or cases were broken, and goods inside were exposed or removed, the "original package" was held to have been broken, and the goods become subject to state taxation. It should be recognized that the container process is fundamentally concerned only with the mode of transportation of the goods and does not alter the essential nature of the transaction. Goods imported in commercially reasonable units, in a bona fide transaction, should not lose their immunity from state taxation merely because of the mode of transport which the shipper and carrier happen to choose.

Kelley, WJ, Jr *Ohio State Law Journal* Vol. 36 No. 2, 1975, pp 421-435

ACKNOWLEDGMENT: Ohio State Law Journal
PURCHASE FROM: Ohio State Law Journal 1659 High Street, Columbus, Ohio, 43210 Repr. PC

DOTL JC

21 125882

BUFFALO, NEW YORK TERMINAL PLANNING STUDY

This report studies the opportunities for increased efficiency in Buffalo terminal operations concentrating on the main carriers of Penn Central, Erie Lacawanna, and Lehigh Valley. Analysis of existing records, time studies, observations, and interviews are used in the evaluation to determine labor effectiveness and utilization. Procedures are developed for planning of terminal operations and of terminal management, but not procedures for implementation. Profit improvement opportunities are identified. Primary emphasis is placed on ensuring integrity of flows of traffic affected by consolidation. Includes an appendix of Yard Descriptions.

Sponsored by USRA.

Kearney (AT) and Company, Incorporated Final Rpt. USRA/R-048, June 1975, 341 pp

Contract USRA-C-50103

ACKNOWLEDGMENT: United States Railway Association
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244332, DOTL NTIS

21 125895

TRANSPORT OF MINERALS

In this paper the subject of mineral transportation technology is discussed in terms of the significant technical and economic characteristics of the various modes, and the major variables that govern the applications of transportation technology to actual projects.

Skelding, FH
Fluor Utah Incorporated, Fluor Corporation 22 pp

ACKNOWLEDGMENT: Fluor Utah Incorporated, Fluor Corporation
PURCHASE FROM: Fluor Utah Incorporated, Fluor Corporation 2500 South Atlantic Boulevard, Los Angeles, California, 90040 Repr. PC

DOTL RP

21 126431

THE COAL FUTURE

As one phase of a comprehensive study grant by the National Science Foundation, coal transportation in unit trains and by pneumatic and slurry pipelines was examined. Appendix F summarizes relative costs. It is concluded that rebuilding an existing roadbed to the highest of standards would produce transportation costs only half those of a new slurry pipeline. Construction of a new railroad is more expensive, but slurry pipelines have not yet solved some of the major problems of water handling and power failure.

Center for Advanced Computation No Date

PURCHASE FROM: Center for Advanced Computation Illinois University, Urbana, Illinois, 61801 Repr. PC

21 126433

ROTARY CAR DUMPER SYSTEMS

The important technical points in total system planning of car retarders, electronic scale platen, the many varieties of single and tandem dumpers, car ejectors, and train positioners are discussed. Pollution control and OSHA safety provisions also analyzed.

Presented at the Joint Materials Handling Conference, Sheraton-Cleve-

land Hotel, Cleveland, Ohio, 23-25 September 1975.
Sabina, WE (Stearns-Roger, Incorporated)
Society of Manufacturing Engineers MS75-641, Sept. 1975

ACKNOWLEDGMENT: Society of Manufacturing Engineers
PURCHASE FROM: Society of Manufacturing Engineers 20501 Ford Road, Dearborn, Michigan, 48128 Repr. PC

21 126436

CANADIAN PACIFIC BACKS THE CONTAINER

Unlike the USA, where piggyback dominates the domestic intermodal scene, CP Rail foresees containers taking the lead as more cranes are installed and different box sizes become available. CP is also in the shipping and road haulage business which permits cooperation between modes in a way which is legally impossible in the USA. This gives the Canadians a distinct advantage, not only in developing intermodal domestic freight, but also as a landbridge for maritime containers moving between the Far East and Europe as well as to the US midwest.

Janner, AE (CP Rail Intermodal Services) *Railway Gazette International* Vol. 131 No. 8, Aug. 1975, pp 293-295, 2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 126438

DB'S SUNDRIES TRAFFIC ON A FIRMER BASIS

Faced with ever-increasing competition in the less-than-carload freight field, the German Federal Railway initiated studies to determine the optimum organizational structure. The plan envisages reduction in the number of so-called Sundries terminals from 1,000 to 400 by the end of 1976. Door-to-door service will actually be expanded and no reduction in service quality is anticipated.

Railway Gazette International Vol. 131 No. 8, Aug. 1975, pp 299-300, 2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 126439

FREIGHTLINERS' SECOND ASSAULT ON THE DOMESTIC MARKET

Designed originally by British Railways to replace inefficient domestic carload movement, Britain's network of dedicated container trains has, under Freightliners Ltd., gained most new business in the maritime field since 1971. Now a fresh attack on the domestic market is planned using physical distribution techniques to combine warehousing and break-bulk functions with the intermodal road/rail transfer, or even to eliminate them altogether from the distribution chain in some cases.

Bleasdale, C (Freightliners Limited) *Railway Gazette International* Vol. 131 No. 8, Aug. 1975, pp 296-298, 2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 126464

PROSPECTIVE CHANGES FOR HANDLING OF COMMODITIES IN CANADIAN PORTS

Because Canada is not on major trade flows, costs of transporting goods in and out of the country should be as low as possible to minimize foreign competition. Containerization and its complement, transportation of pallets, are likely to reduce transport costs not only for international trade but also for domestic commerce. The study is to guide business in short-and long-term planning of daily operations, indicating whether they should plan for new and possibly initially costly methods of transportation. The report includes: Introduction; Methodology; Trade Analysis of the Ports Under Study; Piggyback Transport in Canada; General Conclusions and Recommendation; Selected Bibliography.

Transportation Development Agency June 1975, 93 pp, Tabs., Refs.

PURCHASE FROM: Information Canada Ottawa, Ontario K1A 0S9, Canada Repr. PC

T48-8/1975, DOTL RP

21 126979

THE COMPUTER-CONTROLLED GRAVITY SORTING YARD OF THE GERMAN FEDERAL RAILWAY [Die rechnergesteuerten Ablaufanlagen bei der Deutschen Bundesbahn]

The author first reviews the development of automated shunting and train formation in DB marshalling yards. He then explains and justifies the use of series process computer control. Besides analysing control algorithms for normal operation, he deals with the recording of technical disturbances and operating irregularities, and the correction of their consequences by the automatic operation of the appropriate protective or preventive measures. [German]

Part 2 appears in Vol. 26 No. 2, pp 54-57, February 1975.

Olzowy, G *Eisenbahningenieur* Vol. 26 No. 1, Jan. 1975, pp 15-19, 5 Fig., 10 Ref.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: Dr Arthur Tetzlaff-Verlag Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

21 127344

CAR ALLOCATION IN NORTH DAKOTA REVISITED

This study was intended to identify reasonable and non-discriminatory factors which can be effectively used in allocation of grain cars in North Dakota and, using those factors, test for "nondiscrimination" in actual allocation of cars during the 1973-1974 crop year by North Dakota railroads. While the rail lines did not use, or even consider using the specified nondiscriminatory factors in their car allocations for movement of North Dakota wheat, the allocation was generally equitable and nondiscriminatory.

Tosterud, RJ *ICC Practitioners' Journal* Vol. 42 No. 6, Sept. 1975, pp 703-706

PURCHASE FROM: Association Interstate Commerce Comm Practitioner 1112 ICC Building, Washington, D.C., 20423 Repr. PC

DOTL JC

21 127621

REDCAR-CONSETT IRON ORE CONTRACT FOR BRITISH RAIL

Iron ore for British Steel Corporation's blast furnaces at Consett, County Durham, is now being imported through the new ore terminal at Redcar on the south side of the Tees estuary. This development means that Redcar is supplying iron ore for every blast furnace north of the Humber and south of the Scottish border. Under an agreement between British Steel Corporation and British Rail, ore for Consett will be handled by up to 8 trains a day each carrying nearly 700 tons over a 58 mile route. Total movement in a year will be about 1.5 million tons.

British Steelmaker Vol. 41 No. 2-4, Mar. 1975, pp 15-16

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

21 127703

DEVELOPMENT AND FUTURE POTENTIALITIES OF LARGE SIZE CONTAINER TRAFFIC ON THE EUROPEAN RAILWAYS

After a period of steady increase, the container traffic of the railways has reached a considerable volume. Even during the current year, the number of containers carried by the railways is on the increase and their number should continue to increase in the coming years if the world-wide economic crisis does not deteriorate abruptly. The percentage growth rates may be somewhat lower than those experienced during the late 1960s; in view of the relatively small numbers of containers during the early years of container traffic (1967-1968), however, this is not surprising; in absolute terms there has been a steady increase from year to year. The European railways are well able to keep pace with the progress of containerisation, originally initiated by the American shipping companies, and it is only in a few important traffic relations where this process has, by now, more or less reached its ceiling. The container traffic from and to the seaports (seaport traffic) continues to play a dominant, albeit no longer exclusive, part. But also the exclusive inland transport of containers (continental traffic) not connected with shipping has assumed much greater importance of the European railways in national as well as international traffic, though the rate of increase has varied as between different railways.

Eiffler, FK *Rail International* Np-10, Sept. 1975, pp 793-800, 6 Phot.

ACKNOWLEDGMENT: Rail International

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

21 127705

RAILROAD CLASSIFICATION YARD TECHNOLOGY: AN INTRODUCTORY ANALYSIS OF FUNCTIONS AND OPERATIONS

A review of the basic operating characteristics and functions of railroad classification yards is presented. Introductory descriptions of terms, concepts, and problems of railroad operations involving classification yards are included in an attempt to provide a "primer" on railroad yards. The report describes certain railroad operating practices and identifies problems that inhibit the efficient operation of railroad yards and the rail system of which they are a part. An extensive bibliography has been provided.

This project was sponsored by Federal Railroad Administration, DOT.

Troup, KF, III

Transportation Systems Center, (DOT-TSC-FRA-75-19) Final Rpt. FRA-OR&D-75-55, May 1975, 134 pp, 12 Fig., 3 Tab., 1 App.

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

21 127721

RAIL CAPACITY PLANNING

Canadian Pacific has developed a program for defining and measuring rail capacity and planning the changes which should be made in the physical plant to handle projected levels of traffic. While "over the road" aspects of capacity are usually studied, CP Rail views its operations as a system composed of many elements such as main lines, yards, motive power, freight cars, shops, communications and other factors. CP has produced simulations handling forecast traffic levels and then makes cost benefit studies of any changes needed. Rail capacity can be increased gradually, rather than/with a massive one-shot investment program. A financially sound system is maintained while meeting needs for new capacity.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Joplin, AF (Canadian Pacific)

Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 9-16, 9 Fig.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

21 127723

RAIL SERVICE RELIABILITY. A BLUEPRINT FOR IMPROVEMENT

This report discusses the need for greater reliability of rail service and concludes that an organized commitment can produce short-term improvements with minor capital investment. With the benefit of service reliability reports and service standards, it is proposed that a Service Reliability Team evaluate solutions to problems such as train scheduling and yard operations. It is observed that railroads do not often consider time an economic value for the consumer. With close monitoring trip cycles should be reduced, utilization improved and unit costs cut. Since capacity is available, demand should be positively influenced by a true corporate objective and organized effort.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Battel, JF

Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 125-132, 9 Fig.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

21 127724

THE COST AND SERVICE EFFECTS OF ALTERNATIVE TERMINAL REORGANIZATION PLANS

This paper explores the relationship between service quality, terminal rationalization and network modeling. All these factors were involved in the

1972-1974 study of the St. Louis terminal region. The three alternatives studied varied in degree of centralization in the network and in the institutional assumptions. More than operating plans and track diagrams were involved in each case. One alternative was shown nonproductive. One of the other two which would involve total centralization showed great benefit. The single master yard, while not markedly more efficient than many others, eliminates operations outside the yard. Inter-railroad rivalries remain the basic problem to achieving the benefits.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Landow, HT (Consulting Associates, Incorporated)

Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 133-138, 1 Fig., 2 Ref.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

21 128610

A PROGRAM OF EXPERIMENTS INVOLVING CHANGES IN TERMINAL OPERATIONS--COMPLETION REPORT, 23RD STREET-IVORY (HEAVY HAULER) TRANSFER EXPERIMENT

This experimental program is a labor, management and government undertaking directed by the Labor/Management Committee. The St. Louis Terminal of the Missouri Pacific Railroad was selected as a location for testing innovative experiments in terminal operations. Temporary experimental changes are considered in any operational or regulatory aspect of the terminal. This report reflects the results and conclusions from an experiment involving a change in management practices and operations. The project teams Car Movement Evaluation System was used in the development of the experiment. As a result of the experiment car detention time was reduced 28 hours per car on 18 cars per day. Management will continue to operate the transfer.

Requests should be directed to the Task Force on Rail Transportation of the Labor/Management Committee, D.M. Collins, Secretary, FRA.

Missouri Pacific Railroad, Association of American Railroads, Federal Railroad Administration, Railroad Labor Organizations Final Rpt. July 1975, 14 pp

Contract EB-400-0-ARR-849

ACKNOWLEDGMENT: FRA
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 128611

A PROGRAM OF EXPERIMENTS INVOLVING CHANGES IN TERMINAL OPERATIONS-COMPLETION REPORT, VALLEY JUNCTION EXPERIMENT

This experimental program is a labor, management and government undertaking directed by the Labor/Management Committee. The St. Louis Terminal of the Missouri Pacific Railroad was selected as a location for testing innovative experiments in terminal operations. Temporary experimental changes are considered in any operational or regulatory aspect of the terminal. This report presents the results and conclusions from an experiment involving a temporary change in a labor-management agreement which prohibited Missouri Pacific St. Louis crews from performing certain switching activities at Valley Junction Yard on the Illinois side of the Mississippi River. The goal of this experiment was to reduce the average terminal detention time on ICG traffic departing on MoPac road trains originating at St. Louis by six hours. The experiment was implemented for a 90-day period beginning July 1, 1975. Analysis of the affected traffic indicated that terminal detention time was reduced by an average of 3.1 hours--from 16.7 to 13.6 hours/car. The experiment did not result in any significant change in the number of transfers operated to handle this ICG traffic. One principal benefit from this experiment was the operation of an additional transfer from Dupo to St. Louis made possible because the St. Louis crew handling this transfer was permitted to haul cars out of Dupo and pick up additional traffic at Valley Junction. This practice was prohibited by the provisions of the agreement temporarily waived by this experiment.

Requests should be directed to the Task Force on Rail Transportation of the Labor/Management Committee, D.M. Collins, Secretary, FRA.

Missouri Pacific Railroad, Association of American Railroads, Federal Railroad Administration, Railroad Labor Organizations Final Rpt. Sept. 1975, 15 pp

Contract EB-400-0-ARR-849

ACKNOWLEDGMENT: FRA
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 128612

A PROGRAM OF EXPERIMENTS INVOLVING CHANGES IN TERMINAL OPERATIONS--COMPLETION REPORT, ALTON & SOUTHERN RUN- THROUGH TRAIN EXPERIMENT

This experimental program is a labor, management and government undertaking directed by the Labor/Management Committee. The St. Louis Terminal of the Missouri Pacific Railroad was selected as a location for testing innovative experiments in terminal operations. Temporary experimental changes are considered in any operational or regulatory aspect of the terminal. This report reflects the results and conclusions from an experiment involving the operation of a run-through train between Missouri Pacific's Neff Yard in Kansas City and the Alton & Southern's Gateway in East St. Louis. The operation of this train reduced car detention by 3.3 hours per car on an average of 53 cars a day. As a by-product of this experiment, the St. Louis Project Team helped initiate an agreement which allows certain A&S crews to haul MoPac-C&EI transfers between St. Louis and Mitchell, Illinois. Previously a crew change was required at East St. Louis. The run-through train operation lasted approximately five months before being terminated as a result of system-wide cutbacks in train operations brought on by the severe recessionary drop in carloadings during December 1974.

Requests should be directed to the Task Force on Rail Transportation of the Labor/Management Committee, D.M. Collins, Secretary, FRA/

Missouri Pacific Railroad, Association of American Railroads, Federal Railroad Administration, Railroad Labor Organizations Final Rpt. Aug. 1975, 14 pp

Contract EB-400-0-ARR-849

ACKNOWLEDGMENT: FRA
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 128613

A PROGRAM OF EXPERIMENTS INVOLVING CHANGES IN TERMINAL OPERATIONS-COMPLETION REPORT, EXPERIMENT INVOLVING THE INSTALLATION OF A REMOTE-CONTROL SWITCH AT KIRKWOOD, MISSOURI

This experimental program is a labor, management and government undertaking directed by the Labor/Management Committee. The St. Louis Terminal of the Missouri Pacific Railroad was selected as a location for testing innovative experiments in terminal operations. Temporary experimental changes are considered in any operational or regulatory aspect of the terminal. This report reflects the results and conclusions from an experiment involving the installation of a power switch and related CTC signaling at Kirkwood, Missouri, where Missouri Pacific's Carondelet Branch joins its St. Louis-Kansas City main line. Although changes in fixed facilities are outside the scope of the St. Louis Terminal Project, the Task Force on Rail Transportation decided to make this project an experiment because MoPac agreed to cover all costs of the project. The installation of the remote-control power turnout and signaling at Kirkwood has expedited the movement of five westbound trains daily with an average reduction in running time of approximately 18 minutes per train. It also eliminated the excessive blocking of street crossings in Kirkwood and Crestwood and provided safer train operations by allowing crews to enter and exit the main line at Kirkwood under signal indication.

Requests should be directed to the Task Force on Rail Transportation of the Labor/Management Committee, D.M. Collins, Secretary, FRA.

Missouri Pacific Railroad, Association of American Railroads, Federal Railroad Administration, Railroad labor Organizations Final Rpt. Sept. 1975, 10 pp

Contract EB-400-0-ARR-849

ACKNOWLEDGMENT: FRA
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 128614

A PROGRAM OF EXPERIMENTS INVOLVING CHANGES IN TERMINAL OPERATIONS--COMPLETION REPORT, TRANS-RIVER TRANSFER EXPERIMENT

This experimental program is a labor, management and government undertaking directed by the Labor/Management Committee. The St. Louis Terminal of the Missouri Pacific Railroad was selected as a location for testing innovative experiments in terminal operations. Temporary experimental changes are considered in any operational or regulatory aspect of the terminal. This report presents the results and conclusions from an experiment which temporarily waived a 1940 agreement which requires that the hauling of traffic between MoPac's east and west side yard facilities at St. Louis across Municipal Bridge be divided on a 50%-25%-25% basis between Dupo, 23rd Street and Lesperance crews, respectively. Because this rule does not reflect the present distribution of Trans-River traffic, this experiment allowed terminal management to use the best situated crew for each Trans-River movement. Analysis of this experiment indicates that the relaxation of the provisions of the Trans-River Agreement has not induced the operation of additional trips across the river, but it has stimulated terminal management to improve the utilization of transfer crews by having them haul cars in both directions across the river more frequently. During a 20-week measurement period, Dupo crews made 45% of the Trans-River trips, 23rd Street made 35% and Lesperance Street made 20%. These results indicate that the percentages provided in the agreement are no longer suited for the present traffic pattern. This experiment also resulted in the savings of about three days per month clerical effort and eliminated the confusion and dissension involved in balancing the Trans-River trips.

Requests should be directed to the Task Force on Rail Transportation of the Labor/Management Committee, D.M. Collins, Secretary. FRA.

Missouri Pacific Railroad, Association of American Railroads, Federal Railroad Administration, Railroad Labor Organizations Final Rpt. Apr. 1975, 14 pp

Contract EB-400-0-ARR-849

ACKNOWLEDGMENT: FRA
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 128615

A PROGRAM OF EXPERIMENTS INVOLVING CHANGES IN TERMINAL OPERATIONS--COMPLETION REPORT, LESPERANCE-IVORY TERMINAL TRANSFER EXPERIMENT

This experimental program is a labor, management and government undertaking directed by the Labor/Management Committee. The St. Louis Terminal of the Missouri Pacific Railroad was selected as a location for testing innovative experiments in terminal operations. Temporary experimental changes are considered in any operational or regulatory aspect of the terminal. This report presents the results and conclusions from an experiment which temporarily waived an agreement giving crews at Ivory Yard exclusive rights to perform yard-to-yard transfer work between Lesperance and Ivory yards. The experiment permitted Lesperance crews to make transfers between these yards in addition to the Ivory crews who previously had exclusive rights. As a result of the experiment the number of transfers from Lesperance to Ivory increased by 50% the number of transfers from Ivory to Lesperance remained unchanged. The impact on car movement was dramatic. The average elapsed time from arrival Lesperance Street to arrival at Ivory was improved by at least 10 hours per car on a movement of about 200 cars/week. This represents a 33% decrease in the transit time for this traffic. Customers served from Ivory Yard also observed faster and more consistent movement of cars to and from industry. Based upon the favorable results from this experiment, the labor and management parties involved are negotiating an agreement to allow Lesperance crews to transfer cars to Ivory Yard.

Requests should be directed to the Task Force on Rail Transportation of the Labor/Management Committee, D.M. Collins, Secretary, FRA.

Missouri Pacific Railroad, Association of American Railroads, Federal Railroad Administration, Railroad Labor Organizations Final Rpt. Mar. 1975, 15 pp

Contract EB-400-0-ARR-849
ACKNOWLEDGMENT: FRA
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 128874

DEVELOPMENT OF DEVICES TO REDUCE THE AERODYNAMIC RESISTANCE OF TRUCKS

A discussion of the basic elements of bluff body drag, as it relates to truck air resistance is given. The concept of a dragless forebody is introduced. It is shown that this dragless state can nearly be achieved with a lip-like device on the front face of the van. The shielding effect of one body ahead of another is described, and the deleterious effects of crossflow in the gap between the bodies is discussed. In particular, it is shown that some add-on devices are particularly susceptible to crosswind flows and lose effectiveness at a few degrees of yaw. Two devices, one, the lip, for the front face of the van body, and the other, the perforated screen for tractor mounting, have been road tested and give very substantial savings in aerodynamic drag coefficients, exceeding 30% in both cases. The fuel savings associated with such devices depend upon payload, speed, etc, but can be as much as 60% of the aerodynamic drag saving.

Prepared for meeting August 11-14, 1975.

Lissaman, PBS (AeroVironment, Incorporated)
Society of Automotive Engineers Preprint N750702, 1975, 10 pp

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

21 128892

WIND TUNNEL DEVELOPMENT OF THE DRAG FOILER--A SYSTEM FOR REDUCING TRACTOR-TRAILER AERODYNAMIC DRAG

Dragfoiler II, an effective and practical add-on aerodynamic drag reducing system for tractor-trailers, has been developed. Wind tunnel tests with 1/16- and 1/7-scale tractor-trailer models were used to determine empirical design guidelines for the Dragfoiler II's side elevation and planform shapes. Optimum designs for various combinations of tractor roof height and length, trailer height, and tractor-to-trailer gap length gave zero-yaw drag reductions between 30 and 35%. At a yaw angle of 10 deg, the percentage drag reductions were about half those at 0 deg. Off-design performance and the effects of trailer side-edge geometry were investigated.

Presented at a meeting held August 11-14, 1975.

Mason, WT, Jr (General Motors Corporation)
Society of Automotive Engineers Preprint No. 750705, 1975, 21 pp

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

21 128893

COMPARISONS OF EFFECTIVENESS OF COMMERCIALY AVAILABLE DEVICES FOR THE REDUCTION OF AERODYNAMIC DRAG ON TRACTOR-TRAILERS

Wind tunnel experiments, with emphasis on cross-wind effects, have been used to evaluate the effectiveness of a number of commercially available devices for reducing the aerodynamic drag of a tractor-trailer combination. The evaluations included consideration of the effects of tractor type, trailer height, and bluntness of the tractors and/or trailers. A wind-averaged drag coefficient was introduced to interpret the basic data for the prediction of average drag in a highway environment. The average drag of the base-line vehicles was found to be a strong function of the bluntness of the tractor and/or trailer, and a weak function of the tractor type. Estimates of the average fuel savings that would result from the application of the various drag reducing devices ranged from 400 to 3300 gallons per 100,000 miles, depending on the combination of tractor, trailer and device that is used.

Presented at a meeting held August 11-14, 1975.

Buckley, FT, Jr (Maryland University, Baltimore); Sekscienski, WS
Society of Automotive Engineers Preprint No. 750704, 1975, 11 pp

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

21 129086

BRINGING WESTERN COAL TO MARKET

Integrated transportation systems are explained and recommended and elements of it analyzed. Diagrams illustrate concept and economy planned.

Yu, A (Tobey Obra Corporation) *Mining Engineering* Vol. 27 No. 7, July 1975, pp 69-73, 1 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

21 129087

LOCOMOTIVE HULAGE OR BELT HAULAGE

The historical development of underground transport in the U.K., is examined. The Reid Report of 1945 recommended that subsidiary rope haulage from the face to the main line system be replaced by conveyors and that locomotive haulage or conveyors should be introduced as the main system of transport in new and reconstructed mines. The need for fast reliable transport systems has not diminished over the intervening thirty years.

Berry, JP (National Coal Board, England) *Colliery Guardian* Vol. 223 No. 8, Aug. 1975, pp 315-320, Refs.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

21 129088

TRANSPORT OF MATERIALS AND MEN: ANCIENT AND MODERN

This paper sets out to indicate the use of a "systems engineering" approach to the problem of planning the transport of materials and men in large collieries. It indicates, by means of an actual case study of a South Durham Colliery, the benefit of employing multi-discipline teams, particularly in the planning stage to formulate policy. Basic principles are stated and certain equipment is briefly described. The paper clearly demonstrates not only the heavy costs involved and the use of all resources but also the need for very early planning and action.

Presented at the Colloquium on Transportation, Nottingham, England; Glasgow, Scotland; Cardiff, Wales; Newcastle upon Tyne, England, Nov.-Dec., 1973.

Clever, EE (National Coal Board, England)

Institute of Mining Engineers Proc Paper Paper 6, 1973, 9 pp

ACKNOWLEDGMENT: EI

21 129097

TYPE L4 LINEAR MOTOR SYSTEM WAGON ROOSTER/RETARDER FOR SHIOHAMA SHUNTING YARD OF THE J.N.R.

A system to automatically control cars in a shunting yard of the Japanese National Railways is outlined. Freight cars on a siding track are released from a retarder at a specified speed. The system catches the car and rolls it at a 13 to 15 km/hr velocity to a specified point where the rolling speed is reduced to a safe coupling speed.

Murato, K (Japanese National Railways); Takie, K Akihama, Y Takahashi, H Akabane, H *Hitachi Review* Vol. 24 No. 6, June 1975, pp 269-276

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

21 129156

LONG-DISTANCE COAL TRANSPORT: UNIT TRAINS OR SLURRY PIPELINES

This Bureau of Mines publication presents an analysis of information related to the transportation of bituminous coal by unit trains and slurry pipelines. Even for short hauls from mines to markets, transport costs frequently account for between one-third and one-half of the delivered price of coal. Minimizing these costs has become an even more critical objective for hauls from the western mines than for hauls from farther east. Factors related to minimizing costs and transporting the western coal receive special attention. Although no general rule of preference is likely to be developed that can be applied to all shipments, both rail and pipeline service will be needed on an

increasing scale. The study should provide useful background information and analysis for government and industry in approaching investment decisions in the mining and transportation industries.

Campbell, TC Katell, S

Bureau of Mines 1975, 31 pp, 3 Fig.

ACKNOWLEDGMENT: Bureau of Mines

PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

128.27:8690

21 129173

TRANSPORTING WESTERN COAL: UNIT TRAIN OR SLURRY PIPELINE

The history of coal pipelines is developed briefly, as well as the general picture with reference to coal transportation. Because coal is a solid and because of its low value relative to its weight, coal has historically had transportation problems. Slurry pipelines are seen as peculiarly well suited to long-distance, high-volume shipments from large mines to large consumers. The features of unit-train transport are also examined. It is concluded that no comparison of pipeline costs with those of unit trains are possible and it is noted that cost estimates for large slurry pipelines are only projections not based on actual experience.

Campbell, TC *Logistics and Transportation Review* Vol. 11 No. 2, 1975, pp 147-151

PURCHASE FROM: British Columbia University Faculty of Commerce, Vancouver 8, British Columbia, Canada Repr. PC

DOTL JC

21 129183

THE INFLUENCE OF TRAIN RUNNING AND SIGNALLING PARAMETERS ON MAKING UP DELAYS IN URBAN TRAIN SERVICES [Einfluss der Zugdaten und Signalsysteme auf Falgeverspactungen bei Stadtbahnen]

When a train is delayed, a number of factors must be taken into account to make up for the time lost. The author calculates how the delay is to be made up taking into account: train running parameters (speed, acceleration, deceleration, train length); signalling and safety regulations. He then comments on the results obtained. Conditions which favour speed and transport capacity on a line are negative factors when making up any delays. [German]

Meyer, HU *Verkehr und Technik* Vol. 28 No. 6, 1975, pp 235-237, 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Schmidt (Erich) Verlag Herforder STrasse 10, 4890 Bielefeld, West Germany Repr. PC

21 129204

LOCOMOTIVE UTILIZATION STUDY FOR CONRAIL

This study evaluates the potential for improvement of Conrail's locomotive fleet effectiveness and control. A centralized locomotive control system is proposed. Locomotive fleet size projections are given for CRC III, IV, and V. Changes in diesel facilities, maintenance activities and train and yard operations are indicated.

This study was sponsored by the U.S. Railway Association.

Emerson Consultants Incorporated USRA-R-125, June 1975, 82 pp

Contract USRA-C-50115

ACKNOWLEDGMENT: United States Railway Association

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

21 129256

TERMINAL PERFORMANCE MEASUREMENT SYSTEMS

This report summarizes and assesses the presentations made and the discussions held during a two-day seminar on the Measurement of Terminal Performance which was conducted under the auspices of the Labor/Management Task Force on Rail Transportation. The seminar was held in Chicago on May 21 and 22, 1975. The written material submitted by the participants is reproduced in the Appendices. The main part of the report consists of a comparison of the similarities and differences between the

various systems, together with an assessment of the seminar and a list of conclusions and recommendations. It was prepared by and is based on the interpretations and judgements of the St. Louis Project Team of the Task Force. It does not necessarily reflect the opinions expressed by all of those attending the seminar.

Requests should be directed to Mr. D.M. Collins, Secretary, Labor/Management Task Force on Rail Transportation, FRA.

Association of American Railroads, Missouri Pacific Railroad, Federal Railroad Administration, Railroad Labor Organizations Oct. 1975, 234 pp, 13 App.

Contract EB-400-0-ARR-849

ACKNOWLEDGMENT: AAR
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 129257

A PROGRAM OF EXPERIMENTS INVOLVING CHANGES IN TERMINAL OPERATIONS. COMPLETION REPORT. LESPERANCE-23RD STREET TRANSFER EXPERIMENT

This experimental program is a labor, management and government undertaking directed by the Labor/Management Committee. The St. Louis Terminal of the Missouri Pacific Railroad was selected as a location for testing innovative experiments in terminal operations. Temporary experimental change are considered in any operational or regulatory aspect of the terminal. This report describes an experiment which temporarily waived an agreement giving crews at 23rd St. Yard exclusive rights to perform yard-to-yard transfer work between 23rd St. and Lesperance Yards. The experiment permitted Lesperance crews to share in this transfer work with the expectation that cars at Lesperance Yard destined to 23rd St. would not be delayed waiting for 23rd St. crews to arrive to handle them. Because nearly nine months elapsed between the time the experiment was approved and then implemented, during which several changes were made in train and transfer operations, the impact of this experiment was greatly reduced. During the 90-day test period which commenced July 1, Lesperance crews were utilized only three times to haul cars between the two yards. Therefore, this experiment had essentially no impact on the operation of transfers between 23rd Street and Lesperance Yards. Since the restriction giving 23rd St. crews exclusive rights to perform all transfer work between 23rd St. and Lesperance Yards is not a serious impediment to current operations, no action is being taken by terminal management to allow Lesperance crews to share in this work.

Requests should be directed to Mr. D.M. Collins, Secretary, Labor/Management Task Force on Rail Transportation,

Association of American Railroads, Missouri Pacific Railroad, Federal Railroad Administration, Railroad Labor Organizations Nov. 1975, 19 pp

Contract EB-400-0-ARR-849

ACKNOWLEDGMENT: AAR
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 129258

A PROGRAM OF EXPERIMENTS INVOLVING CHANGES IN TERMINAL OPERATIONS-COMPLETION REPORT, HOSTLING WITHIN THE ST. LOUIS TERMINAL

This experimental program is a labor, management and government undertaking directed by the Labor/Management Committee. The St. Louis

Terminal of the Missouri Pacific Railroad was selected as a location for testing innovative experiments in terminal operations. Temporary experimental changes are considered in any operational or regulatory aspect of the terminal. This report presents the results and conclusions from an experiment involving the hostling of locomotives within the St. Louis Terminal. The movement of locomotives within the terminal was restricted by established seniority districts and by the lack of agreement to permit hostling across the Mississippi River between MoPac's east and west side yard facilities. An experiment waiving these restrictions for a six-month period was carried out, and the results indicate the hostling privileges were fully utilized producing improved locomotive utilization and reduced yard congestion. The experiment was well received by both terminal management and labor, and an agreement was reached making these changes permanent prior to the completion of the experiment.

Requests should be directed to Mr. D.M. Collins, Secretary, Labor/Management Task Force on Rail Transportation, FRA.

Association of American Railroads, Missouri Pacific Railroad, Federal Railroad Administration, Railroad Labor Organizations Dec. 1975, 16 pp

Contract EB-400-0-ARR-849

ACKNOWLEDGMENT: AAR
PURCHASE FROM: FRA Repr. PC

DOTL RP

21 129324

PIGGYBACK'S POTENTIAL FOR CONRAIL

Varying outlooks for the future of piggyback are presented, ranging from the optimistic future of the railroads' expanding to control 51% of the freight market, with piggyback representing 40% of all freight shipments, to a more conservative outlook that by 1985 railroads' intermodal operations will achieve a level of performance only 5% above that of the peak reached in 1973. The article reviews the factors that appear to promote the piggyback operations of ConRail.

Smith, AB (Penn Central Transportation Company) *Progressive Railroad-ing* Vol. 18 No. 11, Nov. 1975, pp 25-32, 6 Phot.

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

DOTL JC

21 129330

WHAT'S AHEAD FOR FLATBACK, FIZZLE OR BOOM?

Interview with Thomas A. Fante, General Manager, intermodal traffic, Southern Pacific Transportation Co. on Outlook for flatback. Topics covered include profitability to the railroads in the face of strong truck competition; adequacy of rate of return provided by rates covering out-of-pocket costs; need for operating efficiencies; kind of service and equipment required for modernized, more efficient intermodal operation; markets that railroads should aim for; identification of rail intermodal department's competition.

Roberts, R *Modern Railroads* Vol. 30 No. 11, Nov. 1975, pp 70-73, 3 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

22 099868

STUDY ON INTERNATIONAL COMBINED TRANSPORT OF GOODS CONVENTION

This study concludes that, on the basis of nearly 100 interviews with shipper, transport, insurance and financial interests, and a mail survey of 3,300 Canadian importers and exporters: (1) present systems of international multimodal cargo transport, insurance, and documentation are satisfactory to many Canadian trading companies; (2) transport costs are not a major component of the delivered price of goods; and (3) the loss and damage of goods is insignificant. Other conclusions and observations appear on pages 11 and 12 of the report.

Canadian Transport Commission Mar. 1975, 154 pp, 7 Tab., 7 App.

ACKNOWLEDGMENT: Canadian Transport Commission

PURCHASE FROM: Canadian Transport Commission Economic and Social Analysis Branch, 275 Slater Street, Ottawa, Ontario K1A 0N9, Canada Repr.. PC

DOTL RP

22 125147

EVALUATION OF UNIT LOAD HANDLING EQUIPMENT (EMBRACING EQUIPMENT FOR PALLETS, PACKAGED LOADS AND CONTAINERS), A CONFERENCE ARRANGED BY THE MANIPULATIVE AND MECHANICAL HANDLING MACHINERY GROUP OF THE INSTITUTION OF MECHANICAL ENGINEERS

Among the papers presented at the conference were the following: the valuation and selection of fork lift trucks, Carpenter, MJ; Self-Loading Vehicles, Their Mechanical Features and Application, Holt, JB; The Development, use and evaluation of mobile cranes and rough terrain fork lift Trucks used in the Construction Industry, Summers, MJ; The ergonomics of mechanical handling vehicles (with special Regard to Fork Lift Trucks) Astley, RW; Review of Tractor Trailer Units used on British Railways Roll on/Roll off and Container Terminal Operations, Styles, PR; Evaluation of Side Loader Machines, Rundle, M; The Evaluation of Straddle Carriers, Dally, HK and Wilkinson, BE; Long Span Container Cranes, Larkin, JE; Container Cranes on British Rail, Robinson, PJ; Container Spreaders, Bisby, A, 1973. /TRRL/

Institution of Mechanical Engineers Conf Paper No. CP 1/73, No Date, 182 pp, Figs., Tabs., Phots., Refs.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212191)

PURCHASE FROM: Institution of Mechanical Engineers 1 Birdcage Walk, Westminster, London SW1H 9JJ, England Repr. PC

22 126420

TRANSPORTATION OF SPENT FUELS

This paper deals with transportation as a function of movement from point to point and intentionally omits the functions of container selection, packaging, decontamination, surveying, and package labeling as belonging to other expertises within the total system. It discusses the siting of facilities, transportation charges, carrier modes, carrier equipment, loading, vehicle placarding, routing and tracing, bills of lading, state regulations, shipper-receiver liaison, unloading, vehicle surveys and release.

Proceedings of the 4th Symposium, 22-27 September 1974.

Turner, LL (Atomic Energy Commission)

Packaging and Transp of Radioact Mater. Int Symp No. t2, 1974, pp 988-994

ACKNOWLEDGMENT: EI

PURCHASE FROM: NTIS Repr. PC

DOTL NTIS

22 127727

A SIMULATED CONSOLIDATION OF THE GRAIN HANDLING AND TRANSPORTATION SYSTEM FOR A REGION OF SASKATCHEWAN

The objective of this investigation was to indicate how many elevators and miles of rail line would be abandoned to move from the present system to one with minimum total cost. The analysis of 163 elevators at 55 stations on nine lines of the Canadian National and Canadian Pacific was made by digital computer simulation. Rather than developing a new system, the

present grain storage and transportation system was modified and modernized. Emphasis was placed on all quantifiable producer costs--not just trucking costs. The conclusion is that the prairies' grain handling and transportation system may not be improved by extensive closures or rail abandonments. Rail efficiency could be improved with application of the "common truck usage concept," changes in elevator siding capacity and reduction in grain grades.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Kirkland, CL (Saskatchewan University)

Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 312-327, 2 Fig., 4 Tab., 18 Ref.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

22 128857

DECIDE BETWEEN ROTARY AND BOTTOM-DUMP COAL UNLOADING

There are two basic ways to unload coal from a rail car at the power plant: rotary dump or bottom dump. (A third option, side dump, generally is applicable only for specialized short-haul situations.) Where rotary dumping is used, cars are equipped with rotary couplers so they may be turned over without uncoupling or breaking an air line. The standard cross-dump hopper has poor characteristics for rapid unloading. To bottom-dump coal efficiently while in motion, unit trains require a mechanized self-clearing, quick-dumping car-one that unloads in a matter of seconds -controlled automatically or semiautomatically. This demands a large bottom opening-either large doors or many doors-and usually a pneumatic-or electro-pneumatic- actuated door-opening and-closing system. Quick-dump cars also are more expensive than standard gondolas or hoppers. A fundamental step in selecting a coal-unloading system is to determine the cost of bottom-dump facilities and compare it to the price of a fleet of solid-bottom gondolas plus a rotary car-dumper. In short-haul situations, the more-rapid unloading of quick-dump cars may reduce the cycle time enough to save an entire unit train. The saving in time gained by using quick-dump cars may represent a significant dollar saving to the delivering railroad in terms of train-crew costs. Total operating cost for a rotary-car dumping system is likely to be less than the additional car-maintenance cost associated with the doors and actuating mechanisms of quick-dump cars. Finally, a rotary-dumper installation has the advantage of being entirely enclosed. Thus, control of dust is simplified. This could be important in the case of unwashed coal.

Power Vol. 119 No. 8, Aug. 1975, p 47

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

22 128896

NEEDS FOR IMPROVING LIVESTOCK TRANSPORT AND HANDLING FACILITIES

The needs for engineering improvements in facilities and equipment for transporting livestock by all transport modes are discussed. The export of United States' breeding livestock is growing at a rapid rate, and areas in which agricultural engineers can contribute to the development of equipment and standards for exporting livestock are reviewed. Plates show facilities.

Presented at the 67th Annual Meeting, Oklahoma State University, Stillwater, June 23-26, 1974 and the Winter Meeting, Chicago, Ill., December 10-13, 1974.

Ashby, BH (Department of Agriculture)

American Society of Agricultural Engineers Proc Paper No. 74-4519, 1974, 16 pp, 6 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Society of Agricultural Engineers 2950 Niles Road, St Joseph, Michigan, 49085 Repr. PC

22 129125

PARAMETRIC STUDIES IN TRANSPORTATION-TYPE PROBLEMS

Some results in parametric studies are presented on several transportation-type problems. Specifically, a characterization is obtained for the

optimal values of the variables in the problem of determining an optimal growth path in a logistics system. Also derived is an upper bound beyond which the optimal growth path remains the same. The results are then extended to the goal programming model and the prespecified market growth rate problem.

Fong, CO (Malaya University); Rao, MR *Naval Research Logistics Quarterly* Vol. 22 No. 2, June 1975, pp 355-364, 16 Ref.

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

22 129172

SPECIFYING RAILROAD TRACK SCALES

As raw materials prices escalate, fewer plants are willing to take the shipper's word about the weight of material moved in freight cars. Plant engineers can be confronted with installing a scale which can involve a mass of terms, data and competitive claims. The article outlines the two basic concepts of car weighing and a chart shows the various characteristics of both. The availability of specifications, the various factors which must be considered in preparing specifications, making installations and insuring proper in-service operation are discussed. A glossary of railroad track scale terms is part of the article.

Cameron, JF *Plant Engineering* Oct. 1975, pp 144-147, 3 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

22 129208

AN EFFICIENT ORGANIZATION OF THE MONTANA WHEAT MARKETING SYSTEM

This research was designed to estimate the number, size and location of

wheat elevators which will minimize the combined cost of assembling, storing and distributing wheat in Montana if the present elevator industry did not exist. Optimum industry organization was determined using the transshipment model incorporating an assembly cost function, an internal cost function and a distribution cost function. Results confirmed the recent historical trend toward fewer and larger elevators. In the final solution 28 elevators were utilized as compared to 332 existing in 1970.

Copeland, MD Cramer, GL
Montana State University, Bozeman Bulletin 667, Sept. 1973, 34 pp, Figs., Tabs.

ACKNOWLEDGMENT: Montana State University, Bozeman

PURCHASE FROM: Montana State University, Bozeman Agricultural Experiment Station, Bozeman, Montana, 59715 Repr. PC

DOTL RP

22 129315

COAL HANDLING FOR THE UTILITY INDUSTRY

The history of coal handling in power plants, the changes in design requirements, and the future of bulk handling equipment for the utility industry are reviewed. Examples of coal handling systems are presented that point toward the changing design criteria required by the ever increasing size of today's power plants. The concluding section is devoted to the evaluation of the systems and equipment available to the power industry for the transporting and storage of coal.

Lofink, GV Wallaert, JJ (Heyl and Patterson, Incorporated) *IEEE Transactions on Industry Applications* Vol. IA11 No. 6, Nov. 1975, pp 734-738

ACKNOWLEDGMENT: IEEE Transactions on Industry Applications

PURCHASE FROM: ESL Repr. PC, Microfiche

DOTL JC

23 052675

MACHINES FOR PRINTING TICKETS IN BOOKING OFFICES

This leaflet contains general information on the design of a machine for printing tickets in booking offices, together with the conditions which it should fulfil; the aim of the leaflet is to assist the Railways to establish specifications for this type of equipment.

International Union of Railways DOC 21, Jan. 1969, 10 pp, 1 Ref.

ACKNOWLEDGMENT: UIC

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

DOTL RP

23 052676

MEASURES TO BE TAKEN FOR MECHANISING THE HANDLING AND IMPROVING THE TRANSPORT OF LUGGAGE AND PARCELS TRAFFIC

Table of Contents: 1) Introduction; 2) Mechanization of the handling of goods; 3) Carriage of luggage and parcels in trains; 4) Technical parameters of the appliances used; 5) Technical requirements for luggage vans and parcel vans; 6) Technical requirements for fixed installations; and 7) Notes concerning the calculation of profitability when introducing measures to mechanize the transshipment and improve the transport of luggage and parcels.

International Union of Railways DOC 20, Jan. 1971, 16 pp, Refs.

ACKNOWLEDGMENT: UIC

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

DOTL RP

23 072127

RESEARCH CONCERNING OVERALL TRAFFIC AND COST BENEFITS

This report deals with the problem of over-congestion in Tokyo traffic and the redevelopment of public transportation. As it is not possible to widen streets and highways due to space shortage, the authors suggested the following solutions: 1) Restrict the number of private vehicles and increase public transportation services. 2) Centralize the existing public transportation system: trains, buses, and subways. This will hopefully cut out any duplication of services created by business competition among these three major means of public transportation. 3) A shift of attitude toward public transportation from profit oriented to nonprofit oriented is recommended. 4) The commercial firms who use public highways and roads should share the cost of construction and maintenance. 5) Further government subsidy. [Japanese]

Japan Transport Economics Research Center Mar. 1974, 79 pp, Figs.

ACKNOWLEDGMENT: TSC

PURCHASE FROM: Japan Transport Economics Research Center (105) 1, Shibakotohira-cho, Minato-ku, Tokyo, Japan Repr. PC

DOTL HE277.J374

23 072208

SUBWAY PROBLEMS [I problemi delle Metropolitane]

This book is the second volume of a research devoted to the subway's problems. It is essentially the work of a structural engineer on the various architectural problems that the construction of a subway must meet. Chapter ten analyzes different methods of tunnel excavation, considerable space is given to the history of tunnels and to the problems that their construction may create for the surrounding buildings; with respect to this last point various architectural solutions-Europa Haus in Berlin, the Church of Auteuil in Paris, the E-O line in London, the Dnieper tunnel in Kiev-are examined in some detail. Chapter 11 is devoted to the features of an optimal route for a subway system. Chapter 12 treats the problem of stations from a functional point of view: location, maximum number of buildings, maximum speed of the escalators, the minimal set of rules to which the buildings of a station must conform and an overview of the most remarkable international experiences are covered in this chapter. Chapters 13,14,15 deal respectively with a study of the materials to be used, the main features of the network, and the electricity network that goes with subway systems. The last three chapters deal with the problems that may drive from insufficient automation, from the construction of special plants-made necessary, for

example, by the particular conditions of the soil-and with the extremely serious problem of financing and managing the economics of a subway system. [Italian]

Polese, A

Centro Esperimenti e Ricerche Trasporti Urb e Met No. 2, Dec. 1974, 246 pp, 117 Fig., 34 Tab.

ACKNOWLEDGMENT: TSC

PURCHASE FROM: Centro Esperimenti e Ricerche Trasporti Urb e Met Italy Repr. PC

DOTL TF847 I8P66

23 091847

METRIC CONVERSION AND THE TRANSIT INDUSTRY

The mass transit industry will be affected by the transition to the metric system and must plan for it. The potential effects of metric conversion on the transit industry are discussed based on an assessment of the most probable course of action to be followed as an advocacy of metric conversion.

Phelps, DR

Transit Development Corporation, Incorporated Final Rpt. TDC/500-74/5, June 1974, 11 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-241484/1ST, DOTL NTIS

23 091885

TELECOMMUNICATIONS-TRANSPORTATION TRADEOFFS

The report evaluates the implications of potential communications and computer technology alternatives to urban transportation, particularly the commute to work. Three criteria for successful telecommunications alternatives to transportation were used to evaluate the feasibility of 'telecommuting' in various situations. These criteria are: (1) economic benefits, (2) adequate technological base, (3) semantic and psychological effectiveness. Emphasis was placed on the utility of telecommuting in the information industry. The study concluded that existing and near term technologies provide a suitable economic basis for allowing organizations to decentralize using telecommuting. Potential impacts on energy consumption, transportation and urban development are discussed.

Nilles, JM Carlson, FR Gray, P Hanneman, G

University of Southern California, National Science Foundation Final Rpt. Dec. 1974, 237 pp

Grant NSF-GI-39019

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-241871/3ST, DOTL NTIS

23 092029

A GENERALIZED NO-BART ALTERNATIVE TRANSPORTATION SYSTEM

The report formulates the generalized No-BART alternative transportation developments for use in the BART Impact Program. Based upon policy assumptions defining the probable decision environment in the San Francisco Bay Area, alternative transportation developments which are likely to have been implemented in the absence of the Bay Area Rapid Transit system have been identified. The policy assumptions are documented by interviews with decision-makers and documentary research in decision variables such as planning, growth trends, transportation demands, interest group influences, and financing sources.

Prepared in cooperation with McDonald and Smart, San Francisco, Calif., and Peat, Marwick, Mitchell and Co., San Francisco, Calif.

Metropolitan Transportation Commission, Department of Transportation, McDonald and Smart Incorporated, Peat, Marwick, Mitchell and Company Final Rpt. FR-1-14-75, Mar. 1975, 220 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242438/0ST, DOTL NTIS

23 092030
TRANSPORTATION SYSTEM AND TRAVEL BEHAVIOR
PROJECT RESEARCH PLAN

The Transportation System and Travel Behavior (TSTB) Project of the BART Impact Program will assess the impacts of BART upon the characteristics and performance of the Bay Area transportation system--including BART, parallel and complementary transit services, and the highway system--and the responses of travelers to BART and related transportation system changes, including traveler perceptions, attitudes, and behavior. The report includes discussion of a conceptual framework of the impact processes, the major research questions to be addressed, the priorities for the research, the research methods, and finally, the major work elements of the TSTB Project.

Prepared in cooperation with Peat, Marwick, Mitchell and Co., San Francisco, Calif., and Urban Mass Transportation Administration, Washington, D.C.

Ellis, RH Worrall, RD Sherret, A
 Metropolitan Transportation Commission, Department of
 Transportation, Urban Mass Transportation Administration, Peat,
 Marwick, Mitchell and Company, (UMTA-09-0025) Plann Doc.
 PD-14-3-75, May 1975, 122 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
 PURCHASE FROM: NTIS Repr. PC, Microfiche
 PB-242439/8ST, DOTL NTIS

23 092031
SURVEY OF DATA SOURCES FOR THE LAND USE AND
URBAN DEVELOPMENT PROJECT. WORKING PAPER

The report identifies data sources which appear relevant to the study of BART's impacts on land use. The purpose of this report was to help design a Research Plan for the BART Impact Program Land Use Project. Thirty-seven data sources are described in detail. Use of the data and some analytical methods are described.

Prepared in cooperation with Department of Housing and Urban Development, Washington, D.C.

Skaburskis, A
 Metropolitan Transportation Commission, Department of
 Transportation, Department of Housing and Urban Development
 WP-13-5-75, June 1975, 71 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
 PURCHASE FROM: NTIS Repr. PC, Microfiche
 PB-242440/6ST, DOTL NTIS

23 092047
NATIONWIDE PERSONAL TRANSPORTATION STUDY.
REPORT NO. 9, MODE OF TRANSPORTATION AND
PERSONAL CHARACTERISTICS OF TRIPMAKERS

The report presents personal characteristics of all individuals 5 years old and over who reported making a one-way trip by a motorized vehicle, including automobile (driver and passenger separately), motorcycle, truck, schoolbus, taxicab, bus, subway, train, and airplane. The percent distributions of these trips by mode are related to age, sex, race, and place of residence in unincorporated areas and incorporated places.

Paper copy also available in set of 11 reports as PB-242 884-SET, PC\$33.00.

Randill, A Greenhalgh, H Samson, E
 Federal Highway Administration Final Rpt. Nov. 1973, 51 pp

ACKNOWLEDGMENT: NTIS
 PURCHASE FROM: NTIS Repr. PC, Microfiche
 PB-242893/6ST, DOTL NTIS

23 092153
PROCEEDINGS OF THE SYMPOSIUM ON REGIONAL PUBLIC
TRANSPORTATION

The contents include discussion of: Integrating highway and transit plans for the region; Dallas area transit plan; Fort Worth transit plan; Research results on metro area public attitudes; Evaluation of rail rapid transit and

express bus service in the urban commuter market; Financing alternatives for urban public transit.

Fox, JN
 Texas University, Arlington, Urban Mass Transportation
 Administration, (UMTA-TX-11-0001) UMTA-TX-11-0001-74-1, July
 1974, 89 pp

ACKNOWLEDGMENT: NTIS
 PURCHASE FROM: NTIS Repr. PC, Microfiche
 PB-243654/1ST, DOTL NTIS

23 092223
EXPLORATORY NETWORK ANALYSES OF BART'S IMPACTS
UPON ACCESSIBILITY

The objective of the study was to (1) make a preliminary assessment of BART's impacts on areawide accessibility, and (2) evaluate the use of network-based accessibility measures as an impact analysis technique. Accessibility measures were based on estimates of zone-to-zone travel times and transit fares derived from networks developed for the 1971 'pre-BART' and 1976 'post-BART' highway and transit systems. The accessibility measures were expressed as simple indices, weighted by the size and characteristics of the resident population in the origin zone. Comparisons of the accessibility indices were made for both peak and off-peak travel times for selected destination zones in the BART service area. The selected zones represent the locations of important employment centers, shopping facilities, and hospitals. Assessments were made of BART's potential accessibility impacts on the racial minority, elderly, and low-income populations as well as the generation population.

Prepared in cooperation with Peat, Marwick, Mitchell, and Co.

Fan, HSL Sherret, A
 Metropolitan Transportation Commission, Urban Mass Transportation
 Administration, Peat, Marwick, Mitchell and Company, (UMTA-
 CA-09-0025) WP-15-3-75, July 1975, 93p

Contract DOT-OS-301-76

ACKNOWLEDGMENT: NTIS
 PURCHASE FROM: NTIS Repr. PC, Microfiche
 PB-244088/1ST, DOTL NTIS

23 092230
STUDIES IN RAILROAD OPERATIONS AND ECONOMICS.
VOLUME 5. MODELS FOR INVESTIGATING RAIL TRIP TIME
RELIABILITY

The unreliability of the trip time of railroad freight shipments is often given as the reason for the railroads' loss of traffic to competing modes of transport. The report investigates various operating policies and practices affecting reliability through the use of two simulation models. A network model is developed which simulates the day-to-day movements of cars through a portion of rail network, while another model simulates the journey of a single car moving through a series of yards. The objectives of these models are similar; namely, to study the network effects on reliability of operating policies such as (a) holding outbound trains for more traffic, (b) cancelling outbound trains, (c) altering scheduled connection times at yards, and (d) running shorter more frequent trains between yards. Major conclusions are that railroad operating policies do have a substantial effect on car movement reliability.

See also Volume 4, PB-244 121, and Volume 6, PB-244 123.

Folk, JF
 Massachusetts Institute of Technology, Federal Railroad Administration
 Final Rpt. MIT-R72-40, FRA/RPD-75/1.4, June 1972, 213 pp

Contract DOT-FR-10006

ACKNOWLEDGMENT: NTIS
 PURCHASE FROM: NTIS Repr. PC, Microfiche
 PB-244122/8ST, DOTL NTIS

23 092298
A VALUE CAPTURE POLICY

Set includes PB-244 101 thru PB-244 104.

Rice Center for Community Design and Research, Department of Transpor-
 tation Nov. 1974, 448p-in 4v

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244100-SET/ST, DOTL NTIS

23 092299

A VALUE CAPTURE POLICY. VOLUME I. INTRODUCTION

A case study in Houston, is examined from both a public and private viewpoint across three issue areas. These are: legal, community enhancement, and financial. The report is one of a set of 4. The four volumes consist of an introduction, (Volume 1) a legal element, (Volume 2) a community enhancement element, (Volume 3) and a financial element, (Volume 4). Contained in these four volumes is a description of the concept, evaluation of legal issues and precedents related to supplemental condemnation, monetary transfers, intergovernmental cooperation and air rights/sub-surface development; community design issues and examples related to mobility, social relationships, services impacts and provisions, employment opportunities and environmental impacts; and finance concerns as to forms and attributes of both capitalization and income realization as well as the total potential for new public and private revenue which can be produced by joint public-private ventures in Value Capture Policy. In the case study example, 20% to 40% of the transit system's capital costs, including interest on borrowed capital, can be defrayed through Value Capture Policy.

Paper copy also available in set of 4 reports as PB-244 100-SET, PC\$17.00.

Sharpe, CP Callies, DL Montgomery, SN
Rice Center for Community Design and Research, Department of Transportation Tech. Rpt. DOT/TST-75/82, Nov. 1974, 101p

Contract DOT-OS-40007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244101/2ST, DOTL NTIS

23 092300

A VALUE CAPTURE POLICY. VOLUME II. LEGAL ELEMENT

A case study in Houston, is examined from both a public and private viewpoint across three issue areas. These are: legal, community enhancement, and financial. This report is one of a set of 4. The four volumes consist of an introduction, (Volume 1) a legal element, (Volume 2) a community enhancement element, (Volume 3) and a financial element, (Volume 4). Contained in these four volumes is a description of the concept, evaluation of legal issues and precedents related to supplemental condemnation, monetary transfers, intergovernmental cooperation and air rights/sub-surface development; community design issues and examples related to mobility, social relationships, services impacts and provisions, employment opportunities and environmental impacts; and finance concerns as to forms and attributes of both capitalization and income realization as well as public-private ventures in Value Capture Policy. In the case study example, 20% to 40% of the transit system's capital costs, including interest on borrowed capital, can be defrayed through Value Capture Policy.

Paper copy also available in set of 4 reports as PB-244 100-SET, PC\$17.00.

Sharpe, CP Callies, DL Montgomery, SN
Rice Center for Community Design and Research, Department of Transportation Tech. Rpt. DOT/TST-75/83, Nov. 1974, 74p

Contract DOT-OS-40007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244102/0ST, DOTL NTIS

23 092301

A VALUE CAPTURE POLICY. VOLUME III. COMMUNITY ENHANCEMENT ELEMENT

A case study in Houston, is examined from both a public and private viewpoint across three issue areas. These are: legal, community enhancement, and financial. The report is one of a set of 4. The four volumes consist of an introduction, (Volume 1) a legal element, (Volume 2) a community enhancement element, (Volume 3) and a financial element, (Volume 4). Contained in these four volumes is a description of the concept, evaluation of legal issues and precedents related to supplemental condemnation, monetary transfers, intergovernmental cooperation and air rights/sub-sur-

face development; community design issues and examples related to mobility, social relationships, services impacts and provisions, employment opportunities and environmental impacts; and finance concerns as to forms and attributes of both capitalization and income realization as well as the total potential for new public and private revenue which can be produced by joint public-private ventures in Value Capture Policy. In the case study example, 20% to 40% of the transit system's capital costs, including interest on borrowed capital, can be defrayed through Value Capture Policy.

Paper copy also available in set of 4 reports as PB-244 100-SET, PC\$17.00.

Sharpe, CP Callies, DL Montgomery, SN
Rice Center for Community Design and Research, Department of Transportation Tech. Rpt. DOT/TST-75/84, Nov. 1974, 118p

Contract DOT-OS-40007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244103/8ST, DOTL NTIS

23 092302

A VALUE CAPTURE POLICY. VOLUME IV. FINANCIAL ELEMENT

A case study in Houston, is examined from both a public and private viewpoint across three issue areas. These are: legal, community enhancement, and financial. This report is one of a set of 4 for the Department of Transportation. The four volumes consist of an introduction, (Volume 1) a legal element, (Volume 2) a community enhancement element, (Volume 3) and a financial element, (Volume 4). Contained in these four volumes is a description of the concept, evaluation of legal issues and precedents related to supplemental condemnation, monetary transfers, intergovernmental cooperation and air rights/sub-surface development; community design issues and examples related to mobility, social relationships, services impacts and provisions, employment opportunities and environmental impacts; and finance concerns as to forms and attributes for both capitalization and income realization as well as the total potential for new public and private revenue which can be produced by joint public-private ventures in Value Capture Policy. In the case study example, 20% to 40% of the transit system's capital costs, including interest on borrowed capital, can be defrayed through Value Capture Policy.

Paper copy also available in set of 4 reports as PB-244 100-SET, PC\$17.00.

Sharpe, CP Callies, DL Montgomery, SN
Rice Center for Community Design and Research, Department of Transportation Tech. Rpt. DOT/TST-75/85, Nov. 1974, 155p

Contract DOT-OS-40007

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-255104/6ST, DOTL NTIS

23 092355

FACTOR ANALYSIS OF THE SYSTEMWIDE RESPONDENT, GEOGRAPHIC, CENSUS AND LAND USE VARIABLES

The report presents the rationale behind a factor analysis of selected respondent, geographic, census and land use variables from the pre-BART systemwide sample for the urban residential environmental impact study. It describes the sample, the variables and the statistical procedures used in that analysis and finally it presents the resultant factors and offers some suggestions for their utilization.

Carp, FM Zawadski, RT
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development
WP-6-1-75, July 1974, 27 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244683/9ST, DOTL NTIS

23 092486

NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT STUDY. TASK 11S. IMPROVEMENT PLAN FOR PHYSICAL PLANT WITH ESTIMATED COSTS. VOLUME 1

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 1. Facilities include track, bridges, tunnels, signals, communications, electrification and other items.

See also report dated Apr 75, PB-243 420.

Sutcliffe, H Bailey, W Biss, DJ Irvin, LA Livingston, FM Bechtel Incorporated, Federal Railroad Administration Final Rpt. FRA/ONECD-75-11S, Aug. 1975, 174 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244873/6ST, DOTL NTIS

23 092487

REGIONAL TRANSPORTATION PLAN. TECHNICAL SUMMARY REPORT. VOLUME I

The report is the technical summary of the Regional Transportation Plan for the San Diego region. It contains an overview of the plan's development process; describes the existing transportation system; summarizes the Regional Transportation Plan by modal elements; contains adopted regional development and transportation goals, objectives and policies, the implementation strategy (financial plan), proposals for changes in institutional arrangements (operations plan), and a description of the continuing planning activities to be undertaken to further refine and assist in plan implementation.

See also PB-244 894. Supplemental Report.

San Diego County Comprehensive Planning Organizatn, Urban Mass Transportation Administration, (UMTA-CA-09-0037) CPO-TRANS-RTP1-75, Mar. 1975, 240 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244893/4ST, DOTL NTIS

23 092488

REGIONAL TRANSPORTATION PLAN. FINANCIAL PLAN. VOLUME II

This report documents the financial analysis undertaken in the Regional Transportation Plan. Following a brief description of the plan elements, the report describes the basic assumptions used for cost and revenue escalation and source of funds. A cost/revenue comparison for the transit and highway elements is presented and the additional transportation funding needs are identified. The final chapter discusses three financial policies adopted to support plan implementation. A five-part appendix documents the history of transportation revenues and expenditures in the San Diego region, describes the cost constrained financial plan, and contains the detailed project listings and revenue and expenditure forms required by the California Department of Transportation.

See also PB-244 895. Supplemental Report.

San Diego County Comprehensive Planning Organizatn, Urban Mass Transportation Administration, (UMTA-CA-09-0037) CPO-TRANS-RTP2-75, Mar. 1975, 99 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244894/2ST, DOTL NTIS

23 092489

REGIONAL TRANSPORTATION PLAN. DEVELOPMENT OF THE PLAN. VOLUME III

The report describes the methodology used to develop the Regional Transportation Plan and documents the major elements of that methodology, including the regional goals and objectives program, the citizen participation program, the plan development alternative studies, the

evaluation criteria utilized to select a development strategy, the policy selection process, and the plan refinement and staging process.

See also PB-244 893. Supplemental Report.

San Diego County Comprehensive Planning Organizatn, Urban Mass Transportation Administration, (UMTA-CA-09-0037) CPO-TRANS-RTP3-75, July 1975, 191 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-244895/9ST, DOTL NTIS

23 092810

POTENTIAL USE OF RAIL TRANSIT BY THE PHYSICALLY DISABLED IN THE WASHINGTON METROPOLITAN AREA

As originally designed, the 98 mile rapid rail system which is to serve the Washington metropolitan area was to use escalators as the sole means of access to all station platforms. This dependence upon escalators would limit the use of the Metro system to those who were capable of using the equipment. Among those most directly affected would be many of the physically handicapped. The purpose of this study was to provide 'low,' 'high,' and 'most probable' estimates of additional Metro usage that would be made possible if inclined or vertical elevators at Metro stations were provided for use by the physically handicapped who, by virtue of their disability, are unable to use an escalator.

Prepared in cooperation with Pratt (R. H.) Associates, Inc., Kensington, Md.

Washington Metropolitan Area Transit Commission, Pratt (RH) Associates, Incorporated WMATA-75/24, Apr. 1972, 26p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242840/7ST, DOTL NTIS

23 092813

TECHNICAL REPORT ON THE MID-CITY ALTERNATIVE RAIL LINE LOCATION

The study examines the impact on ridership and revenues of an alternative mid-city alignment of the Greenbelt line of Metro's Adopted Regional System (ARS). The change in alignment involves the substitution of three stations on the proposed alignment under consideration as opposed to two stations on the original route. Two alternatives are studied in the report. First, the realignment of the mid-city portion of the Greenbelt Route from the Gallery Place Station to Columbia Heights is examined; second, this same realignment is considered along with the elimination of the Petworth Station. The report identifies changes that might result in ridership and revenue under each of the alternatives and their impact on WMATA's system-wide projections of ridership and revenue for the year 1990.

See also PB-184237. Prepared by Voorhees (Alan M.) and Associates, Inc., McLean, Va., Rept. no. AMV-R-20-1004(905), and Gilman (W. C.) and Co., Inc., McLean, Va.

Washington Metropolitan Area Transit Commission, Voorhees (Alan M) and Associates, Incorporated, Gilman (WC) and Company Incorporated WMATA-75/20, June 1969, 25p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242837/3ST, DOTL NTIS

23 092814

IMPACT ON RIDERSHIP AND REVENUE OF SELECTED EXTENSIONS TO THE ARS

The purpose of the study was to estimate ridership, revenue, and operating costs for the year 1990 that would result from the extension of two lines of the Metro rapid rail system which is to serve the Washington metropolitan area.

Forecast: 1990. See also PB-184237. Prepared by Pratt (R.H.) Associates, Inc., Kensington, Maryland.

Washington Metropolitan Area Transit Commission, Pratt (RH) Associates, Incorporated WMATA-75/19, Oct. 1973, 29p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-242836/5ST, DOTL NTIS

23 092815

ADVERTISING AND CONCESSIONS POLICY STUDY

The report provides guidelines toward the development of an advertising and concessions policy for within the Metro system of the Washington metropolitan area. The report looks at the pros and cons of advertising and concessions within the rapid rail system, the types of each which might be permitted, and specific locations for advertising and concessions within cars and stations; finally, a set of guidelines was developed suggesting how both advertising and concessions could be regulated, controlled, and administered. The report concludes that a well-controlled advertising and concessions program would be beneficial to both WMATA and its patrons and, by the year 1990, could produce slightly over \$1 million in annual income to WMATA.

Forecast: 1990.

Washington Metropolitan Area Transit Commission, Allen Associates
WMATA-75/18, Jan. 1971, 62p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242835/7ST, DOTL NTIS

23 093011

A COMPARISON OF METHODS FOR EVALUATING URBAN TRANSPORTATION ALTERNATIVES

The objective of the study was to compare five alternative methods for evaluating urban transportation 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 were drawn: (1) the judgmental method is satisfactory in several important respects, but its subjectivity and 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 Final Rpt. DOT-TSC-UMTA-75-5, UMTA-MA-06-0053-74-1, Feb. 1975, 62 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245057/5ST, DOTL NTIS

23 093130

TOPICS ON TRANSPORTATION IN THE BALTIMORE REGION

The papers included in this volume are the results of the year-long study on transportation problems in the Baltimore Region. Areas of study include an analysis of the multi-level planning process in Maryland, a forecasting methodology for low frequency commuter rail service, alternatives for improvement of Baltimore's suburban transportation, including Dial-A-Ride feasibility, and bikeway planning for the central city.

See also report dated Dec 73, PB-226 829.

McCready, R Kingham, I Flanagan, S Pripusich, J Warman, L
George Washington University, National Science Foundation Final Rpt.
ES-251-252-D, 1974, 256 pp

Grant NSF-GZ-2605

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244341/4ST, DOTL NTIS

23 093294

NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 9: TECHNICAL AND ECONOMIC ANALYSIS OF VEHICLE/RIGHT OF WAY SYSTEMS. VOLUME I

This report presents the results of a study performed to define the combination of vehicle and right-of-way characteristics which best meets objectives for upgrading passenger service on the Northeast Corridor. The

specific goals of this rail system are 2-1/2 hours travel time between Washington, D.C. and New York City with five stops, and 3 hours travel time between New York City and Boston with five stops. Consideration of technical, economic and intangible factors leads to the conclusions that certain right-of-way improvements should be implemented and that multiple unit electric (MU) cars should be used. Volume One discusses high speed technology, power concepts, vehicle design, kinematics, safety, comfort, train performance, and some mathematical formulations.

See also PB-242 445 and Volume 2, PB-245 222.

Lawson, KL Prause, RH Gillespie, CW Wujek, JH Arnlund, R
Bechtel Incorporated, Federal Railroad Administration Final Rpt.
FRA/ONECD-75/9-Vol-1, Aug. 1975, 225 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245221/7ST, DOTL NTIS

23 093295

NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 9: TECHNICAL AND ECONOMIC ANALYSIS OF VEHICLE/RIGHT OF WAY SYSTEMS. VOLUME II

This document contains the results of a study performed to define the combination of vehicle characteristics and right-of-way improvements which best meets the Corridor Rail objectives for upgrading passenger service on the Northeast Corridor. Volume Two of a two-part report deals with economic inputs of rolling stock, electrification, shop construction, track maintenance, and service demand. Costs, planning, and systems engineering are discussed, along with tradeoffs, environmental considerations, and vehicles, with particular attention to tilt body design.

See also PB-242 445 and Volume 1, PB-245 221.

Lawson, KL Prause, RH Gillespie, CW Wujek, JH Arnlund, R
Bechtel Incorporated, Federal Railroad Administration Final Rpt.
FRA/ONECD-75/9-Vol-2, Aug. 1975, 245 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245222/5ST, DOTL NTIS

23 096832

TRAVEL TIME AND COST CHARACTERISTICS TO SOME INTER-CITY TERMINI IN LONDON

In June 1969 a study was undertaken on a number of domestic inter-city routes in Great Britain to determine the factors influencing inter-city travel choice between rail and air. This paper outlines the results obtained in the study relating to access travel times and costs to London (Euston) station and London (Heathrow) airport. These may be influential in deciding inter-city modal choice for many travelers in London since journeys in London may be lengthy and complex. Data were collected for trips that terminated in Birmingham and Glasgow. Access modes were bus, rail, underground, taxi/hired car, private car and airport coach. Modal split models were found accurate.

Leake, GR Doherty, A (Leeds University, England) *Traffic Engineering and Control* Vol. 15 No. 14, June 1974, pp 652-5, 3 Fig., 4 Tab., 10 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 211612)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 098071

RAPID TRANSIT AND OFFICE DEVELOPMENT

Since rapid transit development has taken place in the context of extensive decentralization of population and employment activities in metropolitan areas, this article reports on the relationship between suburban commercial office development and establishment of rail transit. The area is the New Jersey suburbs of Philadelphia during and after completion of the Lindenwold Line. While high residential density is normally regarded as necessary for rail transit, Lindenwold demonstrates that high quality service will cause commuters to substitute suburban transit station parking for that in the

CBD. While it has/consolidated Philadelphia's CBD as a prime office location, it has also spurred development of new suburban office sites. The complete impact of this will require passage of more time before conclusions can be drawn.

Gannon, CA (Pennsylvania University, Philadelphia); Dear, MJ (McMaster University, Canada) *Traffic Quarterly* Apr. 1975, pp 223-242, 1 Fig.

PURCHASE FROM: Eno Foundation for Transportation, Incorporated P.O. Box 55, Saugatuck Station, Westport, Connecticut, 06880 Repr. PC

**23 099235
RESEARCH NEEDS FOR EVALUATING URBAN PUBLIC TRANSPORTATION**

This Special Report contains the results of a 3-day conference organized by the Committee on Public Transportation Planning and Development of the Transportation Research Board to devote attention to the research needed for evaluating urban public transportation. There is an introductory survey of the need for evaluation of urban public transportation, followed by the five formal papers presented to the conference as a setting for workshop discussions. Part III of the Special Report contains the workshop reports describing the general discussions and any consensus reached. Part IV contains the 57 research project statements which were the important products of the workshop groups. The research statements were developed independently by the individual workshops, and thus there are certain overlaps in various tasks of the research called for. An index is provided as a cross-reference to the subject topics of the research project statements. The conferees were not reticent in designation of costs, priorities, and establishment of research urgency. The total suggested costs to undertaken all the identified research in the 57 projects amount to nearly \$8,000,000.

For abstracts of individual paper see HRIS Numbers 099237-099247.

Transportation Research Board Special Reports No. 155, 1975, 123 pp

PURCHASE FROM: TRB Publications Off Orig. PC

DOTL JC

**23 099307
ANOTHER ALTERNATIVE: THE CASE FOR LIGHT RAIL, PART 1**

The objectives of providing better mass transit through conventional means (bus, heavy rail transit and personal rapid transit) are examined, and the possibilities of increasing system efficiency by incorporating light rail rapid transit into the overall plan is explored. A discussion the physical characteristics of light rail cover aspects of the vehicle, the operator, fare collection, design criteria and standardization, right-of-way, stations, controls and communication. Light rail's basic characteristic is versatility, and it can be used effectively in: basic service supplemented by bus; supplement to high capacity rapid transit; rapid transit feeder service; high-speed suburban service; and short haul intercity service. Light rail's capability to meet fluctuating traffic demand is discussed and comments are made on light rail as an instrument for integrated public transportation.

Taylor, SF (Sanders and Thomas, Incorporated) *Transit Journal* Vol. 1 No. 2, May 1975, pp 15-34, 3 Fig., 13 Ref.

PURCHASE FROM: American Transit Association 1100 17th Street, NW, Washington, D.C., 20036 Repr. PC

**23 099599
URBAN PUBLIC TRANSPORT (REPORT BY THE TOWN AND TRANSPORT COMMITTEES AND THE INTERNAL TRANSPORT COMMITTEE FOR THE 6TH PLAN, 1971-1975) [Transports collectifs urbains (Rapport des commissions des Villes et des Transports et du Comité des Transports Interieurs du Sixieme Plan, 1971-1975)]**

This report outlines the policy put forward by the committees for the promotion of public transport: rehabilitation of the public transport concept, offer of a valid alternative to the car, and prevention of irreversible forms of urban development. The main actions proposed for implementation within the 6th plan are: development of railway networks in the paris region, construction of transport corridors in Lyon and Marseille, experiments with new forms of transport in several medium-sized towns, better operation of the road network, improvement in the productivity and level of service of existing transport networks, improvement of managerial staff with a view to gaining an overall understanding of urban transport problems. /TRRL/ [French]

Documentation Francaise R&D Rept. 1971, 51 pp, 7 Tab.

ACKNOWLEDGMENT: Institut de Recherche des Transports, Laboratoire Central des Ponts et Chaussees, Transport and Road Research Laboratory (IRRD 101110)

PURCHASE FROM: Documentation Francaise Quai Voltaire 29-31, Paris, France Repr. PC

**23 099705
COMMON STARTING POINT FOR INTERCITY PASSENGER TRANSPORTATION PLANNING**

This article presents an overview of the methods and findings of the Boeing Commercial Airplane Co. study of intercity passenger transportation which was to comprehensively and accurately compare modes and services in regard to energy efficiency, atmospheric emissions, and service and economic aspects. Some results simple confirm a widespread finding: Intercity buses are superior to all other passenger modes. But the analysis also shows aircraft, autos, and trains to have comparable energy efficiency at the longer distances. The time and cost associated with intercity travel are probably the most important comparative criteria for the passenger.

Schott, GJ Leisher, LL *Astronautics and Aeronautics* Vol. 13 No. 7, July 1975, pp 38-55

PURCHASE FROM: AIAA Repr. PC

DOTL JC

**23 099776
SYNTHESIS OF A STUDY ON THE ANALYSIS, EVALUATION AND SELECTION OF URBAN PUBLIC TRANSPORT SYSTEMS**

A summary of a study carried out in 1971 by the Battelle Research Center at the request of Fiat. This study is made up of 8 volumes: (1) Definition of transport demand; (2) Definition of Transport supply; (3) Analysis of linear transport (transport serving several stations along one line); (4) Physiological problems; (5) Proposals by the Battelle Research Center for 4 original linear systems; (6) System selection process based on the functional and operational qualities of the systems; (7) Economic and technical evaluation of the systems; and (8) Project development methods. This document contains 8 chapters, summarizing the contents of the original report.

Centro Studi Sui Sistemi di Trasporto Sept. 1974, 67 pp, 37 Fig.

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: International Union of Railways, BD 14-16 rue Jean Rey, 75015 Paris, France Repr. PC

UIC cat. No. 89N37

**23 099795
A SLOW ORDER FOR BART**

After six months of limited level revenue service on its 71-mile system, the Bay Area Rapid Transit still is confronted with a multitude of technical problems. It has also filed a \$237 million suit against its consultant and three major suppliers, claiming inadequate engineering and contract management and failure to meet equipment specifications. Train control equipment and the availability and reliability of the rolling stock are major problems which are being attacked by a task force approach.

Middleton, WD *Railway Age* Vol. 176 No. 9, May 1975, 3 pp, 2 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

**23 099812
SEPTA'S RED ARROW DIVISION: TRACTION IN THE LIMELIGHT**

The three routes of the Southeastern Pennsylvania Transit Authority which qualify for light rail transit status serve suburbs to the west of the center city. All connect with the elevated/subway system at the SEPTA 69th Street Terminal. Details of the operation, physical plant and cars are given in this article.

Zimmermann, KR *Passenger Train Journal* Vol. 7 No. 4, Apr. 1975, pp 15-17, 5 Phot.

PURCHASE FROM: Passenger Train Journal 29 East Broad Street, Hopewell, New Jersey, 08525 Repr. PC

DOTL JC

23 099813

FIRST BART-NOW MUNI METRO

San Francisco is transforming its conventional streetcar operation, the Municipal Railway, into a light rail transit system in conjunction with a new center city access through the tunnels built for Bay Area Rapid Transit. The goal is a transit service comparable with the most modern tramways in western Europe. Changes and improvements include new cars, extended routes and upgraded service facilities.

Anderson, J *Passenger Train Journal* Vol. 7 No. 4, Apr. 1975, pp 13-14, 5 Phot.

PURCHASE FROM: Passenger Train Journal 29 East Broad Street, Hopewell, New Jersey, 08525 Repr. PC

DOTL JC

23 099815

AMTRAK: FOUR YEARS OF PROGRESS

Amtrak, officially The National Railroad Passenger Corporation, is itself unique. It is a corporation but rather than a venture of private capital it is the creation of the United States government. While the corporation does have the right to sell stock to the public in the open market, this right has, to date, been exercised in only the most limited sense. The Corporation is governed by a board of directors, but a majority of this board is public members nominated by the President and confirmed by the Senate. Amtrak was created to be a "for profit" entity but, while this continues as the goal, it will certainly be some years before the profitability can be achieved. In the meanwhile, Amtrak continues to be reliant on government subsidies and assistance in large amounts. Clearly Amtrak is a hybrid of government and the private sector unusual in the United States and elsewhere. In spite of declining ridership, deteriorating equipment and tracks and calculated neglect by management which has characterized the twenty years of American passenger service prior to Amtrak, the turning point has been reached and successfully passed. The first four years have been difficult as Amtrak has often been forced to run merely to stay in place. The next four years will have their problems but they will show real progress to reestablishing inter-city rail passenger service as a viable part of the American transportation complex. The goal of the 8,488 employees at Amtrak is no less than to provide Americans with the best system of inter-city rail passenger travel in the world.

Lewis, R Reistrup, PH *Rail International* No. 6, June 1975, pp 445-453

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 099819

PASSENGER BUSINESS PLANNING OF INTER-CITY SERVICES ON BRITISH RAILWAYS

Until recent years the passenger business in British Railways was always envisaged as a production problem, within a framework of an obligation to provide for all who wished to travel up to the limits of capacity. Commercial initiative was minimal, and, largely confined to ways and means of spreading the peak load through fares policy. When the railway had a monopoly of long distance travel this system worked well enough, although in retrospect we can see what opportunities were lost for development of the business by this negative approach. As business planning evolved it became the means not only of introducing the very necessary commercial initiative into the process of railway investment but of co-ordinating the investment schemes to best overall advantage. With the construction of successive plans there has emerged a long term strategy for the Inter-City passenger services. Coherent planning of Inter-City passenger services is along term project. A timescale ranging from five years at the minimum to 15-20 years at maximum is essential for projects being considered for the first time. Piecemeal improvements are of little use.

Smith, JG *Rail International* No. 5, May 1975, pp 339-355, 9 Fig.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 099825

TEN MEMBERS IN THE 120 KM/H CLUB

Dramatic cuts in trip-time during the late 1960s have been followed by consolidation as the groundwork is laid for another big jump in passenger

train speeds toward the end of this decade. But promise and performance are sometimes hard to disentangle, so the author looks at today's schedules to see where 120 km/h start-to-stop speeds are actually being attained.

Steffee, DM *Railway Gazette International* Vol. 131 No. 7, July 1975, pp 269-272, 2 Tab., 2 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 099836

41ST CONGRESS

A series of articles on light rail transit is introduced by a comment of the president of the International Union of Public Transport in which he sees the urgent need to develop and exploit cheaper ways of providing reserved tracks free from congestion caused by road traffic. The articles: Koln-Bonn LRT route will be completed in three years; Designing a car for the tramway/metro transition; All aboard the LRT bandwagon; US and Canada develop standard trams.

41st Congress of the International Union of Public Transport, held in Nice, France May 25, 31, 1975.

Belin, R (International Union of Public Transport) *Railway Gazette International* Vol. 131 No. 5, May 1975, pp 173-174, 1 Phot.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 099858

COMPARISON OF STRATEGIES FOR DEVELOPMENT OF INTERCITY TRANSPORT

Development of heavily-populated regions in the United States, Japan and other countries has led to severe congestion of regional transport systems and a need for immediate solutions to complex and growing problems. In many cases conditions are such that operational improvements to the existing transport system would not relieve these problems; solutions must involve development of new transport technology tailored to regional needs. The Intercity Passenger Transport Study (ref. 1) was undertaken as a preliminary assessment of the role of new or developing technology in meeting future demand for passenger transportation in Canada. The Study is intended as the first phase of continuing research designed to produce a data and information base which will contribute to planned and timely development of the transport system. With this broad objective in mind, the Study concentrated on the most heavily developed region in Canada—the 700-mile corridor between Quebec City and Windsor. Detailed analysis centred on development of the transport links between Toronto, Ottawa and Montreal through addition of high-speed rail services, tracked air cushion vehicles (TACV), and short- takeoff-and-landing aircraft (STOL).

Clark, GA

Canadian Transport Commission No. 16, Apr. 1971, 27 pp, 8 Fig., 1 Tab., 4 Ref.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
DOTL RP

23 099861

URBAN ACCESS IN THE CANADIAN CORRIDOR

The purpose of this report is to present data and information concerning urban access to intercity passenger terminals which was collected as part of the Canadian Transport Commission's report "Intercity Passenger Transport Study". While this report summarizes and evaluates some of the information collected, data on a more detailed level can be made available either from the CTC or through an analysis of the data tape. The urban access data referred to contains information on the movements of travellers between the terminal (air, rail, or bus) and their ultimate origin or destination within the urban areas in Montreal, Toronto, Ottawa and Quebec City. The travellers included are those on short haul trips by common carrier within the Quebec City to Windsor corridor.

Culley, EK Shaw, MF

Canadian Transport Commission No. 32, June 1972, 91 pp, Figs., Tabs., 5 App

ACKNOWLEDGMENT: Canadian Transport Commission
 PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
 DOTL RP

23 099862
EVALUATION OF NEW TECHNOLOGY FOR INTERCITY TRAVEL

This paper describes a study carried out by the Canadian Transport Commission designed to evaluate the potential impact of new technology on problems of intercity passenger travel. The study deals with travel requirements of the most densely populated travel corridor in Canada lying between Quebec City and Windsor, Ontario. A comparative analysis of six different strategies for meeting intercity passenger travel demands considers conventional transport technologies such as air, railway and bus together with new technologies such as STOL and tracked air cushion vehicle systems. The major conclusion which emerges from the study is that the most profitable strategy is to achieve higher performance from existing facilities through improved vehicle technology rather than through capital investment in up-grading facilities.

Soberman, RM Clark, GA Parkinson, TE
 Canadian Transport Commission No. 31, July 1971, 22 pp, 11 Fig., 3 Tab.

ACKNOWLEDGMENT: Canadian Transport Commission
 PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
 DOTL RP

23 125022
AN ENVIRONMENTAL EVALUATION OF A NEW SYSTEM

This paper reports a process of environmental appraisal of the effects of introducing a system like cabtrack into central London. The characteristics of the system are first considered: cabstops, track, cabs. Criteria for the assessment of the impact of the system are presented and illustrated. The problem of changing a network to avoid conservation areas, listed buildings, areas of good visual quality and narrow streets but take advantage of the opportunities provided by redevelopment areas and inaccessible areas are discussed. It is concluded that the system has sufficient flexibility not to involve excessive environmental costs. The conclusion discusses problems of embodying the potential of new technology into long term planning. The number of the covering abstract of the textbook is IRRD abstract no 212297. /TRRL/

Derbyshire, A (Matthew (Robert), Marshall (Johnson) & Partners)
 David and Charles (Holdings) Limited Textbook 1974, pp 155-168, 3 Fig., 1 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212312)
 PURCHASE FROM: David and Charles (Holdings) Limited South Devon House, Newton Abbot, Devonshire, England Repr. PC

23 125097
ON THE FLUID MECHANICS OF HUMAN CROWD MOTION

The paper presents a theory of the flow of people along a channel which may be of variable width, or have a partial blockage in it. The results are presented in kinetic form to facilitate comparison with observation. It is shown that a crowd fluid may exhibit anomolous gas dynamic behaviour caused by a change in the sign of a well known derivative. This indicates that expansion shocks are possible in crowd fluids. /TRRL/

Henderson, LF (Sydney University, Australia) *Transportation Research* Vol. 8 No. 6, Dec. 1974, pp 509-515, 1 Fig., 1 Tab., 14 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 212690)
 PURCHASE FROM: ESL Repr. PC, Microfilm
 DOTL JC

23 125197
BINARY STATION CHOICE MODELS FOR A RAIL RAPID TRANSIT LINE

Using two independent data sets, alternative binary station choice models were successfully calibrated and tested. The regression and probit models are based on a two stage decision process: first the commuter selects his mode

of travel, and then, given the use of rapid transit, he chooses a station. The station choice models focus on the second stage of the decision process. The models estimate the relative frequency a station will be selected by commuters from a census block group, given a modal choice of rapid transit. This proportion is a function of the trip cost difference between that station and the next least cost station. /TRRL/

Desfor, G (York University, Canada) *Transportation Research* Vol. 9 No. 1, Feb. 1975, pp 31-41, 3 Fig., 5 Tab., 23 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213119)
 PURCHASE FROM: ESL Repr. PC, Microfilm
 DOTL JC

23 125199
QUANTIFICATION OF THE COMFORT VARIABLE

Recent travel demand models and particularly mode-choice models have used a probabilistic disaggregate approach. That is, such models determine choice probabilities at the individual level. It is in this framework that one might be able to include qualitative measures affecting the individual's choice of a travel mode. The objective of this work is to develop a set of quantitative measures of comfort. This is achieved by use of modern psychometric techniques. Principal factors of comfort are defined and various travel modes are represented as a set of points in this comfort space. From the positioning of each point as well as from the variability of an individual's perception, an index of comfort is defined which describes the level of comfort of a particular travel mode to the particular individual. /TRRL/

Nicolaidis, GC (Cornell University) *Transportation Research* Vol. 9 No. 1, Feb. 1975, pp 55-66, 5 Fig., 3 Tab., 23 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213117)
 PURCHASE FROM: ESL Repr. PC, Microfilm
 DOTL JC

23 125530
A REVIEW OF CURRENT DEVELOPMENTS

Four types of urban passenger transport journey are distinguished and the characteristics of the transport systems needed to cater for them are outlined. This leads to a basic distinction between area or network systems and line-haul systems. Technical developments which will make the new systems feasible are outlined. Some studies of the application of particular systems are reported, both in hypothetical and concrete situations. Two major constraints on the adoption of new systems are then discussed: economic viability and environmental impact. The number of the covering abstract of the textbook is IRRD Abstract No. 212297. /TRRL/

Mitchell, CGB (Transport and Road Research Laboratory)
 David and Charles (Holdings) Limited Textbook 1974, pp 131-154, 5 Fig.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRD 212311)
 PURCHASE FROM: David and Charles (Holdings) Limited South Devon House, Newton Abbot, Devonshire, England Repr. PC

23 125607
SPATIAL DISTRIBUTIONS OF HOMES FOR JOURNEYS TO WORK BY DIFFERENT MODES OF TRANSPORT

Home density data from London and Bristol are examined for different transport modes to work. The data can be fitted to functions that generalize those proposed by Clark (1951) and Sherratt (1960) for the same purpose. Our generalized model assumes circular symmetry, but takes into account the smaller density of homes in the central area. Comparison between the different modes of transport in London show that the homes of car commuters are the most spread out, followed by train and then bus. The homes of tube commuters are the least spread out across the city. Further studies of the data on journeys to work show that the positions of the homes and workplaces are correlated. The correlation is especially apparent for car journeys and bus journeys in London. Direct distances between home and workplace are examined and comparisons made between the different modes of transport. /Author/TRRL/

Blumenfeld, DE (University College, London); Shrager, R Weiss, GH (National Institutes of Health) *Transportation Research* Vol. 9 No. 1,

Feb. 1975, pp 19-23, 2 Fig., 4 Tab., 6 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213121)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 125771

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 socioeconomic 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. /Author/

Gaudry, M *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 249-258

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 125796

COMMUNITY ROLE IN MODAL CHOICE FOR TRANSIT SYSTEM PLANNING

The Buffalo, N.Y., SMSA is currently anticipating the construction of a rail rapid transit system. This rail rapid transit system is to be contained in a central corridor going from the existing CBD in Buffalo to the rapidly developing new State University campus and planned new community in the suburban areas. Current travel patterns and their changes in the past decade have been examined together with changes in population, employment, and shopping characteristics. As the proposed rapid transit is the culmination of a long transportation planning process begun in the early 1960's, the history of this process is reviewed. Issues that have arisen by community groups in the impact area are traced. It is noted that the diversity of the issues and current concerns regarding planning have arisen from previous transportation actions, job availability, and dependence upon the car. The paper concludes with an assessment of current actions in the corridor area.

Paaswell, RE (State University of New York, Buffalo); Pafka-Gerbig, J *ASCE Journal of the Urban Plan and Develop Div* Vol. 101 No. 1, May 1975, pp 35-47, 16 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 125811

ECONOMIC HIGH-SPEED RUNNING OF RAILWAYS

Railway engineers have for some years been accelerating their understanding of those branches of engineering science applicable to the development of techniques leading to new equipment to meet changing market needs. Carrying passengers is more than half British Rail's total business, and this article describes the growth in technology devoted to improving the speeds of passenger trains. Topics dealt with include the lateral stability of vehicles, route alignment, lateral track forces, vertical track forces, track developments, braking and acceleration, aerodynamic drag, electrification, signaling and traffic control, and the economics of innovation.

Jones, S (British Railways Board) *Electronics and Power* Vol. 21 No. 2, Feb. 1975, pp 100-104

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

23 125830

NEW TRANSIT MODES: APPLICABILITY AND CURRENT STATUS

A survey of new urban transportation systems around the world reveals that four significant technology classes are presently emerging: Moving Way Transit (MWT), Light Guideway Transit (LGT), Personal Rapid Transit (PRT) and Dial-A-Bus (DAB). The author concludes that LGT a state-of-the-art, that accelerating MWT systems are at an awkward state

with respect to the marketplace that high capacity PRT appears to be no less than four years away from state-of-the-art and the DAB systems are operational.

Prepared for meeting 24-28 February 1975.

Elms, CP

Society of Automotive Engineers Preprint 750214, Feb. 1975, 19 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

23 125832

BART PROGRESS REPORT

The need for some kind of modern transit system as an alternative to the automobile in the San Francisco Bay Area had its genesis over a quarter century ago, at a time when the established transit systems in the area were suffering decreasing patronage and freeways were gaining popularity in California. This is a report on the actions which developed from early recognition of that need. The report describes the concept of BART and the major experiences translating that concept to its present operation in revenue service. At the conclusion, the report gives an account of BART's patronage and its trend as an indicator of its acceptance as a People Moving System.

Prepared for meeting 24-28 February 1975.

Quintin, WP (Bechtel Corporation); Eanes, TS

Society of Automotive Engineers Preprint 750442, Feb. 1975, 8 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

23 125837

MASS TRANSPORTATION VEHICLES AND PEOPLE MOVERS

The purpose of this paper is to give an overview of developments in mass transportation vehicle and people mover design and to illustrate the constraints facing the industrial designer. To discuss specific transportation projects which Sundberg-Ferar has been directly involved in, such as the San Francisco BART Car; the Washington, D.C. Metro; the New York City Transit Authority R-44 Subway Car; the Morgantown and Dashaveyor people movers. Also, vehicle design for both exterior and interior components with commentary on design criteria and final results.

Prepared for meeting 24-28 February 1975.

Heck, RA (Sundberg-Ferar, Incorporated)

Society of Automotive Engineers Preprint 750440, Feb. 1975, 10 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

23 125847

TRACK AND HIGH SPEED ON LINES WITH MIXED TRAFFIC

[Il binario e l'alta velocita nelle linee a traffico misto]

While recognizing the validity of high-speed, specialized service in appropriate cases, it is proposed to introduce mixed operations on new lines as an answer to the requirements which presage an integrated system of transportation providing for a massive shift to the railroad. The new direct line, Rome--Florence, meets these requirements because, in accordance with the European Master Plan, it is the first significant example of a plan designed for operations assuring the greatest capacity and high flexibility. There arise complicated technical problems regarding harmonization between the consequences of a greater aggressiveness of the heavy traffic and the preservation of the levels of quality suitable for super-fast runnings. Some of the most important aspects of this problem are briefly dealt with. [Italian]

Pandolfo, A *Ingegneria Ferroviaria* No. 1, Jan. 1975, pp 29-37

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 125896

THE RAPID BUSWAY OR THE RAPID TRANSIT RAILROAD?

The author counters the recent arguments favoring the busway as an economical alternative to full-scale rapid rail transit. It is argued that bus operation introduces high labor costs and a subway-type busway in a center

city could actually cost more than a rail subway in the same site. The costs of the Lindenwold line are analyzed and a fully equivalent busway operation is estimated.

Holden, WHT *Third Rail* Vol. 1 No. 4, Apr. 1975, pp 44-45

PURCHASE FROM: Third Rail Press P.O. Box 79, Babylon, New York, 11702 Repr. PC

DOTL RP

23 126059

MUCH WE CAN LEARN FROM U.S. ON TRANSPORTATION

The author describes one rail-based, and one bus rapid transit system, as seen on a visit to North America in 1974. He first outlines the scope of American transport problems, as seen by the Federal Secretary of Transportation. Poor coordination of transportation planning and management are blamed. Peak-hour capacity creates the greatest operational difficulties; fewer than 25% of seat-miles are used. Responsibility for administration is shared among federal, state, county, city and town councils, which are often at odds. Recent progress has been made, with the unified transportation assistance programme (\$19.3 billion). This is a six-year plan, coordinating highway and urban mass transit expenditure, under each state Governor's control. Progress on the 98-mile Washington Metro is described. It is proving more expensive than planned, but is proceeding on schedule. Automated service every 2 minutes, in peak hours, is planned. Generous park-and-ride provision is planned, but coordinated bus feeders should provide 2/3 of riders. The automated fare collection system, using magnetic cards, and the design of stations, vehicles, and a novel railbed, are described. Also discussed is the Shirley Highway metrobus service. This collects from Virginia suburbs, and runs on special way up the central reservation of a very congested dual carriageway, 19 miles into Washington. Ridership has increased 450% since the first year of operation. The average passenger load is 50, and the service is generally very successful. /TRRL/

Mustow, SN *Municipal Engineering* Vol. 152 No. 5, Jan. 1975, pp 207-10, 1 Tab., 1 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213506)

PURCHASE FROM: ESL Repr. PC, Microfilm

23 126061

A TYPOLOGICAL APPROACH TO INDIVIDUAL URBAN TRAVEL BEHAVIOR PREDICTION

With the use of cluster analysis a sample of 1018 residents of the San Francisco bay area was classified into eleven types of urban residents on the basis of overall similarity of personal and environmental characteristics, and independently into nine types of travel behavior. The relations between the two typologies, and the comparative travel behavior of the types of urban resident were investigated in an attempt to gain insight into the determinants of urban travel. The probability of the correct assignment of a travel behavior type to an urban resident type was of the order of 0.30. Monte Carlo simulation methods were used to test empirically whether the value of a given travel behavior characteristic for a given urban resident type can be assumed to be higher (or lower) than the value in the general population, thus testing the predictability of the travel behavior of the various urban resident types. Conversely, the prediction of the urban traveler's personal characteristics his travel behavior type was also evaluated. This typological approach made the prediction of the usage of the San Francisco Bay Area rapid transit system (for going to work, for going to shop, for going out for leisure, or for some other purpose) possible, in about 15% of the cases, from the knowledge of the urban resident type and, in about 25% of the cases, from the knowledge of the travel behavior type. /Author/TRRL/

Oppenheim, N (Texas A&M University) *Environment and Planning* Vol. 7 No. 2, 1975, pp 141-52, 11 Tab., 8 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213495)

PURCHASE FROM: Pion Limited 207 Brondesbury Park, London NW2 5JN, England Repr. PC

DOTL JC

23 126408

PLANNING, IMPLEMENTATION AND OPERATION OF THE PHILADELPHIA-LINDENWOLD LINE

The one to six car trains are operated by a one man train crew who is, in fact, part of the automated or computerized process. He notifies the computer as to the length of the train; opens and closes doors; determines the length in time of each stop; initiates acceleration; and can eliminate station stops. The computer prevailing determines train speed for each track section and right of way conditions; causes the train to decelerate at the optimum rate; and stops at the station with the center of the train at the center of the platform. The Lindenwold Line has demonstrated that motorists will leave their cars if superior transportation is provided; quality transit service can reduce air and noise pollution and conserve energy; traffic congestion can be reduced; technology is now available to create desirable rapid transit service, and that rail rapid transit can be planned, constructed, and efficiently managed to meet operating and maintenance costs out of the fare box.

Johnston, RB (Port Authority Transit Corporation of Penn and NJ) *Society of Automotive Engineers Preprint #750623*, May 1975, 5 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

23 126412

QUESTIONNAIRE SURVEYS OF PASSENGER COMFORT

Some of the techniques involved in the quantitative treatment of data obtained in the 'field' situation are discussed. The examples provided concern attempts to quantify passenger reaction to the noise and vibration experienced in public transport, since it is the assessment of these two factors, and their effects on passenger comfort, which is being investigated at Swansea. After discussing the validity of information derived in this way, general methods of assessment are described. The paper continues with a detailed examination of questionnaire methods of the subjective assessment of environmental stimuli, and concludes with examples of the pitfalls which may be inherent in such assessment.

Osborne, DJ (University College of Swansea, Wales) *Applied Ergonomics* Vol. 6 No. 2, June 1975, pp 73-103, 9 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

23 126425

DISTRIBUTION OF BENEFITS OF PUBLIC TRANSIT PROJECTS

The paper examines the basic issues related to efficiency and equity and reviews the existing techniques of including income redistributive effects in the evaluation of public projects with the objective of determining their applicability to the ease of urban mass transit projects. The current techniques of estimating the benefits of rapid transit as well as conventional bus systems and the quantification of their distribution among the various socioeconomic groups of beneficiaries are examined. It is pointed out that in the case of urban transportation projects, it is necessary for practical reasons to extend the concept of an equitable distribution of income to that of mobility or the opportunity to travel. Two alternative procedures based on the criteria of the dependence of individual groups on particular modes for different purposes are suggested for analyzing the distributive effects of urban transportation projects.

Chatterjee, A Sinha, KC *ASCE Journal of Transportation Engineering* Vol. 101 No. TE3, Proc. Paper 11497, Aug. 1975, pp 505-519

ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 126426

WASHINGTON METRO ACCESS FACILITIES

The 98 mi (158 km) Metro system will have 82 stations. There will be an off-street bus terminal at 54 of the stations with an average of six modified saw-tooth off-street bus bays at each terminal. There will be 26,000 parking spaces located at 32 stations. Forty-six stations will have kiss & ride spaces. Each of the 1,650 follow-through kiss & ride spaces will be designed so that the auto will not have to back up while picking up or discharging a passenger. Sixty-six of the stations will have rental bicycle lockers and free

chain-rack type facilities for locking the frame and wheels. Access to the Washington Metro rail system is the key to its success. Parking is an integral portion of the entire access design.

Akins, MM *ASCE Civil Engineering* July 1975, pp 63-65.

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

DOTL JC

23 126514

PASSENGER TRANSPORT IN CANADIAN URBAN AREAS

Urban transportation in Canada, as with most developed countries, is dominated by the automobile; public transport has survived reasonably well but the spiral of increased costs and decreasing patronage has started. No operational or technical panacea will meet these problems. In general, transit will continue the trend toward increasing peak hour use with decreasing base service patronized by the young and underprivileged. The Bus will continue to be the major service producer with need for examining parking control, marketing, promotion, coordinated schedules and transfers, all of high priority. Comparisons are made with U.S. rail transit, and various facets of rapid transit and light rail transit are examined.

Parkinson, TE
Canadian Transport Commission Dec. 1971, 92 pp, 10 Fig., 13 Tab., 64 Ref.

PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Orig. PC
DOTL RP

23 126515

INTERCITY PASSENGER TRANSPORT STUDY

This study provides a preliminary evaluation of the potential application of new technology to intercity passenger travel in Canada and identifies those technologies where further research and development seem justified. Special emphasis is placed on travel requirements of the Montreal/Toronto/Ottawa corridor. Tracked air cushion vehicles and new forms of high-speed rail transport are compared with existing technologies. The study presents information on present travel patterns and population characteristics. Six different development strategies are compared. The major conclusion is that the most profitable strategy to adopt involves maximizing the potential of existing railway facilities through introduction of new vehicle technology.

Canadian Transport Commission RB7001, Sept. 1970, 103 pp, Figs., Tabs., 15 Ref., 1 App.

PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Orig. PC
DOTL RP

23 126517

NATIONAL MARKET FOR URBAN TRANSIT VEHICLES

This report is based on a survey of transit operators in Canada and generally reflects current policies and conventional operating practices and does not consider the possibility of new transit concepts. It details the 1978 and 1983 markets for minibuses, buses, trolley coaches, streetcars, rapid transit cars, and light rail transit vehicles.

Study conducted for Transportation Development Agency, Canada.

Kates, Peat, Marwick and Company 11 pp, 8 Tab.

PURCHASE FROM: Kates, Peat, Marwick and Company P.O. Box 31, Commerce Court Postal Station, Toronto, Ontario, Canada Orig. PC
DOTL RP

23 127010

PREPARATION OF STRATEGIC CHOICES IN INTER-REGIONAL URBAN OR SUBURBAN PUBLIC TRANSPORT SERVICES [Préparation des choix stratégiques en matière de transports interregionaux de personnes (TR.I.P.)]

The French Minister of Transport and the Minister for Urban and Regional Development have set up an interministerial Steering Committee to study possible strategies for inter-regional passenger transport. The author, who is chairman of the working party known as TR.I.P., which is the committee's executive body, explains the progress made by his group in its work. He describes the organization and scope of the study, the supply-demand

simulation model, the envisaged financing plan, and the strategic formulations they make possible. It is planned to apply them in the preparation of the VIIth economic plan. [French]

Proceedings of the International Conference on Transportation Research, Bruges, Belgium, June 1973.

Metzinger, G
International Conference on Transport Research Proceeding June 1973, pp 246-252

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: OECD Publications Center 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006 Repr. PC

23 127013

THE USE OF INTERCITY MULTIMODAL FORECASTING MODELS BY THE USE DEPARTMENT OF TRANSPORTATION

The DOT (Department of Transportation) has carried out several studies of alternatives for providing short-haul passenger service in the United States. The author mentions four such studies, in particular the Northeast Corridor Transportation Project, and gives the conclusions from the latter. The author discusses some of the models employed, such as forecasting models, demand and modal split models, use of judgement, independence of irrelevant alternatives, non-quantifiable attributes, and gives a few numerical examples of divergencies in results from forecasting models.

Proceedings of the International Conference on Transportation Research, Bruges, Belgium, June 1973.

Cheslow, D
International Conference on Transport Research Proceeding June 1973, pp 907-915, 4 Tab., 15 Ref.

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

23 127355

PLANNING OF STATION BUILDING AS VIEWED FROM THE STANDPOINT OF PASSENGER SERVICE

The present study is aimed at establishment of guidelines on the planning of type and scale for railway passenger stations in future. Through survey of stations past and present and through factorial analysis of their changes, the role, functions and problems of passenger stations to be planned hereafter are discussed. Various data collected on the behaviors of passengers and status of service facilities utilization as fundamental data for designing station buildings as nodal points of traffic are analyzed and, based on the results thereof, several approaches to planning of building space layout and scale are proposed.

Uehara, T *Railway Technical Research Institute* Vol. 16 No. 2, June 1975, pp 70-74

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

23 127360

TYNESIDE RAPID TRANSIT ANALYSIS. TECHNICAL REPORT

This report, for Tyneside Pte, compares an all-bus system with the Light Rapid Transit (LRT) recommended in the Tyne Wear Plan (TWP). It was decided that the best alternative base to the LRT was an all-bus system, replacing existing commuter rail services. Conservative characteristics were chosen for the LRT; in particular there were no coordinated bus feeders. Nevertheless, 70% of passenger miles are by bus (23% LRT) in this study, compared with 93% by bus in the base. Full capital costs of the LRT, including costs to BR and property owners, are counted. The report discusses fully the technical procedures used in forecasting travel demand and operating characteristics; also the procedures and results of economic evaluation. The model includes a measure of service reliability, where LRT improves on buses. Highway congestion and some traffic restraint are modelled. Details of data preparation are also given. Economic and financial benefits are calculated; (LRT would cost 62m to build, would produce 1.3m net annual benefit, and an 11% first year rate of return (8% discounted). A firm recommendation to build the LRT is made, and future extensions are encouraged. /TRRL/

Voorhees (Alan M) and Associates, Limited R&D Rpt. June 1972, 130 pp, 20 Fig., 33 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 273475)

PURCHASE FROM: Voorhees (Alan M) and Associates, Limited 47 Princess Gate, London, England Repr. PC

23 127381

1970 TRAVEL CHARACTERISTICS: TRIP LENGTH

This report is one of a series summarizing 1970 Travel Characteristics in the Chicago-Northwestern Indiana Region. One of the most important characteristics of urban travel is trip length. A knowledge of current trip lengths, as well as an understanding of how trip lengths may be altered by changing urban travel environment, are vital to the travel forecasting process. While most trips tend to be short, the longer ones have the greatest impact on transportation facilities. Trips over 5 miles in length constitute less than 30 percent of all trips but account for 75 percent of all passenger miles of travel.

Northwestern Indiana Regional Planning Commission, Chicago Area Transportation Study CATS 372-49, Feb. 1975, 43 pp, 10 Fig., 11 Tab., 8 Ref.

PURCHASE FROM: Northwestern Indiana Regional Planning Commission 8149 Kennedy Avenue, Highland, Indiana, 46322 Repr. PC, Chicago Area Transportation Study 300 West Adams Street, Chicago, Illinois, 60606 Repr. PC

DOTL RP

23 127386

THE ADVANCED PASSENGER TRAIN: AN ECONOMIC ALTERNATIVE TO THE CONSTRUCTION OF NEW TRACK FOR HIGH SPEED

This paper examines to what degree reasonable extensions of established railway technology may be made and then to determine to what extent and at what cost such "stretched" technology can satisfy foreseen market needs. It was this approach, to see how big a stretch could be effectively made taking account of technology and economy, that led to the concept of the British Rail Advanced Passenger Train (APT). Hence APT may be defined as a train incorporating stretched railway technology and designed to run at maximum speed on existing good railway track incurring the minimum cost penalty for speed. The beneficial features of the train, which will be taken as the basis for comparison in this paper, can best be appreciated by first examining the problems encountered in guided wheel transport. The production cost of APT (maximum speed 250 k.p.h. and plus minus 9 degrees powered tilt) will be much the same as that of conventional trains with lower speed capability. Put another way, the cost of one APT is about equal to 1 or 2 km of new track laid on new right of way. It is designed to be economical of traction energy and maintenance cost. It is compatible with existing rail infrastructure. The most telling point in favour of APT is that its adoption permits of a staged investment strategy in keeping with the growth of measurable benefits. No initial massive infrastructure cost is called for and the trains may be introduced at a rate in keeping with observed net revenue benefits.

Jones, S *Rail International* No. 7, July 1975, pp 605-614, 8 Fig., 3 Tab.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 127702

THE COMPLEX SYSTEM OF SUBURBAN TRAFFIC ON ZONE SECTIONS

High standards of suburban service and economic operation of railways largely depend on the optimum parameters included in the complex system of suburban traffic on zone sections. The first parameters to be included in the complex system are the optimum weight and the optimum average running speed of suburban trains under operating or prospective conditions. The optimum number of suburban zones is one of the most important problems of suburban passenger service. The parameters for determining the length of suburban zones and therefore the location of zone sections are as follows: convenience for passengers by cutting down their journey time; points where most passengers get off the train; efficient use of technical facilities of a suburban line including the rolling stock; minimum national expenditures on suburban service. At the Moscow Railway Transport Institute a group of scientists and engineers has developed algorithms and a programme for the suburban train turnover schedule to be compiled by

a computer. The automation of such a complex process under zone service enables us to find the optimum turnover schedule version.

Kochnev, FP *Rail International* No. 9-10, Sept. 1975, pp 785-792, 7 Fig.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 127704

ECONOMIC AND ENGINEERING ASPECTS OF PUBLIC PASSENGER TRANSPORT DEVELOPMENT IN THE USSR

Considered in the paper are the main social, economic, scientific and engineering aspects involved in the development of inter-city passenger traffic in the USSR, the problems of selecting the transportation mode in inter-city services and the development of the high-speed passenger rail transport; the prerequisites and principal requirements for the technical equipment of the trunk high-speed lines, the procedures for selecting the optimal version of the reconstruction of serviceable lines as well as the procedures for engineering and economic justification for the organization of high-speed passenger services on these lines; the results obtained from the studies carried out to determine the optimal technical speed for passenger trains with different forms of traction and the procedures for selecting the major parameters of high-speed multiple-unit electric trains.

Bechtcheva, NI *Rail International* No. 9-10, Sept. 1975, pp 739-783, 16 Fig.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 127849

THE PENN CENTRAL PASSENGER SURVEY

This report contains data on Penn Central commuter service between Valparaiso, Ind., and Chicago. The reported data is of two basic types: System operational service data from sources other than PC Passenger Survey including performance, physical plant and rolling stock, and survey data obtained from a 19-question passenger survey. The Northwestern Indiana Regional Planning Commission submitted this information as part of an input for agencies such as U.S. Railway Association, the Illinois Department of Transportation and the Northwest Indiana Public Transportation Authority.

This report was financed in part through a grant from the U.S. Department of Transportation, Urban Mass Transportation Administration.

Northwestern Indiana Regional Planning Commission July 1975, 110 pp, Tabs., Photos.

PURCHASE FROM: Northwestern Indiana Regional Planning Commission 8149 Kennedy Avenue, Highland, Indiana, 46322 Repr. PC

DOTL RP

23 127863

ESTIMATED AND PERCEIVED VARIABILITY OF TRANSIT TIME

Two small surveys were made of shipper opinions on the value placed on reliability of delivery time. If the results are correct, two implications are suggested. Railroads have not done a good job in informing the shippers about improvement in rail services and to the extent that the preference for truck over rail was based, in part, on incorrect perceptions of the variability of transit time, a shift from trucks to rail as a fuel conservation measure may have less effect on shippers than may have been expected. A more definite conclusion has to wait until variability of transit time on the choice of transport mode is properly quantified.

Miklius, W (Hawaii University); Casavant, KL (Washington University, Olympia) *Transportation Journal* Vol. 15 No. 1, Sept. 1975, pp 47-51, 4 Tab.

PURCHASE FROM: American Society of Traffic and Transportation 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr. PC

DOTL JC

23 127900

PROPOSED O.R. WORK ON RAIL TABLING

This note proposes an initial feasibility study into the production of timetable "standards" as part of the possible application of O.R. Techniques to assist railway timetable compilation. If successful this will be followed by joint O.R./D.P. Assessment and extension to joining of standards. /TRRL/

Weston, JG

London Transport Executive Tech. Note #88, Aug. 1974, 3 pp

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215030)

PURCHASE FROM: London Transport Executive Transad House, Leicester Square Station, London, England Repr. PC

23 127901

PUBLIC TRANSPORTATION LINE POSITIONS AND HEADWAYS FOR MINIMUM USER AND SYSTEM COST IN A RADIAL CASE

In this paper, a model of a transit system is built in polar coordinates with radial transit lines in order to find the line positions and headways which minimize user (travel time) and transit agency (operating) costs in response to A general population density function. It is found that the optimum line location is related to the population density and the circumferential access. The optimum headway is found to be that which causes user waiting time cost to equal the operating cost. The simplification of a population density function varying only radially is introduced. A method for determining the optimum number of lines is developed. This number depends upon the ratio of the access cost to the sum of the waiting and operating costs. It is proven that, for optimality, lines should be located in the centers of corridors of uniform width and have equal headways. A fleet size constraint is also introduced for the simplified case. It is proven that for optimality, the fleet is divided equally between lines. (A) /TRRL/

Byrne, BF (West Virginia University) *Transportation Research* Vol. 9 No. 2/3, July 1975, pp 97-1023, 3 Fig., 3 Tab., 9 Ref.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 215059)

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 127911

AUCKLAND RAPID TRANSIT SCHEME

This article is based on the environmental impact report on the Auckland rapid transit scheme. This has the objective of providing a public passenger transport service which will make use of an electrified railway fully integrated and co-ordinated with road transport. It will involve a 30km rapid transit system and an underground loop line. The authors outline the proposals for the rail component including electrification, elimination of level crossings and a standardized service. Details of stations are given, which are designed for pleasantness and convenience, and include provisions for handicapped people. The route of the rail service is next discussed followed by brief details of the overhead power system. Three-car units each seating 150 passengers will operate at up to 120km/h two being operated in tandem during peak hours. After briefly describing the storage and servicing complex the authors discuss the construction of the underground section most of which will be excavated in unweathered sandstones and siltstones, which can be tunnelled by a header unit with a small traversing cutter or by a tunneling machine. 2.5 and 4 meter ventilation and emergency shafts will be incorporated. The 200,000 cubic metres of spoil are to be used in the Grafton Gully motorway construction. Environmental features of the system are discussed with particular reference to appearance and noise. Noise reduction is to be achieved by the use of long welded rails on rubber pads and heavy sleepers, by high quality alignment, the use of ballasted bridge deck designs and noise barriers. /TRRL/

New Zealand Engineering Vol. 30 No. 4, Apr. 1975, pp 99-102, 4 Fig., 1 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 214553)

PURCHASE FROM: ESL Repr. PC, Microfilm

23 127912

NON-STOP ON THE TYNESIDE EXPRESS

This article is concerned with the construction of the first stage of the Tyneside metro. Monorails and minitrains were considered but rejected as offering no real advantages, and London style heavy tube trains discarded in favour of 27M long articulated cars in a light rapid transit system. A 75 percent government grant has been approved. The system is being fully integrated with other forms of transport, and a study has shown the system as giving an eleven percent return over an all-bus system. The author discusses the form of stations followed by an account of the construction of the first stage with particular reference to the problems encountered. Boulders prevented the use of a full-face tunneling machine and shields and roads headers are being used from both ends. Methods will be adjusted to suit ground conditions, and particular care is being taken to ensure the stability of overhead buildings. The methods include the specification of compressed air in some areas and, the use of small explosive charges to remove siltstone. Tolerance in line, grade and circularity is only 30mm overall. The gateshead side of the river is riddled with old mine shafts, and requires special methods. These include drilling and grouting from above and the pneumatic stowing of pfa/cement and stone/cement grout. /TRRL/

FERGUSON, H *New Civil Engineer* No. 142, May 1975, pp 19-21, 2 Fig., 2 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 214550)

PURCHASE FROM: Institution of Civil Engineers 91-93 Farringdon Road, London EC1M 3LE, England Repr. PC

23 128147

TYNESIDE RAPID TRANSIT ANALYSIS. TECHNICAL REPORT

This report, for tyneside pte, compares an all-bus system with the light rapid transit (lrt) recommended in the tyne wear plan (twp). It was decided that the best alternative base to the lrt was an all-bus system, replacing existing commuter rail services. Conservative characteristics were chosen for the lrt; in particular there were no coordinated bus feeders. Nevertheless, 70% of passenger miles are by bus (23% lrt) in this study, compared with 93% by bus in the base. Full capital costs of the lrt, including costs to br and property owners, are counted. The report discusses fully the technical procedures used in forecasting travel demand and operating characteristics; also the procedures and results of economic evaluation. The model includes a measure of service reliability, where lrt improves on buses. Highway congestion and some traffic restraint are modelled. Details of data preparation are also given. Economic and financial benefits are calculated; lrt would cost .62M to build, would produce .1.3M net annual benefit, and an 11% first year rate of return (8% discounted). A firm recommendation to build the lrt is made, and future extensions are encouraged. /TRRL/

Voorhees (Alan M) and Associates, Limited R&D Rept. June 1972, 130 pp, 20 Fig., 33 Tab.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 273475)

PURCHASE FROM: Voorhees (Alan M) and Associates, Limited 47 Princess Gate, London, England Repr. PC

7564154

23 128148

"SUPERTRAM" NETWORK TO SPEED TYNESIDE TRAVELLERS

The author discusses the "supertram" network at Tyneside and what it will involve. The decision to adopt a rapid transit system is considered feasible due to the combination of traffic congestion and government aid. The track will require a bridge across the river tyne, tunnelling beneath the city centre and some re-alignment of part of the track already present from the river route towards the city. The cost of the phases of work is quoted. An overhead electrification system was selected because of greater safety. The 2-track Tyne road bridge will soon go out to Tender; the bridge is a through truss design connecting directly with a tunnel at the cliff face. A viaduct is also used and a test track is under construction. The electronically operated "Supertram" was chosen for its quietness and freedom from fumes; the train will run directly to shopping areas, hospitals and schools. Buses are expected to be used to transport people to the rapid transit systems and interchanges for public and private transport. /TRRL/

Atkinson, I *Contract Journal* Vol. 265 No. 4996, June 1975, pp 28-29, 1 Fig., 3 Phot.

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 214480)

PURCHASE FROM: IPC Building and Contract Journals, Limited 32 Southwark Bridge, London SE1, England Repr. PC

23 128847
A NEW IMAGE

The Northeast Corridor high speed electrified railroad may be a reality by 1981. Proposals for the final system plan are awaiting Congressional approval. Three service levels are being evaluated: (1) Metroliner I, a plan for emergency repair and maintenance on the Northeast Corridor of track and bridges and maintenance of present schedules; (2) Metroliner II which meets the minimum requirements for a high-speed line, calling for curve realignments and maximum speeds of 120 mph; (3) Corridor Rail-proposal for full improvements, including electrification of Boston-New Haven line and maximum speed of 150 mph. Problems remain-as yet the ownership question has not been settled, nor a financing scheme. Also to be resolved are questions relation to freight operations. But the future looks bright for the high-speed passenger corridor concept.

Myers, ET *Modern Railroads* Vol. 30 No. 9, Sept. 1975, pp 84-88, 3 Fig., 1 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

23 128895
DEMAND FUNCTIONS, BEHAVIORAL ANALYSIS, AND COST EFFECTIVENESS IN URBAN TRANSPORTATION

The sensitivity of cost-benefit assessments to variations in demand for public transportation systems, indicates some major changes in costs and benefits for different demand conditions. However, the relative standing of new systems of urban transportation were not significantly affected. Also discussed are requirements for improved modeling of demand. Diagram and table illustrate analysis.

Dodson, EN (General Research Corporation) *Transportation Science* Vol. 9 No. 2, May 1975, pp 139-148, 14 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 129121
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 reported to be 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.

Rubin, F (International Business Machines Corporation) *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 215-223, 10 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 129124
QUANTITATIVE ANALYSIS OF SYNCHRONOUS VS. QUASI-SYNCHRONOUS NETWORK OPERATIONS OF AUTOMATED TRANSIT SYSTEMS

This paper investigates the performance of the synchronous and quasi-synchronous network control policies proposed for modern automated transit systems. Performance is analyzed from the user point-of-view in terms of the expected travel time delay associated with each policy. Using an idealization of the network layout and uniform demand for service, analytic expressions for the expected delay are derived for each policy in terms of fundamental

parameters (line spacing, trip rate, trip length distribution, maneuver region). Comparisons of the performance of each policy are presented in parametric form.

Kornhauser, AL (Princeton University); McEvaddy, P *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 241-248, 10 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 129129
STATION PLANNING AND DESIGN: WHERE TO START

The paper discusses Chicago's approach to meeting the needs of consumers by expanding the rapid transit system wherever possible, and making it conveniently accessible to a greater number of riders without compromising its high average speed. This has been accomplished by changing or instituting bus routes to act as feeders to the rail lines from as many tributary areas as possible. There exists a need to improve the interface between the bus and rail modes and to bring them both up to the highest standards possible to encourage patronage. However, closely spaced stations provide a convenience for nearby users but reduce the speed of operation. Other considerations include the security of passengers and station employees, and the economics of station spacing. Criteria are included for station design and bus interchange facilities.

Presented at the Transportation Facilities Workshop: Passenger, Freight and Parking, New York, N.Y., May 22-24, 1974.

Misek, FJ

American Society of Civil Engineers Proc Paper 1975, pp 150-162

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Institute of Chemical Engineers 345 East 47th Street, New York, New York, 10017 Repr. PC

23 129130
SOME ASPECTS OF RAPID TRANSIT STATION DESIGN

The careful consideration of the various interfaces with other modes of transportation in rapid transit station design, is an important aspect in increasing the attractiveness of public transit. Station stops increase the overall travel time and should occur only at points of significant passenger demand as indicated by the transit planning processes. Stations may also be used as a generative factor, located purposely to force development in specific areas as related to land use planning. The types of interfaces include pedestrian, surface public transit vehicles, private automobile, and bicycle. The complexity and layout of a rapid transit station and the nature and efficiency of its interfaces depends to a great extent on several nonengineering factors: the operating philosophy; the fare policy, and the location of the station.

Presented at the Transportation Facilities Workshop: Passenger, Freight and Parking, New York, N.Y., May 22-24, 1974.

Harvey, JT (Toronto Transportation Commission)

American Society of Civil Engineers Proc Paper 1975, pp 100-118

ACKNOWLEDGMENT: EI

PURCHASE FROM: ASCE Repr. PC

23 129131
FIVE DECISIONS IN TRANSIT STATION DESIGN

In each of the five areas the decisions may either aid or hinder the realization of design objectives, depending on the interplay of client-consultant consultation. The decision areas include the nature of station design; how best to handle people-moving requirements; providing for amenities and environmental quality; providing intermodal transfer facilities; and the level of community involvement in professional problem-solving. The paper suggests design methodologies in each of these areas to guide the achievement of design objectives.

Presented at the Transportation Facilities Workshop: Passenger, Freight and Parking, New York, N.Y., May 22-24, 1974.

McCutchen, WR (Bay Area Rapid Transit District)

American Society of Civil Engineers Proc Paper 1975, pp 95-99

ACKNOWLEDGMENT: EI

PURCHASE FROM: ASCE Repr. PC

23 129132

TRANSIT STATION PLANNING AND DESIGN METHODOLOGY
Station facilities may range from various kinds of bus stops to bus stations, rail transit stations, complex interline transit terminals, and station complexes integrated in varying degrees with other developments and functions. The planning and design of transit stations is intimately linked in space with the planning and design of line-haul, storage-maintenance, and other fixed transit facilities, with the vehicles and trains providing the moving elements of the service, and with the neighborhoods in which such stations are located. In the scheduled sequence of transit system development, the planning and design of transit stations occupy a certain place, generally following on early or preliminary overall planning and before construction of designed facilities.

Presented at the Transportation Facilities Workshop: Passenger, Freight and Parking, New York, N.Y., May 22-24, 1974.

Quinby, HD (Parsons, Brinckerhoff, Quade and Douglas, Inc)
American Society of Civil Engineers Proc Paper 1975, pp 77-90, 33 Ref.

ACKNOWLEDGMENT: EI
PURCHASE FROM: ASCE Repr. PC

23 129158

LIVERPOOL STREET: AN ALTERNATIVE APPROACH

Liverpool Street is one of the great 19th-century London railway terminals. Various proposals for making the station better able to cope with today's traffic are outlined and it is hoped to build a very substantial office development without demolishing some of the finer architecture.

Stones, A *Modern Railways* Vol. 32 No. 327, Dec. 1975, 2 pp, 2 Fig., 3 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: XUM Repr. PC

DOTL JC

23 129160

UNDERGROUND IN LIVERPOOL

Liverpool has had an underground railway for almost 90 years, joining two densely-populated areas on either side of a wide estuary. The whole system is now being greatly expanded, and services linked, stations rebuilt, etc. to meet modern needs.

Edwards-May, D *Modern Railways* Vol. 32 No. 327, Dec. 1975, 7 pp, 4 Fig., 9 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: XUM Repr. PC

DOTL JC

23 129162

PASSENGER BUSINESS PLANNING OF INTER-CITY SERVICES. 2

The author, who is Passenger Manager, B.R. Western Region, shows how having established long-term business needs, the results of market studies and computer analysis are fed into the planning process by way of detailed examination of alternative investment proposals. He then details lessons learned from experience.

Smith, JG *Modern Railways* Vol. 32 No. 327, Dec. 1975, 4 pp, 3 Fig., 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: XUM Repr. PC

DOTL JC

23 129273

BUSSES AND TRAMS IN THE YEAR 2000 [Bus en tram in het jaar 2000]

Scenariomethodology and structure of the organisation. Cost and amount of rural and urban transport. Urbanbus versus tram costs (approach), bus and subway and rural services (passenger/km). Productivity development 1968-1972. Expansion in the future: assumptions for the productivity in 2000 ("Expansionscenario"), the transport-volume and cost implications. Assumptions with regard to a "2000-growth-scenario". Expansion versus "2000 growth" Profitable public transport seems illusionary.

Hupkes, G *Openbaar Vervoer* Vol. 8 No. 3-4, 19 pp

ACKNOWLEDGMENT: International Union of Railways, BD
PURCHASE FROM: Uitgeverij - Ceres - Meppel, Netherlands Repr. PC

23 129418

DENVER LOOKS TO LRV TO SAVE GAS, TAXES, AMENITIES

In looking at future growth patterns, Denver is planning a multi-modal transit system, with steel-on-steel as the probable mode for trunk routes. This article describes the planning process which has focused attention on light rail. The goal, by the year 2000 is approximately 73 miles of fixed guideways with 44 stations. A map shows the proposed system and table indicates the projected elements of cost.

Ellsworth, KG *Railway Age* Vol. 176 No. 21, Nov. 1975, pp 30-31

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 129419

MARTA GETS MOVING, AT LAST

Construction has started on the Metropolitan Atlanta Rapid Transit system. This article describes the long planning and political processes which preceded the building of the system that is eventually to extend 60.9 miles, cost \$2.1 billion and require more than 330 cars.

Asher, J *Railway Age* Vol. 176 No. 23, Dec. 1975, pp 20-24

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

23 129427

PASSENGER BUSINESS PLANNING OF INTER-CITY SERVICES. 1

When railways had a monopoly of long-distance travel, the concern was production of service, rather than commercial exploitation. Business planning on British Rail has produced a long-term strategy for intercity passenger services. Attention has been given to the period 5 to 15 years ahead where major capital investment would be required. Assessment must face opportunities in the market in face of competing modes. Also traffic generation and transfer from other modes must be understood. While there are irrationalities, it has been possible to develop mathematical models that establish the value of time against advantages such as comfort, safety and reliability. Speed and frequency of service are of greatest significance.

Smith, JG (British Railways Board) *Modern Railways* Vol. 32 No. 326, Nov. 1975, pp 440-42, 5 Fig.

PURCHASE FROM: XUM Repr. PC

DOTL JC

24 091828

ON MODELING THE PROCESS OF INNOVATION IN THE ECONOMY'S PRIVATE SECTOR. VOLUME I

The objective of this study was to generate concepts and hypotheses that could be linked into a model or models of the process of technological innovation. These were based on a study of thirty specific innovation case histories.

Wood, EC

Stanford Research Institute, National Science Foundation, (SRI-2785)
Final Rpt. Mar. 1975, 117 pp

Grant NSF-RDA73-07238

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242471/1ST, DOTL NTIS

24 092147

NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 1. DEMAND ANALYSIS

Engineering, technical and financial studies have been performed: (a) to assist the Federal Railroad Administration in the development of detailed improvement plans, and (b) to provide inputs to the United States Railway Association for the development of the preliminary and final plans. As a basis for developing detailed improvement plans, performing operational simulations, selecting and sizing physical facilities, and estimating costs, estimates are required for future service needs covering all types of rail traffic in the Northeast Corridor, i.e., passenger services-CorridorRail, suburban and inter-corridor; and freight services-intra-corridor, inter-corridor and local. The findings and estimates derived from the demand analysis are given in this report for 1990 high and low potential demand levels.

See also PB-242 444, and PB-243 420.

Gillespie, CW Sultan, S Fondak, G White, D

Bechtel Corporation, Federal Railroad Administration Final Rpt.
FRA/ONECD-75-1, Apr. 1975, 124 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243419/9ST, DOTL NTIS

24 092286

CAPITAL STOCK MEASURES FOR TRANSPORTATION. VOLUME IV. ECONOMIC OR MARKET VALUES

Investment and stocks of plant and equipment are measured for detailed transportation modes. Concepts of depreciation and costs of capital services are discussed. The effect of the interest rate and maintenance and repair costs on depreciation are illustrated. Economic depreciation is calculated and a method for revaluation of stocks is presented. Estimated market values of plant and equipment are given. This volume extends the perpetual inventory measures of transportation stocks presented in Vols. I and II.

See also report dated Aug 73, PB-225 004.

Faucett, JG Terrovitis, T

Faucett (Jack) Associates, Department of Transportation JACK-
FAU-71-04-4, Apr. 1974, 111 pp

Contract DOT-OS-20113

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244065/9ST, DOTL NTIS

24 092294

ANALYSIS AND EVALUATION OF PAST EXPERIENCE IN RATIONALIZING RAILROAD NETWORKS

Railroad network rationalization constitutes a process of adjusting the size and configuration of the railroad plant and its utilization in conformity with current and prospective volumes of traffic to obtain optimum efficiency in costs and levels of service. This report reviews the nature and scope of prior efforts to rationalize rail networks, including the Transportation Act of 1920, the Emergency Transportation Act of 1933, abandonments, mergers, and rail-highway coordination. It has been found that, in most respects,

these prior schemes have either failed entirely or have achieved less than their anticipated success. Numerous opportunities for improving industry performance have been hampered by interfirm rivalries, managerial insensitivity, employee organizations' opposition, and regulatory constraints imposed by statute or by directive. A recognition both of these restraining factors and of the potential benefits should advance the rationalization process in the future.

Sloss, J Humphrey, TJ Krutter, FN

Massachusetts Institute of Technology, Department of Transportation
Final Rpt. MITOR74-54, DOT/TST-75/77, Mar. 1975, 212p

Contract DOT-OS-40002

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-244085/7ST, DOTL NTIS

24 092627

TECHNOLOGY TRANSFER-TRANSPORTATION

The application of aerospace technology to the solution of urban public transportation problems is considered. Data are given on highway and railway systems with particular attention given to safety devices, fuel economy, and measures for profiling railways and highways. The development of streamlined truck bodies, to reduce air drag, and efficient brake systems for light trucks and other vehicles was also dealt with.

Anoyos, T Lizak, R Wilhelm, J Hirschberg, K

Stanford Research Institute Annual Rpt NASA-CR-143040, Sept. 1974,
39 pp

Contract NASW-2455

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
N75-26931/6ST, DOTL NTIS

24 093288

NORTHEAST CORRIDOR HIGH SPEED RAIL PASSENGER SERVICE IMPROVEMENT PROJECT. TASK 4. SCENARIO DEVELOPMENT AND SYSTEM SIMULATION

The report covers, in brief, the preliminary work performed in identification, development, and evaluation of 14 alternative scenarios to handle estimated high potential demand for rail services in the Northeast Corridor in 1990. Additionally, the report outlines the approach and methodology, the assumptions and constraints, and the findings resulting from the LOGSIM simulation of Scenario 13, at the estimated high potential demand for 1990. Changes in track configuration and interline connections for 1990 operations are identified.

See also PB-243 419.

Gillespie, CW Arnlund, R McGinnis, M Buchan, A Clausing, E

Bechtel Incorporated, Federal Railroad Administration Final Rpt.
FRA/ONECD-75/4, June 1975, 324 pp

Contract DOT-FR-40027

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245132/6ST, DOTL NTIS

24 099789

A RAIL INVENTORY OF THE NORTHEAST AND MIDWEST UNITED STATES

Bechtel Incorporated's primary role in the survey of rail facilities under the Regional Rail Reorganization Act of 1973 was that of technical direction contractor. Using input from the United States Railroad Association and five other associate contractors, Bechtel established administrative and procedural guidelines to assure consistency in work performed and to rationalize the data gathered. The result was a quantitative and qualitative inventory and assessment of the rail facilities to determine condition, identify required rehabilitation work and materials and estimate the cost of rehabilitation. In the inventory was trackwork, yards, shops, bridges, tunnels, buildings, terminals, signals, communications, servicing facilities and motive power.

Bechtel Briefs Vol. 30 No. 6, July 1975, 2 pp, 2 Phot.

PURCHASE FROM: Bechtel Corporation P.O. Box 3965, San Francisco, California, 94119 Repr. PC

24 099797

TIE DEMAND NOSEDIVES FOLLOWING LAST YEAR'S SURGE
This report on a meeting sponsored jointly by the Transportation Materials Management Forum and Railway Progress Institute described the upturn of the wooden cross tie market in 1974, then its collapse in 1975 as producers had succeeded in raising production. To assure that needed ties will be produced in coming years, it was agreed that it is necessary to have a stability in tie production. Railroad managements were said to overreact to fluctuations in business at both ends of the business cycle--first ordering more than can be produced or used, and then eliminating virtually all such purchases with a downturn of almost any magnitude.

Railway Age Vol. 176 No. 9, May 1975, pp 34-35

PURCHASE FROM: XUM Repr. PC

DOTL JC

24 099810

MEN ON THE JOB MAKE THE BEST CONSULTANTS

Only recently has British Rail offered its century-and-a-half of experience on a formal consulting contract basis. Recovering costs through its Transmark consultancy organization allows the scale of assistance to be far greater than ever before. Transmark's managing director points out that widening the horizons of senior staff also benefits the administration offering advice.

Smith, KV (Transmark, British Rail) *Railway Gazette International* Vol. 131 No. 7, July 1975, pp 263-266

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

24 099827

TAKING CAR UTILIZATION TO TASK

The industry effort to improve the effectiveness of its car fleet is embodied in the Freight Car Utilization Research Program which is spearheaded by the AAR. This article describes how the program came into existence and details the steps which are now under way. The later phases of the program are also indicated.

Shaffer, FE *Modern Railroads* Vol. 30 No. 7, July 1975, pp 56-58

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

24 099833

BETTER PERFORMANCE TODAY

Despite a downturn in traffic, the potential for improving operating results still exists. Santa Fe's vice president, operations, calls Santa Fe's people crucial in such efforts and says motivation and training are crucial. Computerized monitoring of train performance following a rationalization of freight train schedules was instituted. Close control over switching costs has also been instituted. The railroad has also taken a close look at supervision of its freight offices and yard offices, instituting standardized procedures vital in introducing machine accounting. Training programs for the new approach involve subject matter rather than job functions.

Cena, L (Santa-Fe Railway) *Progressive Railroadng* Vol. 18 No. 7, July 1975, 5 pp, 5 Phot.

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

24 125855

PROPERTY DEVELOPMENT ON BRITISH RAIL

It has been suggested that if only British Rail would regard itself as being in the property business as well as as the transport business, and exploit its many sites accordingly, the now traditional deficits might be transformed into surpluses by a new source of earnings. The writer examines this commonly-held belief, tracing the background to the present policy of development when there is also need to finance new locomotives and the electrification policy, and he argues that the Board would benefit from greater commercial freedom. The paper also describes the joint ventures that

have been undertaken with private developers and identifies some of the major problems in the present depressed property market.

Dashwood, PR *Journal of General Management* Vol. 2 No. 2, Dec. 1975, pp 14-21

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: Mercury House Publications Limited Mercury House, Waterloo Road, London SE1 8UL, England

24 125872

NORTHEAST RAILROAD PROBLEM

This monograph examines the sources of the current problem of the bankrupt railroads of the northeastern United States and derives from this inquiry some indications of the proper policy to be followed. The decline of the railroads is attributed to an inappropriate economic organization and a geographical pattern in which the companies are simultaneously rivals and joint venturers, and an archaic technology of separate cars fitted with a nineteenth-century coupling and braking system. The combination of the two factors produces uncertain arrival times, a high incidence of damage claims, and excessive labor expenses. It is proposed that America's railroads should be reorganized into a competitive industry of four to seven nationwide integrated transportation companies, using containerized technology for general cargo. This proposal is then compared with federal policy under the Regional Rail Reorganization Act of 1973.

Hilton, GW

American Enterprise Inst for Public Policy Res Study 35, July 1975, 59 pp

ACKNOWLEDGMENT: American Enterprise Inst for Public Policy Res

PURCHASE FROM: American Enterprise Inst for Public Policy Res 1150 17th Street, NW, Washington, D.C., 20036 Repr. PC

24 125887

ANALYSIS OF PROBABLE MOTIVATIONAL EFFECTS OF EMPLOYEE STOCK OWNERSHIP PLANS ON RAILWAYS IN REORGANIZATION

This analysis deals only with the motivational aspects of an employee stock ownership plan for Conrail. The advantages of ESOPs are considered, and similar related plans are discussed. Labor relations of the affected railways are studied. Monetary motivation of railway employees is researched. It is concluded that ESOPs would probably be ineffective, and it is recommended that they not be used.

Sponsored by USRA.

Gellerman (S) Consulting Incorporated USRA/R-063, Apr. 1975, 191 pp, 76 Ref.

Contract USRA-C-50098

ACKNOWLEDGMENT: United States Railway Association

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB243-996, DOTL NTIS

24 126447

NEW ENGINEERING SETUP EMPHASIZES DIVISIONAL AUTONOMY

Chessie System has reorganized its maintenance of way organization so that system officers coordinate major maintenance activities, construction projects and rail laying, but regional and division offices have primary responsibility for directing and coordinating field forces and for efficient utilization of available resources. Each division has a staff constituted to make it self-sufficient in initiating and carrying out all construction and maintenance work on the division. Major projects are handled either at system or regional level.

Railway Track and Structures Vol. 71 No. 9, Sept. 1975, pp 28-30

PURCHASE FROM: XUM Repr. PC

DOTL JC

24 127719

TRACKAGE RIGHTS: ADVANTAGES AND DISADVANTAGES

Saving of costs is a basic reason for trackage rights but extension of market areas, better service to an existing market and other reasons must also be considered. A reduction of trackage need not mean a reduction in

competition and efficiency. Trackage rights could help solve a number of industry problems. Shippers benefit from competitive service, railroads benefit from lower costs and the public benefits from a healthy railroad industry.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Overbey, DL
Cross (Richard B) Company Vol. 16 No. 1, 1975, 339-147 pp, Refs.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

24 127720
CAREER DEVELOPMENT OF RAILROAD OPERATING CRAFT EMPLOYEES

This paper investigates the career paths of railroad operating employees (trainmen) from pre-employment to employment, to post-employment (retirement). Its purpose is to determine how a person comes initially to the operating craft; once working, to see how a person's career develops over his period employment (normally more than 30 years); and to consider his retirement. Using a modified version of Schein's career development model, the career of railroad employees is analyzed. A framework is provided within which to analyze forces that are acting to modify and change the current career development procedures.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Potratz, JT (Massachusetts Institute of Technology)
Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 348-358, 5 Tab., 18 Ref.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

24 127726
STRUCTURES TO MANAGE TRANSACTION ORIENTED RAILROADS

Basic railroad organizations deal best with long-haul operations in which transactions are relatively less important than movement. Short-haul railroads tend to be relatively less effective as the volume of transactions and the geographic dispersion increase. The author discusses the departmental and regional concepts of rail management as applied to large short-haul U.S. railroads, noting that merging weak small railroads into large weaker railroads will be ineffective unless management is restructured to deal with the new tasks. The decentralization of management and establishment of local profit centers would produce units of manageable scale and instill an entrepreneurial spirit in managers.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Wyckoff, DD (Harvard Business School)
Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 148-156, 1 Fig., 1 Tab.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

24 127729
THE IMPACT OF TECHNOLOGY ON INTERNAL ORGANIZATION OF THE URBAN PASSENGER TRANSPORTATION ENTERPRISE

This paper introduces methodology, data analysis and results relating to work organization characteristics in three areas--taxicab companies, bus operations and rail rapid transit. Technology as an independent variable is quantitatively scaled according to vehicle loading capacity, service controllability and capital intensiveness. The model proposes two objective measures--Time Span of Discretion (TSD) and Discretionary Resource Rate (DRR) at various hierarchical levels, along with their product--the Position Power (PP). The organizational structures of the various urban transportation enterprises are appraised on this basis.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Wirth, I Crossman, ERFW (California University, Berkeley)
Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 157-164

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

24 127853
25 YEARS OF ACHIEVEMENT IN RESEARCH AND STANDARDISATION

Since the International Union of Railways (UIC) established the Office for Research & Experiments (ORE) at Utrecht in 1950, over 700 technical reports covering more than 140 problems peculiar to railway engineering have been published. In addition, much progress has been made towards establishing technical standards through coordination of research and development work carried out by ORE's member railways. Close collaboration between more than 40 administrations and the joint work of nearly 450 specialists demonstrates the international cooperation among railways and creates conditions for the broadest integration.

Railway Gazette International Vol. 131 No. 9, Sept. 1975, pp 336-339, Photos.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

24 127865
RAIL TERMINALS AND THE URBAN ENVIRONMENT A CASE STUDY

With railroads and cities in perilous condition, the author examines the interface, the rail terminal. It is concluded that railroad officials might start to view terminals and their location with the same philosophy as unprofitable routes. Terminals should be abandoned and relocated if costs outweigh revenues. The results of such studies could serve to enhance the city environment. Elimination of rail facilities may make the city a better place to reside. Environmentalists and the public already look at their center-city rail terminals as a blight which needs to be removed.

Foster, JR Schmidt, MF (Colorado University, Boulder) *Transportation Journal* Vol. 15 No. 1, Sept. 1975, pp 52-61, 1 Fig., 2 Tab.

21-13

PURCHASE FROM: American Society of Traffic and Transportation 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr. PC

DOTL JC

24 128190
EXTENSION OF SHINKANSEN SERVICE TO HAKATA

More than ten years have gone by since the opening of the Shin Kansen between Tokyo and Shin Osaka in October 1964. The safety and comfort of the Shin Kansen are more and more appreciated by the public and the number of users has gone up each year. With the westward extension from Shin Osaka in March 1972 and from Okayama to Hakata in March 1975, the 1069 km from Tokyo to Hakata can now be covered in 6 hours 50 minutes. The construction of the Okayama-Hakata segment was based on the earlier line, expanded with new technologies developed since then and with new concern for the environment. This article describes the new technologies and the environmental protection steps that have been taken.

Ishizawa, M (Japanese National Railways) *Japanese Railway Engineering* Vol. 15 No. 3/4, 1974, pp 4-5, 2 Tab.

PURCHASE FROM: Japan Railway Engineers' Association 2-5-18 Otemachi, Chyoda-ku, Tokyo, Japan Repr. PC

DOTL JC

24 128198
FINANCIAL AND OPERATING STATISTICS, CLASS 1 RAILROADS FOR 12 MONTHS ENDED DECEMBER 31, 1973
No Abstract.

Interstate Commerce Commission 1974, 19 pp

ACKNOWLEDGMENT: Monthly Catalog US Government Publications
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

24 128636

THE U.S. RAILROAD INDUSTRY IN THE POST-WORLD WAR II PERIOD: A PROFILE

Railroading has been a troubled industry for half a century. The troubles have approached the crisis stage once again during the past few years. Much of the railroad system in the industrial heartland of the nation-east of Chicago and north of the Potomac and Ohio rivers-is in bankruptcy. These bankruptcies, furthermore, are not yielding to the traditional solution of financial reorganizations. The rate of return on the investment of Class 1 railroads even in the "prosperous" south and west has averaged only about 3.6 percent per year during the past six years. The recent surge in railroad traffic, causing ton-miles to attain all-time peaks, has not generated a corresponding improvement in profits, thus causing railroad managements and analysts to speak of their "profitless boom". This gives rise to fears that another economic recession may send more railroads into bankruptcy. The origins of the railroad problem reside in the simple fact that the economy is expanding in areas that do not typically produce much new traffic of a type suited to conventional rail transport. Competition from trucking, other specialized modes of transport, and transport alternatives (such as high voltage transmission of electricity, synthetic materials, and recycling of waste materials) are further circumscribing the demand for rail freight service. The railroads have also suffered productivity problems, caused in part by these shifts in the freight market. Employment in the industry has declined by nearly two thirds during the postwar period, enabling the industry to record gains in labor productivity as great or greater than the average for private industry. However, to achieve this reduction in labor inputs, the industry has to maintain or slightly increase its employment of capital; as a result, railroad capital productivity, the ratio of output to capital inputs, has shown no growth or has even declined slightly. Total or multiple factor productivity measures that combine labor and capital inputs suggest that railroads' overall productivity gains have been no higher and perhaps lower than the average for private industry.

Meyer, JR Morton, AL *Explorations in Economic Research* Vol. 2 No. 4, Sept. 1975, pp 449-501

ACKNOWLEDGMENT: Explorations in Economic Research
PURCHASE FROM: National Bureau of Economic Research, Incorporated 261 Madison Avenue, New York, New York, 10016 Repr. PC

DOTL JC

24 128844

COAL, CASH, COSTS AND CREDIBILITY

Norfolk and Western Railway has been selected as Modern Railroad's Railroad of the year. The railroad's success is due largely to its constant awareness of costs and their relation to profit. Its major profit source is coal, and Norfolk and Western is not interested in diversification. Major projects are the modernization of computer and communication systems.

Roberts, R *Modern Railroads* Vol. 30 No. 8, Aug. 1975, pp 53-57, 2 Fig., 5 Phot.

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

24 128846

COMPUTERS AND WHERE THE CARS ARE

Norfolk and Western Railway's computer system is devoted primarily to the collection and distribution of real-time data for control of equipment and train operations; information is inputted daily from yards, traffic offices, car distribution offices and material management offices. Car moves are monitored daily, resulting in improved car utilization. New programs are being developed to improve service, particularly a system to provide car supply and demand information. The computer is used also for management activities. Performance is monitored and departments must prove that the expected benefits from a computer project have been realized.

Roberts, R *Modern Railroads* Vol. 30 No. 8, Aug. 1975, pp 58-60, 3 Phot.

156

ACKNOWLEDGMENT: CNR
PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

24 128870

PLANNING FOR MAINTENANCE WORKFORCE REDUCTIONS

Using workload analysis and productivity levels, the author demonstrates a case approach to reduction in force of a plant's maintenance staff. By breaking down a work group's day, a plant engineer can easily determine the percent of time devoted to productive work as opposed to task travel and idleness.

Tomlingson, PD *Plant Engineering* Vol. 29 No. 15, July 1975, pp 67-68

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

DOTL JC

24 128995

AN ESTIMATE OF LABOR PROTECTION COST IN SELECTED RAILWAY CONSOLIDATIONS

This paper examines legal developments in labor protection agreements and estimates the costs of these agreements in selected railroad mergers. Costs are considerably higher when substantial duplicate facilities are to be consolidated. Costs are significantly affected by changes in output following a merger; when economic activity is increasing protection costs are mitigated. If post-merger traffic declines, there were no significant increases in efficiency after the protective period expired. From a public policy stand-point the carriers in regions where excess capacity is most prevalent cannot bear the costs of labor protection. Government should consider eliminating the protection provisions or underwriting a portion of the costs of diminish the possibility of bankruptcies.

Davis, GM Sherwood, CS Jones, RW *ICC Practitioners' Journal* Vol. 43 No. 1, Nov. 1975, pp 56-71

PURCHASE FROM: Association of Interstate Commerce Comm Pract 1112 ICC Building, Washington, D.C., 20423 Repr. PC

DOTL JC

24 129161

ITALIAN STATE RAILWAYS TODAY. 1.

After discussing commercial factors, the author goes onto FS's traction policy and capital investment, and plans to increase route capacity.

Kalla-Bishop, PM *Modern Railways* Vol. 32 No. 327, Dec. 1975, 6 pp, 1 Fig., 10 Phot.

ACKNOWLEDGMENT: UIC
PURCHASE FROM: XUM Repr. PC

DOTL JC

24 129255

RAILROAD RESEARCH STUDY BACKGROUND PAPERS

This publication presents all of the papers presented at the Railroad Research Study. The papers cover a range of subjects in the areas of the national economy for the next 15 years, railroad marketing, railroad economics, information systems and data, railroad management, railroad labor relations and employee training, railroad facilities, railroad equipment, and railroad operations.

These papers were presented at the Railroad Research Study held June 30-July 25, 1975, Woods Hole, Massachusetts. The study was conducted by the Transportation Research Board of The National Research Council under the sponsorship of AAR and FRA, DOT.

Transportation Research Board July 1975, 532 pp, Figs., Tabs.

PURCHASE FROM: Cross (Richard B) Company P.O. Box 405, Oxford, Indiana, 47971 Repr. PC

DOTL RP

24 129259

FREIGHT CAR CLEARINGHOUSE EXPERIMENT: AN INTERIM EVALUATION

The Clearinghouse Experiment was established to determine if the elimination of Car Service Rules 1 and 2 will result in an improvement in freight

car utilization through the reduction of empty cross haul between the participating railroads. Three railroads-Southern, Missouri Pacific and Milwaukee Road-formed a clearinghouse which, in effect, established a pool of their general service cars. The experiment began on September 14, 1974 when the ICC granted a temporary exemption from Car Service Rules 1 and 2 which allowed these roads to use each others cars as though they were their own. The clearinghouse Experiment is still in effect. This interim report provides a quantitative measurement of the impact of the experiment during the first two months of operation. The before-and-after evaluation indicated the experiment resulted in dramatic improvements in car utilization without disrupting the car supplies on the participating roads. However, additional incentives for reloading foreign cars are needed to exploit the full potential of the clearinghouse concept, especially during periods of car surplus.

Requests should be directed to G.M. Leilich, Director, Freight Car Utilization-Demonstration Program, AAR.

Dingle, AD

Association of American Railroads Intrm Rpt. Aug. 1975, 62 pp

ACKNOWLEDGMENT: AAR

PURCHASE FROM: AAR Repr. PC

DOTL RP

24 129290

INTEGRATED LONG-TERM FORECASTING WITH REGARD TO THE FREIGHT AND PASSENGER TRAFFIC DEMAND IN THE GFR ON THE 1990 HORIZON [Integrierte Langfristprognose fuer die Verkehrsnachfrage im Gueter-und Personenverkehr in der Bundesrepublik Deutschland bis zum Jahre 1990]

This concerns a study requested by the German Federal Transport Ministry, and involves the projection of guiding socio-economic data relating to freight traffic (151 p. 54 tables and 71 statistical lists). The authors have endeavoured to prepare a long-term forecast of freight freight traffic in connection with infrastructure planning in the GFR. [German]

Internationales Verkehrswesen Vol. 27 No. 4, July 1975, pp 149-153

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Dr Arthur Tetzlaff Verlag Niddastrasse 64, Frankfurt Am Main, West Germany Repr. PC

24 129321

THE STATE OF THE INDUSTRY

Twelve part feature reviews developments during 1975 in the U.S. rail industry and takes a brief look at the future. Areas covered include: (1) financial; (2) labor; (3) marketing; (4) legislation; (5) ConRail; (6) equipment; (7) flatback; (8) operations; (9) maintenance of way; (10) computer; (11) signal and communications; (12) transit.

Shedd, T *Modern Railroads* Vol. 30 No. 12, Dec. 1975, pp 67-98, 2 Fig., 13 Tab., 22 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

24 129325

RAILROADERS PROBE THE NEXT 10 YEARS

Theme of the 21st International Railway Congress jointly sponsored by the International Railway Congress Association (IRCA) and the International Union of Railways (IUC) was to present information on outlook for the next ten years to improve the competitive position of the railroads. No overwhelming revolutionary force could be identified for the railroads' future, but advances were evident in many areas-the development of higher speeds, concern over track condition, advanced equipment design, and higher capacity electrification. Other areas under consideration were information systems, marketing research, pricing strategies, planning, and environmental problems.

Progressive Railroading Vol. 18 No. 12, Dec. 1975, pp 24-30, 10 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Murphy-Richter Publishing Company 9 South Clinton Street, Chicago, Illinois, 60606 Repr. PC

DOTL JC

25 072121

TRANSPORTATION WHITE PAPER, JFY 1974

The White Paper Report (a frank report) 1973-1974, with its numerous charts, figures, and tables, presents a detail summary, analysis, and forecast of Japanese transportation by land, sea and air. Following the prosperity of previous years the profit margin for Japanese transportation systems continued to increase for the most part of 1973. The oil embargo, which started the upward spiral of fuel, wages and material costs, trimmed the profit margin of most transportation systems considerably, and plunged international import and export transportation into red. Aside from the newly emerged energy crisis and rising inflation Japanese transportation has basic problems it must combat. On land the ever present problem of rising over-congestion makes reorganization in public transportation, traffic patterns, and new safety regulations top priorities. If Japanese transportation moves toward mass transportation, which seems to be the only solution to ease the traffic and raise the efficiency of land transportation, then effective safety measures must be introduced. Standardization of vehicle models, check-up pass and package, easily available check-up stations, modernization of rail and train equipments are offered as possible methods to promote safety on land. At sea the increased number of small motored boats and yachts is a big problem in the harbor area, and is responsible for most of the sea accidents. New regulations are made for the harbor area and registration of all classes of ships. Two basic problems plagued the Japanese aviation system: lack of expansion possibility and noise pollution. A five year plan to reorganize the airports is underway. Control of pollution resulting from vehicles, ships, and planes remains an urgent problem. Strict enforcement of existing pollution control regulations can check some of the problems. The last two segments of the report deal with tourism and weather. [Japanese]

Ministry of Transportation 1974, 460 pp, Figs., Tabs., Photos.

ACKNOWLEDGMENT: TSC

PURCHASE FROM: Ministry of Transportation Tokyo, Japan Repr. PC
DOTL HE277.A52

25 072130

CORRIDOR REPORT: STUDY OF TRANSPORTATION INVESTMENTS IN SELECTED CORRIDORS OF THE FEDERAL REPUBLIC OF GERMANY. PART I AND II [Korridorbericht: Untersuchung ueber Verkehrswegeinvestitionen in ausgewaehlten Korridoren der Bundesrepublik Deutschland]

A special research team studied the efficiency of transportation investments in three so-called transportation corridors. The projects concerned the corridors: Cologne-Frankfurt, Mannheim-Stuttgart, Hannover-Gemunden (-Wurzburg). The projects investigated are indirectly influencing transportation by air and by pipeline. This research undertakes for the first time a study of the cost and benefits of investments in different types of transportation, versus only one type of transportation. The methods for evaluating the investments are described. Traffic analyses and traffic projections for 1985 are given for goods movement, automobile and rail. The competitive relationships between different types of transportation in the corridors are analyzed. Transportation on the Rhine river is especially studied and projections are made. The effect of a super rail system on the corridors is considered. Cost analyses are given for construction, maintenance and repair of the planned investment programs. Benefit analyses of the programs are made. Finally the results of the research project are described. Cost-benefit-relations are given. Monetary and non-monetary (environmental, urban planning etc.) components are ranked separately and then both types of components are considered for the final ranking of the transportation investments according to priority. 42 tables in the report and 71 in the appendix illustrate the study.

Ministry of Transport, West Germany No. 47, June 1974, 198 pp, Figs., Tabs., 31 Ref.

ACKNOWLEDGMENT: TSC

PURCHASE FROM: Ministry of Transport, West Germany Bonn, West Germany Repr. PC

DOTL HE64.A36N47

25 092214

TODAY'S R AND D BUILDING A BASE FOR BETTER TRANSPORTATION

The report presents a concept of a strategic R and D plan for the Department of Transportation. It also presents the concept of a core program of R and

D and sets forth the DOT core program in its present stage of development. The plan shows the relationship within the DOT between socio-economic R and D and R and D in the areas of engineering and in the physical, technical, and life sciences, and presents scenarios for the time frame circa 2000 A.D. for transportation systems for urban passenger, intercity passenger, and freight. Against this background, ongoing R and D programs are described as practical examples of the foregoing conceptual structure. The strategic R and D plan is presented as one with the flexibility to be changed with changing socio-economic patterns, political situations, and break-throughs in the fields of science and engineering.

Virginia Research, Incorporated, Department of Transportation Final Rpt.
DOT/TST-75/111, Apr. 1975, 46 pp

Contract DOT-OS-53101

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243667/3ST, DOTL NTIS

25 092281

ANALYSIS OF FISCAL YEAR 1976 DOT R/D PROGRAM BY R/D MANAGEMENT OBJECTIVES

The document presents a summary of the Department of Transportation's (DOT) total Research and Development (R and D) Program for the fiscal years 1974, 1975 and 1976. Also included are the funding requirements for the transition period between fiscal years 1976 and 1977 resulting from the Congressional Budget and Impoundment Control Act of 1974. The R and D Management objectives are: Modernize regulation/legislation; increase efficiency and service; improve safety and security; lessen unfavorable environmental impacts; minimize adverse impacts of energy constraints; and increase the knowledge base. The objectives of the document is to facilitate communication between the various elements of DOT and the other sectors of transportation, both public and private, so as to maximize the benefits to the nation from the investments being made in transportation research.

Department of Transportation Mgmt. Rpt. DOT/TST-75/107,
TRAIS-B76, June 1975, 205p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243700/2ST, DOTL NTIS

25 092760

ECONOMIC REGULATION AND TECHNOLOGICAL INNOVATION: A CROSS-NATIONAL LITERATURE SURVEY AND ANALYSIS. VOLUME 2, PART 2

Part 2 of a two-part report continues the literature review of relationships between economic regulation of industry and technological innovation in three regulated industries in six industrialized nations.

See also Volume 2, Part 1, PB-243 314.

Gellman Research Associates, Incorporated, National Science
Foundation, (NSF/RDA73-3-2Vol2pt2) Final Rpt. Jan. 1974, 678p

Grant NSF-DA-39394

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243315/9ST, DOTL NTIS

25 092761

ECONOMIC REGULATION AND TECHNOLOGICAL INNOVATION: A CROSS-NATIONAL LITERATURE SURVEY AND ANALYSIS. VOLUME 2, PART 1

The objective of this two-part study was to survey and analyze the literature concerning the relationship between economic regulation and technological innovation in three regulated industries that has been published since World War 2 in six industrialized nations. Countries surveyed were the United States, Canada, Great Britain, France, West Germany, and Japan; industries specifically considered were transportation, communications, and the energy utilities. Volume 2 includes a set of abstracts covering the 345 items which considered to any significant degree the relationship between economic regulation and technological innovation, and 793 negative information reports. Part 1 contains the first half of the review.

See also Volume 2, Part 2, PB-243 315 and PB-233 085.

Gellman Research Associates, Incorporated, National Science Foundation
Final Rpt., -pt-1 NSF/RDA-73-3-2-Vol-2, Jan. 1974, 1097 pp

Grant NSF-DA-39394

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243314/2ST, DOTL NTIS

25 092762

**CASE STUDIES ON THE PROCESS OF TECHNOLOGICAL
INNOVATIONS IN THE ECONOMY'S PRIVATE SECTOR.
VOLUME II**

This set of 30 capsule case histories was prepared as part of a project to study the process of innovation in the private sector of the economy. The purpose is to aid in formulating hypotheses that can be linked into a model or models of the innovation process. Such models are a necessity for understanding the effects of government policy on the rate and direction of innovation.

See also Volume 1, PB-242 471, RRIS 24 091828.

Wood, EC

Stanford Research Institute, National Science Foundation, (SRI-2785)
Final Rpt. Mar. 1975, 142p

Grant RDA73-07238

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-243243, DOTL NTIS

25 092811

**BENEFITS TO THE FEDERAL GOVERNMENT FROM THE
ADOPTED REGIONAL METRO SYSTEM. TECHNICAL
APPENDIX**

This report is one of several which assessed the costs and benefits associated with the construction of a rapid rail system for the National Capital Region. The report examined both the direct and indirect benefits to the federal government of the Metro rapid rail system. The study concludes that the federal government will receive 94 cents in direct benefits for every \$1 it contributes toward financing the Adopted Regional System (ARS). Some of the direct benefits which contribute to these figures and which are discussed in the report include employee parking, conservation of land, interoffice communication, and a reduction in employee tardiness. Other factors which were considered in the analysis but were not so easily quantified included savings to individual federal employees, the development of tourism, improving the environment of the nation's capital, making for a more efficiently-operating region, and contributing to the development of the national capital region as a showcase for both the nation and the world.

Prepared by Development Research Associates, Washington, D.C.

Washington Metropolitan Area Transit Commission, Development
Research Associates WMATA-75/23, Oct. 1968, 51p

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-242839/9ST, DOTL NTIS

25 093012

**GUIDEBOOK FOR PRELIMINARY ASSESSMENT OF URBAN
RAILROAD PROBLEMS**

The report is the second of four volumes and prepares a methodology for performing future railroad relocation studies. The purposes of Volume 2 are to acquaint community leaders with the problems and opportunities that are presented by planning for railroad relocation, and to enable local government personnel, with assistance from railroad company and highway department sources, to prepare a preliminary estimate of the feasibility for improving a local railroad system--including rough costs, economic consequences, and other community impacts, using minimum resource outlay. Charts, tables, and worksheets aid in estimating costs and impacts of alternative approaches to improving the local railroad system. Volume 1 is an executive summary; Volume 3 is a guidebook for community policymakers and technical specialists for conducting detailed relocation planning projects; and Volume 4 presents a nationwide estimate of the nature and magnitude of urban railroad problems.

Prepared in cooperation with TOPS On-Line Service, Inc., San Francisco, Calif., and Kaiser Engineers, Inc., Oakland, Calif.

Moon, AE

Stanford Research Institute, Federal Railroad Administration, Federal
Highway Administration, Tops-On-Line Service, Incorporated, Kaiser
Engineers Final Rpt. FRA/RP-31-Vol-2, Apr. 1975, 79 pp

Contract DOT-FR-20037

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-245063/3ST, DOTL NTIS

25 099784

**RESEARCH ON GROUND PROPULSION SYSTEMS:
HEARINGS...**

Hearings on a bill to permit the unique scientific and engineering competence of NASA to be applied more fully to research and development activities designed to improve the efficiency, economy, performance, and clean emission characteristics of existing ground propulsion systems, as well as to explore the feasibility of various alternative engines that promise to be superior in all these respects to those in use today," featured as witnesses representatives from NASA; the Department of Transportation; the Environment Protection Agency; the U. S. Army Tank Automotive Command; and Steam Power Systems, Inc. of San Diego. There are many photographs, figures and tables accompanying the text of these hearings.

Government Printing Office 1974, 137 pp

ACKNOWLEDGMENT: High Speed Ground Transportation Journal

PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

25 099793

RAIL FREIGHT AND PASSENGER SERVICE

This report presents the findings of the Rail Freight and Passenger Services study which was undertaken as part of the Trans-Newfoundland Corridor Transportation Study. Since the existing narrow-gauge railroad system is essentially a freight-oriented operation, the investigations were directed at freight-train operations and various rail freight services. Various levels of possible new rail passenger services from the point of view of operational feasibility, capital outlays and operation costs were also considered.

Peat, Marwick, Mitchell and Company Vol. D Mar. 1974, Figs., Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission

PURCHASE FROM: Canadian Transport Commission Systems Analysis
Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Repr. PC
DOTL RP

25 099794

**FREIGHT TRANSPORTATION. DEMAND CHARACTERISTICS
AND USER OPINION**

Kates, Peat, Marwick and Associates, in association with consultants specializing in highway engineering, railway engineering, railway operations and inter-city bus operations were engaged by the Canadian Transport Commission to examine transportation services and recommend improvements for a corridor that roughly parallels the Trans-Canada Highway in Newfoundland. The consultant's final report is contained in ten volumes and the main conclusions and recommendations are presented in a Summary document.

Kates, Peat, Marwick and Company Vol. G Mar. 1974, Figs., Tabs., 6
App.

ACKNOWLEDGMENT: Canadian Transport Commission

PURCHASE FROM: Canadian Transport Commission Systems Analysis
Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Repr. PC
DOTL RP

25 099818

**DEVELOPMENT OF INTERNATIONAL TRAFFIC BY RAIL
BETWEEN ITALY AND THE OTHER EUROPEAN COUNTRIES
IN THE NEXT TEN YEARS, AND NEW SYSTEMS TO BE
INTRODUCED TO MEET THIS DEVELOPMENT**

The fact of having rediscovered the train as a reliable, economic and less polluting expedient (which has tended to make itself felt for some years as a result of road traffic congestion), also the immediate awareness of the seriousness of the situation, have accelerated approval of the programme of

exceptional measures concerning the modernisation and increase in capacity of the FS network. This activity and programming at national level has now been repeated at international level, the purpose of which, in line with the definition of the "European master plan", is to set up a basic European network capable of providing competitive international links from the point of view of quality and quantity. If their fulfilment takes place within the time limits laid down, all these measures and programmes should be able to satisfy the traffic requirements in the near future in a rational and uniform manner, and thus encourage a balanced development in the European countries from the economic and social points of view, by giving a fresh impetus to the process of integration followed for more than ten years.

Cirillo, B *Rail International* No. 6, June 1975, pp 455-473, 12 Fig., 8 Ref.

ACKNOWLEDGMENT: Rail International
PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

25 099840

DEPARTMENTAL ACTION PLAN AND REPORT TO THE SECRETARY

This report on urban goods movement contains two main sections (1) a "Departmental Action Plan" and (2) a "Report to the Secretary," which were prepared by the Urban Goods Movement Task Force established in 1972. The "Department Action Plan" has been approved by the Secretary and is intended to deal with the organizational and structural aspects of the Department's role in urban goods movement. It addresses the questions of decentralization, intergovernmental and interagency relations, and the broad responsibility for initiative and oversight to insure continued momentum and coordination in urban goods movement activities at all levels. The "Report to the Secretary" is intended to provide an overview of urban goods movement, the associated problems, and related Department of Transportation activities.

Department of Transportation June 1973, 22 pp, 1 Tab., 1 App.

ACKNOWLEDGMENT: DOT
PURCHASE FROM: DOT Repr. PC

DOTL HE199.U7U65

25 099843

GOODS TRANSPORTATION IN URBAN AREAS

A five-day conference to explore issues in urban goods movement was organized by representatives of the American Society of Civil Engineers, Highway Research Board, Institute of Traffic Engineers, and the U.S. Department of Transportation. Five areas were studied and reported by Probe Groups, namely (1) urban goods movement considerations in urban transportation planning, (2) use of local regulatory and police power in facilitating goods movements, (3) freight terminal relocation, (4) issues in urban rail relocation, and (5) consolidation of pickup and delivery services. Each Probe Group report presents recommendations for action to improve urban goods movement. Eleven keynote, summary, and resource papers are presented covering such topics as Federal, State, and local programs for goods movement facilitation; terminal location and consolidation; improvement of intermodal transfer; regulation; and energy requirements for trucking. Five case studies describe ongoing regional programs in Dallas-Fort Worth, St. Louis, New England (Boston and Maine Railroad regional impact), northern New Jersey, and the New York City Garment Center.

Proceedings of the Engineering Foundation Conference, Academy, So. Berwick, Me., August 5-10, 1973. Sponsored by the Department of Transportation Federal Highway Administration.

Engineering Foundation Conferences Final Rpt. FHWA32-01-23(RFP379), Feb. 1974, 415 pp, Figs., Tabs., 6 Ref., 4 App.

ACKNOWLEDGMENT: Federal Highway Administration
PURCHASE FROM: NTIS Repr. PC

DOTL NTIS

25 099871

TRANS-NEWFOUNDLAND CORRIDOR TRANSPORTATION STUDY

Studies were made of virtually every phase of transportation in Newfoundland. Included is Rail Freight and Passenger Services (RRIS 25 09979). Concluding that there are transportation system shortcomings, it is

recommended that improvements in passenger and freight transportation and facilities be considered in terms of a low-investment alternative and a higher investment which would appear to be economically justifiable. The Canadian National Railways' rail freight operation would not need major investment in either case.

Kates, Peat, Marwick and Company Mar. 1974, 75 pp, Figs., Tabs.

ACKNOWLEDGMENT: Canadian Transport Commission
PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa, Ontario K1A 0N9, Canada Repr. PC
DOTL RP

25 125631

THE IMPROVEMENT OF PUBLIC TRANSPORT

The author reviews the roles of public and private transport: it is noted that few people now believe the car is the solution to all transport problems. This is due to American experience and the warnings of documents such as the Buchanan report. A description of the general decline in public transport is followed by an analysis of the relative investment in the two types of transport, indicating a far greater emphasis on private transport. The financing system is discussed and it is concluded that the separate financing of individual projects favours road transport and considerably distorts real costs and benefits. It is argued that effective control of all parking is needed to limit car usage. The construction of trans-shipment centres and the provision of good rail access are examined as means of alleviating freight transport problems. The author presents a number of policy conclusions which include the need for overall planning of the transport system, an integrated financing system, parking controls and more encouragement for rail freight. /TRRL/

Millar, J (Greater Manchester Council, England) *Planner* Vol. 60 July 1974, pp 809-811

ACKNOWLEDGMENT: Transport and Road Research Laboratory (IRRD 213155)

PURCHASE FROM: Royal Town Planning Institute 26 Portland Place, London W1N 4BE, England Repr. PC

25 125831

HIGHLIGHTS OF UMTA'S RAIL PROGRAM

This paper highlights the role of the rail research programs of the Urban Mass Transportation Administration (UMTA). Included are descriptions of several recently developed computer transit cars--the state-of-the-Art Car, The Advanced Concept Train and dual-powered, gas turbine/electric cars. Also discussed are efforts by UMTA in developing test facilities for urban rail vehicles and in furthering research in tunneling technology and noise abatement.

Prepared for meeting 24-28 February 1975.

Silien, JS (Department of Transportation)
Society of Automotive Engineers Preprint 750441, Feb. 1975, 4 pp

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

25 125833

MASS TRANSPORTATION: A NATIONAL COMMITMENT

This paper emphasized the need for a national commitment to public transportation and the need for legislative action to provide stable long-term funding. It is estimated that a \$77 billion commitment could provide the systems and rolling stock for public transit to attract upwards of 38 billion trips by 1990. The three basic modes of ground transportation--rail transit, bus, and automated personal rapid transit--are discussed and their relative role and funding needs advanced.

Prepared for meeting 24-28 February 1975.

Lancaster, TA (Rohr Industries, Incorporated); Hearn, DL
Society of Automotive Engineers Preprint 750443, Feb. 1975, 6 pp

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

25 125834

URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM PROGRESS

This paper describes the content, objectives, and status of the U.S. Dept. of Transportation's Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program (URRVS).

Prepared for meeting 24-28 February 1975.

Hervey, DE (Boeing Vertol Company)

Society of Automotive Engineers Preprint 750444, Feb. 1975, 16 pp

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

25 125873

STEPS TOWARD IMPROVING FREIGHT CAR UTILIZATION

This commentary reviews the several actions taken by the Commission to improve freight car utilization, the corresponding responsibilities of the carriers and shippers, and the importance of tariff observation in obtaining that goal. A car ownership formula and incentive per diem charges, are essentially long range steps. In addition, the Commission has supported legislation which would assist the railroads in acquiring freight cars in those circumstances where their financial resources are severely strained. Drastic techniques may be utilized by the carriers and the Commission to provide an equitable distribution of the available car supply, to prevent unnecessary delays in the movement of cars, and to attach penalties, where necessary. The shipper or receiver can best participate in improving car utilization by ordering cars at the appropriate time in sufficient numbers to meet its needs. Undue detention of freight cars by shippers should, as a matter of good shipping practices, be avoided.

Murphy, RL *Transportation Law Journal* Vol. 6 No. 2, July 1974, pp 85-93

ACKNOWLEDGMENT: Transportation Law Journal

PURCHASE FROM: Osgoode Hall Law School of York University 4700 Keele Street, Downsview 463, Ontario, Canada Repr. PC

DOTL JC

25 125876

THE IMPORTANT ROLE OF RATE BUREAUS IN TRANSPORTATION

This first installment of a two-part series discusses the history, scope and function of rate bureaus in establishing prices, rules and general procedures in the regulated segment of the domestic transportation industry. The author sees the drive for drastic curtailing of rate bureau activities as based on a real misunderstanding of the function. He concludes that such bureaus provide essential administrative procedures that appear to be equitable to shippers and carriers in addition to assisting the ICC in its administration of the Interstate Commerce Act.

Davis, GM (Arkansas University, Fayetteville) *Traffic World* Vol. 163 No. 7, Aug. 1975, 2 pp

PURCHASE FROM: Traffic Service Corporation 815 Washington Building, Washington, D.C., 20005 Repr. PC

DOTL JC

25 126445

BLUEPRINT FOR TRACK REHABILITATION?

The Iowa Department of Transportation has been authorized by the legislature, concerned about track conditions in the state, to take several steps. A program of rehabilitation of branch lines has seen work started on ten segments involving expenditure of \$8.7 million. Condition of all trackage in the state is to be monitored annually by a new track-measuring car. Development of a numerical "sufficiency rating" for all trackage in the state will rate ability of the lines to perform in accordance with accepted standards. Steps will be taken to assure sufficient supplies of materials and machines and enough manpower to meet any crash program of railroad rehabilitation which might be initiated at the federal level. So far state, local and railroad funding is involved.

Railway Track and Structures Vol. 71 No. 9, Sept. 1975, pp 14-17, 1 Tab., 2 Phot.

PURCHASE FROM: XUM Repr. PC

DOTL JC

25 126452

HIGH-SPEED GROUND TRANSPORT--A GERMAN CONTRIBUTION TO THE DEBATE

Cancellation of the British, French and German advanced concepts in very high speed land transport are examined in the light of exhaustive studies carried out in West Germany which favor conventional technology because speeds of 300 km/h can meet competition from the air. With further advances in forms of suspension other than wheel/rail, the question of need for further research needs to be examined.

Barwell, FT *Rail Engineering International* Vol. 5 No. 4, June 1975, pp 141-143, 6 Fig.

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

25 126456

THE ECONOMIC BASIS FOR TRANSPORT SUBSIDIES

This report is concerned with the conceptual basis for transport subsidies in the current Canadian context. Examination of the circumstances under which transport subsidies may be economically justified is done in terms of increasing returns to scale, counteracting imperfections in the market place, the social benefits of transport and the use of transport subsidies to promote regional development.

Heads, J

Canadian Transport Commission ESAB 75-4, Apr. 1975, 50 pp, 4 Fig., 25 Ref.

PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A 0N9, Ontario, Canada Repr. PC
DOTL RP

25 126516

REVISION TO ALTERNATIVE ENVIRONMENTS FOR CANADIAN TRANSPORTATION 1980-2000

This report represents the initial futures research work undertaken by TDA. It has attempted to establish a suitable approach for studying long-range planning and used this to explore the key aspects of some future environments in which Canadian transportation may operate. Two principles have been established: No single aspect of the future can be studied in isolation; and the future must be studied as a range of likely alternatives. The sections of the study: Introduction; Contemporary Expectations About the Future; Scenarios of the Early 1990's; Building Blocks for Scenario Construction; Final Comments; Appendices.

Exploratory Forecasting Report No. 1.

Ministry of Transport, Canada Sept. 1974, 185 pp, 15 Fig., 18 Tab.

PURCHASE FROM: Ministry of Transport, Canada 2085 Union, 8th Floor, Montreal, Quebec, Canada Orig. PC

DOTL RP

25 127011

ECONOMIC CRITERIA FOR MAINTAINING MODIFYING OR CREATING URBAN OR SUBURBAN PUBLIC TRANSIT SYSTEMS [Criteres economiques pour le maintien la modification ou la creation de services de transports publics urbains ou suburbains]

Professor Beeseley, of the London Graduate School of Business Studies, author of the report, presents the latter as a sequel to his communication, under a similar title, to the 4th ECMT Symposium held at the Hague in 1971. This 1st study showed more particularly how public-transport subsidies alleviated certain social costs such as those occasioned by traffic congestion, and contributed to a redistribution of incomes in favour of lower-income groups. In his report, the author reviews and comments on a whole range of studies covering: the effects of subsidies on various aspects of urban life and development; the flexibility of public-transport services, in terms of fares, frequency, and efficiency; their flexibility set against the private car; what he calls their "operational role" and the possibility of taking the value of this "role" into consideration. The exchanges of views are a critical survey: of the justification given for the subsidies, of their sometimes unexpected effects; of the alternatives to subsidies; of the conditions for the subsidies to be efficient; of the pattern to be given them: equipment, operating, inclusive or special-purpose subsidies; finally, of the role of the controlling authorities these subsidies imply. In conclusion, the Round Table stresses the need for studying the problem in the general framework of transport as a whole and of the conditions of town life. [French]

Report on the 24th Round Table on Transport Economy held in Paris on 22-23 November 1973, and subsequent exchange of views.

European Conference of Ministers of Transport No. 24, 1974, 82 pp

ACKNOWLEDGMENT: International Railway Documentation, Selection of PURCHASE FROM: International Union of Railways, BD 14 rue Jean Rey, 75015 Paris, France Repr. PC, OECD Publications Center 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006 Repr. PC
UIC cat. No. 01N106

25 127012

REFLECTIONS ON A METHOD OF APPROACH FOR THE DEFINITION OF AN INTER-CITY FREIGHT TRANSPORT POLICY [Reflexions pour une methode d'approche relative a la definition d'une politique de transport interurbain de marchandises]

The writer, Director of Transport at the French Ministry of Transport, first reviews the many different factors involved in the development of the transport system. He then considers how a long-term policy can be determined on the basis of these contradictory and problematical factors, and proposes a method of "scenarios", based on different objectives and transport methods. From a clear and precise definition of objectives, the constraints in the development of the system must be determined, and for each policy imagined, the difficulties and bottlenecks that may arise. A study made by the Transport Research Institute, based on the 176 positions of the Transport Nomenclature, defined about 15 variables attached to each of these positions. An iterative process identified about ten well-defined groups, each corresponding to a partial market, for which rival transport modes were in competition. Other studies have determined the range of growth in costs by 1980. The object of the "scenario" method is not to define a policy, but to explore the range of possibility, and to detect the dangerous areas. [French]

Proceedings of the International Conference on Transportation Research, Bruges, Belgium, June 1973.

Dobias, G

International Conference on Transport Research Proceeding June 1973, pp 904-906

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

25 127380

RAILROAD REORGANIZATION AND FEDERAL AID: THE CONRAIL PROPOSALS

This Issue Brief discusses the seven bankrupt railroads in the Northeast and Midwest subject to reorganization under the Regional Rail Reorganization Act of 1973. With estimated Federal costs of \$5 to \$18 billion over a 10-year period, Congress must also decide whether, to what extent, and in what ways there will be future Federal financial participation in the U.S. Railroad industry. This paper has the following sections: Issue Definition; Background and Policy Analysis; Legislation; Hearings; Reports and Congressional Documents; Other Congressional Action; Chronology of Events; Additional Reference Sources.

Cole, LM

Library of Congress IE75073, Sept. 1975, 21 pp

PURCHASE FROM: Library of Congress Congressional Research Service, Washington, D.C., 20540 Repr. PC

DOTL RP

25 127392

PERSPECTIVES ON FEDERAL TRANSPORTATION POLICY

This is the proceedings of a two-day conference in Washington in February 1974. Economists have been increasingly critical of the effects of government regulation on the nation's transportation system. Transportation specialists still maintain that some governmental regulation is necessary if the public interest is to be safeguarded. The topics: The Changing Economic Case for Surface Transport Regulation; Is There an Alternative to Regulation for the Railroads; Economic Objections to the Present Approach to Public Policy on Surface Freight Transportation; The Penn Central Crisis, a Fairy Tale and the Northeast Rail Bill; If We're Going to Regulate the Airlines, Let's Do It Right; Regulation of the U.S. Airline Industry: an Interpretation; Is Efficient Regulation of Air Transportation Possible; Economists Versus

Regulators; An Evaluation of the Airport Development Aid Program; The Urban Mass Transportation Assistance Program; An Economic Policy Analysis of the Amtrak Program; Three Back-of-an-Envelope Evaluations of the Interstate Highway System; The Transportation Improvement Act of 1974; No Clamor for Deregulation: Should There Be; Prospects for Regulatory Reform; A CAB Perspective on Airline Regulation; Opportunities for Academics to Influence Transportation Policy.

American Enterprise Inst for Public Policy Res 1975, 218 pp, Figs., Tabs.

PURCHASE FROM: American Enterprise Inst for Public Policy Res 1150 17th Street, NW, Washington, D.C., 20036 Repr. PC

DOTL HE311.45P47

25 127708

BRITAIN'S TRAINS-150 YEARS AND DEEPER IN DEBT

Rail passenger transport in Britain is celebrating its 150th anniversary with a massive deficit and grave doubts about its future. Few financing options are left for a railway system that has tried just about everything to stay alive. Like the U.S., the British Railways suffer from over-regulation and from capital starvation. The author concludes that status quo will not long be tolerated. He foresees route reductions, abandonment of some carload freight, higher intercity rail fares, growing subsidies for commuter service and a reduction in the labor force and in the relative earnings of the remaining workers.

Gwilliam, K *New Scientist* Vol. 67 No. 968, Sept. 1975, pp 698-701

PURCHASE FROM: New Science Publications Limited 128 Long Acre, London WC2E 9QH, England Repr. PC

25 127730

CANADA'S NEED FOR A NEW NATIONAL TRANSPORTATION POLICY

The theme of Canadian transportation policy has changed with time. In appraising the present status, it is suggested the basic goal should be provision of transportation service of required types and qualities at lowest cost. This should mean not using more economic resources than the minimum necessary to meet the nation's needs. The roles of economic regulation, infrastructure investment, crown corporations and operating subsidies are investigated for each mode. Alternative models for transportation policy are then described. It is recommended that a comprehensive research agenda for policy development be devised since all previous evaluations have been partial and superficial. Policy until now has tended to drift with events.

This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.

Munro, JM (Simon Fraser University)

Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 285-293, 3 Tab., 23 Ref.

PURCHASE FROM: Vietsch (Grant C) 181 East Lake Shore Drive, Chicago, Illinois, 60611

25 127759

CONTROLLED MOBILITY? ASPECTS OF TRANSPORTATION GEOGRAPHY IN THE ORIENTATION REPORT [Beheerste Mobiliteit? Verkeers-en Vervoers-Geografische Beschouwingen naar Aanleiding van de Orienteringsnota]

One of the central goals of the physical planning orientation report of 1974 is the future restriction of mobility in the Netherlands. It is in conflict with many forces in present society, which rather stimulate the increase of personal mobility. Consequently limited use of private cars can only be realized if alternative mobility opportunities are strongly promoted, eppg fail transport for commuting and other public transport facilities. The orientation report, however, is very indefinite on this point. That a brake should be put on the further growth of motor traffic is shown by a calculation of the total areal occupation of this kind of mobility. It appears that by the year 2000 as much space will be needed for motorways and their noise zones as for all residential areas. Therefore, promotion of public transport is necessary to secure urban renewal as well as rural open areas. /TRRL/ [Dutch]

Lohuizen, C *Tijdschrift voor Economische en Sociale Geografie* Vol. 65 No. 4, 1974, pp 288-304, 1 Fig., 4 Tab., 35 Ref.

ACKNOWLEDGMENT: Road Safety Research Foundation, Transport and Road Research Laboratory (IRRD 214768)

25 127839

CAIRNCROSS AND THE CHANNEL TUNNEL RAIL LINK

Michael R. Bonavia, MA, PhD, who led BR's Channel Tunnel team until his retirement last year, explains how the political decision to divide responsibility between governments, financing companies, project managers, and railways prevented co-ordinated planning of the tunnel and its British and French rail links-in the end, a major factor in the British Government's decision to pull out of the project.

Bonavia, MR *Railway Gazette International* Vol. 131 No. 9, Sept. 1975, pp 351-353

ACKNOWLEDGMENT: British Railways

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

25 127845

RAIL PLANNING PROCEDURES REPORT

This report is a compilation of documentation on the methodologies of state rail planning in Wisconsin and Michigan which was specifically prepared for FRA for later input to a manual on state rail planning. These states subsequently are using their respective methodology in establishing their rail plans pursuant to the Federal assistance requirements of the Regional Rail Reorganization Act of 1973 (PL 93-236). The report is structured so that the reader can go through the rail planning process and select for in-depth study, a step of particular interest. Initially, it focuses on goal development and constituency identification. Considerable attention is given to the collection, use and analysis of data relating to rail traffic and costs, and to the existing rail plant. The reader is given the option of two different approaches towards analyzing the prevailing problems endemic to light density branch lines. A thorough discussion of evaluating the need for rail passenger service is also included. Upon publication of manual on state rail planning, additional material on policy planning and implementation will be developed. There will also be current information on special problems such as urban rail relocation, yard and terminal consolidation, and state participation in rail safety. A detailed and comprehensive bibliography on rail planning will be included.

This project was sponsored by FRA.

Wisconsin Department of Transportation Res. Rpt. FRA 40025-75, Sept. 1975, 196 pp

Contract DOT FR 40025

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-245729/AS, DOTL NTIS

25 127855

RAILROAD IMPACT STUDY. WREN, IOWA-IROQUOIS, SOUTH DAKOTA

This study of the Wren-Iroquois line of the Chicago & North Western was prepared for the South Dakota Task Force on Railroad Policy and is one of four authorized and funded by the 1974 State Legislature involving rail lines for which abandonment applications have been filed. The study considers the area served, products shipped, economic impact factors, costs of highway construction versus rail line upgrading, environmental considerations, results of questionnaire surveys of community leaders and rail users, and a report of the experiences of another area of South Dakota in the wake of abandonment of a similar Milwaukee Road branch line.

This study was done in cooperation with the South Dakota Task Force on Railroad Policy and The South Dakota Department of Transportation, Pierre, South Dakota. It is available to South Dakota residents free of charge.

South Dakota University, Vermillion Bulletin 111, July 1975, 127 pp; Tabs.

ACKNOWLEDGMENT: South Dakota University, Vermillion

PURCHASE FROM: South Dakota University, Vermillion Business Research Bureau, School of Business, Vermillion, South Dakota, 57069 Repr. PC

25 127860

THE MATTER OF BALANCED TRANSPORTATION

Balanced transportation has been used to describe a mixture of transport services involving desirable or optimum combination of two or more modes. This article concludes that a balanced transport system has not yet been achieved in any urban area. The author urges that there be better understanding of the nature of problems such as relation between land use and transportation. Decision making processes must be clarified and there should be continued advancement in the processes of planning. More adequate concepts of organization are needed to perform transport-related functions. Broader bases are needed for public financing of urban transport. A greater range of alternatives are available for meeting special requirements of a complex regional transport system.

Davis, HE *Traffic Quarterly* Vol. 29 No. 4, Oct. 1975, pp 515-530

ACKNOWLEDGMENT: Traffic Quarterly

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

25 127861

A PERSPECTIVE OF TRANSPORT FINANCE IN THE UNITED STATES

In view of the capital shortage, it must be allocated sparingly to those uses that will best serve to increase the economy's productivity. This article reviews some of the factors that have affected transportation development and identifies some emerging elements that should be considered responsibly by those involved in transportation planning. Transportation is one of the most capital intensive industries. Neither dividing lines between government and private funding nor those between local or state and federal funding have ever been precisely delineated. Roles of private capital and state and local financing seem to be rapidly diminishing; the role of federal financing is increasing. Various facets of freight and passenger transport financing are considered along with political and economic implications.

Weller, JL *Traffic Quarterly* Vol. 29 No. 4, Oct. 1975, pp 481-498

ACKNOWLEDGMENT: Traffic Quarterly

PURCHASE FROM: ESL Repr. PC, Microfilm

DOTL JC

25 127864

REGULATION PUBLIC POLICY, AND EFFICIENT PROVISION OF FREIGHT TRANSPORTATION

This paper considers the economic effects of existing transport regulation and the changes indicated from an appraisal of such effects. Attempts at deregulation fail from the inability to measure or provide weights for the conflicting or complementary benefits and costs. Society's concern at the industry level should now be with efficiency and technological progress, neither of which a regulatory agency in a semicompetitive market is in a position to promote. Recent attempts at deregulation will continue to meet institutional obstacles and the costs of regulation will continue to mount with no corresponding benefits except through distribution of wealth to a favored few.

Wilson, GW (Indiana University, Bloomington) *Transportation Journal* Vol. 15 No. 1, Sept. 1975, pp 5-20, 2 Fig.

PURCHASE FROM: American Society of Traffic and Transportation 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr. PC

DOTL JC

25 127866

THE ECONOMIC EFFECTS OF RAIL ABANDONMENT ON COMMUNITIES: A CASE STUDY

This is a study of the possible deterioration of the economic base of ten smaller communities that have lost their rail service during the past 40 years. Indications are that the short-run and long-run adverse economic effects will not be significant. While transportation costs did increase on many commodities, sellers and buyers of affected products accepted the higher expenditures and remained in the community. The consumer was forced to accept a heavier burden of the increased cost than the seller. In all cases, the attractiveness of the community as a site for industrial developments for many firms was reduced. Since this cannot be measured, it cannot be introduced into ICC considerations of abandonments but, the author feels, may be significant.

Allen, BJ (Washington State University) *Transportation Journal* Vol. 15 No. 1, Sept. 1975, pp 52-61, 1 Fig., 2 Tab.

PURCHASE FROM: American Society of Traffic and Transportation 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr. PC

DOTL JC

25 128181

THE STATES AND RAIL PRESERVATION

For states faced with rail abandonment or service curtailment, the Council of State Governments has appraised the Regional Rail Reorganization Act of 1973 and examined some of the possible state responses to actions taken under the act. The booklet contains a draft of a State Rail Preservation Act for consideration by legislatures to give the State Department of Transportation or other agency the right to act as sole agent for assistance or acquisition by purchase, condemnation or other means of rail properties for continued operation in the public interest. As presented the draft legislation has seven titles.

Black, WR

Council of State Governments Jan. 1975, 17 pp, 2 Tab.

PURCHASE FROM: Council of State Governments Iron Works Pike, Lexington, Kentucky, 40511 Orig. PC

25 128182

THE STATES AND RURAL RAIL PRESERVATION. ALTERNATIVE STRATEGIES

This report identifies the problems of rail abandonment and rural development, and presents alternative strategies available to States in coping with abandonment problems. In the overview, there are 16 recommendations to States, 11 to the Federal government and one for the railroad industry. The chapters: Perspectives on Light Density Branch Line Problem; Rail Abandonment and Its Impact on Rural Economies and the Environment; Potential of Future Rural Economic Development; Subsidy and Acquisition as Alternatives; Short Line Railroad as an Alternative; Changing Service Levels and Alternative; Other Possible State Actions and Considerations.

The National Task Force on Rail Line Abandonment-Curtailment and Rural Development was sponsored by the Council of State Governments and financially supported by the Economic Development Administration, Department of Commerce, grant No. 99-6-09383.

Black, WR Runke, JF

Council of State Governments Oct. 1975, 142 pp, 5 Fig., 13 Tab., 2 App.

PURCHASE FROM: Council of State Governments Iron Works Pike, Lexington, Kentucky, 40511 Orig. PC

25 128195

RAILWAYS: ACCOUNTING FOR DISASTER

In examining the gloomy picture recently painted of British Railways, the authors say the basis has been a failure to distinguish between bookkeeping and economics, and between money and resources. Railways operate as a closed-loop commercial system, while money reaches the highways from numerous sources. Railways have to show an internal commercial return of 8 to 10 percent on capital for all new works. Savings used for justifying highway improvements do not, in any strict sense, represent an economic return because road users do not pay interest on motorway investment. The many transport accounting anomalies mean no government can make responsible decisions about the future of railways on the basis of the present antiquated system of bookkeeping.

Ogilvie, J Johnson, B *New Scientist* Vol. 68 No. 972, Oct. 1975, pp 228-29

PURCHASE FROM: New Science Publications Limited 128 Long Acre, London WC2 9QH, England Repr. PC

DOTL JC

25 128196

PUBLIC RESPONSE TO SECRETARY OF TRANSPORTATION'S RAIL SERVICES REPORT, RAIL SERVICE IN MIDWEST AND NORTHEAST REGION, REPORT OF RAIL SERVICES PLANNING OFFICE TO US RAILWAY ASSOCIATION. VOLUME 2, MID-ATLANTIC STATES

No Abstract.

Interstate Commerce Commission Oct. 1974, 177 pp

ACKNOWLEDGMENT: Monthly Catalog US Government Publications
PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

DOTL HE1051

25 128197

IMPLEMENTATION OF REGIONAL RAIL REORGANIZATION ACT OF 1973

No Abstract.

Interstate Commerce Commission Mar. 1974, 19 pp

ACKNOWLEDGMENT: Monthly Catalog US Government Publications

PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

25 128200

COSTS OF SPRAWL, ENVIRONMENTAL AND ECONOMIC COSTS OF ALTERNATIVE RESIDENTIAL DEVELOPMENT PATTERNS AT URBAN FRINGE, LITERATURE REVIEW AND BIBLIOGRAPHY

No Abstract.

Real Estate Research Corporation Apr. 1974, 331 pp

ACKNOWLEDGMENT: Monthly Catalog US Government Publications

PURCHASE FROM: Government Printing Office Superintendent of Documents, Washington, D.C., 20402 Repr. PC

25 128616

URBAN RAILROAD RELOCATION: NATURE AND MAGNITUDE OF THE PROBLEM AND PLANNING FOR REMEDIAL ACTION--EXECUTIVE SUMMARY

This executive summary reports the significant findings and recommendations of a project to analyze the nationwide magnitude and nature of urban railroad relocation and prepares a methodology for future relocation studies. Three other volumes report the results in detail. Volume 2 is a guide for preliminary assessment of the potential for planning/ Volume 3 is a detailed guidebook for planning/ and Volume 4 presents a nationwide estimate of the nature and magnitude of urban railroad relocation. The investigators found that there is a conflict between communities and railroad operations that evidences itself in delays and added costs to highway users at grade crossings, hazards to the safety of the community, community barriers, environmental degradation, incompatible land use, and reduced railroad efficiency. Relocation or consolidation of railroad facilities are potential remedies for the conflict. The nationwide cost of relocating railroad lines in all places where there is a potential conflict is estimated at \$3 to \$11 billion. However, if projects are restricted to locations where substantial benefits accrue, the program will be closer to \$2 billion. Railroad yards could also be relocated with substantial benefits, but at an additional nationwide cost of \$1 billion. The high cost of individual projects deters communities and railroad companies from undertaking beneficial projects, so financial assistance and incentives are recommended to encourage relocation projects.

Sponsorship was provided by FRA, FHWA.

Moon, AE

Stanford Research Institute Final Rpt. Vol. 1 RP-31, Aug. 1975, 13 pp

Contract DOT-FR-20937

ACKNOWLEDGMENT: FRA, Federal Highway Administration

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

25 128638

COMPETITIVE TRANSPORTATION SYSTEM: A MYTH

This paper takes the position that the transportation industry as a whole is not a fit subject for competition in the rigorous, modal sense. It also maintains that the modes most often are not as competitive as they claim to be. Regulation was a response to economic and political needs, and, before it is discarded, careful study of the economic and political consequences of such action should be undertaken. No nation has reached or maintained a high level of economic development in the absence of a stable infrastructure, an important element of which is the transportation system. Even if a competitive transportation structure could achieve the desired standards of

stability, financial responsibility, and service, elements for such an entity are lacking.

Melton, LJ, Jr *Transportation Journal* Vol. 14 No. 4, June 1975, pp 48-55

PURCHASE FROM: American Society of Traffic and Transportation 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr. PC

DOTL JC

25 128848

THE CANADIAN CONNECTION

The National Transportation Act of 1967 promoted competition as the regulating force in transportation in Canada. The problems that exist are due mainly to the failure to implement certain sections of the Act. The main problems concern compensation for the continuation of unprofitable services and facilities required for social reasons, the situation regarding the statutory grain rates, and long and short haul rates. In June 1975 a summary proposal for a new transportation policy was made by the Ministry of Transport but made few concrete proposals. More government intervention in transportation, more emphasis on availability of service and less on allowing market forces to govern appear certain. The Canadian experience confirms the value of a policy allowing freer play to market forces while indicating the political difficulty of implementing such a policy.

Shedd, T *Modern Railroads* Vol. 30 No. 9, Sept. 1975, pp 66-68, 2 Fig., 2 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

25 128849

RECOGNIZING THE IMBALANCE

Present U.S. transportation policy seems to be the cumulative effect of unrelated laws passed over the years, the result in part of the split in policy formation roles between the DOT and the Senate and the resulting partisan politics. A significant change appears imminent in an effort to save the railroads signalled by a flood of rail-related bills in Congress that hopefully will correct the present imbalance in support to other modes vis-a-vis the railways. This new awareness of the railways' necessity stems in part from the energy crisis and environmental concerns. A new era of financial aid to the railways may soon begin and regulatory reform also appears in the offing.

Roberts, R *Modern Railroads* Vol. 30 No. 9, Sept. 1975, pp 59-62, 2 Fig., 1 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

25 128894

TRANSPORT PLANNING IN ALGERIA: A SYSTEMS APPROACH

All too frequently the plans for a country's transport sector consist of a collection of individual project proposals for the development of road, rail, port and pipeline facilities. Many if not all will satisfy the project selection criteria. However, collectively the projects do not represent the most efficient use of the country's resources and facilities to meet the estimated total transport needs. An overall economic criterion was derived for investment planning purposes by combining the country's objectives with those of the transport sector. The recognition of these objectives and the corresponding resource limitations further led to the establishment of individual criteria by which improvements to the transport system could be judged.

Emerson, EC (EASAMS, Limited); Field, J Fouracre, PR Williamson, RG *Automatica* Vol. 11 No. 3, May 1975, pp 247-260, 12 Ref.

ACKNOWLEDGMENT: EI

PURCHASE FROM: ESL Repr. PC, Microfilm

25 128996

RHODE ISLAND STATE RAIL PLAN

This study outlines a safe, efficient rail system to serve present and future needs of Rhode Island. It includes details of a rail freight network which will

service present industries and reach areas designated for future economic development; indicates how a commuter rail system could be developed on the east and west shores of Narragansett Bay; and has details of the high-speed rail passenger route of the Northeast Corridor. The goals would be efficient rail service, reduced total energy consumption in the state, relief of peak-hour passenger vehicle pressure on the major highways, and improvement of air quality in urbanized areas.

Rhode Island Statewide Planning Program Report 27, Dec. 1975, Tabs.

PURCHASE FROM: Rhode Island Statewide Planning Program 265 Melrose State, Providence, Rhode Island, 02907 Repr. PC

DOTL RP

25 128997

ALTERNATIVES IN TRANSPORT POLICY: A MATRIX APPROACH

Quandaries face the analyst in examination of transportation policy. To grasp the unique setting of the United States policy, and to recognize that divergent goals and variables can be sorted out for examination, a public policy grid can be used. This essay has the proposed matrix form and suggests its use for analysis and synthesis. It also suggests a reconsideration of organizational structure for policy.

Wallin, TO (Syracuse University) *Transportation Journal* Vol. 15 No. 2, Dec. 1975, pp 43-53, 2 Fig.

PURCHASE FROM: American Society of Traffic and Transportation 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr. PC

DOTL JC

25 128998

THE OPERATIONAL REALITY OF INDEPENDENT RATE MAKING: SOME EMPIRICAL FINDINGS

This article reviews the origins and basis for current discussion surrounding the independent actions in conference rate making. An attempt is made to determine the operational reality of independent behavior based on the frequency, success and importance of independent rate making. In the light of recent commission decisions, the readiness of bureaus to protest independent actions was examined. Before advocating departure from current procedures, the effects of alternatives must be evaluated prior to advocating eliminating existing institutional mechanisms. A reassessment of a bureau's right to protest independent actions may be in order, but in the light of other means of rate screening, the ICC might find any cure more painful than the current problem.

Sherwood, CS (Eastern Kentucky University) *Transportation Journal* Vol. 15 No. 2, Dec. 1975, pp 5-12, 2 Tab.

PURCHASE FROM: American Society of Traffic and Transportation 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr. PC

DOTL JC

25 129090

PLANNING OF AN URBAN TRANSPORTATION FACILITY

The planning process can be broadly classified into: the goal formulation and decision making process; the plan development process; and the plan implementation process. Urban transportation planning should ideally be set up as a governmental body in which all urban transportation would be dealt with on a regional basis. Each function of the mass transit administration should be clearly defined and organized into a unit responsible for the function alone, and each one of these units should be headed by a single responsible director. The interdependency of transportation functions and urban development should be recognized and headed by an administrative authority. The paper includes a case history to illustrate the complex nature of the planning process.

Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.

Yusuff, M (New York City Transit Authority) *American Inst of Mining, Metallurg & Petrol Engrs Proc Paper* Vol. 1 1974, pp 331-350

ACKNOWLEDGMENT: EI

PURCHASE FROM: American Inst of Mining, Metallurg & Petrol Engrs Society of Mining Engineers, New York, New York, 10017 Repr. PC

25 129120

TRANSPORT IN THE 1980-1990 DECADE, VOLUME 1: INTRODUCTORY REPORTS, VOLUME 2: SUMMARY OF THE DISCUSSION

Following a review of current transportation problems, showing the need for change, consideration is given to six timely topics dealing with the reorganization of public transportation and the introduction of new forms of transportation. These topics include the impact of changes in society on the demand for passenger and freight transportation; the impact of innovation on the supply of passenger transport by both conventional and new techniques; the impact of innovation on the supply of freight transport; changes in the planning organization, and finance of transport for the 1980's; and the impact of transport on the quality of life. In a separate volume a summary of the discussion at the Symposium is provided.

Fifth International Symposium on Theory and Practice in Transportation Economics, Athens, Greece, October 22-25, 1973.

Organization for Economic Cooperation and Devel 1974

ACKNOWLEDGMENT: EI

PURCHASE FROM: Organization for Economic Cooperation and Devel Suite 1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006 Repr. PC

25 129169

AN IDEA WHOSE TIME HAS COME?

With a major revision in the prescribed Uniform System of Accounts of ICC pending, it would be possible either to retain the full-cost, financial type of accounting or to adopt a cost accounting system such as was considered in the 1930s. Since the 1930s, the "formula" approach has dominated rail cost finding, a system which does not focus on relevant variable or direct costs. To adopt cost accounting it would be first necessary to develop a contribution-to-margin approach to accounting which centers on the relevant direct costs. This can be part of a responsibility accounting system, if the uniform system is sufficient flexible in its definition of cost centers and locations. The result would be relevant data for decision making.

Presented at the 16th Annual Meeting of Transportation Research Forum and Concdian Transportation Research Forum, Toronto, Nov. 4, 1975.

Buckwell, JJ, Jr

Office of the Secretary of Transportation 1975, 16 pp

PURCHASE FROM: DOT Repr. PC

DOTL RP

25 129201

RAILROAD IMPACT STUDY. DOLAND-WATERTOWN, SOUTH DAKOTA CHICAGO AND NORTH WESTERN TRANSPORTATION COMPANY RAILROAD LINE

The study measures some of the more important impacts of the proposed C&NW abandonment of the Doland-Watertown line in South Dakota. The study examines the area served, its products, its rail transport needs, and the economic impact factors. The economic figures include the impacts on farms, other businesses, employment and taxes. Environmental and energy factors are covered, and attention is given to the problems of substituting highway transport.

This study was done in cooperation with the South Dakota Task Force on Railroad Policy and The South Dakota Department of Transportation.

South Dakota University, Vermillion Bull. No. 114, Oct. 1975, 65 pp, 31 Tab., 3 App.

PURCHASE FROM: South Dakota University School of Business, Business Research Bureau, Vermillion, South Dakota, 57069 Repr. PC

25 129202

PROCEEDINGS OF THE 1975 NATIONAL RAIL PLANNING CONFERENCE

This publication is a compilation of thirty-five papers presented at the two and one-half day National Rail Planning Conference held in New Orleans, Louisiana from May 19-22, 1975. The Conference attracted approximately 300 representatives of government, industry, university and consulting interests. The objective of the Conference was "to outline the direction that rail planning should take in the development of urban, state, rural and national transportation systems and to insure that these systems are responsible and productive to the people that use them". To accomplish this objective speakers from the Federal, state, regional and local governmental

levels, the railroad industry and research agencies presented papers related to rail planning in the following areas: NATIONAL LEVEL: Federal support for rail planning funds; procedures and methodology for conducting rail planning studies; appropriate Federal policy regarding rail system planning. STATE LEVEL: State rail planning goals; state capability to conduct rail planning studies; state planning approach--modal vs. functional. LOCAL AND REGIONAL LEVEL: Abandonment of facilities and service; economic impact of railroad on communities; USRA approach to rail system planning; role of railroad industry in local and regional planning.

This project was sponsored by the Federal Railroad Administration, DOT.

Richards and Associates Conf. Proc Oct. 1975, 104 pp

Contract P.O. 66018

ACKNOWLEDGMENT: FRA

PURCHASE FROM: NTIS Repr. PC, Microfiche

DOTL NTIS

25 129291

EXAMINATION OF THE DETERMINANT BASES OF THE SHORT AND MEDIUM-TERM TRANSPORT DEMAND, AND OF THE DEVELOPMENT OF THE TRANSPORT CONTRIBUTION TO THE SOCIAL PRODUCT [Untersuchung der kurz-und mittelfristigen Bestimmungsgrunde de Verkehrsnachfrage und der Entwicklung des Beitrages des Verkehr zum Sozialprodukt]

This concerns a study requested by the German Federal Transport Ministry (284 pages). It analysed the bases for determining the demand and the development of transport in the short and medium terms. [German]

Internationales Verkehrswesen Vol. 27 No. 3, May 1975, pp 101-104

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: Dr. Arthur Tetzlaff Verlag Niddastrasse 64, Frankfurt Am Main, West Germany Repr. PC

25 129299

GENERAL TRANSPORT PLANS-METHODS, SHORTCOMINGS

The report by Mr. BOURDREZ studies methods of drawing up a national transport plan, the factors to be taken into consideration, the basic problems raised, and presents an example of an integrated transport plan in the Randstad in the Netherlands. It is followed by a summary of the discussion, which records planning experience in the last 15 years and outlines a new transport planning concept. [French]

This is a publication of ECMT Round Table 27 held Oct. 10-11, 1974.

European Conference of Ministers of Transport Vol. 1 1975, 68 pp, 14 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

PURCHASE FROM: OECD Publications Center 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006 Repr. PC

25 129329

RUNNING THE NEW ONE

Outline of the 5-year plan for ConRail which reorganizes the eight bankrupt Eastern railroads. Major aspects of the plan include improvements to the physical plant, traffic concentration on major routes, and increased utilization of road and terminal facilities through the elimination of duplication of services. Capital required is almost \$1 million per week for the five years. If the operational plan does not work and if the financial plan is inadequate, the possibility exists that ConRail might be nationalized.

Shaffer, FE *Modern Railroads* Vol. 30 No. 11, Nov. 1975, pp 66-69, 2 Fig., 1 Tab., 1 Phot.

ACKNOWLEDGMENT: CNR

PURCHASE FROM: Cahners Publishing Company, Incorporated 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

DOTL JC

26 092424

BART IMPACT PROGRAM. DATA SUMMARY

The paper is a guide to data collected for use by the BART Impact Program. For each data collection project it contains (1) a short summary of the nature and purpose of the study, (2) a description of each type of data collected and the size of the data set, (3) the time period represented by the data, (4) the geographic location of the data collection and (5) a list of the data items and reports which are presently available and catalogued at MTC and the Data Catalog I.D. Words by which the items may be referenced. The Appendix includes study area maps, matrices of data collection by BART station area, and the BART Impact Data Catalog table of contents.

Bachman, S

Metropolitan Transportation Commission, Department of Housing and Urban Development Work Paper WP-8-1-75, July 1974, 56 pp

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS NTIS Price, /MFS\$2.25

PB-244553/4ST, DOTL NTIS

26 092766

FEDERALLY SUPPORTED MATHEMATICAL MODELS: SURVEY AND ANALYSIS

The study attempts to examine the extent and the ways in which federal agencies use models. In Part I the results of extensive survey of Federal agencies are analyzed and conclusions drawn. The report recommends that in order for the potential of modeling and other rigorous analytical techniques to be realized, improvements must be made in the availability of data, in procedures used to fund and monitor research, and in information flows between model builders and policy makers. In the second part, the projects are listed alphabetically by Project Director, institution, sponsoring agency, and subject area. Part III contains the appendices to the study: The project director questionnaire; the agency monitor questionnaire; and the tables compiled for the study.

Supersedes reports PB-241 562, PB-241 563 and PB-241 564. Prepared in cooperation with Abt Associates, Inc., Cambridge, Mass.

Fromm, G Hamilton, WL Hamilton, DE

Data Resources Incorporated, National Science Foundation, ABT Associates, Incorporated Final Rpt. NSF/RA/S-74-029, June 1974, 303p

Contract NSF-C804

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PB-243095/7ST, DOTL NTIS

26 093098

SNOW STUDIES (A BIBLIOGRAPHY WITH ABSTRACTS)

The bibliography covers research on snow cover, snowmelt, snowdrifts, snow removal, trafficability, snow rescue and survival, physical and mechanical properties, as well as detection by remote sensing. Applications include construction of roads, runways, buildings, pipe lines, etc. in cold, remote, arctic or subarctic regions. (Contains 252 abstracts).

Supersedes NTIS/PS-75/042.

Brown, RJ

National Technical Information Service Bibliog. Sept. 1975, 257 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PS-75719/5ST, DOTL NTIS

26 093155

PARTICIPATIVE MANAGEMENT (A BIBLIOGRAPHY WITH ABSTRACTS)

Studies are cited on the extensive use of participative management. Included are citations on citizen participation in urban planning of mass media, health services, water resources, transportation, and education. Group dynamics and motivational aspects of participative management are also included. (Contains 102 abstracts)

Grooms, DW

National Technical Information Service Bibliog. Sept. 1975, 107 pp

ACKNOWLEDGMENT: NTIS

PURCHASE FROM: NTIS Repr. PC, Microfiche

PS-75696/5ST, DOTL NTIS

26 096059

EFFECTS OF NATURAL ELEMENTS AND CHEMICALS ON BITUMEN-AGGREGATE COMBINATIONS: 1966-1974

This chronologically arranged list of references provides bibliographic data together with brief annotations. Sources searched in the preparation of the bibliography are Chemical Abstracts through December 1973, API-TU Information Retrieval System through October 1971, Asphalt Institute Files through October 1971, Highway Research Information Service (HRIS) files through 1971, and HRIS Abstracts through December 1973, as well as papers from the Transportation Research Record 515.

Transportation Research Board Bibliography 56, 1974, 35 pp, 86 Ref.

PURCHASE FROM: TRB Publications Off Orig. PC

DOTL JC

26 099781

MODAL CHOICE MODELS: INTRODUCTION AND SELECTED BIBLIOGRAPHY

Research articles in this bibliography are concerned with how people choose their mode of transportation in cities. This decision is important to transportation planners, since knowledge about it helps them to estimate the number of people who will transfer modes if an alternate mode becomes apparent to them. The compilers supply a ten-page introduction to their bibliography.

Davies, S Alpert, MI

Council of Planning Librarians #692, Nov. 1974, 43 pp

ACKNOWLEDGMENT: High Speed Ground Transportation Journal

PURCHASE FROM: Council of Planning Librarians P.O. Box 229, Monticello, Illinois, 61856

26 099782

THE VALUE OF PASSENGER TRAVEL TIME: INTRODUCTION AND SELECTED BIBLIOGRAPHY

The research articles listed in this bibliography are related to an understanding of how people choose their mode of transportation in cities. The compiler states that the references listed "attest to the fact that travel time savings and costs have and will receive considerable attention in the literature." The two parts of the bibliography are "Articles" and "Books and Reports."

Davies, S

Council of Planning Librarians #675, Oct. 1974, 17 pp

ACKNOWLEDGMENT: High Speed Ground Transportation Journal

PURCHASE FROM: Council of Planning Librarians P.O. Box 229, Monticello, Illinois, 61856 Repr. PC

26 099783

TRANSPORTATION SYSTEMS BIBLIOGRAPHY

The compiler prepared this bibliography while conducting research for a book on the subject. It is arranged topically under the five headings Models in Transportation, Network, Socio-Economic Effects of Transportation, Effects of Transportation, Effects of Transportation on Urbanization, and Transportation Planning. There is a sixth section titled "Other Bibliographies." The compiler states that the work "can be used as a helpful reference source for future research in the area and/or, equally as well, can be used in the classroom."

Bierman, DE

Council of Planning Librarians Apr. 1974, 11 pp

ACKNOWLEDGMENT: High Speed Ground Transportation Journal

PURCHASE FROM: Council of Planning Librarians P.O. Box 229, Monticello, Illinois, 61856 Repr. PC

26 099866

METRO 1972-1973

The work comprises 1000 references in a 225-page volume, providing the most recent information on technical publications existing in such areas as tunnel construction, automatic fare collection, electronics, safety, rolling

stock, signalling equipment, noise reduction, vehicle cleaning, park-and-ride systems, escalators, etc.

International Union of Public Transport Bibliog. 1973, 225 pp

ACKNOWLEDGMENT: International Union of Public Transport

PURCHASE FROM: International Union of Public Transport 19 Avenue de l'Uruguay, Brussels B-1050, Belgium Repr. PV

DOTL RP

26 099888

RESEARCH BASE FOR DEVELOPMENT OF A NATIONAL CONTAINER POLICY. PHASE I. VOLUME 2. ANNOTATED BIBLIOGRAPHY

Most of the reports cited in this bibliography are pertinent either factually or theoretically to the entire study. As indicated in the annotations, many of the reports cover the entire subject of containerization and thus, apply to different sections of Phase I report, depending on the reader's interest. A few of the reports deal with specific phases of containerization, and others present general background material used in developing a specific analysis of one or more phases.

See also Volume 1, RRIS 21 099888.

Matson Research Corporation, (269-116) No. 4, Sept. 1970, 35 pp

ACKNOWLEDGMENT: Canadian Transport Commission

PURCHASE FROM: Canadian Transport Commission Systems Analysis Branch, 275 Slater Street, Ottawa K1A ON9, Ontario, Canada Repr. PC
DOTL RP

26 128183

THE NORTHEAST AND MIDWEST RAIL CRISIS. A BIBLIOGRAPHY OF CURRENT LITERATURE

This bibliography was developed as part of a rail abandonment grant project sponsored by the Economic Development Administration and the Council of State Governments. It is intended to insure that States embroiled in current rail difficulties may plan and implement appropriate policy by having a source of information on the crisis and the reactions of government agencies and private research and industry organizations to the problems. About 80% of the citations are from 1971-1975 and the primary thrust is at governmental policy and planning for railroads. Reports cited are generally available from a publishing agency; where documents contain confidential or proprietary information they may be provided only to state level planners.

This bibliography was developed under a grant from the Economic Development Administration, Project No. 99-6-09383.

Balck, WR Runke, JF

Council of State Governments Aug. 1975, 43 pp

PURCHASE FROM: Council of State Governments Iron Works Pike, Lexington, Kentucky, 40511 Orig. PC

Ongoing Research Summaries

00 036999

PRESERVATION IMPROVEMENT AND REPLACEMENT OF ELEVATED TRANSPORTATION STRUCTURE BY ENGINEERING-PLANNING

The contractor shall carry out studies to determine the behavior of elevated structures from two standpoints: Existing structures, which do not possess acceptable dynamic characteristics based on present day criteria, and new structures, which can be designed to ensure that the required dynamic characteristics are within acceptable limits. This research program shall analytically model structural systems consisting of the elevated structure itself, the foundation, and the surrounding soil. The analysis shall be sufficiently general so that the behavior of a wide variety of structural systems can be investigated. As an analytic program requires field measurements to ensure that the numerical results truly represent field conditions, a small field measurement program shall be included. This research program.

PERFORMING AGENCY: Illinois University, Chicago
INVESTIGATOR: Silver, ML
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269639)

Contract DOT-OS-30092
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1973 TOTAL FUNDS: \$197,852

ACKNOWLEDGMENT: TRAIS (PR # PUR-1-30224)

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-Champaign, 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, Board of Trustees
INVESTIGATOR: Peck, RB (Tel (217)333-3823) Paul, SL (Tel (217)333-3823) Ghaboussi, J (Tel (217)333-3823) Gaylord, E Gamble, WL Ghaboussi, J Paul, SL Parker, HW Mahar, J
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Lucke, WN (Tel 202-4260808)

Contract DOT-FR-30022 (CPFF)
STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Jan. 1973 TOTAL FUNDS: \$1,197,638

ACKNOWLEDGMENT: TRAIS (PR # 73-65)

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: Feb. 1976 START DATE: Jan. 1974 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

A MODEL FOR SYSTEMS ANALYSIS OF TUNNELING AND EXCAVATION

The purpose of this research is to develop a computer model of the tunneling-excavation process, using techniques of systems analysis. The model is intended to be as comprehensive and as realistic as is possible; toward this end, close liaison will be maintained with appropriate contractors, government agencies, equipment manufacturers and engineering organizations. The model will be used for the following purposes: 1) To conduct sensitivity analyses to identify needed improvements in the current state of the art and to assess the impact of such improvements, if they could be realized by research and development investment; 2) to evaluate specific current or proposed innovations in tunneling technology on a cost-benefit basis; 3) to provide a means for rational cost estimation of tunnel construction, including the use of probabilistic methods when advisable because of geologic, hydrologic, and other uncertain factors; and 5) to permit optimization of the total tunneling system according to selected criteria such as construction time, construction cost, total cost including the service provided by the facility, safety, minimum disruption of contiguous activities, etc. A comprehensive analysis considering social as well as technical and economic factors is sought.

REFERENCES:

Tunnel Cost Estimating Under Conditions of Uncertainty Wyatt, RD, R75-13, June 1974, PB-242428/1ST

The Probabilistic 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: McGarry, FJ Moavenzadeh, F

SPONSORING AGENCY: National Science Foundation, Division of Advanced Technology Applications, GI-34029A1

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: May 1974 COMPLETION DATE: Apr. 1975 TOTAL FUNDS: \$137,500

ACKNOWLEDGMENT: 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 and final guidelines will be printed at the end of contract.

PERFORMING AGENCY: Haley & Aldrich, Incorporated

INVESTIGATOR: Liu, TK (Tel 617-4926460)

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Saulnier, G (Tel 617-4942432)

Contract DOT-TSC-836

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: \$186,203

ACKNOWLEDGMENT: TRAIS (PR# TM-0013)

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 utility networks, and 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.

PERFORMING AGENCY: IIT Research Institute

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Kelleher, DJ (Tel 617-494-2144)

Contract TSC-794 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: June 1974 COMPLETION DATE: July 1975 TOTAL FUNDS: \$113,996

ACKNOWLEDGMENT: TRAIS

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.

PERFORMING AGENCY: Arkansas University, Little Rock, Graduate Institute of Technology

INVESTIGATOR: Blacklock, JR (Tel 501-375-7247)

SPONSORING AGENCY: Department of Transportation

RESPONSIBLE INDIVIDUAL: O'Sullivan, W (Tel 202-426-4377)

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

Contract DOT-FH-11-8594 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Jan. 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$91,920

ACKNOWLEDGMENT: Federal Highway Administration (41-10-0025)

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.

PERFORMING AGENCY: Minnesota University, Department of Civil and Mineral Engineering
 INVESTIGATOR: Nelson, CR
 SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
 RESPONSIBLE INDIVIDUAL: McFarland, RK

Contract DOT-OS-40087 (CS)
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Mar. 1974 TOTAL FUNDS: \$70,602

ACKNOWLEDGMENT: TRAIS (PUR-1-40075)

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 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: Feb. 1976 START DATE: Apr. 1975 TOTAL FUNDS: \$2,500

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
 SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
 RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

ID AS-50063
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1975 TOTAL FUNDS: \$35,000

ACKNOWLEDGMENT: Office of Systems Development and Technology

00 058435

REVIEW OF THE DEPARTMENT OF TRANSPORTATION TUNNELING RESEARCH AND DEVELOPMENT 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-50060
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1975 TOTAL FUNDS: \$10,000

ACKNOWLEDGMENT: Office of Systems Development and Technology

00 058438

TESTING PROGRAM ON MUCK PREPARATION AND PNEUMATIC TRANSPORT

The pneumatic transport test facility shall be constructed, tested and evaluated in the following areas: 1. Muck Preparation Unit (a) Reliability of equipment (b) Wear and maintenance requirements of equipment (c) System capacity (d) Operating noise levels (e) Energy requirements and operating costs 2. Pneumatic Conveyance System (a) Reliability and flexibility of equipment (b) Wear and maintenance requirements (c) System capacity (d) Operating noise levels (e) Energy requirements and operating costs (f) Effect of moisture content on material handling (g) Extensibility of pneumatic system.

PERFORMING AGENCY: Colorado School of Mines
 SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
 RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

Contract DOT-OS-50100
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Mar. 1975 TOTAL FUNDS: \$200,699

ACKNOWLEDGMENT: Office of Systems Development and Technology

00 058470

ASSESSMENT OF DISRUPTIVE EFFECTS ASSOCIATED WITH URBAN TRANSPORTATION TUNNEL CONSTRUCTION

Effects of constructing both bored and cut and cover tunnels will be considered. Effects from bored tunnels center on the impact of the construction of access shafts, underpinning, 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, identify and describe the currently used method(s) of measurement for determining a disruptive dollar value of that impact. Develop a preliminary approach to predicting and assessing the degree of each disruptive impact.

PERFORMING AGENCY: ABT Associates, Incorporated
 SPONSORING AGENCY: Transportation Systems Center, UM-504
 RESPONSIBLE INDIVIDUAL: Saulnier, G (Tel 617-4942432)

Contract DOT-TSC-1018 (CPFF)
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$68,845

ACKNOWLEDGMENT: TRAIS (UM-504)

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, Department of Interior
 SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
 RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

IA AS-50061
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: \$8,000

ACKNOWLEDGMENT: TRAIS

00 115950

A COMPREHENSIVE PROGRAM ON ROCK PROPERTIES, TUNNELING AND EXCAVATION TECHNOLOGY AND NUCLEAR BLAST EFFECTS ON EARTH MEDIA

Third-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.

PERFORMING AGENCY: Purdue University, School of Civil Engineering
 INVESTIGATOR: Judd, WR Touloukian, YS
 SPONSORING AGENCY: National Science Foundation, Division of Advanced Technology Applications, GI-34608X2

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: June 1974 COMPLETION DATE: May 1975 TOTAL FUNDS: \$89,000

ACKNOWLEDGMENT: Science Information Exchange (GSQ 213 2)

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: Proposed NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

00 129709

GUIDELINES FOR EXISTING SUBWAY MAINTENANCE

The objective of this contract is to assess current subway system tunnel maintenance practices 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 617-494-2432)

Contract DOT-TSC-1078

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$165,314

ACKNOWLEDGMENT: TSC

00 129710

ECONOMIC FACTORS IN TUNNEL CONSTRUCTION

Develop a tunnel construction cost data base and cost estimating and systems analysis methodologies 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: Feb. 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: Feb. 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

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: Feb. 1976 START DATE: Jan. 1976 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: \$91,065

ACKNOWLEDGMENT: TSC

01 019580

FIELD STUDIES OF TRACK SUPPORTED ON PRESTRESSED CONCRETE TIES: TESTS TO EVALUATE STRUCTURAL CAPACITY OF SLAB AND BEAM RAIL SUPPORT STRUCTURES
No Abstract.

PERFORMING AGENCY: Atchison, Topeka and Santa Fe Railway Company
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel 202-4260855)

Contract DOT-FR-90043 (BOA)

STATUS: Active NOTICE DATE: Aug. 1975 COMPLETION DATE: Dec. 1978 TOTAL FUNDS: \$193,637

ACKNOWLEDGMENT: TRAIS (PR# 72-135)

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.

PERFORMING AGENCY: C&O and B&O Railway Companies
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel (202)426-4377)

Contract DOT-FR-20015 (CS)

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Aug. 1971 TOTAL FUNDS: \$37,368

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.

PERFORMING AGENCY: Association of American Railroads
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel (202)426-4377)

Contract DOT-FR-30038

STATUS: Active NOTICE DATE: July 1975 START DATE: May 1973 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: \$447,218

ACKNOWLEDGMENT: FRA

01 038974

CONTINUOUS MEASUREMENT OF DYNAMIC COMPLIANCE CHARACTERISTICS OF RAILROAD TRACK.

The proposed contract is for the design, fabrication, demonstration and furnishing of equipment for the continuous measurement of dynamic compliance characteristics of railroad track.

PERFORMING AGENCY: Battelle Memorial Institute
INVESTIGATOR: Prause, RH (Tel 614-2993151)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Woll, TP

Contract DOT-FR-30051

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1973 COMPLETION DATE: 1977 TOTAL FUNDS: \$400,000

ACKNOWLEDGMENT: TRAIS (PR# RP-39)

01 045168

DEVELOP AND JUSTIFY METHODOLOGIES AND PROCEDURES FOR ANALYZING THE ECONOMIC COST OF RAILROAD ROADWAY

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 conditions for the purpose of developing a portion of the relevant economic costs for pricing purposes.

PERFORMING AGENCY: Tops-On-Line Service, Incorporated
INVESTIGATOR: Williams, JH (Tel 415-9892670)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Pomponio, J (Tel 202-426-0771)

Contract DOT-FR-30028

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1973 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: \$413,000

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 048894

KANSAS TEST TRACK

The Kansas Test Track constructed parallel to the Atchison, Topeka and Santa Fe Railway Company's main line between Aikman and Chelsea, Kansas, is a unique, eight-thousand foot long track structure test facility. Test period of six months has been concluded and data is now under review.

PERFORMING AGENCY: Atchison, Topeka and Santa Fe Railway Company
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel 202-4269644)

Contract DOT-FR-90043/13

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: May 1974 COMPLETION DATE: Dec. 1975 TOTAL FUNDS: \$68,831

ACKNOWLEDGMENT: TRAIS

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: Active NOTICE DATE: Feb. 1976 START DATE: Dec. 1974 COMPLETION DATE: Dec. 1975 TOTAL FUNDS: \$82,555

ACKNOWLEDGMENT: FRA

01 058305

NONDESTRUCTIVE MEASUREMENT OF LONGITUDINAL RAIL STRESSES

The work under this contract has dual objectives. One is the study of the effect of applied stress on the propagation of ultrasonic pulses in high-carbon, railroad-quality rail steel. This shall be accomplished by an analysis of appropriate wave equations with the non-linear elastic constants included, plus experimental work to compare with the predicted results. The second objective shall be to initiate research utilizing ultrasonic pulses that will result in techniques adaptable 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, School of Aerospace, Mechanical and Nuclear Engineering

INVESTIGATOR: Engle, DM (Tel 405-325-7241)

SPONSORING AGENCY: Department of Transportation

RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel 202-426-4377)

Contract DOT-OS-40091

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: 1974 COMPLETION DATE: June 1976 TOTAL FUNDS: \$100,000

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: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel (202)426-4377)

STATUS: Active NOTICE DATE: July 1975 START DATE: May 1974 COMPLETION DATE: Unknown TOTAL FUNDS: \$43,390

ACKNOWLEDGMENT: FRA

01 058307

RAIL INSPECTION SYSTEMS ANALYSIS AND TECHNOLOGY ASSESSMENT

Study of economic and operational aspects of rail inspection systems and an assessment of the state-of-the-art rail inspection technology.

PERFORMING AGENCY: Battelle Columbus Laboratories

INVESTIGATOR: Meacham, HC (Tel 614-299-3151)

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Tauro, A (Tel 617-4942421)

Contract DOT-TSC-979

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: Jan. 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: \$149,202

ACKNOWLEDGMENT: 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, RR-519

RESPONSIBLE INDIVIDUAL: Cecon, H (Tel 617-494-2711)

Contract DOT-TSC-995

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Apr. 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: \$75,552

ACKNOWLEDGMENT: TRAIS (RR-519)

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. Task will utilize both field tests and tests performed on the rolling load track test facility currently being developed and constructed by AAR. Task will also include sensitivity studies of track parameters utilizing dynamic simulation models developed during Track Train Dynamics, 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: July 1975 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 refurbish 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, Rail Safety Research Office

RESPONSIBLE INDIVIDUAL: McConnell, D (Tel 617-494-2461)

Contract DOT-TSC-1044

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Aug. 1975 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: \$53,000

ACKNOWLEDGMENT: FRA

01 099368

ENGINEERING ANALYSIS OF STRESSES IN RAILS

This project will provide a description of rail stresses required to develop predictions of the probability of rail fracture, utilizing the best available representations of service loads and support conditions. It will also provide descriptions of the conditions of stress and strain occurring at the boundaries of typical rail flaws in the head, web, and rail end regions suitable for calculation of appropriate fracture related stress intensity factors. This will

be done in two phases, with the first phase reviewing existing analyses and data on stresses in rails and then devising a method of analysis of rail stress. This will then be used to identify conditions of damaging stresses, to describe the build-up of residual stresses in the rail, and to describe the stress strain conditions in the vicinity of certain rail flaws. The second phase will review stresses in the rail joint region and study the load transfer from joints to rails to come up with an analysis of rail end stresses. Stress and strain conditions in the vicinity of certain rail end flaws will be developed for use in the fracture analysis techniques.

PERFORMING AGENCY: Battelle Memorial Institute
 SPONSORING AGENCY: Federal Railroad Administration, Rail Safety Research Office
 RESPONSIBLE INDIVIDUAL: McConnell, D (Tel 617-494-2451)

Contract DOT-TSC-1038
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1975
 COMPLETION DATE: June 1977 TOTAL FUNDS: \$343,345

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, Rail Safety Research Office
 RESPONSIBLE INDIVIDUAL: Cecon, H (Tel 617-494-2711)

In-House
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Mar. 1974

ACKNOWLEDGMENT: FRA

01 099370
SLEEVE EXPANSION OF BOLT HOLES

This project will determine by laboratory testing whether the sleeve expansion process is likely to be an effective means of reducing the bolt hole failure rate under railroad loading conditions. The laboratory studies will optimize the process parameters for a range of hole sizes in rail steel. Based on this work, a procedures manual will be prepared defining all critical engineering requirements including inspection details. Additionally, fatigue tests shall be made on both treated and untreated rail to permit the use of extreme-value statistical techniques to project the expected improvement in the field. There will also be devised a test plan for a preliminary field evaluation defining cost and time required to implement the plan.

PERFORMING AGENCY: Boeing Company
 SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
 RESPONSIBLE INDIVIDUAL: Steele, R (Tel 617-494-2476)

Contract DOT-TSC-1048
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1975
 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: \$159,010

ACKNOWLEDGMENT: FRA

01 099371
RAIL INSPECTION SYSTEM ANALYSIS AND TECHNOLOGY SURVEY

This research program will attempt to define quantitatively those factors which limit the present speeds of inspection systems used to locate rail defects and to determine the overall costs associated with making improvements on rail flaw detection systems which would enable information on the location and type of rail defects to be obtained more quickly. A technological data base will be formed that will primarily consist of data and information concerning the conditions in which inspection systems must operate and the equipment (detecting and data processing) currently in use. This will then be used to assess the economic benefits versus inspection system trade offs. Based on this analysis, a selection and recommendation of rail inspection system will be made.

PERFORMING AGENCY: Battelle Memorial Institute
 SPONSORING AGENCY: Federal Railroad Administration, Rail Safety Research Office
 RESPONSIBLE INDIVIDUAL: Cecon, H (Tel 617-494-2711)

Contract DOT-TSC-979
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Jan. 1975
 COMPLETION DATE: June 1976 TOTAL FUNDS: \$161,582

ACKNOWLEDGMENT: FRA

01 099372
PLAN FLAW OCCURRENCE STUDY

The intent of this study is to provide a sampling of that portion of U.S. railroad derailment occurrences which can be attributed to rail failure. This shall be done with a sufficient degree of specificity to assess the severity of different types of rail flaws as causes of derailments and to establish the relationship between defect occurrence frequency and the load environment, the track and rail characteristics, and the maintenance and inspection practices employed by the U.S. railroad industry. The sampling will include a review of appropriate FRA, NTSB and AAR records as well as those of one or more railroads over the last five years. From this there will be developed a data base to which statistical correlation procedures will be applied. This project will also calculate a derailment severity index for different types of flaws and hopefully will serve as a necessary foundation for the reliability analysis of rail-in-service as well.

PERFORMING AGENCY: Midwest Research Institute
 SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
 RESPONSIBLE INDIVIDUAL: Steele, R (Tel 617-494-2476)

Contract DOT-TSC-1061
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1975
 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$54,197

ACKNOWLEDGMENT: FRA

01 099374
ANALYSIS AND DESIGN REQUIREMENT FOR IMPROVED CROSS TIE TRACK SYSTEMS

In this project, the contractor will assemble and validate the required analysis, and techniques, and then use these techniques in assessing the track response to wheel/rail loads, the load transfer between and stresses within components, and the effect of tie/fastener characteristics on track response and performance. Additionally, concrete cross ties will be assessed in terms of performance and failure characteristics, current design specifications will be evaluated and the economic feasibility of concrete tie fastener systems will be studied. Consideration will also be given to the evaluation of the structural and performance potential of "synthetic" cross ties made of material other than timber and concrete.

PERFORMING AGENCY: Battelle Memorial Institute
 SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
 RESPONSIBLE INDIVIDUAL: Kish, A (Tel 617-494-2442) McConnell, D

Contract DOT-TSC-1044
 STATUS: Obligated NOTICE DATE: Feb. 1976 START DATE: July 1975
 COMPLETION DATE: June 1977 TOTAL FUNDS: \$326,661

ACKNOWLEDGMENT: FRA

01 099376

ULTRASONIC SYNTHETIC APERTURE REAL-TIME IMAGING SYSTEM

This project will develop a multi-directional transducer detection system, data processor and imaging system which can overcome some of the fundamental problems and limitations of conventional rail inspection systems. The detection and characterization of defects based on images derived from processing of signals from multi-directional transducers is expected to reduce substantially the dependence upon echo amplitude as detection criterion thereby improving reliability of detection of defects with unfavorable orientations. An ultrasonic scanning system will be developed and built to record, store, and display image format data suitable for synthetic aperture processing which is also compatible with current conventional systems such as that used on the TSC Rail Inspection Vehicle. Next the synthetic aperture image processing will be added, plus those elements of the system required for high speed operation, namely the conversion to correlation processing of pseudo-random coded signals, and the provision for defect detector processor which will limit visual evaluation of image data to those portions having known or suspected defects.

PERFORMING AGENCY: Electra-Physics, Incorporated
 SPONSORING AGENCY: Federal Railroad Administration, Rail Safety Research Office
 RESPONSIBLE INDIVIDUAL: Ryan, RP (Tel 617-494-2711)

Contract DOT-TSC-1036

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1975 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: \$96,577

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: Feb. 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.

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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. 1975

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, Rail Safety Research Office

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

Acoustical 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. 1975

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 study of the stresses and deformations under dynamic and static load systems in railway track structure and support is being undertaken. Initially, the geotechnical properties of ballast and sub-ballast are being studied. A 25 ft. length of full scale track is now being built for testing in the laboratories. /RTAC/

PERFORMING AGENCY: Queen's University, Canada

INVESTIGATOR: Raymond, GP

SPONSORING AGENCY: Canadian Institute of Guided Ground Transport

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: May 1971 COMPLETION DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

01 129713

INVESTIGATION OF THE MECHANICS OF BALLAST COMPACTION

Phase I: Compile information on the mechanics of non-cohesive material compaction, existing ballast compaction methods and machinery. Determine the relationships between compaction and track performance. Critically assess the methods and equipment used and determine the controlling parameters. Phase II: Develop guidelines for compaction and prepare plans for concept verification and further required research.

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 617-494-2019)

Contract DOT-TSC-1115

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Jan. 1976 COMPLETION DATE: Jan. 1978 TOTAL FUNDS: \$212,000

ACKNOWLEDGMENT: TSC

02 054696

DYNAMICS OF FREIGHT TRAINS

A mathematical model has been developed for investigating the dynamic stability of cars in long freight trains and appears able to predict accurately the stability characteristics of a specific container car employed by Canadian National Railways for which dynamic stability data are available. Groups of up to sixteen cars were investigated, and the results indicate that the range of train velocities for which a long freight train will exhibit stable behavior can apparently be determined with satisfactory accuracy by consideration of individual cars free of coupling forces. The model includes the effects of creep and spin forces at the rail-wheel interface, and a consideration of spin forces was found to be important. It is possible to define an optimum value of lozenge stiffness for which the freight-car trucks would be stable as regards hunting for all speed of interest for freight trains. /RTAC/

PERFORMING AGENCY: Queen's University, Canada, 2.8
 INVESTIGATOR: Kurtz, EF, Jr
 SPONSORING AGENCY: Queen's University, Canada, Department of Mechanical Engineering

STATUS: Active NOTICE DATE: Oct. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 055812

FREIGHT CAR DYNAMICS RESEARCH PROGRAM

The contractor shall address the following objectives in carrying out the program. 1. Develop mathematical models that may be used to understand the dynamic behavior of freight cars and the effects of various truck, car, and track design parameters on this behavior. 2. Validate these models with data gathered by the AAR-RPI-FRA Train-Track Dynamics Program, and the SP Truck Research Program. 3. Utilize the models developed to examine current vehicle and track maintenance procedures and to suggest amendments to the procedures. 4. Utilize the models to suggest conceptual design improvement and modifications for current trucks and to suggest alternative truck designs.

PERFORMING AGENCY: Clemson University, Department of Engineering
 SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
 RESPONSIBLE INDIVIDUAL: Dyle, J

Contract DOT-OS-40018 (CS)
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Jan. 1973
 COMPLETION DATE: May 1975 TOTAL FUNDS: \$111,498

ACKNOWLEDGMENT: TRAIS (PR # DOT-OS-40018)

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 irregularities and alignment variations. 2 -Analytical tools and computations subroutines routines 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
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Tauro, A (Tel 617-4942421)

Contract DOT-TSC-902
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Sept. 1974
 COMPLETION DATE: Aug. 1975 TOTAL FUNDS: \$56,000

ACKNOWLEDGMENT: TSC (PR# TMP-0193 & A)

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 Develop-

ment 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 1975 START DATE: July 1975
 COMPLETION DATE: June 1978 TOTAL FUNDS: \$1,700,000

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 RDC, 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. A vertical shaker system (Block I VTU) has been accepted at the RDL as of November 1975. The contractor has demonstrated vertical shaker system performance and capabilities.

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: Olekszyk, P (Tel 202-755-1877)

Contract DOT-FR-64200
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1975
 COMPLETION DATE: 1977 TOTAL FUNDS: \$2,750,000

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 058294

TUNNELING LINE AND GRADE TOLERANCES IN CURRENT USE, AND THEIR RELATIONSHIP TO VEHICLE RIDE QUALITY

No Abstract.

PERFORMING AGENCY: Federal Railroad Administration
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: McFarland, RK (Tel 202-4269638)

ID DOT-AS-50029

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Jan. 1975 TOTAL FUNDS: \$21,000

ACKNOWLEDGMENT: TRAIS

02 058303

FREIGHT CAR TRUCK DESIGN OPTIMIZATION

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.

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: Active NOTICE DATE: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1978 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: Fuller, G (Tel 617-4942349)

Contract DOT-TSC-990 (CPFF)

STATUS: Active NOTICE DATE: Apr. 1975 START DATE: Feb. 1975 COMPLETION DATE: Nov. 1975 TOTAL FUNDS: \$25,594

ACKNOWLEDGMENT: TSC (RR-515)

02 058401

AERODYNAMICS ON SUBWAY TUNNEL DESIGN AND 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 AS-50030

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Feb. 1975 TOTAL FUNDS: \$23,600

ACKNOWLEDGMENT: Office of Systems Development and Technology

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 effect improvement with respect to wayside detection and prevention of accidents.

PERFORMING AGENCY: Shaker Research Corporation
SPONSORING AGENCY: Transportation Systems Center, RR-523
RESPONSIBLE INDIVIDUAL: Fuller, G (Tel 617-4942349)

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)

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
INVESTIGATOR: Hedrick, JK
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Fearnside, JJ (Tel 202-4264347)

Contract DOT-OS-50107 (CS)

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: \$66,000

ACKNOWLEDGMENT: TRAIS (PUR-50175)

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/

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: Active NOTICE DATE: Feb. 1975 START DATE: May 1974 COMPLETION DATE: Apr. 1975

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 1975 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.

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: July 1975 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: July 1975 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: July 1975 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: July 1975 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. Along with testing these two plans on W/R loads, field measurements will also be used to determine loads and then the results will be compared. After modification and/or validation, the predictive techniques will be used to identify strategies for the reduction of W/R loads linked to track deterioration. This will help in providing a means for extrapolating W/R loads data to alternative track, vehicle and operating conditions and in identifying alternate strategies for the reduction of W/R loads by specified amounts in specified frequency ranges. The aim for the entire project is to provide a clear assessment of the data and analysis requirements for the characterization and reduction of W/R loads.

PERFORMING AGENCY: Battelle Memorial Institute

SPONSORING AGENCY: Federal Railroad Administration, Rail Safety Research Office

RESPONSIBLE INDIVIDUAL: Kurzweil, L (Tel 617-494-2142)

Contract DOT-TSC-1051

STATUS: Obligated NOTICE DATE: Aug. 1975 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: Feb. 1976 TOTAL FUNDS: \$30,913

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: Feb. 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. 1975 START DATE: June 1975 COMPLETION DATE: Dec. 1977

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: Feb. 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

INVESTIGATOR: Rennie, RP (Tel 514-877-4337)

SPONSORING AGENCY: Canadian National; Transportation Department Agency

RESPONSIBLE INDIVIDUAL: McLaren, W (Tel 514-283-2880)

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Sept. 1974 COMPLETION DATE: Mar. 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.

See also RRIS 12A 081788 in Bulletin 7501.

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: Feb. 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 213-8936321)

Contract DOT-TSC-1037

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1975 COMPLETION DATE: May 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 de Buda, P

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: 1975 COMPLETION DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 128042

REVIEW OF AERODYNAMICS OF RAIL TRANSIT VEHICLES PHASE I

The purpose of this project is to: (a) Establish the background in rail transit vehicle aerodynamics; (b) Define aerodynamic research projects to be undertaken by the Ministry of Transportation and Communications of Ontario. The background information will provide an understanding for aerodynamic phenomena associated with rail transit vehicles. Also, it will permit us to determine the methods available for analyzing these phenomena. The project will be primarily a literature search into the following areas: (1) Steady and unsteady state aerodynamic drag forces in free air and particularly in tunnels. (2) The generation of pressure waves by a vehicle in a tunnel. (3) The generation of passing pulses. Some of the information obtained in this project will be immediately useful in the energy management study. This project comprises the first phase of a railed vehicle aerodynamic project. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 3603

INVESTIGATOR: Colavincenzo, O Palm-Leis, A

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Mar. 1975 COMPLETION DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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. Long range goals: Development and demonstration of improved vehicles.

PERFORMING AGENCY: Boeing Company, Vertol Division
 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: Oct. 1975 START DATE: June 1971 COMPLETION DATE: Feb. 1977 TOTAL FUNDS: \$22,000,000

ACKNOWLEDGMENT: UMTA (IT-06-0026)

03 036986

ADVANCED DESIGN TECHNIQUES FOR RAIL TRANSPORTATION VEHICLES

Using the constraint method the program develops an analytical model for simulating the structural action of typical rail transportation vehicle components with sufficiently high degrees of precision to permit realistic evaluation of expected fatigue life. A computer program for analysis of peak stress values in stiffened plate and shell structures will be developed to facilitate the design and production of a safer, more economical transportation vehicle not using the trial-and-error method, to increase the knowledge and scope of the finite element method, and to better the flow of research information in the industry. The model will be able to evaluate alternative design decisions, incorporating advanced structural design techniques, on the basis of expected fatigue life for application in the railway car manufacturing industry.

PERFORMING AGENCY: Washington University, St Louis
 INVESTIGATOR: Szabo, B (Tel 314-8630104)
 SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
 RESPONSIBLE INDIVIDUAL: Levine, D (Tel 202-4261227)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1973 COMPLETION DATE: June 1976 TOTAL FUNDS: \$87,600

ACKNOWLEDGMENT: TRAIS

03 038061

RAIL HAZARDOUS MATERIAL TANK CAR DESIGN STUDY

The objectives of the study are: (1) to provide the basis for defining practical and economical safety improvements which can be either retrofitted to in-service cars or incorporated into the design and manufacture of new tank cars, and (2) define the safety research gaps which must be remedied before a prototype tank car can be designed to optimal safety/economic considerations.

PERFORMING AGENCY: Calspan Corporation
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202)426-1227)

Contract DOT-FR-20069 (CPFF)
 STATUS: Active NOTICE DATE: Oct. 1975 START DATE: Oct. 1972 TOTAL FUNDS: \$94,555

ACKNOWLEDGMENT: FRA

03 038826

PERFORM POST ACCEPTANCE TEST ON THE STATE-OF-THE-ART CAR (SOAC)

The Ground Systems Division of the Transportation Systems Center, which is acting as Systems Manager for the Rail Programs Branch of UMTA in certain research, development and demonstration areas, is funding this contract for the twofold purpose: to perform post acceptance engineering test on the State-of-the-Art Car and to expand and improve the General Vehicle Test Plan. Both of these objectives are in furtherance of the Urban Rail Supporting Technology Program and more specifically will: provide engineering data for the Advanced Concepts Train Programs, provide

UMTA with an engineering baseline to judge future program progress, relate HSGTC track characteristics to those of 5 model areas, and provide an instrumentation package that can be used on railcar test programs, including the AC Train. SOAC undergoing extended tests on Lindenwold line.

PERFORMING AGENCY: Boeing Company, Vertol Division
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Neat, G (Tel 617-4942290)

Contract DOT-TSC-580 (CPFF)
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Feb. 1973 COMPLETION DATE: Apr. 1975 TOTAL FUNDS: \$657,395

ACKNOWLEDGMENT: TRAIS (PR# PE-0082)

03 038849

IMPROVE METROLINER TRUCKS

The objective of this contract is to design, fabricate, test, integrate and railcar test improved Metroliner trucks. Phase I and II, Prototype (4). Reports are under preparation.

Work on this project is continuing under a contract between AMTRAK and LTV.

PERFORMING AGENCY: LTV Aerospace Corporation, Ground Transportation Division
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Gannett, CM (Tel 202-426-9665)

Contract DOT-FR-20049 (FFP)
 STATUS: Completed NOTICE DATE: Feb. 1976 START DATE: Mar. 1973 COMPLETION DATE: June 1975 TOTAL FUNDS: \$3,784,869

ACKNOWLEDGMENT: TRAIS

03 045009

STRUCTURAL STUDY OF HAZARDOUS MATERIAL TANK CARS

The objectives 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 1975 START DATE: May 1973 COMPLETION DATE: Nov. 1975 TOTAL FUNDS: \$89,000

ACKNOWLEDGMENT: FRA

03 045874

PRODUCTION OF THE IMPROVED METROLINER TRUCKS

Task Order 3 is herewith assigned for engineering support on an as-required basis for the production of the improved Metroliner trucks. Support shall include but not be limited to engineering evaluation, monitoring of dynamic analysis, and/or truck manufacture and testing, review of transformer mount modifications, carbody modification and/or supporting design fabrication and related testing.

PERFORMING AGENCY: Budd Company, Systems Technology D
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Swerdlow, C (Tel 202-4262970)

Contract DOT-FR-10035 (CPFF)
 STATUS: Active NOTICE DATE: July 1975 START DATE: Jan. 1971 TOTAL FUNDS: \$257,017

ACKNOWLEDGMENT: TRAIS (PR# 73-90-1)

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

SPONSORING AGENCY: Griffin Wheel Company

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: Unknown

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).

Testing to 77 mph under light car with worn wheels indicates that basic design and principles are sound. Plans being made for further testing under load and 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

SPONSORING AGENCY: Railway Engineering Associates, Incorporated; Canadian National Railways

RESPONSIBLE INDIVIDUAL: List, HA

In-House

STATUS: Active NOTICE DATE: July 1975 START DATE: Jan. 1971 COMPLETION DATE: Unknown

ACKNOWLEDGMENT: Railway Engineering Associates, Incorporated

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 Company, Vertol Division

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Kelleher, DJ (Tel 617-4942144)

Contract DOT-TSC-856 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: June 1974 COMPLETION DATE: May 1976 TOTAL FUNDS: \$239,139

ACKNOWLEDGMENT: TSC (PR# TME-0131), TRAIS

03 055636

RAIL SAFETY/EQUIPMENT CRASHWORTHINESS

The Transportation Systems Center (TSC) is providing technical assistance 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 Company, Vertol Division

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Nelson, R (Tel 617-4942032)

Contract DOT-TSC-821

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Oct. 1975 TOTAL FUNDS: \$122,641

ACKNOWLEDGMENT: TSC (PR# TME-0117)

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: Sands, E (Tel 617-4942385)

Contract DOT-TSC-855 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: \$151,977

ACKNOWLEDGMENT: TSC (PR# TME-0120)

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: Feb. 1976 START DATE: July 1975 COMPLETION DATE: Feb. 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).

PERFORMING AGENCY: Illinois Institute of Technology
 INVESTIGATOR: Kumar, S
 SPONSORING AGENCY: Department of Transportation
 RESPONSIBLE INDIVIDUAL: O'Sullivan, WB (Tel 202-426-4377)

Contract DOT-OS-40103
 STATUS: Active NOTICE DATE: Feb. 1975 START DATE: Mar. 1974 COMPLETION DATE: Mar. 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 instrumentation 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: Sands, E (Tel 617-4942385)

Contract DOT-TSC-1043 (CPFF)
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$46,994

ACKNOWLEDGMENT: TRAIS (RR-525)

03 080330

TURBO TRAIN REVIEW

A study of the development, systems design and implementation of the United Aircraft Turbo Train is being undertaken to quide the implementation of future advanced technology systems. /RTAC/

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 4.35.74
 INVESTIGATOR: Buchan, PB
 SPONSORING AGENCY: Canadian National Railways; Queen's University, Canada

STATUS: Active NOTICE DATE: May 1974 START DATE: May 1974 COMPLETION DATE: Apr. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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)229-3405)
 SPONSORING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute
 RESPONSIBLE INDIVIDUAL: Morella, NA (Tel 216-229-3400)

STATUS: Active NOTICE DATE: July 1975 START DATE: 1972 COMPLETION DATE: Dec. 1975

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)-225-0600 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: Feb. 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 be required for validation of mathematical models. Testing will be carried out under a variety of conditions to obtain load environmental data using a variety of cars with varying loads.

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: July 1975 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.

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: July 1975 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: July 1975 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

03 099084

AMERICAN RAILROAD CARS BEFORE 1900

This study will be an engineering history of American railroad 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. Expanded to include 20th century developments. Six of eight chapters finished.

PERFORMING AGENCY: Smithsonian Institution

INVESTIGATOR: White, JH

SPONSORING AGENCY: Smithsonian Institution, Museum of History and Technology

STATUS: Active NOTICE DATE: Oct. 1974 START DATE: July 1973 COMPLETION DATE: June 1974

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. 1975

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: Active NOTICE DATE: Feb. 1976 START DATE: May 1973 COMPLETION DATE: Mar. 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: Feb. 1976 START DATE: 1970 COMPLETION DATE: 1976

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 sill 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: Feb. 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

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: 1974

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.

PERFORMING AGENCY: Boeing Company, Vertol Division

INVESTIGATOR: Robinson, J (Tel 215-522-2477 X-3909)

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Jankovich, J (Tel 617-494-2129)

Contract DOT-TCS-913

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Oct. 1974 COMPLETION DATE: June 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 installed on a train will automatically stop the train upon detection of a hot journal or a wheel on the ground. NAV-SURFWPNCEN/WOL will develop, install and initiate 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: Aug. 1975

ACKNOWLEDGMENT: FRA

03 099634

HOPPER-BOTTOM BOXCAR FOR RAILROAD TRANSPORTATION

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 Foundation
 INVESTIGATOR: Macomber, FS Breakiron, PL
 SPONSORING AGENCY: Department of Agriculture, 0701-15841-008-C

Contract 12-14-1001-406
 STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Mar. 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS-0041196)

03 128043 BOGIE AND RAIL DESIGN

This project is assisting the Toronto Transit Commission in the technical evaluation of the OTDC 4 axle, Single End, MU Vehicle for the Eglinton/Kennedy to Scarborough Transit Line Application, the results of the evaluation will be used to ensure safe and adequate compatibility between the vehicle and the line. The approach follows 3 steps. 1. Examining the changes that are absolutely necessary to make line and vehicle compatible. 2. Investigating the implication of various vehicle features on cost, operational efficiency, capability for future upgrading etc. 3. Analysing the ultimate capabilities of the vehicle with respect to the transit line. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 3113
 INVESTIGATOR: Charles, RJ Duncan, I
 SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Aug. 1975 COMPLETION DATE: Nov. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

03 128045 URBAN RAIL BOGIE DESIGN

A thorough investigation of the curving and stability characteristics 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. /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: Sept. 1975 START DATE: May 1975 COMPLETION DATE: Dec. 1975

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. /RTAC/

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: Sept. 1975 START DATE: May 1975 COMPLETION DATE: Dec. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

04 036771

METRO IMPROVEMENT

In order to determine why the Metroliner has not performed as originally planned and to assume a role of leadership in the future development of this type equipment, work is to be performed to correct the Metroliner reliability problems and to make necessary modifications and improvements based upon operating experience. Investigation and train modifications will be conducted. It is anticipated that the engineering effort and the modification work will require two years to complete. finite element method, and to better the flow of research

PERFORMING AGENCY: General Electric Company
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Gannett, CM (Tel 202-4269665)

Contract DOT-FR-10037
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1971 TOTAL FUNDS: \$4,356,240

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

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: Feb. 1974 COMPLETION DATE: June 1975

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. /RTAC/

PERFORMING AGENCY: Queen's University, Canada, 3.11.72
 INVESTIGATOR: Rawat, SK
 SPONSORING AGENCY: Canadian Institute of Guided Ground Transport, Queen's University

STATUS: Active NOTICE DATE: Oct. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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: Feb. 1975

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 COMPLETION DATE: Dec. 1975 TOTAL FUNDS: \$124,000

ACKNOWLEDGMENT: TRAIS (612-0218)

04 099377

FLYWHEEL ENERGY STORAGE UNIT FOR YARD SWITCH ENGINEERS-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: Aug. 1975 START DATE: Feb. 1976 COMPLETION DATE: Jan. 1978

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: Active NOTICE DATE: Aug. 1975 START DATE: Apr. 1975 COMPLETION DATE: June 1976

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 & Communication, Can, 3405

INVESTIGATOR: Duncan, I

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: 1975 COMPLETION DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

04 128006

PROPULSION SYSTEMS DATA SEARCH AND ANALYSIS

The purpose of the project is to develop parametric data on and analysis of propulsion system components. This will enable the electrical group to realistically evaluate new performance goals pertinent to new equipment specifications for future systems. Analysis of major components such as traction motors will be developed and relegated to the digital computer. Thus, given a supplier's data, pertinent performance characteristics may readily be obtained and used to assess the suitability of the motor for a particular application. A methodology of conducting similar data search and analysis for other components will be included. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communication, Can, 3407

INVESTIGATOR: Kanham, MD

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: July 1975
ACKNOWLEDGMENT: Roads and Transportation Association of Canada

04 128007

ENERGY MANAGEMENT PROGRAM COORDINATION-R&D PHASE

The purpose of the energy management program is to initiate and coordinate investigations aimed at improving and, where appropriate, optimizing energy subsystems in rail transportation. At present at least eight such projects are envisaged and of these two have already been defined. Almost the entire program will be useful to other transit modes. The first step is a review of technologies connected with energy management; traction motors and power conditioning, electrification and energy storage. In the second step the energy and power requirements of a base-line transit system at various line levels (deep tunnel, cut-cover tunnel, free air) will be determined and the actual energy consumptions and power profiles calculated for different propulsion systems: cam-controlled and chopper controlled with or without regeneration and with or without energy storage. This step requires with traction motors, their controls, characteristics, efficiencies and costs. It also requires studies dealing with aerodynamic drag forces, performance requirements, line and network strategies and with various energy storage devices. The third step constitutes the conceptual design and a preliminary recommendation of energy subsystems for each line level. This involves optimization procedures including trade-offs between the cost and performance of the energy subsystem. On the basis of this study an optimum energy subsystem in terms of benefit and cost can be selected for a specific application. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communication, Can, 3601

INVESTIGATOR: Soots, V Palm-Leis, A

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Mar. 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 ancillary 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 & Communication, Can

INVESTIGATOR: Soots, V Palm-Leis, A

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: 1975 COMPLETION DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

04 128031

CONTROL OF MULTILOCOMOTIVE POWERED TRAINS

The general research objective is to obtain a practical control system to compensate for large coupler forces while maintaining schedule velocity for long multilocomotive powered unit trains. This control system will be designed to operate on grades encountered on Canadian Railroads. It will also compensate for the deadzone nonlinearity of the couplers in the consist. Presently locomotive throttle settings have been obtained which are effective in a simulation of a train traversing a grade. /RTAC/

Propulsion Systems

04A

PERFORMING AGENCY: Queen's University, Canada

INVESTIGATOR: McLane, PJ

SPONSORING AGENCY: Queen's University, Canada, Department of Electrical Engineering

STATUS: Active NOTICE DATE: Oct. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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: Feb. 1976 START DATE: June 1975 COMPLETION DATE: Mar. 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: Sütliiff, DR (Tel 312-225-9600 X-1463)

STATUS: Active NOTICE DATE: July 1975 START DATE: Jan. 1975 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: AAR

06 048861

**TES SPONSORED STUDY OF SAN FRANCISCO BART
AUTOMATIC TRAIN CONTROL TO ASSURE PUBLIC SAFETY**

A comprehensive review of standards, regulations, design criteria and specifications, and industry safety practices will be performed. This information will be compiled into a generalized set of functional requirements for ATC systems. These requirements in turn, will serve as the basis for a detailed functional description of the ATC system and subsystems. Specific system designs, such as BART, will be compared to these requirements and to the functional description to uncover areas of nonconformance and potential sources of compromise (degradation) in overall ATC system safety. Particular attention will be given to the definition of the role of the train attendant within a safe ATC system.

PERFORMING AGENCY: Office of Environment, Safety and Consumer Affairs, Department of Transportation

SPONSORING AGENCY: Urban Mass Transportation Administration; Office of Environment, Safety and Consumer Affairs, Department of Transportation; Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Herringer, FC (Tel 202-426-4040)

ID DC-06-0092

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: Oct. 1973 COMPLETION DATE: July 1974 TOTAL FUNDS: \$200,000

ACKNOWLEDGMENT: UMTA (DC-06-0092)

06 054694

**TRAIN CONTROL SYSTEMS FOR UNSIGNALLED RAILWAY
LINES**

This is a feasibility study to examine the requirements for the control of trains along unsignalled rail lines with a view to developing a control system that can be incorporated simply and economically into present-day railroad procedures. /RTAC/

PERFORMING AGENCY: Queen's University, Canada

INVESTIGATOR: MacKay, NA

SPONSORING AGENCY: Queen's University, Canada, Department of Electrical Engineering

STATUS: Active NOTICE DATE: Oct. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

06 054699

**SURFACE WAVEGUIDES FOR GUIDED RADAR AND
OBSTACLE DETECTION**

Open-guiding electromagnetic structures, i.e. surface waveguides, are being studied, both theoretically and experimentally, with the aim of providing a means for the detection of obstacles in guided ground transportation. Initially, emphasis is being placed on the detection of landslides in mountainous areas on present railway systems. This can be called "Guided Radar", as the intention is to enable a train to be warned within the braking distance of the train. Only the electromagnetic field aspects are being studied in this project; the signal-processing is under separate and co-ordinated investigation, formerly by Dr. G.J.M. Aitken also of Queen's University, now also by Dr. J.C. Beal. /RTAC/

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport
INVESTIGATOR: Beal, JC

SPONSORING AGENCY: Canadian National Railways; Ministry of Transport, Canada; Queen's University, Canada

STATUS: Active NOTICE DATE: Feb. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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: Active NOTICE DATE: May 1974 START DATE: May 1974 COMPLETION DATE: 1977

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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: Aug. 1975 START DATE: Feb. 1975 COMPLETION DATE: July 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: Aug. 1975 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-516

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Jan. 1976 COMPLETION DATE: Dec. 1976 TOTAL FUNDS: \$215,000

ACKNOWLEDGMENT: FRA

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.

Reports issued are available from National Technical Information Service, Springfield, Virginia 22161.

REFERENCES:

PROPOSED QUALIFICATION REQUIREMENTS FOR SELECTED RAILROAD JOBS, Hale, A; Jacobs, HH, Federal Railroad Administration, FRA-OR&D-75-44, May 1975

TASK ANALYSIS FOR THE JOBS OF FREIGHT TRAIN CONDUCTOR AND BRAKEMAN, Sanders, M; Jankovich, J, Federal Railroad Administration, FRA-OR&D-75-69, May 1975

HUMAN FACTORS IN RAILROAD OPERATIONS ACTIVITIES IN FISCAL YEAR 1973, Devoe, DB; Feehrer, CE; Hill, JH; Sussman, ED, Federal Railroad Administration, FRA-ORD&D-74-32, Feb. 1974

PERFORMING AGENCY: Transportation Systems Center

INVESTIGATOR: Devoe, D (Tel 617-4942368)

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Levine, D (Tel 202-426-1227)

Contract PPA-RR695 Task 3

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: July 1975 COMPLETION DATE: June 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: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Unknown TOTAL FUNDS: \$59,127

ACKNOWLEDGMENT: TSC (PR# TI-0147), TRAIS

07 058468

DEVELOPMENT OF A TRAIN HANDLING CONTROL MODEL FOR FREIGHT TRAIN LOCOMOTIVE ENGINEER PERFORMANCE

The development of this model will contribute to the understanding and improvement of selection, training, and evaluation of engineers, and will support the development of improved locomotive operating controls and displays. The model will depict at least the following phases or types of train handling: 1. starting the train from rest; 2. controlling the train through changes in grade; 3. stopping the train.

PERFORMING AGENCY: Turpin Systems Company

SPONSORING AGENCY: Transportation Systems Center, RR-509

RESPONSIBLE INDIVIDUAL: Burke, W (Tel 617-4942042)

Contract DOT-TSC-1037 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$24,744

ACKNOWLEDGMENT: TRAIS (RR-509)

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.

PERFORMING AGENCY: Johnson (Lawrence) and Associates

INVESTIGATOR: Jones, J (Tel 617-2774200) Lewis, M Shapiro, B

SPONSORING AGENCY: Transportation Systems Center, RR-509

RESPONSIBLE INDIVIDUAL: Abernethy, C (Tel 617-4942079)

Contract DOT-TSC-1010

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: May 1975 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: \$40,000

ACKNOWLEDGMENT: TRAIS (RR-509)

07 058555

ANALYTICAL METHODS AND DESIGN IMPLICATIONS OF DETERMINISTIC RIDE QUALITY CRITERIA

No Abstract.

PERFORMING AGENCY: Arizona State University

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Doyle, J (Tel 202-4269745)

Contract DOT-OS-40101 (CS) NOTICE DATE: Feb. 1976 START DATE: Jan. 1974 TOTAL FUNDS: \$20,000

ACKNOWLEDGMENT: TRAIS

07 080132

INVESTIGATION OF PILOT CONTROL CAPABILITY DURING VIBRATION

Vibration and noise effects are insufficiently understood for general design criteria for advanced aircraft. The objective of this research is to provide the aircraft design community with pilot control performance criteria for mechanically stressed environments in terms that are readily understood and immediately useful. The contractor will collect pilot performance data in terms of control system figures of merit under noise, GZ, and random vibration. The ensemble of seat, display, control, operator and controlled element with the command input and mechanical disturbances have mathematically determinable relationships. Take measurements of errors, control activity and operator behavioral properties used to develop models which will have applicability, over operationally likely combinations of variables.

PERFORMING AGENCY: Systems Technology, Incorporated

INVESTIGATOR: Jex, HR Allen, RW

SPONSORING AGENCY: Department of the Air Force, 6570 Aerospace Medical Research, Laboratory BB, DF316510 F33615-73-C-4003

Contract

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1974 COMPLETION DATE: June 1975 TOTAL FUNDS: \$8,945

ACKNOWLEDGMENT: Science Information Exchange (GQF316510 2)

07 099433

INVESTIGATION OF METHODS OF IMPROVING RAILROAD CREW VIGILANCE

The objective of this effort is to conduct experimental studies of factors affecting the responses of railroad train crews to colored light signals. Two experiments will be performed in a locomotive cab mockup located at the U.S. Army Materials Research Agency in Watertown, Massachusetts. In the first experiment, the speed and accuracy of responses will be studied in situations where the subject is led to expect one signal and is unexpectedly presented with another, since false expectations are frequently involved in the causation of train accidents. In the second experiment, principles employed in current cab alerting techniques will be compared for effectiveness, including: two-man teams to detect signals, random versus regular alerting signals, and a constant warning time signal. The results of these experiments will be interpreted for implications for improvement in methods of maintaining alertness in locomotive cabs.

Human Factors

07A

Funds for this project are administered by DOT/Transportation Systems Center, Cambridge, Mass.

PERFORMING AGENCY: Lawrence Johnson and Associates
INVESTIGATOR: Jones, J (Tel 617-277-4200)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Abernethy, C (Tel 617-494-2617)

Contract DOT-TSC-1010

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: May 1975 COMPLETION DATE: Oct. 1975 TOTAL FUNDS: \$40,000

ACKNOWLEDGMENT: FRA

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 202-426-0771)

Contract AR-64216

STATUS: Active NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

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: Ultrasonics, Incorporated, Dynamic Science Division

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Fuller, G (Tel 617-4942349)

Contract DOT-TSC-700 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1976 TOTAL FUNDS: \$158,553

ACKNOWLEDGMENT: TRAIS

08 049658

RAIL SAFETY/GRADE CROSSINGS PROTECTION

The program will consist of four major tasks: (1) Development of Application Guidelines for Train 'on board' conspicuity and impact attenuation devices. (2) Standardization of protection equipment will be emphasized including three related cost reduction objectives for production cost, maintenance cost and administrative cost. (3) Innovative System development will study new grade crossing protection concepts. (4) System Analysis will establish interadministration, state and railroad requirements for a data system to accommodate new FRA grade crossing inventory and other data.

PERFORMING AGENCY: Transportation Systems Center

INVESTIGATOR: Coulombre, RE (Tel 617-494-2449)

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Levine, D (Tel 202-426-1227)

PPA Contr. PPA-RR-X02

STATUS: Active NOTICE DATE: July 1975 START DATE: Sept. 1973

ACKNOWLEDGMENT: FRA

08 055566

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: Harmon Electronics, Division of Harmon I

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Kelleher, DJ (Tel 617-4942144)

Contract DOT-TSC-869 (CPFF)

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Feb. 1975 TOTAL FUNDS: \$54,201

ACKNOWLEDGMENT: TRAIS (PR# TME-0137-GF)

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: Votolato, AC (Tel 617-4942190)

Contract DOT-TSC-870 (CPFF)

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Sept. 1975 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: Fuller, G (Tel 617-4942349)

Contract DOT-TSC-997 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1975 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: \$97,400

ACKNOWLEDGMENT: TRAIS (RR-502)

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/

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: Active NOTICE DATE: July 1975 START DATE: May 1974 COMPLETION DATE: Apr. 1975

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, Institute 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 1975 START DATE: Sept. 1973 COMPLETION DATE: June 1976

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

INVESTIGATOR: Keller, DV

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Lauriente, M (Tel 202-4269364)

Contract DOT-OS-50124 (CS)

STATUS: Active NOTICE DATE: June 1975 START DATE: May 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: \$73,142

ACKNOWLEDGMENT: TRAIS

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: United States Steel Corporation

INVESTIGATOR: Kesler, CE

SPONSORING AGENCY: Illinois University, Urbana

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: July 1972

ACKNOWLEDGMENT: Science Information Exchange (NIL 753 4)

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 Solvents, 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

10 045983

RAPID TRANSIT NOISE ABATEMENT AND COST REQUIREMENTS

The purpose of this effort is to provide an engineering assessment and evaluation of the acoustic noise environment associated with the New York City Rail Transit System, and the determination of combinations of noise abatement techniques for reducing the existing noises environment to specific levels at minimum cost.

PERFORMING AGENCY: Polytechnic Institute of New York
SPONSORING AGENCY: Urban Mass Transportation Administration

Grant NY-11-0010

STATUS: Active NOTICE DATE: July 1975 START DATE: Nov. 1973 COMPLETION DATE: Unknown TOTAL FUNDS: \$70,000

ACKNOWLEDGMENT: UMTA (NY-11-0010)

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
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: Feb. 1976 START DATE: Jan. 1974 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: \$61,092

ACKNOWLEDGMENT: UMTA (IL-11-0007)

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.

PERFORMING AGENCY: Bolt, Beranek and Newman, Incorporated
SPONSORING AGENCY: Transportation Systems Center, OS-507
RESPONSIBLE INDIVIDUAL: Fuller, G (Tel 617-4942349)

Contract DOT-TSC-1016 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: \$49,017

ACKNOWLEDGMENT: TRAIS (OS-507)

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

Contract DOT-TSC-1035 (CPFF)

STATUS: Active NOTICE DATE: July 1975 START DATE: May 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: \$69,150

ACKNOWLEDGMENT: TRAIS (OS-507)

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: Dec. 1974 START DATE: July 1974 COMPLETION DATE: June 1975 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 will be improved to include alterations to existing ambient air quality resulting from transportation network changes. The research will be conducted in three phases. The first will be a model for forecasting emissions. Emissions from stationary sources will be 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 will be calibrated for the Boston area which will be applicable to other urban areas. 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. 1975 TOTAL FUNDS: \$123,588

ACKNOWLEDGMENT: DOT

10 099437

MEASUREMENT OF TOXIC SUBSTANCES IN TRAIN CREW ENVIRONMENTS

The objective of this effort is to obtain measurements of contaminants that may be present in the breathing environment of the crews of road-haul freight trains engaged in normal railroad operations. Data will be taken on at least five railroad routes to sample variations in air contaminants with respect to mode and location of operation. Measurements will be made of nitric oxide, nitrogen dioxide, carbon monoxide, total hydrocarbon, aldehydes, ozone and particulates. The measurements will be correlated with salient features of engine performance, terrain and meteorological conditions. The results will be interpreted with respect to current air quality standards for implications for crew safety and wellbeing.

Funds for this project are administered by DOT/Transportation Systems Center, Cambridge, Mass.

PERFORMING AGENCY: Scott Environmental Technology, Incorporated
INVESTIGATOR: Souza, A (Tel 215-766-8861)
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Hobbs, J (Tel 617-494-2413)

Contract DOT-TSC-1071

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1975
COMPLETION DATE: Jan. 1975 TOTAL FUNDS: \$37,114

ACKNOWLEDGMENT: FRA

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 solid waste management. /SIE/

PERFORMING AGENCY: Harvard University, School of Engineering and Applied Physical Research

INVESTIGATOR: Thomas, HA

SPONSORING AGENCY: National Science Foundation, Division of Engineering Systems and Research, GI-35117A #3

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974
COMPLETION DATE: July 1975 TOTAL FUNDS: \$303,100

ACKNOWLEDGMENT: Science Information Exchange (GSQ 331 2)

10 128003

CONTINUOUS STATE-OF-THE-ART UPDATE-TRANSPORTATION NOISE ATTENUATION METHODS

This project is attempting to continuously review advances in transportation noise attenuation actually experienced by other agencies, to provide guidelines for design, evaluation and implementation of attenuation methods on specific transportation projects for which noise presents a high priority

problem, and to monitor the cost effectiveness of any transportation noise attenuation devices or methods implemented by M.T.C. or by others such as municipalities and/or private developers. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 4104

INVESTIGATOR: Jones, G Hajek, J

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: 1975
COMPLETION DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

10 129716

NOISE AND VIBRATION ASSESSMENT OF THE NEW YORK RAIL TRANSIT SYSTEM

The Performing Agency will contribute to a major effort to assess the noise climate on U.S. Rail Transit properties, to provide a common data base for problem ranking and abatement impacts. This will involve an assessment and evaluation of the magnitude of the rail transit noise problem and its abatement within the city of New York, concentrating primarily on lines on which the R44 (Air Conditioned) cars are scheduled. Assessment will include: (1) In-Train Noise; (2) Station Noise; (3) Community Noise Ranges and combinations of factors will be taken into account.

REFERENCES:

Noise in the New York City Transit System: An Assessment McShane, WR; Slutsky, Oct. 1975

Noise in the New York City Transit System: Abatement Methodology and Cost Estimate, McShane, WR; Slutsky, Oct. 1975

PERFORMING AGENCY: Polytechnic Institute of New York

INVESTIGATOR: Pignataro, LJ (Tel 212-643-5272) McShane, WR

SPONSORING AGENCY: Urban Mass Transportation Administration, University Research and Education Division

RESPONSIBLE INDIVIDUAL: Hughes, PG (Tel 202-426-0080)

Contract NY-11-0010

STATUS: Completed NOTICE DATE: Feb. 1976 START DATE: Nov. 1973
COMPLETION DATE: Dec. 1975 TOTAL FUNDS: \$110,400

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 associated with TACRV test operations. The TACRV Test Operations Program consists of the following tasks: Test Operations-HSGTC, Test Operations-Bethpage, Ingress/Egress System Design, Fabrication 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, Department of Transportation
 RESPONSIBLE INDIVIDUAL: Herringer, FC (Tel 202-426-4040)

Grant DOT-MD-11-0001-00

STATUS: Active NOTICE DATE: July 1974 START DATE: Apr. 1974 COMPLETION DATE: Apr. 1975 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.

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: Active NOTICE DATE: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Jan. 1976 TOTAL FUNDS: \$35,000

ACKNOWLEDGMENT: FRA

11 055786

A STUDY OF PRT VEHICLE CRASHWORTHINESS

The purpose of this contract is to obtain the engineering data required to delineate the particular crashworthiness requirements for the PRT-3 vehicle.

PERFORMING AGENCY: Northeastern University
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Tauro, A (Tel 617-4942421)

Contract DOT-TSC-750 (CR)

STATUS: Active NOTICE DATE: July 1975 START DATE: Aug. 1974 COMPLETION DATE: June 1975 TOTAL FUNDS: \$24,836

ACKNOWLEDGMENT: TRAIS (PR# TMP-0199)

11 058271

NUMERICAL ANALYSIS METHOD FOR LINEAR INDUCTION MOTORS

The principal objective of this project is to develop an accurate mathematical model of the linear induction motor. Model is correlated with available test data and other available mathematical models. The model being developed is the most general and postulates realistic 3-dimensional, finite-iron motors. Another important part of this inter-agency agreement is the application of the model to on-going hardware projects of interest to FRA.

PERFORMING AGENCY: Jet Propulsion Laboratory, California Institute of Technology

INVESTIGATOR: Elliott, DG (Tel 213-354-3486)

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Guarino, M (Tel 202-426-9564)

DOT-AR-30006

STATUS: Active NOTICE DATE: July 1975 START DATE: Sept. 1972 COMPLETION DATE: June 1976

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: Active NOTICE DATE: July 1975 START DATE: Jan. 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: FRA

11 058338

PERSONAL RAPID TRANSIT (PRT) TECHNOLOGY

Participate in technical review meetings and perform specific studies in areas including (1) Guideway Structures; (2) Site Related Studies; (3) Acoustic Noise; (4) Mechanical Structures; and (5) Architectural and Engineering Specifications.

PERFORMING AGENCY: Mitre Corporation
 SPONSORING AGENCY: Urban Mass Transportation Administration

Contract DOT-UT-50016/4 (CPFF)

STATUS: Active NOTICE DATE: Apr. 1975 START DATE: June 1974 COMPLETION DATE: May 1975 TOTAL FUNDS: \$150,000

ACKNOWLEDGMENT: UMTA

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: July 1975 START DATE: Apr. 1974 COMPLETION DATE: May 1975 TOTAL FUNDS: \$92,506

ACKNOWLEDGMENT: Office of Systems Development and Technology

11 058375

MORGANTOWN PRT IMPACT EVALUATION

The study will consist of the pre-PRT stage prior to the revenue 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.

PERFORMING AGENCY: West Virginia University
 SPONSORING AGENCY: Transportation Systems Center, UM-505

Contract DOT-TSC-985

STATUS: Active NOTICE DATE: June 1975 START DATE: Feb. 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$110,097

ACKNOWLEDGMENT: TSC (UM-505)

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--Provide a detailed description of the analytical model developed during the design effort.

PERFORMING AGENCY: Boeing Company, Aerospace Group
 SPONSORING AGENCY: Transportation Systems Center, UM-533
 RESPONSIBLE INDIVIDUAL: Van Meter, D

Contract DOT-TSC-994 (CPFF)

STATUS: Active NOTICE DATE: July 1975 START DATE: Mar. 1975 COMPLETION DATE: Nov. 1975 TOTAL FUNDS: \$10,344

ACKNOWLEDGMENT: TSC (UM-533)

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: June 1975 START DATE: Feb. 1975 COMPLETION DATE: Sept. 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
 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: July 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: \$40,000

ACKNOWLEDGMENT: TRAIS (PUR-50185)

11 058619

TECHNICAL STUDIES FOR HIGH PERFORMANCE PERSONAL RAPID TRANSIT (HPPRT) SYSTEM DEVELOPMENT PROGRAM

Studies will be performed in areas related to HPPRT system reliability, maintainability and availability requirements.

PERFORMING AGENCY: Smith (Frank C.) and Associates
 SPONSORING AGENCY: Urban Mass Transportation Administration, TX-06-0016
 RESPONSIBLE INDIVIDUAL: Hamm, J (Tel 202-4269264)

Contract TX-06-0016

STATUS: Active NOTICE DATE: July 1975 START DATE: Apr. 1975 COMPLETION DATE: Oct. 1975 TOTAL FUNDS: \$19,800

ACKNOWLEDGMENT: TRAIS (TX-06-0016)

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: Aug. 1975 START DATE: Dec. 1974 COMPLETION DATE: June 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. /RTAC/

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 1975 START DATE: Oct. 1971 COMPLETION DATE: Oct. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

11 128001

MOAR FLOATWAYS FLOATING CONVEYER BELT DEMONSTRATION AND RESEARCH PROJECT

The floating conveyor belt demonstration or research project is a test facility set up to refine the development of a floating conveyor belt. The floating conveyor belt is an innovative design for materials handling in situations where large quantities and relatively long distance hauls are required. The objectives of the project are to refine the belt design by experimentation with different materials and belt configurations and to test operating characteristics in a variety of conditions. /RTAC/

PERFORMING AGENCY: Moar Floatways Limited

INVESTIGATOR: Moss, IP Grimble, DL

SPONSORING AGENCY: Alberta Department of Industry & Commerce, Canada

STATUS: Active NOTICE DATE: Oct. 1975 START DATE: July 1974

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

11 128009

TIME DEPENDENT FIELD MEASUREMENTS OF TDS GUIDEWAY

The time-dependent behavior of a six span section of the TDS Guideway is being measured and analyzed. Instrumentation on guideway sections will measure deflections, strains and slopes. Data from the field measurements will be used to determine any beam discontinuities that could contribute to an uneven ride on the test track. The field measurements will be compared with predicted values based on the laboratory tests. Where discrepancies exist improvements in the design procedure for time-dependent effects will be developed. The Portland Cement Association, Skokie, Illinois will act as Consultants to the Ministry of Transportation and Communications of Ontario in this work. An accurate knowledge of the material properties of concrete is necessary for the design and construction of smooth riding, zero

camber beams. Laboratory work is underway (W.O. 10931-23) that will predict the behavior of the guideway. Camber values, etc., will be compared with predicted values based on the laboratory work. In this way the engineering data needed for the precise calculation of the initial and time-dependent deformations of the guideway will be determined. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, W.O. 10931-25&26

INVESTIGATOR: Russell, H Ryell, J

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: Sept. 1975 START DATE: Apr. 1974 COMPLETION DATE: 1976

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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, TRAIS

12 045986

JOB KNOWLEDGE REQUIREMENTS

The contractor shall supply the necessary facilities, services, materials and personnel to perform the work specified as follows: For the jobs of locomotive engineer, train dispatcher, front-end brakeman rear-end brakeman/flagman and conductor, prepare: Item 1. A statement of this minimum job knowledge requirements for the safe performance of duties. Item 2. A statement of the minimum job skill requirements for the safe performance of duties. Item 3. A statement of the minimum training requirements for the safe performance of duties Item 4. A proposed written test of the job knowledge required in Item 1. Item 5. Proposed proficiency checks as tests of the jobs skills required in Item 2.

REFERENCES:

Proposed Qualification Requirements for Selected Railroad Jobs, Hale, A; Jacobs, HH, National Technical Information Serv, Springfield, Va., 21161, FRA-OR&D-75-44, May 1975

PERFORMING AGENCY: Dunlap and Associates, Incorporated
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Votolato, AC (Tel 617-4942190)

STATUS: Completed NOTICE DATE: July 1975 START DATE: Jan. 1971 COMPLETION DATE: May 1975 TOTAL FUNDS: \$51,594

ACKNOWLEDGMENT: TRAIS

12 048571

RAIL SAFETY/EQUIPMENT

This project seeks the improvement of 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 important areas.

PERFORMING AGENCY: Transportation Systems Center
INVESTIGATOR: Lavery, AL (Tel 617-4942040)
SPONSORING AGENCY: Federal Railroad Administration

PPA Contr. PPA-RR-X14

STATUS: Active NOTICE DATE: July 1975 START DATE: Sept. 1973 TOTAL FUNDS: \$1,093,500

ACKNOWLEDGMENT: FRA

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 048905

FACTORS AFFECTING RAILROAD CREW VIGILANCE

The objective of this procurement was to conduct experimental studies of factors related to the maintenance of alertness in railroad train crews. Experiments were performed in a locomotive cab mockup located at the U. S. Army Materials Research Agency in Watertown, Massachusetts. Subjects were required to make manual responses to colored light signals infrequently presented during an otherwise uneventful run of several hours. Brain waves, muscle potentials, eye movements body movements, and reaction times were recorded and correlated with incidents of missed signals or wrong responses in a search for indices of loss of attention. Although the measures studied have been of value as criteria in previous laboratory studies, the results failed to reveal any physiological or behavioural indices of attention loss readily applicable to in-cab monitoring and alerting systems.

PERFORMING AGENCY: Johnson (Lawrence) and Associates
SPONSORING AGENCY: Transportation Systems Center; Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Votolato, AC (Tel 617-494-2190)

Contract DOT-TSC-817 (CPFF)

STATUS: Completed NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Mar. 1975 TOTAL FUNDS: \$21,477

ACKNOWLEDGMENT: TSC

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, critiquing 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
SPONSORING AGENCY: Transportation Systems Center

Contract TSC-860 (CPFF)

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 TOTAL FUNDS: \$35,260

ACKNOWLEDGMENT: TRAIS (PR# SP-0063 & A)

12 048967

OPTIMIZATION OF AUDIBLE WARNING DEVICES

The objective of this contract is to maximize effectiveness and minimize annoyance of motor and railroad carrier emergency audible warning signals.

The requirements for both urban and suburban areas will be investigated.

PERFORMING AGENCY: Society of Automotive Engineers
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Kelleher, DJ (Tel 617-494-2144)

Contract DOT-TSC-868

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: June 1975 TOTAL FUNDS: \$99,000

ACKNOWLEDGMENT: TRAIS

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.

PERFORMING AGENCY: Ultrasystems, Incorporated, Dynamic Science Division

SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Kelleher, DJ (Tel 617-4942144)

Contract DOT-TSC-840 (CPFF)

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Apr. 1975 TOTAL FUNDS: \$520,679

ACKNOWLEDGMENT: TRAIS (PR# TME-1028-RN)

12 050004

TRANSPORTATION OF WATERBORNE HAZARDOUS MATERIALS IN THE WEST GULF COASTAL REGIONS OF TEXAS: ECONOMIC CONSIDERATIONS OF THE RISK INVOLVED

To develop a systematic approach to the evaluation of the risk involved in transporting waterborne hazardous materials in the coastal region of Texas: (a) To determine the present and projected movement of hazardous materials on the waterways of the coastal region, by commodity classification and type of transportation equipment used in the movement. (b) To determine the historical accident experience (from 1960) of water transport bulk cargo vessels (barge and ship) by principal commodity carried on Texas coastal region waterways. (c) To estimate the amount of spill involved in each of the accidents identified. (d) To estimate the economic cost of these accidents to society. (e) To develop methodology for determining accident potential for selected waterways, specific sites (e.g. bridges and curves), type of vessel and type of commodities transported. The results of this study will be applicable to establishing safety standards for the transport of hazardous materials on Texas Coastal Waterways; providing shippers with estimates of risk involved in moving hazardous materials on the coastal waterways; establishing priorities for the allocation of funds for safety improvement in Texas coastal waterways; identifying cargos and vessels most subject to accidents; and establishing estimates of total cost of waterborne hazardous materials transportation accidents in Texas coastal waterways.

Related project: R/Eq-1.

PERFORMING AGENCY: Texas A&M University

INVESTIGATOR: Richards, HA Dresser, GB Bridges, GS
SPONSORING AGENCY: National Oceanic and Atmospheric Administration, Sea Grant Office, Department of Commerce, R/CRM-3

Grant 04-3-158-18

STATUS: Active NOTICE DATE: May 1975 COMPLETION DATE: June 1975 TOTAL FUNDS: \$20,475

ACKNOWLEDGMENT: National Oceanic and Atmospheric Administration

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 reseal 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, DF342540

RESPONSIBLE INDIVIDUAL: Dancer, D (Tel (202)426-1227)

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1973 COMPLETION DATE: Dec. 1975

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 1975 START DATE: May 1973 COMPLETION DATE: Dec. 1976

ACKNOWLEDGMENT: FRA

12 058268

HAZARDOUS MATERIAL RAILROAD TANK CAR TORCHING 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 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: Townsend, W (Tel 301-272-3979)

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Dancer, D (Tel 202-426-1227)

AR-44061

STATUS: Active NOTICE DATE: July 1975 START DATE: Feb. 1974 COMPLETION DATE: Sept. 1976

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 effectiveness with present standard signals.

PERFORMING AGENCY: South Dakota University

INVESTIGATOR: Berkhout, J

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: McGuire, CW (Tel 202-4264468)

Contract DOT-OS-50121 (CS)

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: \$27,057

ACKNOWLEDGMENT: TRAIS (PUR-50156)

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: Feb. 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 tank 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 hazardous 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, Rail Safety Research Office

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

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.

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 312-225-9600)

STATUS: Active NOTICE DATE: Aug. 1975 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: Feb. 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 defined, and, finally, to prepare for subsequent full scale tests. This was followed by two fullscale fire tests, one with an uncoated and the other with a coated tank. A report on these fire tests is under preparation. 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 the FRA at its Pueblo, Colorado, 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 insulation-jacket type thermal shield systems.

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: Feb. 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: Inactive NOTICE DATE: Feb. 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 099428

RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 6-SAFETY VALUE 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 312-5673607)

STATUS: Active NOTICE DATE: Feb. 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 four year period 1971/1974. 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: Feb. 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

13 045012

PENN CENTRAL ELECTRIFICATION NEW YORK TUNNELS 25 KV VS. 12.5/25 KV

The Contractor shall perform engineering services and furnish recommendations and appropriate reports by studying alternatives to the proposed re-electrification of the New Haven Region of the Penn Central Railroad and by studying the feasibility of employing 25kv overhead power supply between New Haven, Conn. and New York, N.Y., including the N.Y. Connecting RR.

PERFORMING AGENCY: Gibbs and Hill, Incorporated
SPONSORING AGENCY: Federal Railroad Administration, FRA-ONECD-75-51

Contract DOT-FR-30065 (CPFF)
STATUS: Completed NOTICE DATE: July 1975 START DATE: June 1973 COMPLETION DATE: Apr. 1975 TOTAL FUNDS: \$28,780

ACKNOWLEDGMENT: FRA

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 058415

PROVIDE AC AND DC POWER TO THE UMTA TEST TRACK AND ANCILLARY FACILITIES AT THE TTC, PUEBLO

AC service of 120/208 volts of approximately 150 KVA and DC power of 600-750 volts of approximately 500 KVA is required at the Transit Maintenance Building. A maximum of 4000 KW DC power shall be provided at the Track with capability of variable voltage from 600-750 volts DC.

PERFORMING AGENCY: Ground Transportation Development Center, Federal Railroad Administration
SPONSORING AGENCY: Transportation Systems Center

ID RA-75-28

STATUS: Active NOTICE DATE: June 1975 START DATE: Mar. 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: \$100,000

ACKNOWLEDGMENT: TSC (612-0294)

13 099411

CANADIAN RAILWAY ELECTRIFICATION STUDY PHASE I-DEVELOPMENT OF STUDY PLAN

OBJECTIVES: To bring into sharper focus the time frame that electrification 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: Cornil, 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: Feb. 1976 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: \$117,000

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 occurred. 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

15 045815

BART IMPACT PROGRAM

Under this task TSC will provide 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 (task #1) 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: Bouchard, R (Tel 202-4260163)

Contract DOT-OS-30176/1

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1973 TOTAL FUNDS: \$54,419

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 TOTAL FUNDS: \$196,000

ACKNOWLEDGMENT: TRAIS (PR# DOT-OS-40001)

15 045967

RE-USE PLANNING OF TRANSPORTATION PROPERTY ABANDONMENTS

To develop an operational planning paradigm which coordinates considerations of re-use potential with the more immediate aspects of transportation prospective abandonments of rail branch lines, secondary roads, and general aviation airports, in a manner which anticipates long-term trends in excess transportation plant and in the dearthness of land resources. The abandonment study will stress the systematic analysis of re-use potential and the integration of that analysis into existing institutional procedures for abandonment decisions. A multimodal perspective would be realized, embracing aviation airports. Principal techniques include substantive legal research, systems analysis of re-use demand and market areas, and prototype test applications in cooperation with state agencies in Iowa.

REFERENCES:

Proposed Abandoned Railroad Right-of-Way Re-Use Act Baldus, DC; Grow S, Oct. 1974

Railroad Abandonment: The Administrative Decision-Making Process, Mazziotti, DF; Meyer, M, June 1974

Railroad Abandonment and Re-Use Planning: Relationship with State-wide Transportation Planning and Citizen Participation, Mazziotti, DF; Meyer, M; Ducker, KJ, Aug. 1974

PERFORMING AGENCY: Iowa University

INVESTIGATOR: Ducker, KJ

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Nupp, BL (Tel 202-4264447)

Contract DOT-OS-40019 (CS)

STATUS: Active NOTICE DATE: July 1975 TOTAL FUNDS: \$69,388

ACKNOWLEDGMENT: TRAIS (PR# DOT-OS-40019)

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: Feb. 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: Feb. 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: Putnam, 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: Feb. 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: Office of Policy, Plans and International Affairs

RESPONSIBLE INDIVIDUAL: Weiner, E (Tel 202-426-4168)

Contract DOT-OS-50160

STATUS: Programmed NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: Office of Policy, Plans and International Affairs

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: Knoop, P (Tel 617-4942128)

Contract DOT-TSC-1007 (CR)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1975 COMPLETION DATE: Apr. 1976 TOTAL FUNDS: \$99,896

ACKNOWLEDGMENT: TSC (OS-514)

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 conceptual 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: Sept. 1975 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: Feb. 1976 START DATE: June 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: \$43,800

ACKNOWLEDGMENT: OST

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

INTEGRATE 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: Eckland, J (Tel 202-4261227)

Contract DOT-FR-40009

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: Mar. 1974 COMPLETION DATE: Apr. 1975 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: MacDwen, GH

SPONSORING AGENCY: Canadian Pacific; Ministry of Transport, Canada, Transportation Development Agency; Queen's University, Canada

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Apr. 1977

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

17 081792

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE I, TASK 5--ESTABLISH MECHANISMS FOR REPORTING SYSTEM PROBLEMS RELATING TO TRACK TRAIN DYNAMICS

The objective of this task is to develop a perpetual system for collection of Track Train Dynamics data, including the selection of data analysis techniques, software and a mechanism for advising the industry of trends and significant occurrences. AAR and FRA have worked cooperatively toward development of train accident reporting short forms, and FRA issued a handbook entitled 'FRA Guide To Incident Reports.' Although reporting forms and instructions will probably undergo some revision, certain data elements are of particular interest to the Program, including route identification, milepost location, first car involved, causing car, number of locomotives, location of loads and empties, and similar data. AAR is now working to develop long forms for train accident reporting to provide more detailed information. FRA is now utilizing a computerized data management system for storage and retrieval of accident data with AAR having terminal access to this information.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Lind, EF

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transportation Development Agency

RESPONSIBLE INDIVIDUAL: Lind, EF (Tel 312-225-9600 Ext 866)

STATUS: Active NOTICE DATE: July 1975 START DATE: 1972

ACKNOWLEDGMENT: AAR

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 RRIIS 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 415-362-1212)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: 1975 COMPLETION DATE: Jan. 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 analyze 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 415-362-1212 X-21016)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: 1975 COMPLETION DATE: Jan. 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: Leilich, GM

STATUS: Active NOTICE DATE: Jan. 1976 START DATE: 1975 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: AAR

17 099405

MECHANIZED INVENTORY CONTROL SYSTEM FOR FREIGHT CARS IN RAILWAY CLASSIFICATION YARD

To develop a mechanized inventory control system for a railway hump yard to improve supply of railroad cars to Canadian shippers and increase railway productivity. Objectives: 1. To develop an improved inventory control system for a railway terminal, using available technology including minicomputers, cathode ray tube (CRT) inquiry devices and automatic car identification (ACI) scanners. 2. To transfer the knowledge gained in the development of this system to other members of the railway industry. 3. To improve service in the Montreal yard. 4. To monitor implementation problems in the introduction of an automated information system in a rail terminal.

PERFORMING AGENCY: Canadian National Railways

INVESTIGATOR: Hoisak, P (Tel 513-877-5430)

SPONSORING AGENCY: Transportation Development Agency

RESPONSIBLE INDIVIDUAL: Ruddback, NE (Tel 514-283-4077)

Contract MOT-95668

STATUS: Completed NOTICE DATE: Aug. 1975 START DATE: Feb. 1972 COMPLETION DATE: Mar. 1975 TOTAL FUNDS: \$185,000

ACKNOWLEDGMENT: Transportation Development Agency

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.

Funding for this project has been allocated as of January 1975 but the contract has not yet been awarded to a performing organization.

SPONSORING AGENCY: Urban Mass Transportation Administration

IT-06-0094

STATUS: Active NOTICE DATE: Aug. 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: \$860,000

ACKNOWLEDGMENT: UMTA

17 099420

FINANCIAL ACCOUNTING AND REPORTING ELEMENTS (FARE), TASKS I-IV

Financial and statistical information reported by transit operators has proven to be unreliable or incompatible due to varying accounting practices and procedures. This project, conducted with the advice of appropriate transit officials, is an attempt to create a comparable reporting scheme and to provide transit operators and government at all levels with a basis for planning, decision-making and action. Under Phases I-IV of this project, a standard system of financial accounting and reporting elements with selected operating statistics was developed. Direct input to the project by the transit industry was provided through the Industry Control Board and other interested agencies. Under Phase V of the FARE project, additional effort to develop management information systems using the FARE data base will be undertaken.

Project FARE Task II and Task III Reports, Set of Four Volumes, PB-222-041

Task and Project Summary and Reporting Systems, Set of Five Volumes, PB-226-358

PERFORMING AGENCY: Andersen (Arthur) and Company

SPONSORING AGENCY: Urban Mass Transportation Administration

IT-06-0034

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Aug. 1972 COMPLETION DATE: July 1975 TOTAL FUNDS: \$1,185,000

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.

Cargo Data Interchange System-CARDIS-Data Elements, Functions, and Information Standardization, National Committee on International Trade Documentation, June 1975, PB244072/AS

Preliminary Functional Specification for a Prototype Electronic Data Interchange System, Transportation Data Coordinating Committee, July 1975, PB244092

System Concept Study for a Cargo Data Interchange System (CARDIS), Computer Sciences Corporation-TSC-DOT, Apr. 1975, PB245865IAS

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, Department of Transportation

RESPONSIBLE INDIVIDUAL: Ronayne, M (Tel 202-4264317)

Contract DOT-PS-50017

STATUS: Active NOTICE DATE: Feb. 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 and direct connection with the Chicago Railroad Terminal Information System. Project will serve as a prototype interface between a large terminal information and management system and a railroad-level system.

PERFORMING AGENCY: Grand Trunk Western Railroad

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Shamberger, RC (Tel 202-426-2608)

Contract DOT-FR-4-5020

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Jan.

1976 COMPLETION DATE: Mar. 1977 TOTAL FUNDS: \$1,000,000

ACKNOWLEDGMENT: FRA

18 045249

DEVELOP A STANDARD TRANSPORTATION COMMODITY DESCRIPTION AND CODING SYSTEM

Tasks include: 1. Analyze the requirements for freight tariffs, statistical collection systems, Government controls, foreign and domestic requirements. 2. Review the descriptions from an operational standpoint to determine whether each description meets the operational and other needs of the transportation community. 3. Select the paper products category as the initial to develop description criteria and catalog the descriptions covering the paper products category. 4. Select additional product categories based upon industry, Federal Government, and Customs Cooperation Council recommendations.

PERFORMING AGENCY: Transportation Data Coordinating Committee
SPONSORING AGENCY: Department of Transportation, Office of Facilitation
RESPONSIBLE INDIVIDUAL: Merker, MS (Tel 202-4264317)

Contract DOT-OS-10205

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1971 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$252,000

ACKNOWLEDGMENT: FRA (PR# DOT-OS-10205), TRAIS

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, 4.33.74

INVESTIGATOR: Darling, H

SPONSORING AGENCY: Canadian Institute of Guided Ground Transport

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Dec. 1975

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.

PERFORMING AGENCY: Tops-on-Line Service, Incorporated

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel 202-426-0771)

Contract DOT-FR-30032

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: 1973 TOTAL FUNDS: \$62,100

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.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Pomponio, J (Tel 202-426-0771)

Contract DOT-FR-55055

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1975 COMPLETION DATE: Jan. 1978

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

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.

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 (C)
 STATUS: Active NOTICE DATE: July 1975 START DATE: May 1973 COMPLETION DATE: May 1976 TOTAL FUNDS: \$384,999

ACKNOWLEDGMENT: TRAIS (PR.# PUR-1-30303)

20 048497

CONTAINERIZATION AND THE GREAT LAKES TRANSPORTATION SYSTEM

1. To update data previously collected on the effects of containerization on the Great Lakes area. 2. To present governmental policy recommendations for the shipping and port industries. State, Regional and Federal government policy making agencies will be provided this information to aid in developing rational policies toward the shipping and port industries. This information will also be useful to officials in the shipping and port industries in meeting the problems posed by expanding containerization.

A report published in 1967 using 1964 data by E. Schenker entitled, "Effects of Containerization on Great Lakes Ports" has been updated. The purpose of this updating was to determine whether the conclusions are still valid in accordance with present more recent data (1970) concerning the general cargo traffic in the Great Lakes ports; or, in other words, have the trends upon which the projections and recommendations were based continued through the years after the study was made?

Related projects are: PC-1, PC-5, PC-7.

PERFORMING AGENCY: Wisconsin University, Milwaukee, Center for Great Lakes Studies
 INVESTIGATOR: Schenker, E Brockel, H
 SPONSORING AGENCY: National Oceanic and Atmospheric Administration, Sea Grant Office, Department of Commerce, 04-3-158-5 #1 R/PC-1

(11615)

STATUS: Active NOTICE DATE: May 1975 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: National Oceanic and Atmospheric Administration, Science Information Exchange (GBP 1704)

20 051254

EFFECT OF TRANSPORTATION RATES, FACILITIES, AND INSTITUTIONS UPON THE GRAIN-MARKETING SYSTEM IN MONTANA

OBJECTIVE: Determine present railroad and truck rate structure for grain moving within and out of Montana; determine changes in railroad grain loadings and rates over past 40 years as compared with production; analyze movements of grain directly from farms and elevators, both by truck and railroad. Determine handling methods, rates, pricing, origin, destination and uses for grain handled by truck from farm and elevator points in Montana; determine effects of barge services on Columbia upon truck and rail transportation in Montana. Determine effects of trends in transportation methods and rates on grain-pricing methods and institutions in Montana, with special attention to different kinds of wheat and other grains. APPROACH: Will use secondary data and information obtainable from regulatory authorities. Also obtain data from carriers and farmers through use of questionnaires. Transportation models and location theory will be applied to data in analysis. PROGRESS: With respect to research in the transportation area in general, further reading of the literature has been done and working relationship with Gene Carroll, the State Department's transportation specialist, has been developed. Various research topics have been discussed, various current transportation problems have been attacked, and an investigation is underway to determine what the crucial problems are so an extension of the work already done can be accomplished.

PERFORMING AGENCY: Montana State University, Bozeman, Department of Agricultural Economics
 INVESTIGATOR: McConnen, RJ St George, G
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1975 START DATE: Dec. 1965 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Science Information Exchange (CRIS-0002036), Current Research Information System

20 051256

ECONOMIC EFFECT OF CHANGING RAILROAD SYSTEMS ON GRAIN HANDLING FIRMS

OBJECTIVE: Estimate the effect of railroad abandonment or reduced service on country elevator operations. Determine the needed adjustment in the grain industry resulting from railroad abandonment or reduced services. Evaluate alternative options open to country elevator operations in adjusting to these changes. Estimate the effect of these changes on the flow of grain shipments. APPROACH: Develop a model describing the grain transportation system in Iowa. Collect data for use in the model. Complete the analyses required to achieve the objectives. PROGRESS REPORT: Optimal transportation system solutions have been obtained for corn and soybeans shipped out of a 6-1/2 county area around Fort Dodge, Iowa. These solutions were based on a Stollsteimer type two stage, multiperiod transshipment plant-location model. Transportation alternatives studied included the traditional single-car system, 3-10-car shipments, 50-car, 80-car and 115-car trains, truck, truck-barge, rail-barge, containers and belt lines. Generally, the highest net revenue was obtained by using a subterminal system to assemble large quantities of grain into multiple-car shipments. The optimum number of subterminals varied depending on the rate structure and the amount of rail maintained in each analysis. The least cost location of grain production and transportation from 152 producing regions to 78 consuming regions were obtained for 10 alternative transportation cost structures and demands for grain projected for 1980. The least cost transportation mode--rail, water, truck, or combination of them--was used for each shipment. Three levels of barging costs and five different rail costs were used. Grain transportation will continue expanding and more exports are likely to flow through the Northwest ports. The production location for grain is not sensitive to transportation costs.

REFERENCES:

An Economic Analysis of Alternative Grain Transportation Systems: A Case Study, Eaumel, CP; Drinka, TP; Lifferth, DR; Miller, JJ, National Technical Information Service, PB-224819

Interrelationships of Grain Transport. Prod and Demand: A Cost Analysis and Proj. of Grain Shipments in US for 1980, Fedeler, JA; Heady, EO; Koo, Wk, NTIS, Dept of Commerce

Freight Transport Demand Analysis

PERFORMING AGENCY: Iowa State University, Ames, Agricultural Experiment Station
 INVESTIGATOR: Baumel, CP Thompson, WH
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1975 START DATE: Dec. 1969 COMPLETION DATE: June 1974

ACKNOWLEDGMENT: Science Information Exchange (CRIS-0056040), Current Research Information System

20 051259

IMPACT OF CHANGING TRANSPORTATION SYSTEMS ON LOCAL GRAIN AND FARM SUPPLY FIRMS

OBJECTIVE: 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 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. PROGRESS: Optimal transportation system solutions have been obtained for corn and soybeans shipped out of a 1-1/2 county area around Fort Dodge, Iowa. These solutions were based on a Stollsteimer type two stage, multiperiod transshipment plant-location model. Transportation Alternatives Studies included the traditional single-car system, 3-10-car shipment, 50-car, 80-car and 115-car trains, truck, truck-barge, rail-barge, containers and belt lines. Generally, the highest net revenue was obtained by using a subterminal system to assemble large quantities of grain into multiple-car shipments. The optimum number of subterminals varied depending on the rate structure and the amount of rail maintained in each analysis.

PERFORMING AGENCY: Iowa State University, Ames, Agricultural Experiment Station
 INVESTIGATOR: Baumel, CP Thompson, WH Wisner, RN
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS-0060521)

20 051260

IMPACT OF CHANGING TRANSPORTATION SYSTEMS ON LOCAL GRAIN AND FARM SUPPLY FIRMS

OBJECTIVE: 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. 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. PROGRESS: Least-cost movement pattern for Kansas wheat has been estimated by computer model for 1971-72 and compared with market flows as determined by market survey. Estimates of fertilizer consumption by county for Kansas for 1975 and 1980 is nearing completion. Development of origin points and quantities and transport rate data is in progress to be used in a least-cost flow model.

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PERFORMING AGENCY: Kansas State University, Agricultural Experiment Station
 INVESTIGATOR: Sorenson, LO McCoy, JH
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Science Information Exchange (CRIS-0061435), Current Research Information System

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, GA (Tel 202-4264420)

IA DOT-AS-50042

STATUS: Active NOTICE DATE: July 1975 START DATE: Feb. 1975 COMPLETION DATE: Dec. 1975 TOTAL FUNDS: \$30,000

ACKNOWLEDGMENT: TRAIS

20 058460

TRANSPORTATION OF ENERGY MATERIALS

Identify and quantify mode shipment characteristics and flows of energy materials primarily through the use of personal interviews with energy carriers and working knowledge of the modes of transportation and computer capabilities. Identify the mode shipment characteristics by region and final user of energy materials in the U.S.

PERFORMING AGENCY: Small Business Administration
 SPONSORING AGENCY: Transportation Systems Center, OP-502
 RESPONSIBLE INDIVIDUAL: Tauro, A (Tel 617-4942421)

IA TSC-1000

STATUS: Active NOTICE DATE: June 1975 TOTAL FUNDS: \$29,994

ACKNOWLEDGMENT: TRAIS (OP-502)

20 058467

INTERCITY FREIGHT DEMAND FORECASTING

Emphasis will be placed on evaluating existing data sources and recommendations for new collection techniques needed to acquire better data necessary for more effective forecasts of commodity flows. The analysis of the structural form of the model and definition of the variables will be coordinated with ongoing modeling efforts at MIT. Alternative methods of data collection will be investigated including relative cost aspects.

PERFORMING AGENCY: Massachusetts Institute of Technology
SPONSORING AGENCY: Transportation Systems Center, OP-509
RESPONSIBLE INDIVIDUAL: Tauro, A (Tel 617-4942421)

Contract DOT-TSC-1005 (CR)

STATUS: Active NOTICE DATE: June 1975 START DATE: Apr. 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: \$37,736

ACKNOWLEDGMENT: TRAIS (OP-509)

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, OS-514
RESPONSIBLE INDIVIDUAL: Tauro, A (Tel 617-4942421)

IA TSC-1028 (FFP)

STATUS: Active NOTICE DATE: June 1975 START DATE: May 1975 COMPLETION DATE: Apr. 1976 TOTAL FUNDS: \$49,988

ACKNOWLEDGMENT: TRAIS (OS-514)

20 058488

AN EXPERIMENT IN FREIGHT MODAL CHOICE: DELINEATING THE RAIL-TRUCK INTERFACE

Specific objectives are: 1-To identify the economic characteristics of freight traffic which is rail and truck competitive in more detail than has been practicable to date. 2-To identify the marketing strategies most likely to succeed in attracting freight traffic to the most socially desirable and efficient mode of rail or truck transportation in terms of governmental economic, energy, and environment policies; 3-To estimate the true magnitude of any misallocation of traffic between the rail and truck modes of transportation and what might be done to alleviate that misallocation.

PERFORMING AGENCY: Pennsylvania State University, University Park
INVESTIGATOR: Stenger, AJ
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Meck, JP (Tel 202-4264138)

Contract DOT-OS-50210 (CS)

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: July 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: \$42,266

ACKNOWLEDGMENT: TRAIS (PUR-50232)

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

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: Aug. 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: \$64,529

ACKNOWLEDGMENT: TRAIS (PUR-50030)

20 080313

DEMAND INFORMATION AND FORECASTING RESEARCH PROJECT

To develop functional specifications for an advanced demand information and forecasting system to support intra-railroad car distribution. The system will be sufficiently generalized that it could be adopted by most Class I rails on a voluntary basis. Phase I of the project, now completed and a report prepared, identified the requirements of the data system and the most promising forecasting technique. Sample data from several railroads collected and analyzed to provide information about the current environment and associated problems. In Phase II, the recommendations of Phase I will be implemented on a Class I railroad. This demonstration is expected to provide the framework for evaluating the technical feasibility, operational suitability and economic desirability of the systems for other carriers.

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: Minger, WK (Tel 202-293-6256)

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Braddock, CH (Tel 202-4262920)

Contract DOT-FR-30058

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: 1974 COMPLETION DATE: 1976

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 modes 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, Ontario, Report 72-2,

Jan. 1972

A Railcar Network Model of the Canadian Pacific Railway System, Fullerton, HV, CIGGT, Queen's University, Kingston, Ontario, Report 72-3, Jan. 1972

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, Report 72-10 CIGGT, Aug. 1972

Canadian Freight Transport Data Base Petersen, ER, CIGGT, Queen's University, Kingston, Ontario, Report 73-4, May 1973

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: Active NOTICE DATE: Oct. 1975 START DATE: May 1971

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

20 080334

DATA MANAGEMENT SYSTEM FOR TRANSPORTATION DATA BASE

An existing intermodal freight transport data base containing rail, ship and for-hire trucking data on a common origin/destination/commodity basis for all of Canada is now being adapted for more general use by researchers. This permits intermodal freight traffic analysis to a degree of detail never before possible. /RTAC/

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 5.14.73

INVESTIGATOR: Graham, LJ

SPONSORING AGENCY: Canadian Institute of Guided Ground Transport; Queen's University, Canada

STATUS: Active NOTICE DATE: May 1974 START DATE: Oct. 1973 COMPLETION DATE: Sept. 1975

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, retarded 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: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0064467)

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 subsidies, 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 Integration - 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: July 1975 START DATE: July 1971 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (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 to 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

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1973 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0064289)

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 083525

A RATE-COST ANALYSIS OF NEBRASKA LIVESTOCK AND MEAT TRANSPORTATION WITH GRAIN SHIPMENT COMPARISONS

The objectives of this project are to: Determine geographic patterns of interstate shipments of Nebraska livestock and meat; Determine extent to which backhauls are available and economically significant to livestock and meat truckers; Measure costs of truck shipments of livestock and meat; Obtain truck and rail rates for livestock and meat shipments; Compare truck costs with truck and rail rates; and compare costs and rates for livestock and meat shipments with those for grain shipments. Costs of livestock and meat trucking services are being measured using measured using economic-engineering techniques. Cost data have been collected and partially analyzed. Resulting costs are being compared with rail and truck published rates for meat shipments. Preliminary results indicate rates correspond closely with costs if no costs are allocated to backhauls. Any backhaul revenue received by model firms constitutes pure profit. Livestock/meat transport cost differentials in combination with weight loss in processing make long distance shipment of meat more economical than that for live animals.

PERFORMING AGENCY: Nebraska University, Lincoln, Department of Agricultural Economics, NEB-10-068
 INVESTIGATOR: Anderson, D
 SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1973 COMPLETION DATE: July-1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0063941)

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 guidelines 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. Comparisons 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 guidelines 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, D
 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 decision-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, DE

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 099080

SYSTEMS ANALYSIS OF THE ECONOMICS OF GRAIN MARKETING

OBJECTIVE: Investigate the operations of marketing systems as they affect: Communications and market information needs. Managerial decision-making by grain marketing firms. APPROACH: Kansas will be primarily concerned with objectives b.2 and 4. Will develop a model to be used to analyze and evaluate 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 and improving existing models or creating new models. Operating parameters and external constraints of marketing firms will be assembled and evaluated. These data will be obtained from private and public agencies including EDP companies and trade associations. PROGRESS: An analytical model has been developed for use in selecting the most efficient utilization of existing rail equipment and shipment patterns for shipment of grain stored in terminal elevators to meet a given demand, with the goal of optimization in the performance of

the grain marketing system. Limited testing indicates the subsystem model will be highly useful and could result in substantial cost savings, thus reducing the cost margin between farmers and consumers. Further research and testing is planned.

PERFORMING AGENCY: Kansas State University, Agricultural Experiment Station

INVESTIGATOR: Schruben, LW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, 0061432 KAN00827

STATUS: Active **NOTICE DATE:** Dec. 1973 **START DATE:** July 1973 **COMPLETION DATE:** June 1974

ACKNOWLEDGMENT: Science Information Exchange (GY 61432 1)

20 099083

PREDICTED EFFECTS OF SELECTED POLICY AND TECHNOLOGY CHANGES ON THE GRAIN MARKETING SYSTEM

OBJECTIVE: Evaluate the effects of alternative government policies and technological changes on the market structure in the grain industry. **APPROACH:** Illinois' contribution to SM-42 will focus on the identification of marketing facilities and flows 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. **PROGRESS:** Research on grain flows and grain surplus-deficit regions was reported at an industry seminar. All areas of Illinois produce a surplus of feed grains. Corn moving out of Illinois moves to three major destinations: 24% to Gulf ports, 4% to Chicago, and 49% to southeastern feed markets. Most soybean shipments are made to local processor (70%) with truck accounting for most of the transportation used. Of the total shipments from Illinois elevators, 17% moves by water, 53% by truck and 30% by rail. A data reporting system to identify fuel, transportation, and storage problems by county and district in Illinois was developed and a series of 8 monthly reports were initiated. These reports provided direct assistance to farmers and grain firms seeking alternatives in the face of fuel shortage. The data were also used by government and industry personnel in making policy decisions.

PERFORMING AGENCY: Illinois University, Urbana, Agricultural Experiment Station

INVESTIGATOR: Hill, LD Scott, JT

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, 0006106 ILLU-05-0374

STATUS: Active **NOTICE DATE:** Dec. 1974 **START DATE:** July 1974 **COMPLETION DATE:** June 1975

ACKNOWLEDGMENT: Science Information Exchange (GY 6106 6)

20 099086

POTENTIAL FOR EXPANDING GRAIN STORAGE IN NEW ENGLAND AND ACHIEVING FREIGHT RATE REDUCTIONS

OBJECTIVE: 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. **APPROACH:** 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.

PERFORMING AGENCY: Connecticut University, Storrs, Agricultural Experiment Station

INVESTIGATOR: Seaver, SK Farrish, RO

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, 0064907 CONS00452

STATUS: Active **NOTICE DATE:** Oct. 1974 **START DATE:** July 1974 **COMPLETION DATE:** June 1975

ACKNOWLEDGMENT: Science Information Exchange (GY 64907)

20 099088

WHEAT STUDY--PRELIMINARY ANALYSIS OF EXTENDING NAVIGATION INTO KANSAS, MID-ARKANSAS RIVER BASIN

OBJECTIVE: Conduct a study of the existing and probable future production, marketing, and transportation of wheat to determine the probable changes that would occur as a result of providing barge transportation along the Arkansas River to the vicinity of Wichita, Kansas. **APPROACH:** Mathematical model of wheat movement and a statistical analysis of production and shipment data. **PROGRESS:** Wheat acreage, yield, and production in a 226 county area was analyzed county by county to provide a data base for projecting a long-time trend of the quantity of wheat that will be available for transport from the area. Specific attention was being given to the quantity that would be transported via barge if the Arkansas river canal were to be extended to Wichita, Kansas.

PERFORMING AGENCY: Kansas State University, Agricultural Experiment Station

INVESTIGATOR: Schruben, LW

SPONSORING AGENCY: Kansas State Government, 0062779 KAN-05-299

STATUS: Active **NOTICE DATE:** Dec. 1974 **START DATE:** July 1974 **COMPLETION DATE:** June 1975

ACKNOWLEDGMENT: Science Information Exchange (GY 62779 1)

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 Minnesota 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 099627

AN ECONOMIC ANALYSIS OF PRESENT AND POTENTIAL TRADE BETWEEN ALASKA AND WASHINGTON

Identify present types and quantities of goods and methods of shipment by major commodity, and estimate future volume and commodity make-up of trade between Alaska and Washington; identify characteristics of distribution systems which are or may be critical impediments to present and future trade; develop and present technological, legislative, physical and institutional innovations as needed to improve performance of physical distribution systems and minimize impediments to trade; concomitant with above, examine specify, based on comparative advantage, probable commodity and form composition of such future trade.

A profile of the Alaska-Washington distribution system will be developed through primary surveys and secondary data; commodity data and demographic data will be used to predict increased Alaska commodity demands and required Washington trade expansions and their composition; operating characteristics of the distribution system will be examined for possible impediments to present and future trade; as "critical" impediments are identified potential innovations to improve the performance of the system will be analyzed.

An examination of barriers to trade between Alaska and Washington has been partially completed. Transportation firms, government agencies, and marketing personnel have provided needed data relative to current problems affecting pricing problems. Data collection from the U. S. Army Corps of Engineers was expanded to include Alaska Domestic coastwise water-borne commerce from sources other than Washington for 1966-1972. These data will be analyzed to identify, major Alaska ports for inbound and outbound commerce, major commodities involved in commerce, port and commodity profiles, and volume of commerce relative to economic activity in Alaska. An input-output model of Alaska has been constructed. The model will identify structural interrelationships and provide projections of Alaskan trade needs. On grant-related research, the elasticity of demand for agricultural transportation of cherries and apples has been identified using the "logit" model. Additionally, the stability of exempt carriers in providing transportation service has been investigated via a national survey.

REFERENCES:

Boom or Bust Economy -- Past History for Alaska? Logsdon, CL; Casavant, K; Thomas, W, AAEA Annual Meetings, College Station, Texas, Paper, Aug. 1974

Energy-Intensiveness in Agricultural Transportation as a Source of Energy Conservation, Casavant, K; Cornelius, J, Project independence Public Hearings, Federal Energy Adm., Sept. 1974

PERFORMING AGENCY: Washington State University, Department of Agricultural Economics

INVESTIGATOR: Casavant, KL Faris, JE Waananen, MV

SPONSORING AGENCY: Department of Agriculture, WNP00191

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1973 COMPLETION DATE: June 1974

ACKNOWLEDGMENT: Current Research Information System (CRIS 0064137)

20 099628

APPRAISAL OF CAPABILITY OF 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 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

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

INVESTIGATOR: Schnake, LD

SPONSORING AGENCY: Department of Agriculture, NEA-14-126-20-01

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1974 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041789)

20 099633

MARKET DEVELOPMENT FOR HARD RED SPRING AND DURUM WHEAT

Determine historical market activity for Hard Red Spring and Durum wheat; identify and analyze barriers to development of alternative market outlets; and determine alternative remedies to implement market development programs.

Study trends of stocks of classes of wheat. Identify and project demand for total use of spring wheat. Analyze competitive relationships of competing wheat classes. Analyze export subsidy payment programs. Analyze impact of government programs on distribution of wheat into markets. Cost to volume efficiency study of segments of the transportation industry. Analyze transportation services and related institutional conditions. Determine optimum distribution patterns for spring wheat with varying transportation costs. Study effects of shifts in distribution patterns resulting from changes in market demand. Cross-relate results and to resolve remedies to market development problems.

Work was completed on two manuscripts dealing with a Comparative Analysis of U.S. and Canadian Wheat Grading Standards. Eased on this study, recommendations for several minor changes in the U.S. grading system were suggested. It was generally concluded the Canadian system more closely parallels the U.S. system since the modifications were made. Work on a study of the impact of freight rate changes on farm prices of grain was continued. Several regression procedures are being used to analyze the significance of the rate changes. A Master's thesis is being completed on this study. A Market News Service was initiated on a pilot project basis in August 1974. This service provides toll-free telephone market news to farmers on a tape code-a-phone system, with the news updated twice daily. A questionnaire is planned to users in early 1975 to measure the benefits of the service.

REFERENCES:

Comparative Analysis of U.S. and Canadian Wheat Grades Anderson, DE; Petry, TA, North Dak St Univ, Dept of Agr Econ., Ag Exp. Station, Agri Econo Report, N., Nov. 1974

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics

INVESTIGATOR: Anderson, DE

SPONSORING AGENCY: Department of Agriculture, ND03314

STATUS: Active NOTICE DATE: July 1975 START DATE: Sept. 1965 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Current Information Research System (CRIS 0007897)

20 099644

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 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

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1974 COMPLETION DATE: July 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041661)

**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 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 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 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 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, Bismarck, North Dakota, Mar. 1974

Nature and Quality of Livestock Transportation Services Used by Shippers, Hoffman, LA, Transportation Committee of American Nat'l Cattleman's Ass, Jan. 1974

Changing Technology in Grain Transportation Hutchinson, TQ, International Com 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: July 1975 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041788)

**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 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.

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Grain and Soybean Transportation Problems in Fiscal 1974 Umberger, DE; Hutchinson, TQ, Economic Research Service, Marketing & Transportation Sit., MTS-191, pp 22-28, Nov. 1973

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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, Oct. 1973

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: July 1975 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041660)

**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.

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Grain and Soybean 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., 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: Illinois University, Urbana

INVESTIGATOR: Bunker, AR

SPONSORING AGENCY: Department of Agriculture, NEA-14-125-17-01

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information System (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: Oct. 1975 START DATE: Sept. 1973

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

20 100430

ROLE OF AGRICULTURAL TRADE AND TRANSPORTATION IN THE PROCESS OF ECONOMIC DEVELOPMENT

The objective is to develop a model which indicates interrelationships between sectors of a low income economy. This model will be useful in quantifying how export earnings and purchase imports are related to the growth of a low income economy; provide empirical evidence as to how instability in export earnings affects economic development; appraise the comparative advantages of less developed countries in the production of farm products and manufactured goods. An inquiry will be made into the linkages between farm-to-market roads, regional income, and the potential to produce an exportable surplus. Secondary information and primary data collected through field research in two or more low income countries will be used to quantify the above objectives. Field work is anticipated in at least one Asian and one Latin American Country. Reports Issued: "Economic analysis of ground water irrigation in Nueva Ecija, Philippines," C. A. Robertson, Ph.D. thesis, Cornell University, 274 pages, November 1972. "An economic evaluation of water control in the northern region of the Greater Chao Phay Project of Thailand", L. E. Small, Ph.D. thesis, Cornell University, 412 pages, June 1972. "An econometric analysis of the demand for animal protein in Iran", H. Saleh, Ph.D. thesis, Cornell University, 163.

PERFORMING AGENCY: Cornell University, Agricultural Economics, NYC-121410

INVESTIGATOR: Sisler, DG Robinson, KL

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: Feb. 1975 START DATE: July 1974 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Current Research Information System (GY 6434 4)

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: Oct. 1975 START DATE: June 1973 COMPLETION DATE: 1975

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

Freight Transport Demand Analysis

20A

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: Feb. 1976 START DATE: 1974 COM-
PLETION DATE: Apr. 1976 TOTAL FUNDS: \$89,000

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

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
 COMPLETION DATE: Dec. 1975 TOTAL FUNDS: \$725,600

ACKNOWLEDGMENT: FRA

21 044568

YARD AND TERMINAL SUBSYSTEM (YATS)

YATS is a subsystem of Missouri Pacific's Transportation Control System (TCS) and is designed to increase the efficiency of railroad operations at major terminals. YATS will assist operations by maintaining a computerized car inventory, supporting local management information requirements, generating car classification work orders, relieving the clerical data entry burden, and providing a real-time, online data base for local operations analysis. YATS is being developed on a Digital Equipment Corporation (DEC) PDP-11 mini-computer in service at eight locations and scheduled for installation at ten more in 1975 and 1976.

PERFORMING AGENCY: Missouri Pacific Railroad
 INVESTIGATOR: Bryan, LM (Tel 314-6222075)
 SPONSORING AGENCY: Missouri Pacific Railroad
 RESPONSIBLE INDIVIDUAL: Sines, GS (Tel 314-622-2564)

In-House

STATUS: Completed NOTICE DATE: July 1975 START DATE: July 1971

ACKNOWLEDGMENT: Missouri Pacific Railroad

21 044569

CARS: CAR ACTIVITY REGULARIZING SCHEDULER

The purpose of the CARS model is to simulate the over-the-road portion of the Missouri Pacific's on-line car scheduling system and to evaluate the data used to drive this on-line system. A pilot program which simulates car scheduling over a portion of the Missouri Pacific network is operational. Current and future efforts are directed towards insuring compatibility of the model with the on-line system and expanding the model's data base to include the entire Missouri Pacific system. The CARS model is made up of three major subprograms--the Preprocessor, the Simulator and the Post processor. The Preprocessor accepts train schedules and blocking policy as input and builds the scheduling files required by the Simulator. The Simulator runs the network for a specified period of time. It accepts car-dependent records as input and schedules these cars to the through and local train required to move them to their respective destinations. Statistics from the Simulator are bled off for analysis by the Postprocessor. The Postprocessor measures the efficiency of the scheduling data base by generating reports on yard and train performance and on transit time reliability.

REFERENCES:

Railroad Car Scheduling System Incorporating Car Scheduling Yoakum, RL; Beaumont, LH, Missouri Pacific Railroad, Jan. 1972

PERFORMING AGENCY: Missouri Pacific Railroad
 INVESTIGATOR: Fuller, JH (Tel 314-6222566) Keller, DC (Tel 314-6222566)
 SPONSORING AGENCY: Missouri Pacific Railroad
 RESPONSIBLE INDIVIDUAL: Sines, GS (Tel (314)622-2564)

In-House

STATUS: Inactive NOTICE DATE: July 1975 START DATE: Jan. 1971

ACKNOWLEDGMENT: Missouri Pacific Railroad

21 045142

INSTALLATION OF A RAIL TERMINAL MANAGEMENT SYSTEM (RTMS)

The Rail Terminal Management System and Intermodal Terminal Management Systems are developmental systems. This installation represents the first full-yard 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 prepared and when trains are dispatched, an accurate consist list is immediately available. The Rail Terminal Management System and Intermodal Terminal Management Systems are 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; Leventh Street
 RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr

Contract DOT-FR-30047

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1973
 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: \$400,000

ACKNOWLEDGMENT: FRA

21 048495

AN EXAMINATION OF THE EFFECTS OF CHANGES IN RAIL TECHNOLOGY UPON GREAT LAKES BULK SHIPPING ACTIVITY

Objectives: To investigate the economic and technical aspects of unit train systems as they relate to Great Lakes shipping activities, with particular emphasis on the development of break-even and threshold points for unit train operations to gain some insight into their overall impact on the future of the Great Lakes shipping system. How information will be applied: Information and knowledge gained from this study would be highly useful in the development of policy and plans for the management of Great Lakes shipping. If, for example, unit trains have a potentially wide application, this would have serious implications upon the planning of new facilities for bulk movements on the lakes. Since such investments would be quite large, such information would be highly essential for proper decision making. Accomplishments during past twelve months: 1. A computer program has been developed to determine costs for bulk shipping on the Great Lakes. Another computer program has been developed to determine costs for unit trains in the Great Lakes region. The models were used to provide a quantitative comparison between two transportation modes under varying conditions. Models show bulk ships tend to dominate unit train movement of goods in and around the Great Lakes region. New and larger unloading ships have strong potential for domination in the future. 2. Two graduate theses have resulted from this work. 3. A paper will be presented at the Operations Research Society of America meeting to be held in Puerto Rico in October 1974.

PERFORMING AGENCY: Wisconsin University, Milwaukee, School of Engineering, Systems Design
 INVESTIGATOR: Beimborn, E Garvey, WA
 SPONSORING AGENCY: National Oceanic and Atmospheric Administration, Sea Grant Office, Department of Commerce, 04-3-158-5 #1

STATUS: Active NOTICE DATE: Jan. 1975 START DATE: July 1974
 COMPLETION DATE: June 1975 TOTAL FUNDS: \$8,986

ACKNOWLEDGMENT: Science Information Exchange (GBP 1698)

21 048795

CONTAINERIZATION IMPACT STUDY

This agreement is to provide funding for new OST(TPI) portion of a containerization impact study to be conducted by the Federal Highway Administration.

PERFORMING AGENCY: Federal Highway Administration
 SPONSORING AGENCY: Office of Policy, Plans and International Affairs
 RESPONSIBLE INDIVIDUAL: Sonnenberg, AT (Tel 202-4260570)

ID AS-30063

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1973
 TOTAL FUNDS: \$30,000

ACKNOWLEDGMENT: Office of Policy and International Affairs

21 054698

IMPROVEMENT IN COUPLING-UP PERFORMANCE IN AUTOMATIC MARSHALLING YARDS

In classification yards of the North American pattern, the free-running cars do not always couple as intended: stalls and overspeed impacts cause \$10 million annual avoidable damage to freight and cars in Canada, and \$100 million annually in the U.S.A. A "Monte Carlo" simulation has been constructed using the IBM 360/50 which is extremely realistic in its simulated assembly of trains. Using it, better methods of constructing and instrumenting the yard are shown to be possible, realizing a 75% reduction in the damage figures. /RTAC/

PERFORMING AGENCY: Queen's University, Canada, 3.7.74
 INVESTIGATOR: Kerf, CN
 SPONSORING AGENCY: Queen's University, Canada, Department of Mechanical Engineering

STATUS: Active NOTICE DATE: Oct. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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 foreseeable 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: Feb. 1976 START DATE: Jan. 1975 COMPLETION DATE: May 1976 TOTAL FUNDS: \$127,781

ACKNOWLEDGMENT: FRA

21 058278

TRUCK/RAIL INTERMODAL OPERATIONS: AN OPTION FOR THE FUTURE?

Case Study made of advantages, if any, of a T.O.F.C. intermodal service in the Los Angeles-Portland corridor, utilizing latest available equipment and operating techniques--without massive capital outlays on rail roadbed and terminals--in terms of: (1) economic geography; (2) topography; (3) traffic flows, existing and projected; (4) costs and service capabilities; (5) shipper modal preferences; and (6) need and demand for highways. Estimates of modal diversion prepared and submitted to sample shippers, carriers, and labor representatives for comment and critiques.

Task A (Preliminary) Traffic Divertability May 1974

Task B (Preliminary) Impact on Carriers and Shippers Mar. 1975

PERFORMING AGENCY: Reebie (Robert) and Associates, Incorporated
 INVESTIGATOR: Ainsworth, D (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: Active NOTICE DATE: July 1975 START DATE: June 1973 COMPLETION DATE: Sept. 1975 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. It is anticipated that test and evaluation of the design concepts selected will be conducted in cooperation with the railroad industry and local and state governments on a cost sharing basis.

The contract to a performing organization has not yet been awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
 RESPONSIBLE INDIVIDUAL: Bang, AJ (Tel (202)426-0855)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Aug. 1976 COMPLETION DATE: Aug. 1977

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, 612-0278-AT
 RESPONSIBLE INDIVIDUAL: Barrows, T (Tel 617-494-2451)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Mar. 1975 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$82,000

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/Management 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, CH (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 satisfactory 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: Feb. 1976 START DATE: 1974 COMPLETION DATE: Jan. 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: Feb. 1976 START DATE: 1975 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: AAR

21 099630

CONTAINERIZED TRANSPORT AND STORAGE SYSTEMS FOR GRAINS AND SOYBEANS

Determine feasibility of combining short term storage and transportation by some form of containerization so as to facilitate use of vehicles not now used for transport of grain and soybeans.

Both on-farm and off-farm handling and storage methods, equipment, and facilities for grains and soybeans will be surveyed to determine the adaptability of the functions to some form of containerized storage and transport. Various types of rail and highway vehicles not now used for grain and soybean transport will be studied to determine if they might be adapted to hauling grains and soybeans on return movement through grain areas. The engineering and operational feasibility of these potential innovations will be assessed and appropriate recommendations developed.

PERFORMING AGENCY: Kearney Foundation
INVESTIGATOR: Breakiron, PL Guilfooy, RF, Jr Macomber, FS
SPONSORING AGENCY: Department of Agriculture, 0701-15842-009-C

Contract 12-14-1001-406

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Mar. 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041197)

21 107252

IMPROVING TRAILER VANS AND CONTAINERS FOR TRANSPORT OF PERISHABLE FOODS

The objectives include the following: Develop design criteria and specifications necessary for improving environmental control systems in transport vehicles and develop, test, and evaluate such improvements. The approach include the following: Standard testing methods for rating performance of loaded refrigerated trailers and van containers will be developed. Development of this method and its related empirical data will provide a basis for realistic design and performance specifications for such vehicles and as a yardstick for evaluating improved refrigerated vehicles and modifications of conventional equipment. Shipping experiments will be made to develop additional performance data and data on cost of fuel, servicing, and maintenance to determine operating and ownership cost of improved equipment. The progress report include the following: The prototype van container has been utilized to transport celery, citrus, cantaloupe, and lettuce domestically; one mixed load of cabbage, poly-bagged carrots, celery, and lettuce was shipped in it to Korea. All outturns were judged excellent by the receivers; temperatures were optimum and uniform, and boxes sustained less damage. Field tests of the prototype will be concluded after an export shipment of corn or radishes during the second or third quarter of FY 1975. It is undergoing fumigation capability tests at this time. The first draft of the project report can then be completed. Reports Issued: Improving the Transport of Perishables Through Better Equipment and Methods, P.L. Breakiron, 24th Int. Conf. on Handling Perishable Agr. Commodities, Purdue Univ., March 1971. Long-Haul Transportation of Frozen, Frozen Food Age, W. F. Goddard, Jr., Distribution Zero Issue, Vol. 19 No. 12, July 1971. Refrigeration Systems and Loading Patterns for Refrigerated Trailers and Van Containers, W.F. Goddard, Jr., Paper, Conference on Delivering Quality Perishables, University of Florida, January 1972. Air Distribution--The Common Denominator, W.F. Goddard, Jr., Journal American Society of Heating, Refrigerating, and Air Conditioning Engineers, January 1972. New Developments in Perishable Commodity Movement, W.F. Goddard, Jr., Paper, Cargo Systems Science Conference, April 1972. The Floor--A Common Denominator for Refrigerated Transport Problems, International Institute of Refrigeration, Meeting of Commission D-2 Land Transport, Wageningen, The Netherlands (1974), Goddard, W.F., Jr., pp 22-26.

PERFORMING AGENCY: Agricultural Research Service, Transportation Facilities Division, 7606-15840-001
INVESTIGATOR: Goddard, WF
SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1971 COMPLETION DATE: Jan. 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0022041)

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: Guilfooy, 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 128026

CANADIAN FREIGHT TRANSPORT MODEL PHASE II

An optimizing network model of the mainline operation of a railroad has been developed. This model predicts the optimal routing of traffic and the congestion at each yard and over each 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. In the current project phase, the mainline Canadian rail networks of both CN and CP have been modelled. Historical railcar tracing data have been summarized for comparison with model predictions. In addition, historical commodity freight data on volume, costs, time and location of rail, ship and for-hire truck movements have been assembled into a coordinated data base. Common codes for commodity grouping have been developed to integrate the diverse modal schemes currently used and the data have been transformed to a common regional basis for use in the development of intermodal choice models in the third and final phase of the project. /RTAC/

PERFORMING AGENCY: Queen's University, Canada
 INVESTIGATOR: Fullerton, HV
 SPONSORING AGENCY: Queen's University, Canada, School of Business

STATUS: Active NOTICE DATE: Oct. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

21 129729

RAILROAD YARD OPERATIONS COSTING

To develop a set of methodologies and procedures for use in estimating the nature of costs and their variability in investing, maintaining and operating railroad yards and terminals.

Contract not yet awarded.

SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development
 RESPONSIBLE INDIVIDUAL: Lawler, JD (Tel 202-426-0771)

STATUS: Proposed NOTICE DATE: Feb. 1976

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, RRS 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 202-426-9682)

Contract DOT-FR-4-3003

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1974 TOTAL FUNDS: \$135,000

ACKNOWLEDGMENT: FRA

22 052066

FREEZING PROBLEMS DURING RAIL TRANSPORTATION

Study to determine methods processes or equipment to eliminate or minimize delays in discharging granular bulk materials (coal ore, etc.) from rail cars under freezing conditions.

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: Aug. 1975

ACKNOWLEDGMENT: Canadian Roads and Transportation Association

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, Department of the Navy

SPONSORING AGENCY: Office of Environment, Safety and Consumer Affairs, Department of Transportation

RESPONSIBLE INDIVIDUAL: Gigliotti, ME (Tel 202-4262311)

IA DOT-AS-50032

STATUS: Active NOTICE DATE: July 1975. START DATE: Jan. 1975 COMPLETION DATE: Jan. 1976. TOTAL FUNDS: \$90,000

ACKNOWLEDGMENT: TRAIS

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. (See Oosthumisen, Colijn) /RTAC/

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: Active NOTICE DATE: Aug. 1975 START DATE: May 1973 COMPLETION DATE: Apr. 1976

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/

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, 3.24.73

INVESTIGATOR: Oousthuisen, PH

SPONSORING AGENCY: Canadian National Railways; Noranda Research; Queen's University, Canada; Canadian Pacific

STATUS: Active NOTICE DATE: May 1974 START DATE: May 1974

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, INDO1732

INVESTIGATOR: Farris, PL

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 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 econometric 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: July 1975 START DATE: Dec. 1967 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0056748)

22 083494

AN ECONOMIC ANALYSIS OF SPATIAL AND TEMPORAL PRICE DIFFERENTIALS FOR GRAINS (OTHER THAN RICE) IN LOUISIANA

The purpose of the project is to determine existing prices for grains (other than rice), including terms of trade, at selected locations in the state, compare prices at these locations over a period of time, determine transfer costs for grains between various locations in the state, and classify operations at these locations as to type of business done. Monthly price data,

including terms of trade to which the prices refer, on soybeans, corn, and grain sorghum will be obtained from selected firms including feed mills, country elevators, small river elevators, and export terminals in the state. The firms also will be surveyed for information relative to classifying them into type of operation and relative to transportation costs. From these data, price maps will be constructed for different types of operations in the market and for selected months. The maps will be compared with transportation costs, intensity of competition, and other factors in order to explain temporal and spatial price differences for grain in the state. Progress Report: Preparation of a manuscript on the amount of feed grains produced, imported, consumed and exported from Louisiana was underway. A broad summary of the manuscript was published as noted below and it is expected that the larger manuscript will be ready for publication by the middle of 1975. The larger manuscript contains details on the kind and amount of feed grains consumed, the amounts of each consumed by each class of livestock, more specific geographic areas in which the consumption is taking place and projections of these factors to the year 1980. The data will be useful to those planning new grain handling facilities in the state and those being supplied to SM-42 for a regional analysis of policies and technological developments affecting the grain marketing system of the South. Also the data are being analyzed, in a transportation type model, to indicate the optimum number, kind, location and capacity of grain handling facilities for Louisiana in the future at the projected and alternative levels of consumption, deficits and the like.

REFERENCES:

Commercial Bulk Grain Handling Firms in Louisiana Traylor, HD; Hodson, RC, La. State Univ. Baton Rouge, Agricultural Experiment Station, AEA Information Series No 31, June 1973

The Futures Market--A Partial Substitute for Unavailable Storage Capacity, Traylor, HD; Lemoine, RV, Louisiana Rural Economist, Vol. 35, No. 2, May 1973

Futures Market Serves as Storage Substitute Traylor, HD; Lemoine, RV, Delta Farm Press, Vol. 30, No. 25, June 1973

Louisiana's \$75 Million Feed Grain Deficit Increases at the Rate of \$3 Million Annually, Owens, MT; Traylor, HD, La. State Univ. Baton Rouge, Dept Agri Econ & Agri Business, Louisiana Rural Economist, V2, May 1975

An Analysis of Futures Trading as an Approach to Overcoming Unavailable Grain Storage Capacity at Harvest, Traylor, DH; Coolf, WF, Northeast La. State Univ, Monroe, Academy of La. Economists, Proceedings, Oct. 1974

PERFORMING AGENCY: Louisiana State University, Baton Rouge, Department of Agricultural Economics and Agribusiness, LAB01599

INVESTIGATOR: Traylor, HD

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: July 1972 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0062488)

22 083502

DEVELOPMENT OF IMPROVED ALTERNATIVE PHYSICAL DISTRIBUTION SYSTEMS FOR CITRUS FRUITS

The objective of this project is to analyze existing physical distribution systems and develop and evaluate alternative less costly systems for marketing citrus. Research into the structure of harvesting systems presently used in the Texas citrus industry was conducted. A manuscript comparing the costs of the three principal harvesting systems is being prepared. A manuscript is being edited prior to publication that compares the costs of five shipping systems for citrus in highway trailers. These systems include nonunitized methods using forktrucks and conveyors and unitized methods using pallets, slipsheets and pallet bins. Of the methods studied, the unitized system using slipsheets proved to be the least expensive.

REFERENCES:

Citrus Shipping Costs Articles Anthony, JP; Mongelli, RC, United Fresh Fruit and Vegetable Association 1974 Yearbook, Mar. 1974

PERFORMING AGENCY: Agricultural Research Service, Transportation Facilities Division, 1104-15842-002

INVESTIGATOR: Anthony, JP

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: Aug. 1970 COMPLETION DATE: Aug. 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0021630)

22 083503

SIMPLIFICATION AND STANDARDIZATION OF SHIPPING CONTAINERS FOR AGRICULTURAL PRODUCTS

The objective of this project is to reduce the cost of marketing agricultural products by simplifying and standardizing the dimensional sizes of shipping containers. A 118 page report, "Standardization of Shipping Containers for Fresh Fruits and Vegetables," was printed and distributed to the fruit and vegetable and packaging industries. Four base dimensional size shipping containers and one base size pallet were recommended for industry adoption. Ways and means of getting industry adoption and use of these standard size containers were discussed in conferences with the United Fresh Fruit and Vegetable Association's Palletization and Productivity Committee, the National Commission on Productivity, the National Bureau of Standards, and the Office of Policy Development, Department of Commerce. Two meetings of the American National Standards Institute MH 10 Packaging Dimensions Committee were attended to develop recommended plan view unit load dimensions and transport-package size dimensions for thermal and non-thermal transport vehicles. Data were collected on 11 palletized shipments of fresh produce.

REFERENCES:

Standardization of Shipping Containers for Fresh Fruits and Vegetables, Stokes, DR; Woodley, GW, MRR 991, 118 pp, Mar. 1974

Palletization: Progress and Goals Stokes, DR, The Packer, pp 3C-6C, Dec. 1973

Transport Package Sizes for ANSI MH 10.1, Unit Load Sizes Stokes, DR, American National Standards Institute, 53 pp, Aug. 1973

PERFORMING AGENCY: Agricultural Research Service, Transportation Facilities Division, 1104-15841-003

INVESTIGATOR: Stokes, DR

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 COMPLETION DATE: Nov. 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0021705)

22 083505

IMPROVED TRANSPORTATION AND PACKAGING SYSTEMS FOR EDIBLE BEANS AND PEAS SHIPPED OVERSEAS

The objective of this project is to improve the efficiency of transporting and handling edible dry beans and peas shipped to overseas markets by improving packaging, handling, and transporting systems. Dry edible beans had experienced losses in export shipments due to an inhospitable transport environment in conventional break-bulk shipments. This research proved the physical feasibility of shipping beans in multiwall paper bags, in bulk, and in van containers. Detailed cost analysis showed that potential savings from containerized bulk shipments range from \$200,000 over burlap bags to \$300,000 over paper bags per annum on the shipments to the United Kingdom alone. Total potential savings for all export shipments of dried beans, peas, and seeds would exceed \$1 million annually with bulk shipment in containers. This research was the prime factor in the Michigan bean industry's shift to containerized bulk shipping.

REFERENCES:

A Cost Comparison of Four Container Systems to Export Dry Edible Beans to the United Kingdom, Anthony, JP, Jr, ARS-NE-31, Dec. 1973

A Comparison of Burlap and Paper Bags in Exporting Dry Edible Beans by Van Containers, Anthony, JP, Jr; Hinds, RH, Jr; Goddard, WF, Jr, ARS-NE-10, Apr. 1973

PERFORMING AGENCY: Agricultural Research Service, Transportation Facilities Division, TF4-226

INVESTIGATOR: Anthony, JP

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: Aug. 1972 COMPLETION DATE: Aug. 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0022998)

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 industrial 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 083541

PREDICTED EFFECTS OF SELECTED POLICY AND TECHNOLOGY CHANGES ON THE GRAIN MARKETING SYSTEM

The objectives are to: (1) Identify marketing facilities and flows of grain; (2) Identify and explain spatial and temporal price differentials for grain; (3) Identify current inefficiencies with regard to capacity and location in the grain marketing system (by comparing current structure with simulated least cost structure); (4) Evaluate the impact of changes in government policies and in technology on the grain marketing system. Ohio will participate in the work of the regional committee and will coordinate research efforts on the basis of sub-committee responsibility. If possible, an effort will be made to publish research results both on a state and regional basis. The 1973 SM-42 work schedule was subdivided into three parts: (1) the organization and content of the Southern Regional Grain Marketing Conference, (2) the development of related publications, and (3) the revision and testing of the required models. Progress Report: The analysis of the data on regional grain price differences in Ohio was completed and a publication written, now in the process of printing. The results show the price advantages to farmers in Ohio if they market their grain based on these market relationships. A

second publication was prepared in cooperation with Purdue University which presented statistical evidence on the changing grain marketing structure in Ohio, Indiana, and Illinois, serving the south and evaluates the implication of these changes on net returns to the midwest farmer and the feeder in the south. This publication is ready for printing. Work is continuing on the interregional, regional and interstate grain marketing, storage, drying and transportation model which will be used by all states in the region. Model adjustments and trial runs are constantly being made by some of the states in the region. When completely developed, the model will serve as a tool to solve minimal cost problems resulting from market structure changes so that farmers, country elevators and processors, transporters can minimize their marketing cost. The dynamics of this model will incorporate the effects of such market structural changes as rail abandonment, unit train shipments, and increased export demand, and changing government policy affecting the grain market. The benefits of the reduction of marketing costs will mean higher grain prices for the farmer.

REFERENCES:

SM-42 - Predicted Effects of Selected Policy and Technology Changes on the Grain Marketing System, Sharp, JW, Ohio Agricultural Research and Development Center, Regional Res. Rept. 1, Apr. 1973

Seasonal Corn Price Differentials in the Cincinnati and Toledo Markets, Sharp, JW; Baldwin, WD, OARDC Research Circular, N203

Estimating a Theoretical Contract Curve Between Vertical Stages in the Illinois Grain Industry, Baldwin, ED; Hill, LD, American Journal of Agricultural Economics, Feb. 1975

PERFORMING AGENCY: Ohio State University, Departments of Agricultural Economics and Rural Sociology, OHO00403
 INVESTIGATOR: Sharp, J
 SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: Mar. 1971 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0059154)

22 083542

VERTICAL COORDINATION POTENTIAL IN COOPERATIVE GRAIN MARKETING SYSTEMS

The objective is to describe those existing marketing patterns and coordinating arrangements in the marketing of grain from producers through country elevators to selected regional grain cooperatives, and investigate those possibilities that would enable regional grain cooperatives to increase producer returns through closer vertical coordination within grain marketing systems will also be investigated. Research efforts will be organized into three parts. Personal interviews with management personnel of regional grain cooperatives in Oklahoma and Kansas will be made to determine grain marketing patterns and coordinating arrangements between local cooperative elevators and regional grain cooperatives, as well as among regional grain cooperatives. Appropriate sampling procedure will be used to select local cooperative elevators whose management personnel will be interviewed concerning coordinating of arrangements between the managers of local cooperatives and producers, relative to procurement, storage, transportation, hedging and merchandising of grain to determine grain marketing patterns and coordinating between producers and local cooperative elevators. A survey of grain producers in Oklahoma and Kansas will be made and questions will be asked dealing with the attitudes, preferences, and flexibility of grain producers in adapting to potentially new marketing arrangements to determine grain marketing patterns and coordinating arrangements between producers and local cooperative elevators. Progress Report: A personal interview questionnaire to determine vertical coordination practices performances and potentials at the local grain cooperative level was constructed. The questionnaire has been approved by the Farmer Cooperative Service, and OMB. A stratified random sample of 67 local cooperative elevators in Oklahoma and Texas was drawn and a completed questionnaire has been obtained from the manager of each local cooperative in the sample. The questionnaire answers have been checked for errors and consistency, and coded on computer cards for analysis. Tabular and regression analyses of the data are in progress.

PERFORMING AGENCY: Oklahoma State University, Department of Agricultural Economics, OKL01559
 INVESTIGATOR: Hummer, PD Oehrtman, RL
 SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1975 START DATE: Oct. 1973 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0064641)

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 099379

FREIGHT RATE STRUCTURE STUDY

A viable transportation system is essential for growth in a market-oriented industrialized economy. The project is a combined research, demonstration, and seminar program to incorporate modern distribution management principles in the freight rate structure to encourage Utah's agricultural development. Data on the availability, quality, and costs of services

combined with the market opportunities for selected commodities and industries in Utah will be analyzed of a definitive set of rate and service proposals by a consortium of producers, distributors, and carriers. Alternative institutional arrangements for the coordination of information concerning the transportation market is being explored to assure the maximum operating efficiency with realistic costing and pricing of the distribution system. The freight rate structures of rail and motor carriers will be examined and criteria for marketing, cost, and management will be developed.

PERFORMING AGENCY: Utah State University, Department of Economics

INVESTIGATOR: Taylor, MH

SPONSORING AGENCY: Office of the Secretary of Transportation, Department of Transportation

RESPONSIBLE INDIVIDUAL: Nupp, BL

Contract DOT-OS-30116

STATUS: Active NOTICE DATE: Aug. 1975 TOTAL FUNDS: \$96,750

ACKNOWLEDGMENT: DOT

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 evaluate 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 describes 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, Mosters 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 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.

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 participate 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 Agricultural 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 atmosphere--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 099632

UTILIZED HANDLING OF GROCERIES FROM SUPPLIER TO DISTRIBUTION WAREHOUSE

Measure costs and determine relative advantages of five unitload handling systems from supplier to distribution warehouse and determine feasibility of shipping unitloads smaller than the 48-by 40-inch currently in use.

Establish by time study the standard time for loading and unloading rail cars and trailers for five classes of product by five methods. Measure the cost of unitizing, platform cost, cost for load security, vehicle cube utilization, and damage. At the destination, determine cost for breaking down and repalletizing to smaller unitloads, cost and return from disposing of dunnage and unitload platform, and cost for maintaining pallets under the pallet exchange program. Determine feasibility, simulated cost, and benefits with use of smaller unitload shipping methods.

PERFORMING AGENCY: Shaffer (PF) Company

INVESTIGATOR: Bouma, JC

SPONSORING AGENCY: Department of Agriculture, 1090-15864-006C

Contract 12-14-1001-421

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041266)

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 date 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 synthesized.

REFERENCES:

Verified 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: July 1975 START DATE: Feb. 1974 COMPLETION DATE: June 1976

ACKNOWLEDGMENT: Current Research Information System (CRIS 0064907)

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 Influencing 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 WHOLESALE

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 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 that 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

MAINTENANCE 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 feasibility 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

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 regulatory 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

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 099649

UTILIZED AND PALLETIZED LOADING TECHNIQUES FOR CITRUS FRUITS

Find ways to utilize containers of citrus to reduce handling and transport costs and product damage.

Develop and test stacking patterns for various size containers in palletless units and transport vehicles. Make shipping tests by piggyback trailer to measure unit and load stability, container and product damage, air-flow and cooling rates. Obtain data on material, equipment and labor inputs by time and cost studies. Determine feasibility of palletless unitizing. Research has been completed-final report giving results to be published during next fiscal year.

PERFORMING AGENCY: Agricultural Research Service, Market Quality Research Laboratory

INVESTIGATOR: Camp, TH

SPONSORING AGENCY: Department of Agriculture, 7302-15870-003

STATUS: Active NOTICE DATE: July 1975 START DATE: Aug. 1974 COMPLETION DATE: Aug. 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0041736)

22 100431

STANDARDIZATION OF SHIPPING CONTAINERS FOR MEAT AND MEAT PRODUCTS

The objective is to improve the efficiency of marketing meats by determining requirements for standardizing shipping containers for meat and meat products. Presently used shipping containers will be surveyed and problem areas associated with the performance of containers during transport and handling will be identified. A first draft manuscript entitled, "Shipping Containers Used for Fresh Beef and Pork", presenting the data collected on the dimensions of shipping containers used for fresh beef, has been completed and is being reviewed prior to being submitted for review and publication. Data were collected at four chainstore distribution warehouses on shipping containers used for meats and meat products and to identify specific problem areas associated with packaging, handling, and distribution of meats. A multiplicity of container types and sizes were found to be used. Much of the container damage observed appeared to be a result of the many

sizes of containers that prevented the use of proper stacking methods. Many of the various sizes of shipping containers could not be handled efficiently on the 48-by 40-inch pallet used in the warehouses. Potential container sizes were developed which could be substituted for the numerous container sizes used.

REFERENCES:

PROLIFERATION OF CONTAINERS INCREASES DAMAGE LOSSES James, GM; Ashby, BH, National Provisioner, Sept. 1973

PERFORMING AGENCY: Agricultural Research Service, Transportation Facilities Division, 1104-15841-002

INVESTIGATOR: Ashby, BH James, GM

SPONSORING AGENCY: Department of Agriculture

STATUS: Active **NOTICE DATE:** July 1975 **START DATE:** Mar. 1970 **COMPLETION DATE:** June 1975

ACKNOWLEDGMENT: Current Research Information System (CRIS 0021141)

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, J (Tel 202-426-0771) Boone, JW

Contract DOT-FR-65024

STATUS: Active **NOTICE DATE:** Feb. 1976 **START DATE:** July 1975 **TOTAL FUNDS:** \$627,000

ACKNOWLEDGMENT: FRA

23 048860

TRANSIT MARKETING PROGRAM

This contract is for a transit marketing program. The project will involve: market research to determine rider motivation, transit service planning, consideration of fares and scheduling, testing promotional methods at selected demonstration sites, and production of a transit marketing manual.

PERFORMING AGENCY: Grey Advertising, Incorporated
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Lee, D (Tel 202-4269157)

Contract DOT-UT-40021
STATUS: Active NOTICE DATE: July 1975 START DATE: Feb. 1974 COMPLETION DATE: Aug. 1975 TOTAL FUNDS: \$465,790

ACKNOWLEDGMENT: TRAIS (IT-06-0078), UMTA

23 048880

A STUDY OF TRANSIT FARE POLICIES AND THEIR IMPLICATIONS

The project will develop information on transit fares and fare structures that can: (1) identify promising techniques, (2) assess impacts, (3) instruct public policy regarding transit pricing, and (4) guide management decision-making by transit properties with regard to fare policies.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company
SPONSORING AGENCY: Urban Mass Transportation Administration; Office of Policy, Plans and International Affairs
RESPONSIBLE INDIVIDUAL: Weiner, E (Tel 202-4264168)

Contract DOT-OS-50134
STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Apr. 1974 TOTAL FUNDS: \$90,000

ACKNOWLEDGMENT: TRAIS (IT-06-0095), UMTA

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 clearing-house 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 9424, 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 Scheduled for FY 76 Educational Facilities Laboratories, New York, New York, Volume I and II, Vol I, \$4.00

PERFORMING AGENCY: National Endowment for the Arts
INVESTIGATOR: Freeland, J
SPONSORING AGENCY: Office of Environment, Safety and Consumer Affairs, Department of Transportation
RESPONSIBLE INDIVIDUAL: Davis, RD TES-1 (Tel 202-4264474)

IA AS-40066
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: May 1974 TOTAL FUNDS: \$2,000

ACKNOWLEDGMENT: Office of Environment, Safety and Urban Affairs

23 058246

OPERATIONS AND MAINTENANCE SUPPORT FOR URBAN RAIL SUPPORTING TECHNOLOGY AT DOT/TRANSPORTATION TEST CENTER

No Abstract.

PERFORMING AGENCY: Ground Transportation Development Center, Federal Railroad Administration
SPONSORING AGENCY: Transportation Systems Center

ID RA-75-22

STATUS: Active NOTICE DATE: June 1975 START DATE: July 1974 COMPLETION DATE: June 1975 TOTAL FUNDS: \$43,844

ACKNOWLEDGMENT: TSC (420-0121)

23 058344

DECLINE IN USE OF MASS TRANSPORTATION

Objective is to determine the effect of the decline in the availability of mass transportation on the ability of urban residents in selected neighborhoods to travel into and out of the city to reach work. Specific objectives are: 1) To determine the characteristics of those who are affected by a decline in mass transit. 2) To assess the numbers who have been affected. 3) To determine the cost to society in terms of those affected. 4) To see what role fear has played in the development and continuation of the problem.

PERFORMING AGENCY: Chicago State University
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Doyle, J

Contract OS-40082 (FP)
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Sept. 1974 COMPLETION DATE: May 1975 TOTAL FUNDS: \$21,353

ACKNOWLEDGMENT: Office of Systems Development and Technology

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 OS-40083 (CS)
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Feb. 1974 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: \$52,746

ACKNOWLEDGMENT: Office of Systems Development and Technology

23 058349

OPTIMAL INTERNAL ORGANIZATION FOR NEW AND EXISTING URBAN PASSENGER TRANSPORTATION ENTERPRISE

Tasks include: 1. Define and quantify the dimensions of the concepts of organization, technology and socio-economic environment so that they can be related to transportation. 2. Identify suitable research hypothesis relating technological and environmental factors to organizational structure and behavior. 3. Conduct sample field surveys to obtain data on passenger transit organizations suitable to the testing of hypotheses and the formulation of findings and conclusions concerning optimal internal organizations for new and existing urban passenger transportation enterprises.

PERFORMING AGENCY: California University, Berkeley
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Doyle, J

Contract OS-40079 (CS)
STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Mar. 1974 COMPLETION DATE: Mar. 1976 TOTAL FUNDS: \$95,793

ACKNOWLEDGMENT: Office of Systems Development and Technology

23 058350

MODAL CHOICE AND DEMAND FOR URBAN TRANSPORTATION

Gather data and create data files adequate for use in the statistical analysis under Phase II. In Phase II, computer data analyses will be performed for

the econometric part of the study. Phase III will develop and document policy analysis.

PERFORMING AGENCY: Brown University
 INVESTIGATOR: Chinitz, B
 SPONSORING AGENCY: Office of Systems Development and Technology,
 Department of Transportation
 RESPONSIBLE INDIVIDUAL: Doyle, J

Contract OS-40078 (CS)
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Feb.
 1974 COMPLETION DATE: Mar. 1975 TOTAL FUNDS: \$24,000

ACKNOWLEDGMENT: Office of Systems Development and Technology

**23 058364
 REESTABLISHING RAIL SERVICE IN CONJUNCTION WITH
 NEW FEEDER SYSTEMS**

A passenger demand model for line-haul service will be specified. Analysis and comparison of alternatives will include; 1) description and coding of alternative networks including assignment of capacities and speed for each line, and 2) tracing minimum path trees using standard techniques. A catalog of institutional and legal constraints will include 1) labor agreements, 2) ownership of rail rights-of-way, and 3) regulatory rules. A range of feasible alternative distribution systems will place the alternatives in parametric form. The alternatives will include, 1) fixed-route bus, 2) jitney, 3) subscriptions bus, 4) dial-a-ride, and 5) park-and-ride.

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 (CS)
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Mar.
 1974 COMPLETION DATE: Mar. 1977 TOTAL FUNDS: \$140,235

ACKNOWLEDGMENT: TRAIS (PUR-1-40145)

**23 058370
 DEVELOP A METHOD FOR PLANNING OF TRANSPORTATION
 SYSTEM IMPROVEMENTS IN A HIGH ACCESSIBILITY URBAN
 CORRIDOR**

The method is to be designed to fill a void in current transportation planning procedures between the regional planning and project planning levels. It will enable the consideration of travel demands and needs for a financially sound system, environmental and social impacts, and energy requirements. It will consist of a computerized model and a strategy for use in a manner well-suited to participation by citizens and political leaders as well as planners and engineers.

PERFORMING AGENCY: Pennsylvania University, Philadelphia
 SPONSORING AGENCY: Office of Systems Development and Technology,
 Department of Transportation
 RESPONSIBLE INDIVIDUAL: Doyle, J

Contract OS-40092 (CS)
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: July
 1974 COMPLETION DATE: July 1975 TOTAL FUNDS: \$69,928

ACKNOWLEDGMENT: Office of Systems Development and Technology

**23 058388
 INTERCITY TRANSPORTATION NETWORK ANALYSIS
 PROGRAM**

No Abstract.

PERFORMING AGENCY: Federal Railroad Administration
 SPONSORING AGENCY: Office of Systems Development and Technology,
 Department of Transportation
 RESPONSIBLE INDIVIDUAL: Velona, W

ID AS-50052
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Feb.
 1975 TOTAL FUNDS: \$2,500

ACKNOWLEDGMENT: Office of Systems Development and Technology

**23 058389
 PHOTOGRAPHIC SURVEY OF DEVELOPMENT AND
 ACTIVITIES IN THE VICINITY OF BART STATIONS**
 Develop a photographic inventory of information on the nature of development and activities in the vicinity of selected BART stations.

PERFORMING AGENCY: Metropolitan Transportation Commission
 SPONSORING AGENCY: Office of the Secretary of Transportation
 RESPONSIBLE INDIVIDUAL: Bouchard, R (Tel 202-4264144)

Contract DOT-OS-30176/17
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Mar.
 1975 COMPLETION DATE: Aug. 1975 TOTAL FUNDS: \$11,460

ACKNOWLEDGMENT: TRAIS

**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, OS-443
 RESPONSIBLE INDIVIDUAL: Nelson, R (Tel 617-4942032)

Contract DOT-TSC-964 (CPFF)
 STATUS: Active NOTICE DATE: June 1975 START DATE: Feb.
 1975 COMPLETION DATE: Dec. 1975 TOTAL FUNDS: \$59,690

ACKNOWLEDGMENT: TRAIS (OS-443)

**23 058431
 TECHNOLOGY FORECAST AND ASSESSMENT OF INTERCITY
 TRANSPORTATION ALTERNATIVES**
 The study includes a technology survey and forecast for both air and ground modes through the years 2000/2025, estimates of transportation demand based on various socio-economic scenarios, and analysis of the impacts of the transportation alternatives. The purpose of the study is to identify promising areas for transportation research.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company
 SPONSORING AGENCY: Office of Systems Development and Technology,
 Department of Transportation; Ames Research Center, National Aeronautics and Space Administration
 RESPONSIBLE INDIVIDUAL: Fearnside, JJ (Tel 202-4264347)

IA AS-50053
 STATUS: Active NOTICE DATE: July 1975 START DATE: Mar.
 1975 TOTAL FUNDS: \$421,000

ACKNOWLEDGMENT: Office of Systems Development and Technology

**23 058440
 DEVELOP AN AGGREGATE MODEL OF URBANIZED AREA
 TRAVEL BEHAVIOR**
 Tasks include: Develop criteria for choosing between alternative models developed, establish methods and procedures for aggregating data, produce a disaggregate forecasting model for testing purposes, produce an aggregate forecasting model for testing purpose, review TRANS model requirements, establish criteria for validating aggregate forecasting procedures, and revise both models based on the results of testing and sensitivity analyses.

PERFORMING AGENCY: Massachusetts Institute of Technology
 SPONSORING AGENCY: Office of Policy, Plans and International Affairs

Contract DOT-OS-50001 (CR)
 STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Feb.
 1975 COMPLETION DATE: Oct. 1976 TOTAL FUNDS: \$99,871

ACKNOWLEDGMENT: TRAIS

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 OS-50161 (CPFF)

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1975 COMPLETION DATE: June 1977 TOTAL FUNDS: \$78,586

ACKNOWLEDGMENT: TRAIS

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: July 1975 START DATE: June 1975 COMPLETION DATE: Aug. 1976 TOTAL FUNDS: \$223,838

ACKNOWLEDGMENT: TRAIS (UM-504)

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 responsible 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 099417

TRANSIT USER INFORMATION AIDS AND DISSEMINATION TECHNIQUES

Alternative mechanisms for the dissemination of transit user information will be identified and evaluated. User information embraces the communication of transit routes, schedules, fare structures, transfer policies, vehicle destinations, stop locations and other requisite information for transit accessibility. Various existing user information aids will be inventoried and evaluated, including maps and schedules, on-vehicle destination markings, stop location signs, telephone information systems and other innovative techniques. Dissemination policies and methods will also be addressed. Promising techniques will be synthesized, and a detailed transit information handbook for transit operators will be prepared.

PERFORMING AGENCY: Ilium Octopus
SPONSORING AGENCY: Urban Mass Transportation Administration

Contract IT-06-0098

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1974 TOTAL FUNDS: \$75,000

ACKNOWLEDGMENT: UMTA

23 099418

MARKETING FUNCTIONS IN TRANSIT MANAGEMENT ORGANIZATION STRUCTURES

The proposed study will inventory and evaluate alternative management organization structures and decision processes with regard to transit marketing. Generic marketing functions will be identified and described (e.g., market research, community relations, information dissemination, service planning, customer services, promotional activities, etc.) within representative transit management organizations. The decision processes for actuating marketing activities will also be examined. Alternative organization structures will be evaluated with regard to the effective integration and conduct of generic marketing functions by a representative for dissemination to the urban transit industry.

PERFORMING AGENCY: Lesko Associates
SPONSORING AGENCY: Urban Mass Transportation Administration

IT-06-0099

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1974 TOTAL FUNDS: \$75,000

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 110868

TRANSIT SYSTEMS DESIGN AND EVALUATION FOR CITIES OF 500,000 POPULATION

Objectives of this project include the following: (I) to develop a framework for evaluating alternate transit system for cities of 500,000 population; (II) to test the evaluation framework with input on transit demand and city growth for Calgary; and (III) systems to be tested include light rail transit, express bus, dial-a-bus, and personal rapid transit. /RTAC/

PERFORMING AGENCY: Calgary University, Canada
INVESTIGATOR: Morrall, JF Finn, N
SPONSORING AGENCY: Calgary, City of, Canada

STATUS: Completed NOTICE DATE: Oct. 1975 START DATE: Jan. 1973

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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: Active NOTICE DATE: July 1975 START DATE: Aug. 1974 COMPLETION DATE: July 1975 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.

Assisting NASA and DOT is a joint industry/university team consisting of Peat, Marwick, Mitchell and Company, the prime contractor, and the University of California, Berkeley, Stanford University, and Gellman Research Assoc.

PERFORMING AGENCY: Cardion Electronics; Department of Transportation

SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Bartholow, B

STATUS: Active NOTICE DATE: Feb. 1976

ACKNOWLEDGMENT: FRA

24 045989

RAIL NETWORK AND MODEL FOR ANALYSIS AND EVALUATION OF ALTERNATIVE RAIL SYSTEMS WITHIN THE CONTINENTAL UNITED STATES

Conduct a detailed examination of the feasibility of extending and expanding data and operational programs for the computation of short line mileage to produce a rail network and model for analysis and evaluation of alternative rail systems within the continental United States.

PERFORMING AGENCY: National Bureau of Standards, Department of Commerce

INVESTIGATOR: Skillington, GE

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Ostrosky, D (Tel 617-494-2190)

IA DOT-RA-74-15

STATUS: Active NOTICE DATE: July 1975 TOTAL FUNDS: \$10,000

ACKNOWLEDGMENT: TSC

24 048949

IMPACTS OF PROPOSED RAIL NETWORK

The Contractor shall develop a set of Methodologies for estimating and evaluating Impacts of Proposed Rail Network changes, helping to ease the redundancies and misallocation of resources affecting the cost and performance of the railroads. Models will be developed, calibrated, and validated to provide a framework in which the impacts of alternative means or rationalization can be evaluated. The railroad industry, the users, labor, and other competing modes are affected by the process. The politico-socio-economic effects of different programs will be evaluated to provide a basis for the models. A review of regulatory agencies and laws will be performed. The end product will be the development and documentation of methodologies to predict quantitative and qualitative impacts within the framework of a railroad network model.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Sussman, JM

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Newkirk, J (Tel 202-4260771)

Contract DOT-OS-40002

STATUS: Completed NOTICE DATE: Feb. 1976 START DATE: Oct. 1973 COMPLETION DATE: Nov. 1975 TOTAL FUNDS: \$180,000

ACKNOWLEDGMENT: TRAIS (PR# PUR-2-30671)

24 050711

ILLINOIS CENTRAL NETWORK ANALYSIS

Railroad transportation operations are characterized by having a large number of variables with extensive interactions between variables and, in most cases, analytical techniques such as linear programming, queuing theory, game theory, etc., do not provide realistic solutions. A network simulation model will be applied to aid railroad management in determining the effects of changing facilities, operating policies, and traffic load on the performance of a railroad, thereby improving the overall system performance.

PERFORMING AGENCY: Illinois University, Urbana, Department of Civil Engineering

INVESTIGATOR: Hay, WW Reinschmidt, AJ Kim, SJ

SPONSORING AGENCY: Illinois Central Gulf Railroad

STATUS: Completed NOTICE DATE: July 1975 START DATE: July 1973 COMPLETION DATE: June 1975

ACKNOWLEDGMENT: Science Information Exchange (AI 753 3)

24 055781

RAIL FACILITIES DATA

The Office of Preparedness shall update rail facilities data for use in the rail network analysis.

This project was done in cooperation with Government Services Organization, Federal Preparedness Agency.

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: Roggeveen, V (Tel (415)328-8338)

SPONSORING AGENCY: Office of Policy, Plans and International Affairs; Office of the Secretary of Transportation

RESPONSIBLE INDIVIDUAL: Leavens, D (Tel (202)343-6213)

IA DOT-AS-40071

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: June 1974 TOTAL FUNDS: \$5,000

ACKNOWLEDGMENT: TRAIS (PR# DOT-AS-40071)

24 058236

ENGINEERING AND SCIENTIFIC MANPOWER AVAILABLE FOR THE TRANSPORTATION INDUSTRY

Prepare a report delineating the recent, present and near-future supply of new graduates in the physical sciences and engineering, and particularly in civil engineering; examine the available demand information; outline the several alternative possibilities for increasing the available supply of technological manpower and/or augmenting it from the present workforce; and make recommendations for a further comprehensive study of the manpower supply/demand situation within the programs of the Department of Transportation.

PERFORMING AGENCY: Scientific Manpower Commission

INVESTIGATOR: Vetter, BM (Tel 202-2236995)

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation, PS-50287

RESPONSIBLE INDIVIDUAL: Money, LJ

Contract PS-50287

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Dec. 1974 COMPLETION DATE: Jan. 1975 TOTAL FUNDS: \$2,499

ACKNOWLEDGMENT: Office of Systems Development and Technology (PS-50287)

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: July 1975 START DATE: June 1975 COMPLETION DATE: June 1976 TOTAL FUNDS: \$59,857

ACKNOWLEDGMENT: TRAIS (PUR-50046)

24 099076

RAIL NETWORK FEASIBILITY STUDY

The study investigates the feasibility of revising an operational computer program (Short Line Miling System) and certain input data to create a planning tool for the analysis of alternative rail configurations. The objective of the study was to develop a conceptual framework for rail network configuration analysis based on modification of a Short Line Miling System devised by TAD in 1971. A second objective involved the addition of certain identifying information on a Short Line Primary Master Stational File Data Tape. The underlying motivation for both activities was to support FRA in testing alternative plans for modification of rail networks in the U.S. The approach involved feasibility analysis of certain changes to the previously devised Short Line Miling System to spacially relate network nodes and links. In addition means were investigated to track commodity shipments by rail node and rail segment as opposed to only origin-destination considerations. Changes to the Short Line Primary Master File were achieved through

the development of several computer programs for isolating data requirements and updating the tape with new information. To date information requirements for updating the SL Primary Master File have been specified to FRA but data has not been supplied by the Agency. A preliminary concept for developing a modified configuration analysis program was presented to FRA. Decisions relating to the suitability of implementing the concept are pending.

PERFORMING AGENCY: National Bureau of Standards, Department of Commerce

INVESTIGATOR: Ramsburg, R

SPONSORING AGENCY: National Bureau of Standards, Department of Commerce, 4314385

STATUS: Active NOTICE DATE: Oct. 1974 START DATE: July 1974 COMPLETION DATE: June 1975 TOTAL FUNDS: \$5,000

ACKNOWLEDGMENT: Science Information Exchange (ZBA 6303)

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 Railroad 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: Feb. 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, conventional 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.

Proceedings 1975--Conf on the Detection, Prevention and Rehab of the Problem Drinking Employee in the RR Industry, Cornell University, Jan. 1976, PB-248906

PERFORMING AGENCY: Cornell University

SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development

RESPONSIBLE INDIVIDUAL: Collins, DM (Tel 202-426-9682)

STATUS: Active 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 202-426-0771)

Contract DOT-FR-65090

STATUS: Active NOTICE DATE: Feb. 1976 TOTAL FUNDS: \$113,510

ACKNOWLEDGMENT: FRA

25 045962

PUBLIC INVESTMENT IN TRANSIT FACILITIES

To evaluate the desirability/feasibility/impact of a value capture policy across areas: 1) The Law, 2) Community enhancement, and 3) Financing. The techniques to be used rely primarily on application and evaluation of case study corridors in Houston which represent prototypical situations. Each corridor will provide a situation for the development of comprehensive strategies (legal, social, financial, physical) based upon the value capture policy. These strategies will then be evaluated. General guidance material developed and integration to evaluate the policy's overall potentials.

PERFORMING AGENCY: Rice Center for Community Design and Research
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Nupp, BL (Tel 202-4264447)

Contract DOT-OS-40007 (C)

STATUS: Active NOTICE DATE: July 1975 TOTAL FUNDS: \$150,000

ACKNOWLEDGMENT: TRAIS (PR# DOT-OS-40007)

25 048920

STATE RAIL PLANNING METHODOLOGY

The proposal is designed to build upon the current efforts and experience of two states to develop a framework for state rail planning which can be used by other states on their own initiative, and specifically in response to the planning requirements of the Regional Rail Reorganization Act of 1973 and the Transportation Improvement Act, upon enactment.

PERFORMING AGENCY: Wisconsin Department of Transportation
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Sperty, JP

Contract DOT-FR-40025

STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: Apr. 1975 TOTAL FUNDS: \$90,000

ACKNOWLEDGMENT: FRA

25 048938

URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES

The function of an effective national R&D policy in transportation is to indicate how federal resources available for R&D should be distributed between and across modes. This judgment must be based on established needs and evidence of promise in both new and existing technologies, with the final decision criterion being which options for expenditure will best assure continued transportation service and maximum national benefit.

PERFORMING AGENCY: National Science Foundation
SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
RESPONSIBLE INDIVIDUAL: Linhares, AB (Tel 202-426-4208)

IA DOT-AS-40063

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: May 1974 COMPLETION DATE: May 1975 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: TRAIS (PR # DOT-AS-40063)

25 048978

AN EXPERIMENTAL REGIONAL TRANSPORTATION INFORMATION DIFFUSION UNIT

The contractor shall undertake experiments and conduct exploration to determine (1) the information needs of the transportation research, development, planning and administration communities in the Chicago Metropolitan Area, (2) the feasibility of a university-based information diffusion unit to act as an instrument for the dissemination of federally developed technologies to state and local transportation institutions, and (3) the impacts of the formal dissemination programs and systems upon the use of new transportation technologies. The method will be to establish an experimental information diffusion unit to provide three types of services: consultation by faculty specialists in transportation, on-line and off-line access to the evolving elements of TRISNET, and a system of delivery of documents and data required by the information users in the execution of their functions.

REFERENCES:

The Effectiveness and Feasibility of a TRISNET Regional Center in Information Transfer, Rath, GJ, et al, Final Rpt., DOT-TSC-76-36, Oct.

1975

PERFORMING AGENCY: Northwestern University, Evanston, Transportation Center

INVESTIGATOR: Rath, GJ Schofer, JL

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Hoshovsky, AG

Contract DOT-OS-40090 (CS)

STATUS: Completed NOTICE DATE: Feb. 1976 START DATE: Apr. 1974 COMPLETION DATE: Oct. 1975 TOTAL FUNDS: \$69,706

ACKNOWLEDGMENT: TRAIS (PR# PUR-1-40057)

25 054707

CONSTITUTIONAL AND GOVERNMENT ASPECTS OF TRANSPORTATION POLICY

A brief examination from secondary sources of the historical, economic, political and legal influences which have governed the development of a transportation policy in Canada and examination of the intergovernmental aspects involved in any revision or development of it in the future. /RTAC/

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport

INVESTIGATOR: Burns, RM

SPONSORING AGENCY: Canadian National Railways; Ministry of Transport, Canada; Queen's University, Canada

STATUS: Active NOTICE DATE: July 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

25 058293

TRANSPORTATION INVESTMENT REQUIREMENTS AND GROWTH PATTERNS IN MICHIGAN

In compliance with Federal policy, the State of Michigan is formulating land use policies. The project is to produce a supply-demand equilibrium model, for use in statewide planning, that is able to incorporate the effects of various future growth patterns in the state on required transportation investment. Differing costs will be associated with each pattern, therefore, indicating possible savings to conserve the available budget. Social and environmental impacts will also be evaluated for various population distributions and transportation systems.

PERFORMING AGENCY: Michigan State University, Department of Civil Engineering

INVESTIGATOR: Taylor, WC

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Williams, W

Contract DOT-OS-50044 (CS)

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Jan. 1975 COMPLETION DATE: Feb. 1976 TOTAL FUNDS: \$31,297

ACKNOWLEDGMENT: TRAIS (PUR-40073)

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) Analyse 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, Southern Mississippi University

INVESTIGATOR: Peterson, JR (Tel ter)

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Macrae, NK

Contract DOT-OS-40089 (CS)

STATUS: Active NOTICE DATE: Aug. 1975 START DATE: Jan. 1974 COMPLETION DATE: Jan. 1977 TOTAL FUNDS: \$177,915

ACKNOWLEDGMENT: TRAIS (PUR-1-40175)

25 058363

RESEARCH ON TRANSPORTATION CONNECTIVITY

A summary of institutional solutions to transportation systems integration will be prepared. A working symposium on the technological state-of-the-art of integrated multi-modal transportation terminals. A theoretical mission flow study and analysis will be initiated to identify the major concepts of connectivity to determine the need in some depth, and to identify the major connectivity activities necessary for a DOT program in connectivity RD and D.

PERFORMING AGENCY: Tennessee University
 INVESTIGATOR: Sleeper, RS
 SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
 RESPONSIBLE INDIVIDUAL: Doyle, J

Contract OS-40105 (C)
 STATUS: Active NOTICE DATE: July 1975 START DATE: May 1974 TOTAL FUNDS: \$25,000

ACKNOWLEDGMENT: Office of Systems Development and Technology

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
 SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation
 RESPONSIBLE INDIVIDUAL: Goodman, KM

Contract DOT-OS-50118 (CS)
 STATUS: Active NOTICE DATE: July 1975 START DATE: June 1975 COMPLETION DATE: July 1976 TOTAL FUNDS: \$42,000

ACKNOWLEDGMENT: TRAIS (PUR-50032)

25 058494

IMPACTS OF THE SAN FRANCISCO BAY AREA RAPID TRANSIT SYSTEM

The Public Policy Project will analyze the observed influence of the BART system on policies of Bay Area, State and Federal governmental units. The influence may be due to costs and resulting bonds and taxes, or it may be due to transportation service changes that affected policies related to transportation facility development, land use and zoning, growth and provision of services, and finance. The reasons why the observed policy impacts occur will be examined, and approaches to improve the effects in future situations will be proposed. The Public Policy Project will also derive indications of the cause for policy changes and the results of change or no change from each of the other projects and may in turn direct their work by identifying changes which should be explained.

PERFORMING AGENCY: Metropolitan Transportation Commission
 SPONSORING AGENCY: Office of the Secretary of Transportation; Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Bouchard, R (Tel 202-4263957)

Contract DOT-OS-30176/201
 STATUS: Active NOTICE DATE: July 1975 START DATE: June 1974 COMPLETION DATE: June 1975 TOTAL FUNDS: \$231,000

ACKNOWLEDGMENT: TRAIS

25 058507

DEVELOPING LOCAL STRATEGIES AS ALTERNATIVES TO ABANDONMENT OF LIGHT DENSITY RAILROAD LINES

By identifying, compiling and stressing innovative procedures which local interests may take either to preserve their rail service or to facilitate transition to a new form of transportation service, this research aims to assist in ameliorating potential deleterious impacts of rail abandonment. The objective is to develop a handbook to assist shippers, local and state governmental units, and planners when their rail service is scheduled for abandonment.

PERFORMING AGENCY: Tennessee University
 INVESTIGATOR: Patton, EP Langley, CJ
 SPONSORING AGENCY: Office of University Research, Department of Transportation
 RESPONSIBLE INDIVIDUAL: Murphy, T (Tel 202-4264416)

Contract DOT-OS-50125
 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1975 COMPLETION DATE: Sept. 1976 TOTAL FUNDS: \$88,427

ACKNOWLEDGMENT: TRAIS (PUR-50164)

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.

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: Active NOTICE DATE: Aug. 1975 TOTAL FUNDS: \$294,644

ACKNOWLEDGMENT: DOT

25 099365

VALUE CAPTURE POLICY RESEARCH-THE ECONOMIC, LEGAL, AND COMMUNITY DESIGN IMPLICATIONS OF CAPTURING LAND VALUE EXCALATION 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 immediately 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 possibilities 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
EFFECTS OF PARTIAL DEREGULATION IN THE
TRANSPORTATION INDUSTRY**

This investigation will focus on movements of commodities such as grain that are exempt from regulation when moved by highway and water and will include examination of the implications of extending the regulatory exemptions to railroads. The study will be correlated with a cost analysis to show the effects of deregulation on productivity, rates and modal choice.

PERFORMING AGENCY: Northwestern University, Evanston, Transportation Center
INVESTIGATOR: Moses, LN
SPONSORING AGENCY: National Science Foundation

STATUS: Active START DATE: 1975 COMPLETION DATE: Dec. 1977 TOTAL FUNDS: \$110,000

ACKNOWLEDGMENT: Northwestern University, Evanston

**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 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 subsidies, 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, 8-18
INVESTIGATOR: Bellomo, SJ (Tel 703-893-4310) Stowers, JR
SPONSORING AGENCY: Transportation Research Board, National Cooperative Highway Research Program
RESPONSIBLE INDIVIDUAL: Spicher, RE (Tel 202-389-6741)

STATUS: Active NOTICE DATE: Jan. 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, Hamburg Incorporated, 8-14
INVESTIGATOR: Memmott, FW Blackwell, RB
SPONSORING AGENCY: Transportation Research Board, National Cooperative Highway Research Program
RESPONSIBLE INDIVIDUAL: Spicher, RE (Tel 202-389-6741)

STATUS: Active NOTICE DATE: Jan. 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.

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: Active NOTICE DATE: Feb. 1976 START DATE: Oct. 1974 COMPLETION DATE: Feb. 1976 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. 1976

The States and Rural 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: Feb. 1976 START DATE: May 1974 COMPLETION DATE: May 1975 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

RESPONSIBLE INDIVIDUAL: Linhares, AB (Tel 202-426-4208)

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: Jan. 1976 COMPLETION DATE: Jan. 1977

ACKNOWLEDGMENT: DOT

25 129739

DEVELOPMENT AND DOCUMENTATION OF A METHODOLOGY ON STATE RAIL PLANNING

Wisconsin 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: Active NOTICE DATE: Feb. 1976 START DATE: July 1974 COMPLETION DATE: Mar. 1976 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: Active NOTICE DATE: Feb. 1976 START DATE: July 1974 COMPLETION DATE: Mar. 1976 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: Transcendental Corporation

SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Economics and Policy Development

RESPONSIBLE INDIVIDUAL: Selzer, LJ (Tel 202-426-0771)

Contract DOT-FR-65118

STATUS: Active NOTICE DATE: Feb. 1976 TOTAL FUNDS: \$150,000

ACKNOWLEDGMENT: FRA

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, R (Tel 617-4942476)

IA RA-75-19

STATUS: Active NOTICE DATE: Feb. 1976 START DATE: July 1975 COMPLETION DATE: Feb. 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 utilization 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 058380

RAILROAD WAGE AND EMPLOYEE STATISTICS RECEIVED BY THE FEDERAL RAILROAD ADMINISTRATION

Describe specific data available and the methods used by railroads in reporting. Verify data accuracy. Specific data items to be inventoried are: (1) Interstate Commerce Commission Annual Wage Statistics of each Class I railroad in the United States for the years 1969-1973 for 128 Employee Occupational Classifications (Form ICC-A-300). (2) Railroad Retirement Board: a) Wage Study Tape--1973-Current Payroll Information b) Wage Study (Xeroxed)--1969-1973 Retained Payroll Data c) Wage History Tapes--1969-1973-Retirement Records. The Interstate Commerce Commission's Form A-300 and the Railroad Retirement Board's Wage Study and

Wage History Tapes are to be thoroughly reviewed for informational quality.

Report on Rail Wage and Employment Statistics Jan. 1976, PB-248782

PERFORMING AGENCY: Whitten (Herbert O) and Associates

INVESTIGATOR: Whitten, HO

SPONSORING AGENCY: Federal Railroad Administration

Contract DOT-FR-55097 (FFP)

STATUS: Active NOTICE DATE: July 1975 START DATE: Mar. 1975 COMPLETION DATE: June 1975 TOTAL FUNDS: \$9,991

ACKNOWLEDGMENT: TRAIS (5097)

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 compilation 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: Feb. 1976 START DATE: 1975 COMPLETION DATE: May 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: Feb. 1976 START DATE: 1970

ACKNOWLEDGMENT: AAR

INDEXES

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.

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