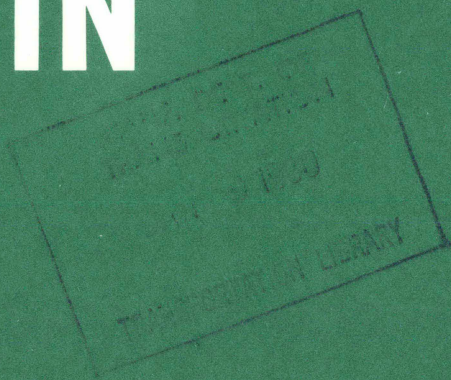
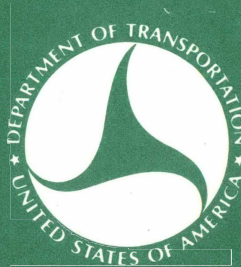


NH-55
C.2



RAILROAD RESEARCH BULLETIN



Autumn 1979
Volume 6 Number 2

RRIS accessions between
February 1979 and July 1979

U.S. DEPARTMENT OF TRANSPORTATION
Federal Railroad Administration

Prepared under contract by
Railroad Research Information Service
Transportation Research Board

25 - R&D Management

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The Transportation Research Board is an agency of the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering. The Board's purpose is to stimulate research concerning the nature and performance of transportation systems, to disseminate information that the research produces, and to encourage the application of appropriate research findings. The Board's program is carried out by more than 150 committees and task forces composed of more than 1800 administrators, engineers, social scientists, and educators who serve without compensation. The program is supported by state transportation and highway departments, the major administrations of the U.S. Department of Transportation, the Association of American Railroads, and other organizations interested in the development of transportation.

The Transportation Research Board operates within the Commission on Sociotechnical Systems of the National Research Council. The Council was organized in 1916 at the request of President Woodrow Wilson as an agency of the National Academy of Sciences to enable the broad community of scientists and engineers to associate their efforts with those of the Academy membership. Members of the Council are appointed by the president of the Academy and are drawn from academic, industrial, and governmental organizations throughout the United States.

The National Academy of Sciences was established by a congressional act of incorporation signed by President Abraham Lincoln on March 3, 1863, to further science and its use for the general welfare by bringing together the most qualified individuals to deal with scientific and technological problems of broad significance. It is a private, honorary organization of more than 1000 scientists elected on the basis of outstanding contributions to knowledge and is supported by private and public funds. Under the terms of its congressional charter, the Academy is called upon to act as an official—yet independent—advisor to the federal government in any matter of science and technology, although it is not a government agency and its activities are not limited to those on behalf of the government.

To share in the task of furthering science and engineering and of advising the federal government, the National Academy of Engineering was established on December 5, 1964, under the authority of the act of incorporation of the National Academy of Sciences. Its advisory activities are closely coordinated with those of the National Academy of Sciences, but it is independent and autonomous in its organization and election of members.

Contents

FOREWORD	iv
AVAILABILITY OF DOCUMENTS	v
LOAN AND PHOTOCOPY SERVICES	vi
RESTRICTED AVAILABILITY OF UIC/ORE DOCUMENTS	vii
ABBREVIATIONS	viii
EXAMPLES OF ABSTRACTS AND SUMMARIES	ix

ABSTRACTS OF REPORTS AND JOURNAL ARTICLES

00 Right-of-Way	1
01 Track and Structures	22
02 Train-Track Dynamics	30
03 Rail Vehicles and Components	40
04 Propulsion Systems	48
05 Braking Systems	60
06 Signals, Control, and Communications	62
07 Human Factors	68
08 Rail-Highway Grade Crossings	70
09 Materials Science	72
10 Environmental Protection	79
11 Advanced Systems	86
12 Safety	97
13 Electrification	105
15 Socioeconomic Factors	112
16 Energy	117
17 Information Systems	122
18 Economics	124
19 History	129
20 Freight Transport Demand Analysis	130
21 Freight Operations	144
22 Logistics and Physical Distribution	149
23 Passenger Operations	159
24 Industry Structure and Company Management	165

25 Government Policy, Planning, and Regulation	171
26 Bibliography and Documentation	178

ONGOING RESEARCH SUMMARIES

00 Right-of-Way	180
01 Track and Structures	185
02 Train-Track Dynamics	193
03 Rail Vehicles and Components	199
04 Propulsion Systems	207
05 Braking Systems	209
06 Signals, Control, and Communications	210
07 Human Factors	213
08 Rail-Highway Grade Crossings	214
09 Materials Science	216
10 Environmental Protection	218
11 Advanced Systems	221
12 Safety	226
13 Electrification	230
15 Socioeconomic Factors	231
16 Energy	233
17 Information Systems	235
18 Economics	238
20 Freight Transport Demand Analysis	240
21 Freight Operations	247
22 Logistics and Physical Distribution	250
23 Passenger Operations	265
24 Industry Structure and Company Management	268
25 Government Policy, Planning, and Regulation	270
26 Bibliography and Documentation	274

SOURCE INDEX	275
--------------------	-----

AUTHOR AND INVESTIGATOR INDEX	293
-------------------------------------	-----

SUBJECT TERM INDEX	307
--------------------------	-----

Foreword

This *Bulletin*, containing 1078 abstracts of journal articles, research reports, computer programs, and magnetic tape data sets and 442 summaries of ongoing research activities, covers material accessioned by the Railroad Research Information Service between August 1978 and January 1979.

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.

The scope of RRIS includes rail rapid transit and light rail 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.

The RRIS Cumulative Subject Index 1973-1975 is available from the Railroad Research Information Service along with most of the editions of the *Railroad Research Bulletin*. Some 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.

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, appropriate subject terms, dates, performing agencies, or other data elements. The search is performed by computer. Output may include abstracts of articles and reports, descriptions of computer programs, and summaries of ongoing research. The output is computer printed and similar in format to citations that appear in this publication.

The fee schedule for RRIS title 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 citation after screening by RRIS. A written authorization or purchase order is required before the retrieval is made.

USING THE RAILROAD RESEARCH BULLETIN

This volume is divided into three 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 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 two-digit subject area number and the six-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.

Availability of Documents

An availability statement is included with most abstracts. Addresses for ordering documents are given with the abstracts or with the publisher listing in the Source Index. Copies of reports and articles listed in this publication are not available from the Railroad Research Information Service. When ordering from any source, give full information on the item wanted. When ordering from the National Technical Information Service, be sure to give the NTIS accession number as well as the title and

other information. When no availability is specified with an abstract, consult an established transportation library. A loan service for publications and a photocopy service for articles and papers are available at two TRISNET Centers as explained on page vi. Because a large number of documents are available from a few sources, space and printing costs have been reduced by abbreviating those sources as follows:

- AAR**
Association of American Railroads
1920 L Street, N.W.
Washington, DC 20036
- AAR**
For technical reports identified by a report number such as R-253:
Association of American Railroads
Technical Center
3140 South Federal Street
Chicago, IL 60616
- AIAA**
American Institute of Aeronautics and Astronautics
Technical Information Service
750 Third Avenue
New York, NY 10017
- AREA**
American Railway Engineering Association
2000 L Street N.W.
Washington, DC 20036
- ASCE**
American Society of Civil Engineers
345 East 47th Street
New York, NY 10017
- ASME**
American Society of Mechanical Engineers
345 East 47th Street
New York, NY 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, DC 20590
- ECMT**
All documents available through
OECD (see below)
- ESL**
Engineering Societies Library
345 East 47th Street
New York, NY 10017
- FRA**
Federal Railroad Administration
400 Seventh Street, S.W.
Washington, DC 20590
- GPO**
Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402
- IEEE**
Institute of Electrical and Electronics Engineers
345 East 47th Street
New York, NY 10017
- IPC**
IPC (America), Inc.
205 East 42nd Street
New York, NY 10017
- *IT**
Transport Publishing House
- *MPS**
USSR Ministry of Railways
- NAE/NAS/NRC**
National Academy of Sciences
Publication Sales
2101 Constitution Avenue, N.W.
Washington, DC 20418
- NTIS**
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
- OECD**
OECD Publications Center
Room 1207
1750 Pennsylvania Avenue, N.W.
Washington, DC 20006
- ORE**
See UIC/ORE below.
- OST**
Office of the Secretary
U.S. Department of Transportation
400 Seventh Street, S.W.
Washington, DC 20590
- RPI**
Railway Progress Institute
700 North Fairfax Street
Alexandria, VA 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, PA 15096
- SNAME**
Society of Naval Architects and Marine Engineers
74 Trinity Place
New York, NY 10006
- TRB**
Transportation Research Board
Publications Office
2101 Constitution Avenue, N.W.
Washington, DC 20418
- TRRL**
Transport and Road Research Laboratory
Crowthorne, Berkshire RG11 6AU
England
- TSC**
Transportation Systems Center
55 Broadway
Cambridge, MA 02142
- *TsNIITEI**
Central Scientific Research Institute of Information and Technical and Economic Research
- 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 page vii)
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
- UMI**
University Microfilms International
300 North Zeeb Road
Ann Arbor, MI 48106
- UMTA**
Urban Mass Transportation Administration
400 Seventh Street, S.W.
Washington, DC 20590

*Publications from this source and any other documents of Russian origin must be ordered in the United States through Victor Kamkin Bookstore, Inc., 12224 Parklawn Drive, Rockville, MD 20852.

Loan and Photocopy Services

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

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

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

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

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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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Abbreviations

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

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

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17. Key Words Railroads, Rail Transportation, Advanced Systems, High Speed Ground Transportation, Bibliography and Documentation			18. Distribution Statement		
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Notice

The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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Examples of Abstracts and Summaries

Abstracts are classified according to an eight-digit document record number: The first two-digits indicate the RRIS subject area number and the last six 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 research report abstract and of a journal article abstract of both U.S. and non-U.S. journal articles appear below and on the next page.

Abstract of a research report

Document record number
TRIS accession number
Subject area code → **02 128640**

Title → **TEST TRAIN PROGRAM SIXTH PROGRESS REPORT**
Research report abstract → This report describes the progress of the Rail Research Program involving operation of the FRA test cars and the performance of other rail research efforts during the period 1 July 1973 to 30 June 1974. Highlights of the work reported include operation of the FRA test cars to perform track surveys and other rail research activities; test car upgrading; expansion of the Rail Research Program; and data management and data analysis tasks which have been undertaken to benefit railroad technology. The Rail Research Program primarily involves the operation and instrumentation of the FRA test cars. This research program is designed to provide high-speed measurement of railroad track characteristics, development of comprehensive track measurement techniques, development of special testing instrumentation, and data evaluation through analysis and electronic processing. 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 → Contract DOT-FR-20032

Source of abstract → ACKNOWLEDGMENT: FRA
Availability → PURCHASE FROM: NTIS Repr. PC, Microfiche
PB-247084/AS, DOTL NTIS

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

Abstract of a U.S. journal article

Document record number
TRIS accession number
Subject area code → **02 131315**

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

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

Source of abstract → ACKNOWLEDGMENT: AREA Bulletin
Availability → PURCHASE FROM: ESL Repr. PC, Microfilm
DOTL JC

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

Abstract of a non-U.S. journal article

Document record number
 TRIS accession number
 Subject area code

Translated title

Title in original language

Journal article abstract

Language of full-text article

Author, publication data, document data

Source of abstract

Availability

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

09 141649
EXPERIMENTAL ANALYSIS OF THE DYNAMIC BEHAVIOR OF A MECHANICAL STRUCTURE. CONCEPT OF MECHANICAL IMPEDANCE [Analyse experimentale du comportement dynamique d'une structure mecanique. Concept d'impedance mecanique]
 The experimental method of analysis called "mechanical impedance" (the concept of mechanical impedance is of the same nature as that of electrical impedance) is used to study the dynamic behavior of the structure of the material. It reveals the vibration pattern in any given area of a component. The SNCF Testing Division uses this method to analyse stress patterns in components, to limit the amplitude of certain vibrations, or to monitor the condition of a metallic structure during operation. The applications of this method are shown by means of examples. [French]

Butteaud, B *Revue Generale des Chemins de Fer* May 1976, pp 304-323, 40 Fig., 3 App.

ACKNOWLEDGMENT: UIC
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DOTL JC

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.

Summary of ongoing research

Document record number
 TRIS accession number
 RRIS subject area number

Project title

Project summary

Agency performing the work

Project investigators

Project sponsors

Contract monitor

Project data

Source of this summary

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

Abstracts of Reports and Journal Articles

00 Right-of-Way

00 053319

STATISTICAL DISTRIBUTION OF AXLE-LOADS AND STRESSES IN RAILWAY BRIDGES. RANDOM LOADING OF RAILWAY BRIDGES AND ITS RELATIONSHIP TO FATIGUE

Random models of railway bridge loading are used to study its accumulative fatigue damage. The effect on the bridge life of different parameters such as speed, damping, traffic load, number of stress ranges and their distribution, etc., is studied. The report also includes the development of an experimental method to obtain bridge stresses under traffic loads. The derived method of designing railway bridges for fatigue allows for the traffic load, the probability of trains passing one another on bridges carrying several tracks, Wohler curves and the life for which a bridge is designed.

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

International Union of Railways D 128/RP 8, Apr. 1978, 59 p., 35 Fig., 7 Tab.

ACKNOWLEDGMENT: UIC
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DOTL RP

00 053332

BRAKING AND ACCELERATION FORCES ON BRIDGES AND INTERACTION BETWEEN TRACK AND STRUCTURE. STARTING AND BRAKING TESTS ON A REINFORCED CONCRETE THREE-SPAN BRIDGE WITH NEOPRENE BEARINGS

This report presents the results of braking and starting measurements taken on a reinforced concrete hyperstatic three-span bridge consisting of two adjacent but independent 35 m decks, one carrying track laid on the ballast and the other with the track laid direct, with special neoprene bearings. The report describes with the distribution of the braking and starting forces in the abutments, the piers and the rails, with different locations of the fixed bearings and with different continuous and discontinuous rail configurations for each of the two types of deck. It also indicates the measured values of the thrusts transmitted to the ground in the case of the deck with ballasted track.

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

International Union of Railways D 101/RP 13, Oct. 1978, 37 p., 35 Fig., 103 Tab.

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00 156837

FILTER FABRICS CAN CUT COSTS OF RIVER-BANK AND SHORE-PROTECTION STRUCTURES

Over the past decade, plastic filter fabrics have seen growing use in shore-protection structures, river-bank protection schemes, and other areas where water comes into direct contact with soil. In a typical application described, the filter fabric is laid directly on top of the soil to be protected, and rip rap, concrete blocks, or some other form of armor protection laid on top. The fabric prevents water from gouging out the soil from behind the armor, a process that would result in the inward collapse of the embankment-protection structure. A number of case histories explaining where and why the fabric was used and how well it has performed is presented.

Dallaire, G *ASCE Civil Engineering* Vol. 47 No. 3, Mar. 1977, pp 74-79, 4 Fig., 5 Phot.

ACKNOWLEDGMENT: EI
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00 183741

THE NEW MEXICO BRIDGE INSPECTION PROGRAM

The New Mexico bridge inspection program is reviewed for its uniqueness as well as the use of the resulting data. Annual training sessions and field work with college professors has kept the program viable and continuing. Close cooperation with the Civil Engineering Department, New Mexico State University, has led to utilization of bridge capacity data developed within the program into a statewide overload routing and permit system. The system takes an overload wheel configuration and load distribution and computes an equivalent HS loading which is compared to the capacity of each bridge along a given route. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

White, K *Transportation Research Record* No. 664, 1978, pp 7-13, 1 Fig., 5 Ref.

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00 183745

WHAT HAS BEEN LEARNED FROM THE FIRST PRESTRESSED CONCRETE BRIDGES--REPAIR OF SUCH BRIDGES

Engineers often wonder to what extent prototype structures have lived up to their expectations. As examples, old construction of the Walnut Lane Bridge, Amdeck section, and one other structure which showed signs of distress over the years will be illustrated. The speaker will discuss the apparent background and reasons for such a distress plus the improvements which may be made to make such effects less severe. Also, methods of repair and what has been learned from these old designs will be described. The lecture is supported with many color slides and viewgraphs which depict old construction details and the increasing severity of distress. Accidental damages caused by vehicles on three different types of prestressed bridge superstructures are also illustrated. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Koretzky, HP (Pennsylvania Department of Transportation) *Transportation Research Record* No. 664, 1978, pp 37-46, 6 Fig., 31 Phot.

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00 183746

EXTENDING THE SERVICE LIFE OF EXISTING BRIDGES

This paper briefly discusses background material and statistical data regarding the nation's current bridge problems and the research presently underway that will aid in resolving this problem. Bridge deficiencies as uncovered in the inspection of over 140 bridges located in five states are outlined. These deficiencies are categorized as Structural, Mechanical, Geometric, and Safety and are discussed as they apply to various bridge types and bridge materials. A catalog of deficiencies is included which lists the deficiencies in the order of frequency of occurrence. Bridge rehabilitation techniques presently in use are outlined and some unique techniques discussed. These include techniques to increase live load capacity, correct mechanical deficiencies, and to improve geometrics. Improvements to rideability, to safety, drainage and other miscellaneous repairs are also

discussed. Sketches are included depicting the concepts of some of these rehabilitation techniques. "Improvement Factor" curves are developed for various techniques that can be utilized to increase live load capacity. This factor is an indication of the percentage of increase in flexural strength that can be achieved by a particular technique. Cost information for each of these techniques is also provided so that a "Cost Effectiveness Factor" can be computed for each. This provides a convenient means of comparison of various techniques from both a cost and an improvement standpoint. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Berger, RH (Byrd, Tallamy, MacDonald and Lewis); Gordon, S (Federal Highway Administration) *Transportation Research Record* No. 664, 1978, pp 47-55, 6 Fig.

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00 183751

FATIGUE CONSIDERATIONS FOR THE DESIGN OF RAILROAD BRIDGES

This paper describes a concept for the fatigue evaluation and design of railroad bridges. The primary objective is to account for the number of stress cycles per train, the corresponding stress ranges, and the total number of trains in the lifetime of the structure. Stress recordings from various structural elements of existing bridges were used as input for fatigue tests on beams. The test results are evaluated using the rainflow counting method and Miner's cumulative damage law. These results show good correspondence with constant amplitude test data. The assessment of traffic is based on theoretical traffic models and on measurements of axle loads and axle spacings. The fatigue effect of the traffic models is simulated by computer programs in terms of span length and compared to field measurements. It is shown that a correction factor may be applied to the design live load when used for fatigue considerations. In addition, the fatigue design concept is able to account for the total number of trains in the lifetime of the bridge. Also, a different safety factor may be applied for redundant and nonredundant load path structures. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Hirt, MA (Swiss Federal Institute of Technology) *Transportation Research Record* No. 664, 1978, pp 86-92, 12 Fig., 16 Ref.

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00 183753

RETROFITTING FATIGUE DAMAGED BRIDGES

This paper examines continuing laboratory and field studies on ways to retrofit fatigue damaged members. Results of a pilot field study on two bridge structures with known fatigue cracks at the ends of cover plates are reviewed. Fatigue damage members were retrofitted by peening and gas tungsten arc remelting the weld toe. The initial retrofit is summarized and the results of subsequent inspection after 1 1/2 years is reviewed. Also discussed is the retrofitting of several more bridges by peening weld toes on a more extensive scale. In recent years many highway and bridge structures have experienced fatigue damage from out-of-plane displacements. This has resulted in web cracking at the ends of transverse stiffeners and floor beam connection plates which were not welded to tension flanges. Cracking as a result of out-of-plane movement is reviewed and several examples of cracking in a number of bridges is discussed. Nearly all of these fatigue damaged members have been repaired and retrofitted by drilling holes in the web plate at the ends of the horizontal cracks. A series of laboratory studies have been carried out to evaluate the fatigue behavior of stiffeners due to out-of-plane displacement. After fatigue cracking from out-of-plane movement these test beams are retrofitted by drilling holes in the web plate. Subsequently the fatigue damaged girder has been cycled to confirm the adequacy of the retrofitting procedures. These results will be summarized and related to bridges with comparable conditions. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Fisher, JW Pense, AW. Slockbower, E Hausamman, H (Lehigh University) *Transportation Research Record* No. 664, 1978, pp 102-109, 14 Fig.,

10 Ref.

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00 183754

REPAIR OF POPLAR STREET COMPLEX BRIDGES IN EAST ST. LOUIS

The web cracks found in the Poplar Street Complex Bridges were located at the top of the web-to-bottom flange fillet weld near the end floor beams. The buckled web was observed at the end of the girders behind the bearing stiffener. This report summarizes the results of the study which intends to determine the proper causes of the distress. It is believed that the main cause of the web crack was due to the out-of-plane movement of the web; and that the cause of the web buckling was from the eccentric reaction induced by the seized bearing pin. The repair method was developed mainly to stiffen the section and to carry the secondary stress induced from the out-of-plane movement of the web and to resist the distortion of the girder due to differential deflection of the main girders. Suggested details for future design are also included. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Hsiong, W (Illinois Department of Transportation) *Transportation Research Record* No. 664, 1978, pp 110-119, 32 Fig., 3 Ref.

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00 183755

FATIGUE CRACKS OF DEEP THIN-WALLED PLATE GIRDERS

Recently in Japan, fatigue cracks have been observed in bridges, cranes and tanks. Generally, there is a possibility of two types of fatigue cracks inherent in thin-walled plate girders. A crack which is initiated at the toe of fillet welds of compressions flange-to-web, is called Type-1 crack. Then, a crack at the toe of fillet welds of vertical stiffener-to-web, is called Type-2 crack. Type-1 and-2 cracks are governing ones in homogeneous and hybrid plate girders, respectively. For the fatigue design of deep thin-walled stiffened plate girders of bridges, the paper presents an extensive study on fatigue strength based on observations at the tests of initiation and propagation of the above-mentioned two fatigue cracks. The outline of girder tests and of coupon-type model tests for Type-2 cracks, and then the outline of girder tests and of plate-type and bar-type model tests for Type-1 cracks, are described and the results are discussed. The mechanism of initiation of Type-1 cracks at the bar-type model tests is discussed from the point of fracture mechanics in connection with unavoidable inherent initial defects due to welding or fabrication. Although the application of the test results to design is discussed, the problem of Type-1 cracks is a matter of structural details subjected to displacement-induced secondary bending stress ranges, and the need of further studies is stated. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Maeda, Y (Osaka University, Japan) *Transportation Research Record* No. 664, 1978, pp 120-128, 19 Fig., 2 Tab., 20 Ref.

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00 183756

ACOUSTIC EMISSION AND FATIGUE CHARACTERISTICS OF TYPICAL BRIDGE STEELS

Acoustic emission monitoring was used during tensile tests of low-carbon structural steels to determine the physical characteristics of the acoustic emission phenomena. Results indicate that acoustic emissions are caused by micro-plastic deformation processes (i.e., dislocation motion). A series of axial-fatigue tests was performed on several types of structural steels, some of which had extensive service in bridges. There was no apparent relation between specimen load histories and subsequent performance in fatigue tests. Tensile tests of specimens subjected to extensive fatigue testing, at stresses below the yield strength of the material, revealed no major difference in mechanical properties or acoustic emission response due to their fatigue histories. Further tests revealed that acoustic emission testing in the frequency range of 100-300 kHz has the physical capability of detecting cracks on large structural steel members. This may prove beneficial for the comprehensive nondestructive evaluation of steel bridges. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge

Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Hopwood, T Havens, JH (Kentucky Department of Transportation) *Transportation Research Record* No. 664, 1978, pp 129-135, 8 Fig., 2 Tab., 14 Ref.

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00 183758

FATIGUE TESTS OF BOLTED CONNECTIONS DESIGNED BY SHEAR-FRICTION

For the elevated structure of Metropolitan Atlanta Rapid Transit Authority's (MARTA) system, bolted connections were designed to provide composite action between the precast concrete deck slab units and the main longitudinal girders. The connections were designed using the shear-friction procedure described in Section 11.15 of the 1971 ACI Building Code. Pretorqued bolts were used as "reinforcement". The paper describes tests of 16 specimens that simulated the joint between the deck and the girder of the MARTA structure. Controlled variables included use of concrete girder, steel girder, different size bolts and different times of grout between deck and girder. The specimens were subjected to repeated loads of either 2 or 5-million cycles. These tests provided a means for determining the behavior of the bolted connection under repeated loading. The test results are compared with values calculated according to the shear-friction concept. Design recommendations are presented. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Rabbat, BG Hanson, NW (Portland Cement Association) *Transportation Research Record* No. 664, 1978, pp 145-152, 7 Fig., 3 Tab., 3 Ref.

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00 183759

AN INVESTIGATION OF THE FAILURE STRENGTH OF DECK SLABS OF COMPOSITE STEEL/CONCRETE BRIDGES

An investigation of the effects of repeated loads on slabs of steel/concrete composite bridges—the most common type in highway construction—was undertaken to supplement static studies conducted under the Ontario Joint Transportation and Communications Research Program No. Q50. The study which involved tests of a number of 1/8th scale direct models of a typical bridge, was aimed at determining endurance limits of the slabs under repeated concentrated loads. Main variables were stress range, and percentage and arrangement of reinforcement. Emphasis was focused on slabs with 0.2 percent top and bottom isotropic reinforcement, this being the amount recommended for use as a result of the static model testing phase of the program. The study showed that the deck slabs of conventionally designed steel/concrete bridges have large reserves of fatigue strength. An endurance limit of 50 percent of the ultimate capacity can be expected in such slabs. In the case of slabs with 0.2 percent isotropic reinforcement, an endurance limit of 40 percent of the ultimate static capacity can be safely adopted for design. These slabs have also performed adequately in static tests; and adoption of their use, where appropriate, would result in considerable reduction of reinforcement requirements in bridge decks. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Batchelor, B deV (Queen's University, Canada); Hewitt, BE (Western Australia Public Works Dept., Australia); Csagoly, P (Ontario Ministry of Transportation & Communication, Can) *Transportation Research Record* No. 664, 1978, pp 153-161, 6 Fig., 7 Tab., 7 Ref.

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00 183760

INVESTIGATION OF THE ULTIMATE STRENGTH OF DECK SLABS OF COMPOSITE STEEL/CONCRETE BRIDGES

A theoretical and experimental study of the ultimate strength of the deck slab of composite I-beam bridges is summarized. A theory, based on a mechanical model proposed by Kinnunen and Nylander, for punching failure of simply supported slabs, is developed which permits the calculation of the punching strength of restrained slabs. The theory suggests that a deck

slab can be expected to have a high inherent strength due to boundary restraints ensured by the presence of shear connectors, beams, diaphragms and the neighbouring slab areas. One-eighth scale direct models of a 24.4 m (80 ft) span prototype bridge were tested in laboratory studies of both orthotropically and isotropically reinforced slabs. Shear connector behaviour and dead load stresses appropriate to unshored construction were simulated. The results of the tests show that conventionally reinforced deck slabs have very high factors of safety against failure by punching and are wastefully reinforced. From considerations of ultimate strength as well as shrinkage and temperature reinforcement requirements, 0.2 per cent isotropic reinforcement is recommended as being adequate for bridge slabs of the type studied. Although this amounts to approximately 30 per cent of the current reinforcement requirements for such slabs, a high factor of safety can still be expected. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Batchelor, B deV (Queen's University, Canada); Hewitt, BE (Western Australia Public Works Dept., Australia); Csagoly, P Holowka, M (Ontario Ministry of Transportation & Communication, Can) *Transportation Research Record* No. 664, 1978, pp 162-170, 13 Fig., 2 Tab., 11 Ref.

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DEEP IMPREGNATION OF CONCRETE BRIDGE DECKS WITH LINSEED OIL

The overall objective of the research described in this paper was to evaluate the feasibility of deep impregnation of concrete bridge decks with boiled linseed oil/diluent mixtures. Impregnation is one of the techniques that is currently receiving considerable attention as a means of improving the longevity of bridge decks by reducing or preventing spalling problems associated with corrosion of reinforcing steel. The choice of linseed oil was based on safety (low volatility and high flash point), cost considerations, and the elimination of the polymerization step required for other polymers. Also, many highway agencies are already familiar with linseed oil, since it is commonly sprayed on bridge deck surfaces periodically to retard surface scaling. The latter procedure results in penetration depths of less than 3 mm and has little or no effect on preventing spalling. Deep impregnation requires a drying step to remove water, followed by sufficient contact with the impregnant to permit penetration to the desired depth. Following a period of preliminary laboratory studies, demonstration impregnations were carried out on 5.6 sq m areas on two bridge decks. One of the bridges had been subject to 3 winters of deicer salt application. The other had received no salt. Four days soaking time with a 50-50 mixture of boiled linseed oil/mineral spirits mixture was used in the impregnation step. Examination of cores subsequently removed from the test areas revealed that penetration depths ranging from about 5 to 10 cm were obtained. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Cady, PD Kline, DE Blankenhorn, PR (Pennsylvania State University, University Park) *Transportation Research Record* No. 664, 1978, pp 183-188, 8 Fig., 12 Ref.

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UTILIZATION OF STRESS HISTORY DATA IN BRIDGE DESIGN

A method for checking the adequacy of steel stringer highway bridges for fatigue is presented. Truck types and weights are utilized with stress analyses to predict the fatigue life of bridges. The distributions of truck weights, axle weights and truck types were based on recent field measurements. A simplified method of establishing stress ranges due to typical trucks is summarized and an example is presented. However, any method may be used to obtain the stress ranges and the procedure outlined in the paper may be used. The method may be used in design or in checking existing bridges. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Goodpasture, DW (Tennessee University, Knoxville) *Transportation Research Record* No. 664, 1978, pp 239-245, 3 Fig., 3 Tab.

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BRIDGE DESIGN BY THE AUTOSTRESS METHOD

The Autostress method has been evolving as an extension to the AASHTO Load-Factor method for rolled-beam and plate-girder steel highway bridges. The Autostress method uses the same three load levels as the Load-Factor method: Service load, Overload, and Maximum Load. However, to satisfy the structural performance requirements, the Autostress method injects two new concepts into bridge design: mechanism formation at Maximum Load and shakedown at Overload. When a structure forms a mechanism, there are sufficient plastic hinges to cause failure. When a structure shakes down, residual stresses and residual moments are automatically developed and assure elastic behavior under subsequent loading--hence the term Autostress. Although results of both methods for a simple span are the same, the Autostress method provides economies in continuous-span bridges; it utilizes the same safety factor against mechanism formation in both simple-span and continuous-span bridges. As part of an AISI-sponsored project, nine Load-Factor bridges were redesigned according to the Autostress method; the average cost saving was 10.7 percent. The objective of the AISI project is to suggest that the Autostress method be incorporated into the AASHTO specification after experimental verification. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Carskaddan, PS Haaijer, G (United States Steel Corporation) *Transportation Research Record* No. 664, 1978, pp 255-261, 5 Fig., 1 Tab., 8 Ref.

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00 183775

FATIGUE TESTS OF PRESTRESSED GIRDERS WITH BLANKETED AND DRAPED STRANDS

In pretensioned girders, draping of strands can be avoided by using straight tendons having unbonded "blanketed" lengths at the ends of girders. An experimental investigation was carried out to determine the effect of repetitive loading on the behavior and strength of girders with draped and blanketed strands. Six full-size Type II AASHTO-PCI girders were tested. Two girders contained draped strands. The other girders had straight strands with four tendons blanketed at each end. The effects of load level, development length, and confining ties were investigated. The test program called for 5-million cycles of loading followed by a static test to destruction. The paper presents results of the investigation and shows that blanketed strands can be used successfully if adequate strand development length is provided. Fatigue fracture of strands was observed in pre-cracked beams where load level produced tensile stress in the precompressed concrete. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Rabbat, BG Kaar, PH Russell, HG (Portland Cement Association); Bruce, RN, Jr (Tulane University) *Transportation Research Record* No. 665, 1978, pp 13-21, 10 Fig., 3 Tab., 13 Ref.

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INCREASING THE SEISMIC RESISTANCE OF EXISTING HIGHWAY BRIDGES

Prior to the 1971 San Fernando Earthquake, bridges in California experienced only minor seismic related damage. The San Fernando event demonstrated that structures designed by AASHTO Specifications in use at that time are vulnerable to seismic shaking. Failure of these bridges during an earthquake could be hazardous to highway users and block vital transportation life-lines. The State of California initiated a bridge retrofit program in 1971 in order to increase the seismic resistance of bridges built before that time. The most prevalent deficiency of pre-1971 bridges is a lack of longitudinal restraint of girders at hinges and end supports. California has developed devices which will have been used to retrofit more than 649

bridges at a cost of \$22 million by 1980. An evaluation of all state owned bridges is currently being made in order to complete the program. Many of the bridge columns which were designed according to specifications prior to 1971 were proven to be seismically deficient because they had too few ties to adequately confine the concrete. This paper and presentation will cover a brief background, philosophy, magnitude of the problem, design criteria, details and costs. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Degenkolb, OH (California Department of Transportation) *Transportation Research Record* No. 665, 1978, pp 31-36, 15 Fig.

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00 183779

WEB STRESSES IN PRESTRESSED CONCRETE BRIDGE BEAMS HAVING DISCONTINUOUS TENDONS

Prestressed concrete bridge girders are sometimes designed with prestressing tendons that terminate within the span rather than at the ends of the girders or at their supports. Tendons of this type are normally significantly inclined at their anchorages due to the clearances required for construction because of the inclination of the tendons at their anchorages. Significant vertical components of prestressing are imposed on the girder. The AASHTO Specifications for Highway Bridges and the Building Code Requirements for Reinforced Concrete (ACI 318-71) do not specify specific methods of analysis for this condition. A finite element analysis of an actual bridge girder was made to determine the conditions of stress in the vicinity of intermediate anchorages. The results of this analysis were compared to those obtained with a principal tensile stress analysis using methods normally employed by bridge designers. It was found both methods of analysis predicted principal tensile stresses of similar magnitude and orientation. The predicted locations of the greatest principal tensile stresses were different for the two methods of analysis. The fact that the greatest principal tensile stresses occur on planes approximately parallel to the paths of some of the post-tensioning ducts is demonstrated. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Libby, JR (Libby (James R) and Associates); Krishnamoorthy, G (San Diego State University); Revels, J (San Diego, City of, California) *Transportation Research Record* No. 665, 1978, pp 45-52, 12 Fig., 5 Ref.

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00 183780

MODEL STUDIES OF DOUBLE-CELL BOX GIRDER BRIDGE WITH INTERMEDIATE DIAPHRAGMS

An experimental study on the influence of intermediate cross-bracing diaphragms on the behavior of a simply supported double-cell box girder bridge has been carried out. A perspex model was tested under various loading conditions and the test results, namely the displacements, cross-sectional distortion, longitudinal and transverse normal forces were compared with theoretical values suggested by Nimityongskul, Pama and Lee. In this analysis, the elements in the box section are treated as rectangular plates subjected to lateral and in-plane boundary forces. The end diaphragms are assumed to be infinitely rigid in and flexible normal to their planes. The intermediate diaphragm is assumed to act in such a way that it exerts only concentrated vertical and horizontal reactions on the joints of the box section without introducing resisting moments against joint rotations. Test results indicated that the distortion of the cross-section of a box girder without intermediate diaphragm is more prominent when loaded along the side-joints. With one intermediate diaphragm the distortion at the loaded section remains practically the same when the diaphragm is sufficiently away from the applied loads, but is considerably reduced when the diaphragm is near the load. The use of intermediate diaphragm decreases effectively the cross-sectional distortion, increases the overall stiffness of the bridge and redistributes the longitudinal normal forces. In general, the experimental values confirm the theoretical predictions on the influence of intermediate diaphragms on the load distribution in a double-cell box girder bridge. Careful considerations must be taken in designing these intermediate cross-bracing diaphragms to satisfy the assumptions made in the theory. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Pama, RP Nimityongskul, P (Asian Institute of Technology, Thailand); Pribadi, DZ (Petra Christian University, Indonesia); Lee, SL (Singapore University, Singapore) *Transportation Research Record* No. 665, 1978, pp 53-64, 12 Fig., 3 Tab., 17 Ref.

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00 183789

STRUCTURAL PROBLEMS FOR THE MESSINA NARROWS BRIDGE

In the past few years a lot of work has been done in Italy on where and how to build the Messina Narrows Bridge. The main problems were the nature and strength of the soil, dangerous currents, winds, faults and relevant earthquakes. At the same time many solutions for a double "one mile" span stayed or suspension bridge and a simple "two mile" span suspension bridge were suggested. This paper gives a survey of the present state of knowledge with special reference to the technical problems connected with the single span solutions, where aeroelastic stability governs the design of the deck and the cables. On the other hand the 380 m towers are themselves a problem in a heavily seismic area. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Finzi, L (Technical University of Milan, Italy) *Transportation Research Record* No. 665, 1978, pp 131-139, 18 Fig., 5 Ref.

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00 183797

CURRENT PRACTICE IN DESIGN AND INSTALLATION OF DRIVEN PILES

Tests have proved that H-piles can dependably carry heavier loads than usually are assigned to them. Concrete and timber piles are being loaded heavier. Prestressed concrete piles benefit from improved splicers. Gaining in use are H-pile extensions for precast. The H end, with cast steel protection, can assure penetration into compact material; it can prevent sliding of sharply battered piles or piles driven on steeply sloping rock; it provides protection to the vulnerable end of a precast pile. An import from Europe is an interlocking deep-web H that can be used with sheet piles for cofferdams or a strong wall. Improved mandrels have increased use of corrugated shell piles. The wave equation is increasingly used for determination of driving stresses and selection of the optimum combination of pile and hammer. Dynamic measurement gives instant pile capacity information at minimum cost. More adequate soils investigation and foundation planning can reduce overall cost. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Hunt, HW (Associated Pile and Fitting Corporation) *Transportation Research Record* No. 665, 1978, pp 200-208, 12 Fig., 1 Tab.

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00 183798

A CRITICAL EXAMINATION OF THE WAVE EQUATION

A recent research project sponsored by the Federal Highway Administration produced a new wave equation computer program for the analysis of pile driving (WEAP). While the primary purpose of developing this program was to provide a better model for diesel hammers a number of other improvements were included and an extensive correlation study with dynamic measurements was made. This study together with the authors' extensive field experience pointed out several conditions where wave equation predictions will be inaccurate and unreliable. In this paper the capabilities of the WEAP program will be compared with other commonly used programs. The various factors which can influence the accuracy of a wave equation analysis are considered, evaluated and discussed. The specific topics included are: pile model, soil model, hammer model, and static soil analysis. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the

Transportation Research Board, September 25-27, 1978.

Rausche, F (Goble and Associates, Incorporated); Goble, GG (Colorado University, Boulder) *Transportation Research Record* No. 665, 1978, pp 209-213, 8 Fig.

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00 183801

TRANSVERSE POST-TENSIONING OF LONGITUDINALLY LAMINATED TIMBER BRIDGE DECKS

Longitudinally, nail-laminated timber bridge decks are used extensively in northern Canada, where the cold and dry climate discourages the activities of fungi and termites. The load-carrying capacity of these structures is dependent upon their ability to effectively distribute wheel loads among the laminates; this being a function of the friction and the holding power of the nails. Due to overloads, volumetric changes and environmental effects, the holding power tends to diminish resulting in a subsequent reduction in the load-carrying capacity of the bridge. Construction of these nail-laminated systems involves extensive labour, since thousands of nails have to be driven into hundreds of laminates. Quality control is quite difficult as it requires continuous supervision to ensure that all the nails are properly placed and driven. This report describes the application of transverse post-tensioning to an existing longitudinally nail-laminated timber deck structure in Ontario. This 3-span continuous bridge portrayed the delaminating problem, and as such, presented an appropriate test site for a post-tensioning system. Load testing was done before and after post-tensioning to determine its effects on the structure's response. An evaluation of the test results indicated that the structure's load-carrying capacity was increased by at least 100%. Transverse post-tensioning, in effect, replaces the need for nailing and hence reduces the labour required for construction. Quality control extends only to ensuring that adequate post-tensioning forces exist to provide the friction necessary for load distribution, allowing for anticipated losses due to creep. This confined deck system exhibits better resistance to the environment, as it eliminates the penetration of foreign materials between the laminations. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Taylor, RJ Csagoly, P (Ontario Ministry of Transportation & Communic, Can) *Transportation Research Record* No. 665, 1978, pp 236-244, 14 Fig., 3 Tab., 4 Ref.

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00 183802

REDUCING THE RISK OF CATASTROPHIC BRIDGE FAILURES

The public and engineers alike have become accustomed to the use of a factor of safety to prevent failures. Unfortunately, such factors do not prevent catastrophic failures because of rare or unusual events or circumstances. Such failures could be caused by large floods, earthquakes, poor workmanship, inferior materials, errant sea vessels or insufficient knowledge on which to make design judgments. This paper presents a philosophy, and briefly describes methods, for reducing the risk of catastrophic bridge failures. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Herr, LA (Federal Highway Administration) *Transportation Research Record* No. 665, 1978, pp 255-257

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DOTL JC

00 183803

CONSIDERATIONS IN THE DEVELOPMENT OF AN EARLY WARNING VESSEL/BRIDGE COLLISION SYSTEM

Highway and railway bridges spanning navigable waterways face the real possibility of being accidentally struck by large ocean-going vessels or large barge trains. In many cases, these accidents can result in serious damage to the bridges, blockage of the waterways, economic losses to communities served by the bridges and waterways, and loss of property and life. Two basic types of systems might be used to help prevent ships from striking bridge supports. The fender system is sometimes deployed around vulnera-

ble bridge supports, but this approach is not always practical nor cost effective. An electronic warning system is a viable alternative or complement to the fender system. The electronic system could continuously monitor the ship's position relative to a safe corridor for passage under the bridge and issue an immediate warning of any deviation from a safe-passage course. The system could also issue warnings to the bridge tender and people on the bridge when a collision is determined to be unavoidable. An advanced design concept of such a system was developed by the Georgia Institute of Technology Engineering Experiment Station (GIT/EES) during a recent study. The study uses a shore-based radar and shore-based display as the most practical concept for an electronic collision avoidance/warning system. The radar would determine the ship's position, and the displays would inform the ship's pilot of the ship's position relative to a safe-passage corridor. The system would continuously assess the potential for collision during the various stages of the ship's passage. Ship speed and trajectory would be monitored as the ship approached the bridge; this information could be displayed for use by the ship crew in navigating the channel. When the ship approached closer to the bridge and entered a critical maneuver zone, the system would continue displaying the ship position while performing trajectory calculations to determine the possibility of a collision with the bridge. Should the system determine that a collision is possible (given the ship's handling characteristics and position in the channel, tide and wind conditions, and distance from the bridge), an alarm would be sounded to alert the ship crew, the bridge tender, and those on the bridge. Safety systems such as gates could be activated to keep additional traffic off the endangered bridge span. Although the design concept was developed for the protection of highway bridges, it could be easily adapted for the protection of railway bridges.

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Greener, EF Eaves, JL McGee, MC (Georgia Institute of Technology)
Transportation Research Record No. 665, 1978, pp 258-260, 1 Fig.

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DOTL JC

00 183999

DESIGN OF PRECAST CONCRETE PILE CAPS

This study is part of an effort directed to the reduction of short span bridge costs in Louisiana. This particular effort is devoted to the development of precast intermediate pile bent caps and the connection of such elements to precast piles. Both conventionally reinforced and prestressed rectangular shapes are presented. Individual pile caps or capitols are presented for use where piles are superstructure girders with continuity diaphragms permit. Concrete and grout type connections are discussed and an essentially welded connection is presented. /Author/

Sponsored by Louisiana Department of Transportation and Development and conducted in cooperation with DOT, Federal Highway Administration.

Turner, HT Buckner, CD
Louisiana State University, Baton Rouge Final Rpt. FHWA-
LA-78-203L, Dec. 1977, 34 pp
SPONSORING AGENCY:

HP&R 77-1ST

ACKNOWLEDGMENT: Federal Highway Administration

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PB-287983/1ST

00 185258

AN EVALUATION OF EXPEDIENT METHODOLOGY FOR IDENTIFICATION OF POTENTIALLY EXPANSIVE SOILS

This report concludes an evaluation of expedient methodology for identifying and qualitatively classifying potentially expansive soils. Seventeen published techniques used for identification/classification purposes were reviewed and evaluated using data collected from an extensive laboratory testing program. A definition of potential swell that is more consistent with field simulation requirements and more representative of in situ volume change behavior is presented. The results of the evaluation of published techniques reveal that the best techniques and thus the best indicators of potential swell are the liquid limit and plasticity index. Other significant indicator properties ranked in descending order are: liquid limit and natural water content combined; shrinkage limit and plasticity index; and shrinkage limit and linear shrinkage. The results of the statistical analysis of the

laboratory data confirm the findings of the evaluation of the published techniques. A classification system more consistent with the definition of potential swell and using the liquid limit, plasticity index, and natural soil suction was developed and is presented. Guidelines for the recommended usage of the classification system are given. /FHWA/

Sponsored by the Federal Highway Administration, Department of Transportation.

Sneath, DR Johnson, LD Patrick, DM
Waterways Experiment Station Intrm Rpt. FHWA-RD-77- 94, June 1977, 48 p.

SPONSORING AGENCY:

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Contract PO 4-1-0195

ACKNOWLEDGMENT: Federal Highway Administration

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PB-289164/AS

00 185286

LONGITUDINAL FORCES ON BRIDGE BEARINGS

Model tests were performed to determine the distribution of longitudinal force to fixed and expansion bridge bearings. Because of errors in the calibration system and variability of friction coefficients, an experimentally verified design procedure for distribution of longitudinal force could not be developed. The report discusses the experimental variables considered, test program, errors in the calibration system, and presents a theory for longitudinal force distribution. /FHWA/

Sponsored by and prepared in cooperation with the Department of Transportation Federal Highway Administration.

McDermott, RJ
New York State Department of Transportation, (Special Rpt 58) Final
Rpt. FHWA-NY-78-SR 58, Sept. 1978, 28 p.

SPONSORING AGENCY:

HP&R Res Proj. 132-1

ACKNOWLEDGMENT: Federal Highway Administration

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PB-287816/3ST

00 185578

BIBLIOGRAPHY ON GROUTING

This bibliography on grouting contains abstracts of various engineering and scientific publications on both portland cement and chemical grouts. The technical data cover subjects such as: dams, bridges, buildings, machinery foundations, tunnels-sewers-shafts, silos, roadbeds, pavements, soils, rock bolts, and miscellaneous structures. (Author)

Peterson, R Griffith, J Dunlap, E Spivey, M Skelton, AG
Waterways Experiment Station, (IT865803M728) Final Rpt.
WES-MP-C-78-8, CTIAC-13, June 1978, 331 p.

ACKNOWLEDGMENT: NTIS

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AD-A057831/OST

00 185674

TUNNEL CONSTRUCTION, VOLUME 1, 1964-1976 (CITATIONS FROM THE NTIS DATA BASE)

Unique tunneling methods, cost studies, tunnel support innovations, tunneling machines, and soil and rock properties encountered are investigated in these Government-sponsored research reports. Vehicular, water, sewage, and mine tunnels are reviewed. Finite element analysis is used extensively for investigation of soil and rock mechanics. (This updated bibliography contains 281 abstracts, none of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Bibliog. Aug. 1978, 288 p.

ACKNOWLEDGMENT: NTIS

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NTIS/PS-78/0847/OST

00 185675

TUNNEL CONSTRUCTION, VOLUME 2, 1977-JULY, 1978 (CITATIONS FROM THE NTIS DATA BASE)

Unique tunneling methods, cost studies, tunnel support innovations, tunneling machines, and soil and rock properties encountered are investi-

gated in these Government-sponsored research reports. Vehicular, water, sewage, and mine tunnels are reviewed. Finite element analysis is used extensively for investigation of soil and rock mechanics. (This updated bibliography contains 97 abstracts, 51 of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Bibliog. Aug. 1978, 104 p.

ACKNOWLEDGMENT: NTIS
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NTIS/PS-78/0848/8ST

00 185677

TUNNEL CONSTRUCTION. VOLUME 5. SEPTEMBER, 1977-JULY, 1978 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE)

Unique tunneling methods, cost studies, tunnel support innovations, tunneling machines, and soil and rock properties encountered are investigated in these reports gathered in a worldwide literature survey. Vehicular, water, sewage, and mine tunnels are reviewed. Finite element analysis is used extensively for investigation of soil and rock mechanics. (This updated bibliography contains 175 abstracts, all of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Bibliog. Aug. 1978, 181 p.

ACKNOWLEDGMENT: NTIS
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NTIS/PS-78/0850/4ST

00 185892

PREDICTION AND MEASUREMENT OF ROCK TUNNEL DISPLACEMENTS

Predictions, using finite element models, were made of the displacements of three rock tunnels but field measurements showed these predictions to be seriously in error. The reasons for these errors are discussed with particular reference to the analytical design of tunnel linings.

Pells, PJN
Sydney University, Australia Res Rpt. R-317, Mar. 1978, 27 p.

ACKNOWLEDGMENT: NTIS
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PB-283739/1ST

00 186243

FEASIBILITY STUDY FOR RAILROAD EMBANKMENT EVALUATION WITH RADAR MEASUREMENTS

A study was conducted to determine the feasibility of using radar measurements to define railroad embankment subsurface layer thickness and properties. A computer model was used to calculate radar reflectances as could be measured over the frequency range of 0.5 to 2.0 GHz at the surface of five different railroad embankments for which data were available. These reflectance curves were converted to realistic depth displays as could be obtained from a realtime analysis of swept-frequency radar data or from a more conventional narrow-pulse radar system. Comparisons were then made of the results of the radar system measurements with the physical conditions of the embankments.

Lundien, JR
Waterways Experiment Station Final Rpt. WES-MP-S-78-10, Aug. 1978, 47 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A058387/2ST

00 186293

PRACTICAL RIPRAP DESIGN

Determination of stable riprap size is a problem that has been studied extensively but not yet solved. Existing design methods are based on the shear stress exerted by the flowing water on the channel boundaries. The various methods available for computing the shear stress do not agree. Determination of the amount of shear stress a given size riprap can withstand depends upon which investigator's coefficient is used in the Shields' equation. The objective of this investigation was to develop a riprap design procedure based on known or easily calculated variables that

properly describes riprap stability. Model tests on riprap stability were used in this investigation to insure that the proposed design procedure is applicable to the higher turbulence levels found in decelerating flow in open channels. Design curves for bottom riprap and side slope riprap in straight channels are presented. Tentative criteria for riprap in channel bends are discussed. (Author)

Maynord, ST
Waterways Experiment Station Final Rpt. WES-MP-H-78-7, June 1978, 78 p.

ACKNOWLEDGMENT: NTIS
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AD-A058837/6ST

00 188833

THE STATE OF THE ART--BRIDGE PROTECTIVE SYSTEMS AND DEVICES

The book is designed to serve as a single source of reference, containing all existing technical data, methodology for selection of optimum fendering devices and recommended standards. It is hoped that this book will serve as a useful reference to the harbor master, port engineer, consultant engineer, the bridge owner and the Coast Guard officer engaged in bridge matters. The book is divided into the following chapters: I. (a) Factors Considered in the Design of Fendering Systems and, (b) Types of Fendering Systems; II. Types of Fendering Systems; III. Materials; IV. Design Parameters; V. Hand Computations; VI. Design Applications and Computers; VII. Conclusions; and VIII. Recommendations for Future Research. In addition, there are twelve appendices containing tables and figures representing the stiffness and energy characteristics of particular fenders at given deflection levels.

Derucher, KN Heins, CP Mancill, RT, Jr
Maryland University, College Park—1978, 320 p., 72-Ref.

ACKNOWLEDGMENT: United States Coast Guard
ORDER FROM: United States Coast Guard Headquarters, 400 7th Street, SW, Washington, D.C., 20590

00 188990

EXPANSIVE AND SHRINKING SOILS--BUILDING DESIGN PROBLEMS BEING ATTACKED

Expansive soils damage thousands of buildings and many miles of highway each year. How and why these types of clays expand is explained. How geotechnical engineers in Colorado, Texas and Mississippi are preventing or curing the problems is explained, in case histories and in general guidelines.

Godfrey, KA, Jr *ASCE Civil Engineering* Vol. 48 No. 10, Oct. 1978, pp 87-91

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

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00 188993

DRIVING WITH A FULL-FACE DIAPHRAGM

A full-face diaphragm on a shield offers means of driving tunnels through soft, wet alluvial soils such as are often found in estuaries. This paper describes an investigation of small diameter tunnels driven at three such sites using the full-face diaphragm on a shield. It was found that this arrangement can successfully drive tunnels through both very wet and very soft ground. Reasonable agreement was found between the observed and calculated ground resistance to driving. The importance of accurately determining the nature and depth of the strata during the site investigation is emphasized.

McCaul, C (Transport and Road Research Laboratory); West, G Manlow, TV *Tunnels and Tunnelling* Vol. 10 No. 6, July 1978, pp 23-25, 12 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

00 188994

METHODS OF TREATING THE GROUND

Ground treatment for tunnelling can be required to increase the stability of the ground to a level where tunnel driving will be both practicable and safe, or to reduce ground water inflow to manageable amounts. Ground treatment may be required over the whole length of a tunnel drive or it may be applied to a short length only; it can be carried out before or during tunnel

construction. It is important for designers and constructors of tunnels to be aware of the options available to treat the ground and the advantages and limitations of the various methods in differing ground conditions. This paper provides an introduction to the methods available to the tunneller to improve ground conditions for tunnelling and gives guidance on the factors influencing the choice of method.

West, G (Transport and Road Research Laboratory); O'Reilly, P
Tunnels and Tunnelling Vol. 10 No. 7, Sept. 1978, pp 25-29, 52 Ref.

ACKNOWLEDGMENT: EI
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00 188995

SETTLEMENTS IN A SAO PAULO SHIELD TUNNEL

The East-West line of the Sao Paulo, Brazil subway system includes about 3.5 km of shield tunnels in the downtown area, about 3 km being completed. The designers (Promon Engenharia S/A) were responsible for the settlement monitoring system, and the data collected was analysed and correlated with characteristics of the soil and the tunnelling methods used. The soil settlement troughs are compared with those predicted by the methods of R.B. Peck and E.J. Cording. The influence of different tail grouting techniques, additional settlements due to the release of air pressure in the tunnel and cases of building damage are described.

Sozio, LE (Promon Engenharia, Brazil) *Tunnels and Tunnelling* Vol. 10 No. 7, Sept. 1978, pp 53-55, 5 Fig., 1 Tab.

ACKNOWLEDGMENT: EI
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00 189006

SUBWAY DESIGNS AND CONSTRUCTION METHODS THAT CUT COSTS

The author describes how the high cost of subway construction in the United States can be reduced by adopting station and track structure configurations, structural systems, and construction techniques best suited to the site geology and other constraints. The mixed soils and high water tables generally encountered in U.S. cities, together with a highly mechanized construction industry, constrains subway design and construction. For such conditions, estimates are provided that indicate the influence on cost of length and diameter of tunnels in different materials. Costs of stations constructed by cut-and-cover and by tunnel-enlargement are also compared. Alternative station construction techniques are described.

Birkmyer, AJ (Bechtel Corporation) *ASCE Civil Engineering* Vol. 48 No. 10, Oct. 1978, pp 62-65

ACKNOWLEDGMENT: EI
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00 189008

TOKYO'S FREEZE-DRY SUBWAY TUNNEL

The paper reports how freezing of soil beneath a riverbed covered with insulating plates solidifies the earth for safe tunnel excavating in a restricted site.

Walabayashi, J *McGraw Hills Construction Contract* Vol. 60 No. 9, Sept. 1978, pp 46-47

ACKNOWLEDGMENT: EI
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00 189009

GROUTING LIMITS SETTLEMENT AS TRANSIT BORES ADVANCE

Construction of an 8-mile mass transit starter line in Baltimore, Maryland is discussed. The Maryland Mass Transit Administration's rail transit line runs the gamut of construction techniques. It begins with compressed air, shield-driven tunnels and cut-and-cover stations in granular material, giving way to drill-and-blast construction through granite-like gneiss.

Engineering News-Record Vol. 201 No. 11, Sept. 1978, pp 22-23

ACKNOWLEDGMENT: EI
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STABILISATION TEST, USING AN ELECTRO-CHEMICAL PROCESS, ON FLYSCHOID FORMATION IN THE SINNI VALLEY [Un esperimento di stabilizzazione, con procedimento elettro-chimico, di una formazione flyscioide nella vallata del Sinni]

The article explains the method used for strengthening particularly-unstable ground along the high-speed route in the Sinni Valley. This method is actually based on an electro-chemical process involving addition of a calcium-chloride solution. [Italian]

Balzano, M *Ingegneria Ferroviaria* Vol. 33 No. 6, June 1978, pp 553-565, 5 Tab., 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

00 189023

A PHOTOGRAMMETRIC METHOD FOR DETERMINING THE DEFLECTION OF RAILWAY BRIDGES [Photogrammetrisches Verfahren zur Bestimmung der Durchbiegung von Eisenbahnbruecken]

Although the deflection of railway bridges undergoing loading tests is not measured every day by the Inspection Department, this measurement should be made at regular intervals. For the bridge over the Moselle at Coblenz, a photogrammetric method of measurement was used in addition to the traditional procedure. The author explains the theories on which the method is based, and the procedure used. [German]

Unkelbach, W *Eisenbahningenieur* Vol. 29 No. 10, Oct. 1978, pp 467-475, 2 Tab., 10 Phot., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

00 189067

A STITCH IN TIME

Nonwoven synthetic fabrics are finding a role in track structures, serving to prevent soil fines from infiltrating ballast and allowing drainage of water into the subgrade. Experiences of Missouri Pacific, Chicago and North Western, Southern and Southern Pacific are described. MP uses the materials routinely, Southern is installing 2 million square yards under a new classification yard and SP has a fully instrumented test track section in Texas.

Myers, ET *Modern Railroads/Rail Transit* Vol. 34 No. 1, Jan. 1979, pp 64-66, 2 Phot.

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DOTL JC

00 189069

BUILDING THE WORLD'S FASTEST RAILWAY

The first segment of French National Railway's Paris-Sud-Est line is due to open in 1981 and the high-speed trains will traverse the entire 400-km route to Lyon in 1983. Construction work has proceeded without unexpected delays due to the thorough geological surveying done well in advance. There are 540 bridges and viaducts, the majority constructed to standard designs. All bridge decks will be ballasted. Special measures have been taken to minimize environmental effects while maintaining standards that could permit future operations at 300 km/h.

Prud'homme, A (French National Railways) *Railway Gazette International* Vol. 135 No. 1, Jan. 1979, pp 51-56, 7 Fig., 5 Phot.

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00 189756

SOIL FREEZING METHOD USING REFRIGERATED FLUIDS

[Priblizennyj metod resenija zadaci o zamorazivanii grunta gazovymi skvazinnymi ustrojstvami]

Until now, for freezing the ground, use was made especially of compressor units with a brine cooling agent. The temperatures of this brine were minus 20C and sometimes as low as minus 35C. But these low temperatures also had adverse effects such as increases in the viscosity of the solution and possible congealing. As a result, more efficient soil freezing methods are used with refrigerated air at minus 80C and minus 100C in the refrigerator and gas turbines (especially with liquid nitrogen). The article describes these methods in detail. [Russian]

Bucko, NA *Transportnoye Stroitel'stvo* No. 11, Nov. 1978, pp 14-17, 2 Fig., 8 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

00 189757

PARIS-SOUTH-EAST HIGH SPEED LINE: SURVEY OF THE LAY-OUT AND DESIGN OF CIVIL ENGINEERING STRUCTURES [Ligne a grande vitesse Paris-Sud-Est: etudes de traces et conception des ouvrages de genie civil]

Prud'homme, Andre: The Paris-South East high speed line: main options. Verrier, Guy: Methodology of studies and design of earthworks. Chambron, Etienne: Bridges and tunnels on the Paris-South East line. The line required numerous studies to adapt conventional railway techniques to high speeds. [French]

Annales de l'Institut Tech du Batiment Travaux Pub Vol. N No. 66, Nov. 1978, pp 69-96, 1 Tab., 44 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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00 189759

"GEOTEXTILES": NEW CONSTRUCTION MATERIALS, WHICH HAVE BECOME INDISPENSABLE IN LESS THAN TEN YEARS. THEIR USE IN RAILWAY CONSTRUCTION

"Geotextiles" are the textiles used in the sciences and technologies of the earth. The author comments on the functions and properties of these materials, before studying the geotechnical behaviour of a railway track and examining the role of geotextiles in the design of railway tracks on the one hand and on the construction and maintenance of these tracks on the other. In concluding, he emphasises the good results already obtained and the important research being undertaken: laboratory tests and tests on sections of actual tracks equipped with instruments.

Giroud, JP *Rail International* Vol. 9 No. 11, Nov. 1978, pp 864-868, 1 Tab., 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

00 189764

PRESENT STATUS OF SEIKAN UNDERSEA TUNNEL

Construction of the 53.85 km long tunnel linking the islands of Honshu and Hokkaido commenced in 1972. Progress as of May 1977 is illustrated by means of a diagram and tabulated data, which divide the construction into three sections. The Honshu onshore section is 13.55 km with a geology consisting mainly of andesite and tuff with intrusive volcanic rocks; the Hokkaido onshore section is 17.0 km consisting of tuff of the so-called Kunnui strata; an offshore section of 23.3 km under the Tsugaru strait with a geology consisting mainly of mud-stone of the Kuromatsunai strata. Reference is made to particular construction problems associated with the length of the tunnel itself and the dangers of seawater flooding. Information is provided on the techniques employed to combat flooding and assist construction which included pilot tunnels approximately 19 sq M; service tunnels almost the same size as the pilot tunnels, 30 M away from the main tunnel route; advance boring with a range of from 500 to 1000 M; feeler drilling of from 70 mm to 90 mm driven 70 to 100 M in advance of the cutting face; chemical grouting and shot-creting. Details are provided of progress related to geological faults and flooding. The tunnel is designed to carry both standard gauge and narrow gauge railway track.

Matsuo, S Endo, K *Civil Engineering in Japan* Vol. 16 1977, pp 75-83, 5 Fig., 4 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-237694)
ORDER FROM: Japan Society of Civil Engineers, 1-chome, Yotsuya, Shinjuku-ku, Tokyo 160, Japan

00 189767

SOFT GROUND TUNNELLING IN THE KLUUVI CLEFT BY THE FREEZING METHOD

About 600 M of a tunnel for the underground system being constructed in Helsinki runs through a fault between the gneiss and granite bedrock. Soil here is still overlain by silt, sand and clay of low strength. It was decided

to construct a frozen shell around the workings by installing horizontal pipes. The strength of the frozen soil depends on soil type, water content, temperature, duration and intensity of load. No tensile stresses must occur in the frozen shell, and compressive stresses must not exceed the ultimate compressive strength of the frozen soil. A factor of safety of 3-5 is applied. The thickness of shell was 2.5 M, achieved by installing 35 pipes per adit. The most difficult operation was drilling for the pipes. Freon R22 was used to freeze 3600 cu M soil and 7200 cu M rock. The cooling load was about 1200 gj. Temperature was monitored by 119 sensors connected to a digital display. Displacements were measured by settlement tubes and inclinometers. Likely settlement was due to consolidation, vibration, frost heave, deformation of ice shell, thaw and deformation of the cast iron tunnel lining. Total settlement is expected to be about 200 mm.

Hartikainen, J *Vag-Och Vattenbyggaren* Vol. 24 No. 8-9, 1978, pp 69-74, 8 Fig., 2 Tab., 4 Phot., 9 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-237663), National Swedish Road & Traffic Research Institute

ORDER FROM: Svenska Vag-Och Vattenbyggaren Riksförband, Regeringsgatan 98, S-11139 Stockholm, Sweden

P5084

00 189775

RAPID TUNNEL CONSTRUCTION IN LENINGRAD [Skorostnoe sooruzenie tonnelej v Leningrade]

With the aid of experience obtained in the field of tunnel construction and operation projects, tunnels on the Leningrad metro have been built at the rate of 876 m per month. The article contains a detailed description of the new kind of lining used in these tunnels. [Russian]

Gucko, VA *Transportnoye Stroitel'stvo* No. 10, Oct. 1978, pp 11-14, 4 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

00 189776

TUNNEL CONSTRUCTION USING THE EARTH FREEZING TECHNIQUE. EVALUATION OF STRESSES AND DEFORMATION [Tunnelvortrieb im Schutze eines gefrorenen Bodenkoerpers. Spannungs-und Verformungs-Ermittlungen]

No Abstract. [German]

Eckhardt, H Meissner, H *Forschung und Praxis* No. 21, 1978, pp 62-70, 18 Phot., 10 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Forschung und Praxis, Dusseldorf, West Germany

00 189787

EFFECT OF SPEED INCREASES ON RAILWAY BRIDGES [A sebessegnoveles hatasai a vasuti hidakra]

The study investigates the effect of railway traffic at speeds over 120 km/h on existing bridges. It is thought that passenger trains being lighter, may travel at speeds up to 150 km/h without causing damage, but experience in Hungary and abroad has led to the conclusion that the maximum speed of freight trains on bridges should not exceed 120 km/h. [Hungarian]

Koiss, I *Melyepitestudomanyi Szemle* No. 5, May 1978, pp 201-109

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Lapkiado Vallalat, Lenin Korut 9-11, 1073 Budapest 7, Hungary

00 189790

APPARATUS FOR STUDYING SOIL CHARACTERISTICS ON THE SITE [Pribor dlja issledovanija svojstv gruntov v polevyh uslovijah]

Description of apparatus designed and used by the Central Research Institute for Civil Engineering in Siberia. With it the characteristics of ground permanently frozen and soft ground can be studied for such things as: the angle of internal friction, the level of compression and consolidation of soft and thawed ground. The apparatus can be used for experiments in the laboratory on the oscillation test bench, in particular to assess the influence of oscillations on soil characteristics. [Russian]

Gordienko, AA Orlov, EP *Transportnoye Stroitel'stvo* No. 11, Nov. 1978, pp 42-44, 1 Fig., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

00 189791

STUDY OF THE BREAKING UP OF FROZEN GROUND WITH ACOUSTIC CHECKS INTO THE CHARACTERISTICS OF THE SOIL [Issledovanie scelevzryvnogo ryhlenija merzlyh gruntov s akusticeskim kontrolom ih svojstv]

No Abstract. [Russian]

Balbacan, IP Cervinskaja, OP *Transportnoye Stroitel'stvo* No. 11, Nov. 1978, pp 41-42, 2 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

00 189793

CHARACTERISTICS OF THE DYNAMICS OF SHORT SPAN STEEL RAILWAY BRIDGES [Besonderheiten der Dynamik stahleerner Eisenbahnbrueckenbauten kleiner Spannweite]

Summary of the main characteristics of the dynamic behaviour of short span bridges. [German]

Schroeter, D *Signal und Schiene* Vol. 22 No. 5, Sept. 1978, pp 249-253, 3 Fig., 2 Tab., 19 Ref.

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

00 189815

DECISION ANALYSIS APPLIED TO ROCK TUNNEL EXPLORATION

The proposed application of decision analysis provides a relatively simple approach to the tunnel exploration problem. The existing knowledge of geology, the possible construction strategies and their costs, the reliability and the cost of considered exploration methods are used to establish if and where exploration is beneficial. The resulting hierarchy of locations where exploration is beneficial and the comparison of expected values of exploration for different methods provides the basis for the selection of a particular site and method. Graphical and numerical means have been created that make the proposed approach a convenient and fast tool in the hands of the decision maker.

Einstein, HH (Massachusetts Institute of Technology); Labreche, DA Markow, MJ Baecher, GB *Engineering Geology* Vol. 12 No. 2, July 1978, pp 143-161, 8 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 190056

FEASIBILITY OF HORIZONTAL BORING FOR SITE INVESTIGATION IN SOIL

The objective of this study is to assess horizontal boring and exploration as an alternative to vertical boring in geotechnical investigation prior to the design and construction of tunnels. The study was divided into three separate topics: Excavation, Exploration, and Economics. Under Excavation, new ideas and preliminary designs were developed for continuous, maneuverable penetration out to distances of 5000 ft (1500 m). Detailed methodology is presented for penetration to 2000 to 3000 ft (610 to 915 m) with recently developed equipment and technology. Under Exploration, preliminary designs were developed for down-hole seismic (geophysical) and contact sensing. These approaches were technically evaluated by investigation of wave attenuation characteristics and hole disturbance. Under Economics, horizontal penetration (with on-board sensing and separate follower sensing) was compared for cost effectiveness with vertical boring and surface geophysics. In addition, the cost of unanticipated conditions was summarized from case histories to assess the value of the various exploration approaches. /FHWA/

Dowding, CH
Massachusetts Institute of Technology, Titan Contractors Corporation, Draper (Charles Stark) Laboratory, Incorporated, Weston Geophysical Engineers, Federal Highway Administration, (CE R-76-15) Final Rpt. FHWA-RD-76-1, Feb. 1976, 398 p.

SPONSORING AGENCY:
RESPONSIBLE INDIVIDUAL: Majtenyi, SI

Contract DOT-FH-11-8526

ACKNOWLEDGMENT: Federal Highway Administration, NTIS
ORDER FROM: NTIS

PB-293055

00 190212

SETTLEMENTS AROUND TUNNELS IN SOIL: THREE CASE HISTORIES

This report presents the results of three case histories of field observations of settlements around tunnels in soil. Two of the cases are twin, 20-ft (6-m) diameter, single-track tunnels for the Washington, D.C. Metro System: Section F2a, F Route, is a steel segment lined tunnel in interbedded sands and gravels and clays, typical of downtown Washington; (2) Section G1, with an expanded rib and lagging lining, is in transition from these deposits to a hard, fissured clay. The third case is a 9-ft (3-m) diameter sewer tunnel with an expanded rib and lagging lining driven in dewatered, dense sands at Rockford, Illinois. Detailed measurements of subsurface settlements at points 3 to 6 ft (1 to 2m) above the tunnel crowns are used to determine sources and magnitudes of lost ground. Where the tunnel face was controlled to prevent large losses, ground losses due to overcutting and plowing of the shield were about one-half of the total estimated ground loss; incomplete filling of the tail void was the next biggest source of loss. Ground surface settlement data, including widths, slopes, and volumes of the surface settlement troughs are reported for several cross-sections on each tunnel and for points along the tunnel centerlines. The volume of surface settlement was less than the volume of ground loss because the disturbance of tunneling caused a net volume expansion in the dense granular materials. The relationship between ground loss and surface settlement volume, as shown by sand bin model test data is also reported. A procedure for estimating ground loss and surface settlement in advance of tunneling is suggested. /UMTA/

Sponsored by the Urban Mass Transportation Administration.

MacPherson, HH
Illinois University, Urbana, (IL-06-0043) Final Rpt. UMTA-IL-06-0043-78-1, Mar. 1978, 144 p.

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB-290856

00 190266

SOIL STABILISATION: THE NEXT ONE HUNDRED YEARS

An examination is made of the data trends for soil stabilization work in Australia over the past 40 years, and this is used as a basis for estimating maximum likelihood developments within the next 100 years. Though the data base is almost wholly Australian and the extrapolations necessarily involve an element of personal judgment, justifications for a universal validity are offered, based on the recent American world-wide Delphi survey. The projection suggests, inter alia, an increasing importance for soil stabilization work due to increasing economic advantage; but a dearth of new methods; and with principal attention directed to the improvement of present techniques by automation. The major consumer is expected to remain the road and rail construction industry; but towards the end of the analysis period housing may have assumed a significant and expanding role. The number of the covering abstract of the symposium is IRRD no. 235195.

Soil Reinforcing and Stabilising Techniques in Engineering Practice. Symposium, Sydney, Australia, October 16-19, 1978.

Ingles, OG (New South Wales University, Australia)
New South Wales Institute of Technology 1978, pp 365-383, 7 Fig., 6 Tab., 16 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-236704), Australian Road Research Board
ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

00 190267

DESIGN AND CONSTRUCTION OF TUNNELS FROM SPENCER STREET YARDS TO FLAGSTAFF STATION FOR THE MELBOURNE UNDERGROUND RAIL LOOP

Four 7M diameter tunnels have been completed in mixed ground conditions west of the new Flagstaff station for the Melbourne underground rail loop.

The variable geological ground conditions presented problems for the designers which resulted in fairly strict specification requirements on the order and method of working. After the award of the contract a continuing assessment of the exposed ground conditions by the engineer assisted the contractor in proposing alternatives to the order and method of working which resulted in cost and time savings to the client- Melbourne Underground Rail Loop Authority (MURLA). The number of the covering abstract of the conference is IRRD no 235185.

Third Australian Tunnelling Conference, Sydney, September 12-15, 1978.

Mason, D (Mott, Hay & Anderson, Hatch, Jacobs)
Institution of Engineers, Australia Preprint Sept. 1978, pp 71-78, 5 Fig., 10 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-235187), Australian Road Research Board

ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

00 190271

TUNNEL BORING

This review paper on the art and craft of tunnel boring discusses the evolution of mechanized tunnel construction from prehistoric to modern times. Specific technical achievements and notably innovative projects are described. The modern boring machine and the optional methods for overcoming varying ground conditions are presented. The conclusion provides a hint for future development trends.

For Meeting held August 7-10, 1978.

Friant, JE (Robbins, Company)
Society of Automotive Engineers Preprint SAE 780676, 1978, 14 p.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

00 190341

EXPERIMENTAL STUDY FOR EARLY DETECTION OF SLOPE FAILURE

When there is an earth slide on a slope, there will have been micro-movements well before. In 1975 a test on this was carried out using artificial rain on the embankment of an abandoned railway line, the rails of which had been dismantled. In this article a description is given of the results of the test and the data collected.

Morino, A *Railway Technical Research Inst, Quarterly Reports* Vol. 19 No. 3, Sept. 1978, pp 132-133, 6 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

DOTL JC

00 190347

MEASURES AGAINST SNOWFALL AT KITAKAMI YARD

No Abstract.

Kuramoto, T *Permanent Way*. Vol. 20 No. 75, Sept. 1978, pp 17-26, 7 Fig., 4 Tab., 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

00 190348

CONSTRUCTION OF CONCRETE SLAB BRIDGE DECKS WITH AIR CUSHIONS [Betonirovanie mostovyh plit s ispol'zovaniem pnevmovkladyselj]

No Abstract. [Russian]

Kacembogen, RA *Transportnoye Stroitel'stvo* No. 10, Oct. 1978, pp 24-25, 2 Fig., 2 Phot., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

00 190361

LIERASEN TUNNELGATE FOR SAFEGUARD AGAINST FROST WEATHERING [Lierasen tunnel. Frostsikring med tunnelport]

Lierasen tunnel, a 10700 meter long double track railway tunnel between Oslo and Drammen has been exposed to frost weathering. The difference in

level between the two tunnel mouths causes a strong upward current of air, which in wintertime allows frost to penetrate several kilometers into the tunnel. The conventional methods of safeguards, as grouting, bolting, injection and insulation have been tried without satisfaction. The article describes the construction and operation of an automatic gate, that closes the lower entrance of the tunnel when no trains are passing and controls the climatic conditions of the tunnel. [Norwegian]

Hartmark, H Vinogg, L *NSB-Teknikk* May 1979, pp 9-14, 9 Fig.

ACKNOWLEDGMENT: British Railways

ORDER FROM: Norwegian State Railways, Storgaten 33, Oslo 1, Norway

00 191405

STRUCTURAL BEHAVIOR OF MONOLITHIC CONCRETE TUNNEL LINING MODELS. CIVIL ENGINEERING STUDIES

Eight tests of circular, 10-ft diameter models of cast-in-place tunnel linings unreinforced and with steel fiber and conventional reinforcement are described. The loading simulated interaction with the ground. The tests are compared with results of a computer program that simulates the soil-structure interaction and the nonlinear behavior of the linings. Additional studies of the concrete material properties and lining section behavior are described.

Sponsored in part by Department of Transportation, Washington, DC. Office of the Secretary.

Ferrera-Boza, RA Paul, SL
Illinois University, Urbana, Federal Railroad Administration, Office of the Secretary of Transportation UILU-ENG-78-2028, Struct Res Ser-456, Dec. 1978, 330 p.

Contract DOT-FR-30022

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-292017/1ST

00 191482

U.S. NATIONAL COMMITTEE FOR ROCK MECHANICS, REPORT FOR 1977

The U.S. National Committee for Rock Mechanics, in the Assembly of Mathematical and Physical Sciences of the National Research Council, has served United States scientists and engineers concerned with rock-mechanics problems since 1967. This fourth periodic report for 1977 describes the work of the Committee and its Panels for calendar year 1977. The activities of the two Panels concerned with educational requirements and domestic/international activities are summarized. The last section of this report presents the findings and recommendations of the following three technical-study Panels, which were organized early in 1976 and completed their studies and reports in 1977: the Panel on Rock Mechanics Problems That Limit Energy Resources Recovery and Development; the Panel on Rock Mechanics Problems Related to Underground Construction and Tunneling; and the Panel on Rock Mechanics Problems Related to Seismology and Earthquake Engineering.

National Research Council, National Science Foundation Summ Rpt. NSF/RA-780334, 1978, 40 p.

Grant NSF-ISP77-13297

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-291017/2ST

00 191675

AERIAL DRAINAGE SURVEYS-COMPUTER DESIGN PROGRAM. FINAL IMPLEMENTATION PACKAGE REPORT

In recent years, aerial photography has played an important role in collecting hydraulic data for the design of bridge and drainage structures. Automated systems, which include aerial photogrammetric techniques, computer analysis, and automated plotting, are increasing the accuracy of aerial surveys. The FHWA contracted with the Wyoming Highway Department to develop a design system using aerial survey methods that is a potentially more economical means of obtaining and displaying basic data for highway drainage site analysis. Studies by the Wyoming Highway Department show it is considerably less expensive to obtain stream profile and cross-section data from a stereo model when done in conjunction with earthwork designs than by conventional field survey techniques. The conventional techniques will generally be more expensive due to greater manpower and time requirements as a result of steep terrain, site inaccessibil-

ity, inclement weather, travel, and manual transcription of survey notes. It should be kept in mind, however, that many variables are involved which affect the cost of both field and aerial drainage surveys. The computer program contained in the manual processes basic aerial survey data and transforms it into drainage information which can be used for design. Tape output for computer plotting application permits profile and cross-section plotting on a special drainage survey form.

Schilling, MG Marques, M Thomas, R
Wyoming State Highway Department, Federal Highway Administration
FHWA/IP-78-2, Mar. 1978, 82 p.

Contract DOT-FH-11-7936

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292815/8ST

00 191772

MAINTENANCE AND PRESERVATION OF CONCRETE STRUCTURES. REPORT 1. ANNOTATED BIBLIOGRAPHY, 1927-1977

Included in this bibliography are 826 annotated references on maintenance and preservation of concrete structures. They cover the period from 1927 to 1977 on the subjects of durability and causes of deterioration, evaluating the condition of existing structures, maintenance and repair materials, procedures, and techniques. A complete subject index and author index are provided. (Author)

Liu, TC O'Neil, EF McDonald, JE
Waterways Experiment Station Tech Rpt. WES-TR-C-78-4, Sept. 1978, 422 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A062694/5ST

00 192081

TUNNEL COST MODEL: EXECUTIVE SUMMARY-TUNNEL CONSTRUCTION REPORT NO. 9

The Tunnel Cost Model is a simulation model of tunnel construction which addresses problems of cost estimating and project scheduling under conditions of risk or uncertainty. The model develops the concept of underground construction as a production process, and to this concept applies procedures drawn from current estimating practices of contractors, owners, and designers. Its main advantages are its flexibility in adapting to diverse needs among users and to various types of underground projects; its ability to match speed with a very high level of detail and accuracy; and its explicit treatment of many major sources of uncertainty in project planning, analysis and control. Any underground structure or complex of structures may be considered, ranging from shafts, tunnels, or adits to networks or systems of tunnels to large underground caverns. This report presents a technical description of the capabilities of the Tunnel Cost Model.

Moavenzadeh, F Markow, MJ
Massachusetts Institute of Technology, National Science Foundation
R78-30, NSF/RA-780364, Sept. 1978, 29 p.

Grant NSF-GI-34029

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291602/1ST

00 192082

TUNNEL COST MODEL: FINAL REPORT-TUNNEL CONSTRUCTION REPORT NO. 10

The Tunnel Cost Model is a simulation model of tunnel construction which addresses problems of cost estimating and project scheduling under conditions of risk or uncertainty. The model develops the concept of underground construction as a production process, and to this concept applies procedures drawn from current estimating practices of contractors, owners, and designers. Its main advantages are its flexibility in adapting to diverse needs among users and to various types of underground projects; its ability to match speed with a very high level of detail and accuracy; and its explicit treatment of many major sources of uncertainty in project planning, analysis and control. Any underground structure or complex of structures may be considered, ranging from shafts, tunnels, or adits to networks or systems of tunnels to large underground caverns. This final report presents

a technical description of the capabilities of the Tunnel Cost Model, focusing on project schedules and costs, subsurface conditions, construction operations, costs, and production rates, model features summary, and model applications.

Moavenzadeh, F Markow, MJ
Massachusetts Institute of Technology, National Science Foundation
R78-29, NSF/RA-780365, Sept. 1978, 178 p.

Grant NSF-GI-34029

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291603/9ST

00 192083

TUNNEL COST MODEL, USER'S MANUAL, VERSION 2-TUNNEL CONSTRUCTION REPORT NO. 7

The Tunnel Cost Model is a simulation model of tunnel construction which addresses problems of cost estimating and project scheduling under conditions of risk or uncertainty. The model develops the concept of underground construction as a production process, and to this concept applies procedures drawn from current estimating practices of contractors, owners, and designers. Its main advantages are its flexibility in adapting to diverse needs among users and to various types of underground projects; its ability to match speed with a very high level of detail and accuracy; and its explicit treatment of many major sources of uncertainty in project planning, analysis and control. Any underground structure or complex of structures may be considered, ranging from shafts, tunnels, or adits to networks or systems of tunnels to large underground caverns. This user's manual is designed to facilitate the user in preparing input to the Tunnel Cost Model. It is assumed that the user has a general knowledge of using computer-programs for solving problems. This manual describes in detail the commands, sets of commands, and general input necessary to run the model. Also provided is information necessary for installing the TCM. Wherever possible, the commands have been described in separate sections so that specific questions or problems can be easily addressed. The order that the input commands are presented in is the most likely order that they will be used by the model.

Bell, TE Markow, MJ
Massachusetts Institute of Technology, National Science Foundation
NSF/RA-780363, Sept. 1978, 201 p.

Grant NSF-GI-34029

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291604/7ST

00 192188

ELECTROMAGNETIC CROSS-BOREHOLE SURVEY OF A SITE PROPOSED FOR AN URBAN TRANSIT STATION

LLL has developed and tested an electromagnetic method for probing between boreholes and has applied the method to characterize the site for a future urban rapid-transit station--the Forest Glen/Georgia Avenue station Washington, DC. Using this technique, the subsurface region's transmission properties were determined by sending a continuous-wave (cw) electromagnetic signal between a transmitter and a receiver in different boreholes. From the network of sampled signals, which vary according to the electrical properties of the media through which they pass, the region's properties can be determined. For the Forest Glen/Georgia Avenue site, there has been an excellent correlation of the predicted subsurface geologic structure and fracture density with the borehole core information. This suggests that cross-borehole probing has significant merit for inferring the detailed structure between boreholes. This is a desired capability that no other technique meets with as high a resolution as the described procedure.

Lytle, RJ Dines, KA Laine, EF Lager, DL
California University, Livermore, Department of Energy June 1978, 23 p.

Contract W-7405-ENG-48

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

UCRL-52484

00 193486

LANDSLIDES: ANALYSIS AND CONTROL

This volume brings together, from a wide range of experience, such information as may be useful in recognizing, avoiding, controlling, designing

for, and correcting movement. Current geologic concepts and engineering principles and techniques are introduced, and both the analysis and control of soil and rock-slopes are addressed. New methods of stability analysis and the use of computer techniques in implementing these methods are included. Rock slope engineering and the selecting of shear-strength parameters for slope-stability analyses are covered in separate chapters. The first part of the book deals primarily with the definition and assessment of the landslide problem. It includes chapters on slope-movement types and processes, recognition and identification of landslides field investigations, instrumentation, and evaluation of strength properties. The second part of the book deals with solutions to the landslides problem; methods of slope-stability analysis, design techniques and remedial measures that can be applied to both soil and rock-slope problems are included.

Schuster, RL Krizek, RJ *Transportation Research Board Special Report No. 176, 1978, 234 p., Figs., Tabs., Photos., Refs.*

ORDER FROM: TRB Publications Off

00 193721

SUMMARY: BRIDGE ENGINEERING CONFERENCE

The Bridge Engineering Conference held in St. Louis, Missouri, September 25-27, 1978, was conducted in order to facilitate an interchange of information on all aspects of design, construction, rehabilitation, and maintenance of vehicular bridges with specific emphasis on problems and solutions of interest to highway, railroad, and transit bridge engineers, administrators, and managers. Proceedings of the Conference were published in Transportation Research Records 664 and 665. This circular contains summaries of reports and discussions presented at the conference and not included in the proceedings. Part 1 of the circular contains introductory remarks by the Conference Chairman along with the keynote address and three of the presentations delivered at the plenary session. Part 2 includes the substance of a panel discussion at the conclusion of Session 12 on the future of bridge loadings. Part 3 reflects some opinions solicited by interviews with selected attendees. Part 4 is a list of corrections to papers appearing in Transportation Research Records 664 and 665, and Part 5 is a list of the conference participants and the sponsoring committee. /Author/

Transportation Research Circular No. 201, Mar. 1979, pp 1-34, Figs.

ORDER FROM: TRB Publications Off

00 193749

METAL FATIGUE IN FAILURE OF CHICAGO TRANSIT STRUCTURE

Unfused welded areas, cold weather and cyclic stressing led to fatigue failure within the elevated structure that carries Chicago Transit Authority tracks across Rock Island. Fatigue cracks in three bents under the curved structure originated at intersections of flanges and bents; highway design principles had been used to produce a smooth, attractive surface.

Railway Track and Structures Vol. 75 No. 3, Mar. 1979, p 44, 4 Phot.

ORDER FROM: ESL

DOTL JC

00 193754

ENGINEERING FABRICS...USED AND RESEARCHED BY SOUTHERN PACIFIC

Southern Pacific has built a 1300-ft test track on nonwoven fabric and instrumented it to determine the stabilizing qualities of this material, as well as its other qualities. During the test, SP continues to install the fabrics at sites where unstable subgrades result in high track maintenance costs. Test will give new insights into behavior of fabrics in the total track structure. Data collected includes loads carried, ballast contamination, moisture transfer in the subgrade and durability of the fabrics used.

Progressive Railroading Vol. 22, No. 3, Mar. 1979, p 52, 7 Phot.

ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

00 193845

SNOW REMOVAL AND ICE CONTROL RESEARCH

This report contains 56 conference papers pertaining to snow removal and ice control research. Several of the papers are concerned with deicing salts--their effectiveness, their impact on the environment, and possible alternatives to them. Alternative methods of deicing discussed herein

include: heating of bridge decks, increasing coefficient of friction between tires and pavement surfaces, use of high intensity lights, and advent of less corrosive chemicals. There are also several papers that address the problem of snow and ice accretion on power wires, guideway systems, sign boards, and etc. There is considerable attention given to development of computer programs and models for predicting scope of snow and ice control operations and for evaluating their effectiveness. Also, several papers discuss new developments in snow removal equipment and the cost of operation and maintenance.

Proceedings of the Second International Symposium, held May 15-19, 1978, at Hanover, New Hampshire and sponsored by the Transportation Research Board, U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory, and U.S. Department of Transportation.

Transportation Research Board Special Report No. 185, 1979, 355 p., Figs., Tabs., Refs.

ORDER FROM: TRB Publications Off

00 193886

SNOW REMOVAL AND ICE CONTROL FOR GROUND TRANSPORT CHANNELS AND TERMINALS

A study was undertaken to determine the current state of the art of snow removal and ice control for ground transport channels and terminals in the Upper Great Lakes Region of the U.S. Selective interviews were made of engineers and individuals in the region who were intimately involved on a daily basis with local snow and ice problems. A seminar-workshop was also held to provide information exchange and experience sharing by those who had considerable interest in or working knowledge of these operations in the area. This paper is a brief summary of the findings of the research effort. /Author/

This Paper appeared in TRB Special Report 185, Snow Removal and Ice Control Research.

Huang, EY (Michigan Technological University) *Transportation Research Board Special Report No. 185, 1979, pp 245-253, 5 Fig.*

ORDER FROM: TRB Publications Off

00 193896

PROTECTION METHODS FOR RAILWAY SWITCHES IN SNOW CONDITIONS

Research and Development programs conducted on several different methods of overcoming the problem of railway switches failing in the presence of snow and ice are outlined. The most common method at present is the application of heat by the combustion of fossil fuel. By the application of forced convection heat transfer switch protection under reasonably severe environmental conditions is possible. A novel combustion heater based on the valveless pulse jet engine has been applied to railway switches. A non-thermal method employing a horizontal air curtain has been developed to prevent the deposit of snow in critical areas. Two switches have been designed and developed for field evaluation. Both switches are capable of operation in snow and ice conditions. /Author/

This Paper appeared in TRB Special Report 185, Snow Removal and Ice Control Research.

Ringer, TR (National Research Council of Canada) *Transportation Research Board Special Report No. 185, 1979, pp 308-313, 5 Fig., 5 Ref.*

ORDER FROM: TRB Publications Off

00 194136

TUNNELS-THE FASTER DRIVE FORWARD

Progress in tunnelling during the last decade is reviewed. Although the output in 1977 was 40 per cent below the peak level of 1973, it was significantly greater than that of 1970 and 1971. Recent major projects are mentioned but three quarters of the work was on sewers. No major breakthrough in tunnelling technique has occurred but there has been a steady incorporation of new techniques such as shotcreting and rock bolting in hard rock, and precast linings in soft ground. Full-face hard-rock machines are improving steadily and partial-face boom type machines are now widely used. Progress in research mentioned includes the large scale instrumentation used in observational tunnelling. Speed of tunnelling and lining erection are dominating influences requiring more detailed ground information. The author believes that tunnelling has survived the period of depression well and looks forward to tunnelling rates of 100 to 200 M of finished work per week which he thinks could be achieved by the end of the century.

From the special Celebration Issue, 1978.

O'Reilly, MP (Transport and Road Research Laboratory) *Ground Engineering* 1978, pp 11-12, 4 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 237962)
ORDER FROM: ESL

00 194137

REMOVING MISCONCEPTIONS ON THE NEW AUSTRIAN TUNNELLING METHOD

The article describes the concept of the so-called New Austrian Tunnelling Method (NATM). While it is not a method of excavation with permanent support, the NATM should be considered as constructing a tunnel on the basis of scientifically established principles proved in practice. The NATM concept is based on mobilizing the bearing capacity of a rock mass so that optimum safety and economy can be achieved. The article mentions some of the most important of the 22 principles which characterize the NATM. A number of tunnel design weaknesses are discussed which have led to construction difficulties. These include lining too thin; delayed ring closing; failing to close the invert; and, destruction of the rock mass. /TRRL/

Muller, L *Tunnels and Tunnelling* Vol. 10 No. 8, Oct. 1978, pp 29-32, 8 Fig., 8 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-237949)
ORDER FROM: ESL

DOTL JC

00 194141

RHINE-RUHR METRO-CASE STUDY NO 1. BOCHUM CITY RAILWAY. CONTRACT 3

The article describes a case study concerning the construction of contract B3 forming part of the underground rapid transit system being commissioned by the city of Bochum as part of the Rhine-Ruhr metro system. Contract B3 is located at the end of the first tunnel section of line B and incorporates a station, a ramp to street level and provision for a future extension of the tunnel section. The construction method used was the new Austrian tunnelling method instead of open cut as originally planned for some sections. Headings were excavated by road-heading machines and a telescopic shovel feeding wheeled loading shovels. Front end loaders transported the spoil to shafts for lifting and removing from site. Steel arches were placed every metre with sprayed concrete for initial support. When the excavation was complete a final in-situ concrete lining was constructed in 8-10 M lengths. Details are given of tunnel dimensions and construction techniques employed.

Hunt, M *Tunnels and Tunnelling* Vol. 10 No. 10, Dec. 1978, pp 44-46, 3 Fig., 3 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-238399)
ORDER FROM: ESL

DOTL JC

00 194142

RHINE-RUHR METRO-CASE STUDY NO 2. HERNE CITY RAILWAY. CONTRACT 5

The Herne city railway, which is to form a link in the Rhine-Ruhr metro system, consists of a single line beneath the city centre connecting Recklinghausen and Bochum. The line is divided into eight sections, one of which, the 660 M long section no 5, is described in this study. The cut and cover excavation method was used with bored pile retaining walls. The geological conditions consisted of 1-2 M of alluvial fill below street level with weathered marl beneath. The water table at 5 M below ground level was lowered below formation level by sinking wells and installing pumping equipment. The floor slab and walls were concreted in one operation to prevent water inclusion using a 60 tonne mobile formwork rig. The article describes construction stages and equipment used.

Hunt, M *Tunnels and Tunnelling* Vol. 10 No. 10, Dec. 1978, pp 42-43, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-238400)
ORDER FROM: ESL

DOTL JC

00 194145

LYNE BRIDGE

The design and construction of the Lyne rail bridge near Chertsey which will eventually carry the Weybridge to Virginia Water railway line over the M25 orbital motorway is described. The 110 M long bridge has been built in

advance at an angle of 28 degrees to the line of the motorway. Several alternative designs were considered including "half-through" types and Warren truss girders with one or two spans which with a steel deck, could be built adjacent to the site and subsequently rolled into place. However, because of the high cost of temporary works and disruption to rail services, the railway line has been diverted and a "spine-beam" design in prestressed concrete has been chosen. To avoid having a deep edge beam, intermediate support is provided by cable stays suspended from a centre column in each edge beam. Wind tunnel tests were carried out to check stability of the structure. Work began in 1976 with the diversion of the railway line. It is expected that the structure will soon be completed and the railway line will be returned to its original position.

Leigh, C *Modern Transport* No. 4, 1978, pp 204-205, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-237966)

ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

00 194155

BETTER MANAGEMENT OF MAJOR UNDERGROUND CONSTRUCTION PROJECTS

The object of this study was to recommend actions that result in public underground projects that are completed on schedule, and at reasonable cost, and operate to design. To this end, a hypothetical model of a major urban underground transportation construction project called the Key City Model was developed by a subcommittee of the National Committee on Tunnelling Technology. From this model, the subcommittee derived a list of primary elements-social, political, physical, and Technical-that could conceivably be faced in building an urban rapid transit system which might have a bearing on management. A questionnaire containing these elements was sent to 105 people experienced in underground construction who were asked to rank them. Using the survey results, the subcommittee ranked the elements and then sent out another survey asking for recommendations. As a result this survey and the comments made at a workshop attended by people involved in underground construction, the recommendations presented here were formulated.

Study conducted by the Subcommittee on Management of Major Underground Construction Projects. Sponsored by the Urban Mass Transportation Administration, National Science Foundation, and Office of the Secretary of the Department of Transportation. See also PB-236973 and PB-272964.

National Academy of Engineering, Office of the Secretary of Transportation, Urban Mass Transportation Administration, National Science Foundation Final Rpt. NRC/AE-TT-78-1, 1978, 151 p., 11 Fig., 4 Tab., Refs., 6 App.

Contract DOT-OS-70030

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-290855/6ST

00 194298

ENGINEERING FABRICS, A LITERATURE REVIEW (1978)

Because of the newness of the use of fabrics in engineering applications, there has been a limited number of in-depth, state-of-the-art reports on the design of fabrics in engineering structures. To remedy this situation, in 1977 the Federal Highway Administration awarded a contract (DOT-FH-11-9353) to Drs. Russell Gary Hicks and J. Richard Bell (with the aid of Research Assistants Corby Heald, Martin Lewis, and Laurie Broderick) of Oregon State University to develop "Test Methods and Use Criteria for Filter Fabrics." As part of the work in Phase I of this study, the researchers collected and analyzed over 200 references relating to: (1) test methods used to characterize fabrics, (2) properties, and factors affecting the properties of fabrics, (3) soil-fabric interaction theories, (4) performance and cost information related to fabric installations, (5) standards (or criteria) used by agencies to select fabrics for various engineering uses, and (6) information on construction methods and problems associated with fabric installations. The staff of the Transportation Research Board Library has integrated additional references with those provided by the Oregon State University and deleted those which would be difficult or impossible to obtain from more common sources of such material. The remaining references have been developed into the literature review presented in this Circular for use by researchers, designers, producers and users of fabrics for engineering purposes. /Author/

Transportation Research Circular No. 204, Apr. 1979, 15 p.

ORDER FROM: TRB Publications Off

00 194667

REFLECTIONS ON THE REVISION OF TUNNEL BUILDING PRESCRIPTIONS [Gedanken zur Neubearbeitung der Tunnelbauvorschriften]
No Abstract.

Martinek, K. *Eisenbahntechnische Rundschau* Vol. 27 No. 11, Nov. 1978, pp 729-736, 1 Tab., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

00 194865

FABRICS

The article discusses the range of synthetic fibres available which has made possible the use of fabrics in permanent and temporary applications in civil engineering. Such fabrics offer rot and mildew resistance, chemical resistance, low water absorption, tensile strength and flexibility. The properties of synthetic fibre polymers of the polypropylene, polyethylene and nylon types of fibre are described. The main classes of fabric can be formed by woven and non-woven methods and can be used for the following functions-separation of fill materials, to allow water to filter through the fabric mesh for drainage purposes and, reinforcement of road bases over soft fill. /TRRL/

Boyes, RGH *Civil Engineering* Dec. 1978, pp 47-53, 2 Fig.

ACKNOWLEDGMENT: TRRL (IRRD 238739)
ORDER FROM: ESL

DOTL JC

00 194878

450 MILES OF RAIL LINE MAPPED IN NINE MONTHS

Mapping the Northeast Rail Corridor between Washington and Boston is discussed. In nine months the companies established 800 second-order survey monuments and produced 2400 drafted topographic maps covering a 300-ft to 800-ft band centered on the railroad.

Burns, JP *ASCE Civil Engineering* Vol. 48 No. 12, Dec. 1978, pp 51-53

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 195065

MO-PAC SETS UP CROSSINGS WITH FILTER FABRICS

Missouri Pacific uses engineering fabrics when installing or rehabilitating switches or railway crossings and in areas where poor soils or chronic mud pumping present problems in maintaining stable track. Geotextiles are increasing track stability and permitting more efficient train operation while also increasing track maintenance intervals. Details of installation procedures are given.

Progressive Railroading Vol. 22 No. 5, May 1979, pp 62-64, 5 Phot.

ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

00 195074

STATE OF THE ART REVIEW OF TUNNEL LININGS IN THE UK

This article discusses a report on the review of tunnel lining methods in the United Kingdom prepared for the Transport and Road Research Laboratory. The report objectives were to detail the development of tunnel linings in the U.K. over the postwar period; to provide a record of the major features as a reference book; and to give general information on design and construction with cautionary advice. Among the points covered in the article are temporary support, precast concrete linings, pipejacking, tolerances, recent innovations, iron and concrete linings, loading in sand, and others.

Tunnels and Tunnelling Vol. 10 No. 9, Nov. 1978, pp 57-61

ACKNOWLEDGMENT: EI
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DOTL JC

00 195075

WORKING IN WEAK ROCK

Swedish rock blasting techniques are highly advanced, due in no small measure to the methods of rock reinforcement in use: driving tunnels with relatively thin layers of shotcrete reinforcement, supplemented with rock bolts where necessary, is quite normal in Sweden, even when the rock is very weak. The Robot and Trixer Stabilator Shotcreting System is described in the article, together with some of the contracts where it has been successfully implemented.

Kramers, M Sjoström, O *Tunnels and Tunnelling* Vol. 10 No. 8, Oct. 1978, pp 63-65

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 195078

REDUCING COSTS IN URBAN TRANSPORTATION CONSTRUCTION

This paper describes an in-depth research study to evaluate the current and projected state of productivity in the construction of transportation facilities and explores improved mechanisms for implementing transportation construction innovations. At this stage it is evident that some of the major obstacles that impact costs, reduce productivity, and inhibit the implementation of innovations result from: (1) Decisions made and policies set during the planning and design phases; (2) the contractual and organizational structure chosen for project administration; and (3) delays and cost increases resulting from third-party intervention. There are also opportunities for further improvements through wider and more effective use by construction contractors of management techniques that have already proven to be successful.

Fondahl, JW (Stanford University); Paulson, BC, Jr Parkér, HW *ASCE Journal of the Construction Division* Vol. 105 No. 1, Mar. 1979, pp 51-63, 6 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 195112

NEW MATERIALS AGAINST FORMATION OF ICE IN TUNNELS [Nye materialer mot isdannelse i tunneler]

NSB has tried several methods to stop formation of ice in tunnels. The last method that has been tested is inside covering of the tunnel with a material called ETHAFOAM, an extruded polyethylene foam, a material with a very good insulating power. It is water-tight and does not absorb water that would destroy the insulation. Moreover the sheets can be formed according to the form of the profile. The sheets are supplied in a width of 0.6m and in a length of 2.75m. The thickness is 30, 50 or 70 mm. The sheets are jointed together with a so-called HOTMELT glue type, a thermoplastic material. The method will also be tested at SJ. [Norwegian]

NSB-Teknikk Vol. 5 No. 1, 1979, pp 14-16, 3 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Norwegian State Railways, Storgaten 33, Oslo 1, Norway

00 195120

PRECISION BRIDGE LEVELLING [LE nivellement de precision des ouvrages d'art]

With this operation it is possible to check the vertical movements in bridges and tunnels by means of periodical measurements with an altimeter. The author describes the equipment used for ensuring that such structures are level and the machines and methods employed. [French]

Boutonnier, J Habert, J *SNCF-Informations Techn-Direction de l'Equipe-ment* No. 18, Dec. 1978, pp 39-48, 16 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Societe Nationale des Chemins de Fer Francais, 92 rue Bonaparte, 75 Paris 6e, France

00 195145

IMMERSED TUNNELS SOLVE DELTA CROSSING PROBLEMS

The advantages of immersed tunnels and their suitability for use in Holland are examined, as well as how they are designed and built, and floated to site and sunk. Two case studies, the Botlek road tunnel at Rotterdam and the

Hemspoor rail tunnel near Amsterdam, illustrate the practical aspects of this "Meccano" style of tunnelling.

Martin, D *Tunnels and Tunnelling* Vol. 11 No. 1, Jan. 1979, p 17, 12 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD, TRRL (IRRD-240361)

ORDER FROM: ESL

DOTL JC

00 195548

INERTIAL SURVEYING ALONG THE NORTHEAST CORRIDOR

Inertial surveying, spinoff from aerospace technology, permits rapid establishment of control points for track alignment and elevation along a segment of Northeast Corridor to facilitate design of track improvements. Location and elevation are fixed by a computer control process known as gyrocompassing, an adaptation of inertial guidance systems.

Maddox, SR, Jr (Maddox and Associates, Incorporated) *Railway Track and Structures* Vol. 75 No. 4, Apr. 1979, pp 38-40, 1 Fig., 2 Phot.

ORDER FROM: ESL

DOTL JC

00 195627

ACCEPTANCE CRITERIA FOR ELECTROSLAG WELDMENTS IN BRIDGES

This report contains the findings from an extensive laboratory investigation of electroslag weldments subjected to a variety of tests intended to assess performance that could be expected in actual bridges. The report is recommended to bridge engineers, researchers, and members of specification-writing bodies concerned with behavior of welded structures. The over-all objective of this project was to develop and verify acceptance criteria for the use of electroslag butt welds in bridges. Research was conducted in two phases. The specific objective of Phase I was to define necessary acceptance specifications based on an experimental study using laboratory specimens from full-size electroslag weldments of the type used in bridge girders. The specific objective of Phase II was to verify the findings of Phase I by conducting tests of full-size bridge girders under simulated service conditions. This report contains the findings of both phases of research and includes suggested acceptance testing procedures for electroslag welding in bridges. /Author/

Benter, WP, JR; Schilling, CG (United States Steel Corporation) *NCHRP Report* No. 201, May 1979, 44 p., 30 Fig., 24 Tab., 22 Ref.

ORDER FROM: TRB Publications Off

00 195683

RAILROAD SURVEYING: INSTANT DATA

Inertial survey system, an advanced technology applied initially for conventional geodetic measurements, is now being used for developing railway engineering data. Mounted in a hi-rail vehicle, the inertial system involves an accelerometer coupled with a time measuring system to produce distance measures than can be converted in coordinate points. Track geometry and location of wayside structures can also be determined, the latter with a laser measuring device. Surveys on Chicago and North Western and in the Northeast Corridor are described. Inertial surveying can be done up to 20 times faster than conventional methods.

Semioli, WJ *Railway Age* Vol. 180 No. 11, June 1979, p 26, 2 Phot.

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DOTL JC

00 195684

UTILIZATION OF AERIAL PHOTOGRAPHS FOR PREVENTION OF DISASTERS

Japan is marked by steep topographic features with rivers flowing into the sea in such terrain. To alleviate disasters originating from rainfall, watersheds upstream from railway roadbeds are surveyed with aerial photographs. A technical manual for interpretation of these photos, now being prepared, will show topography before and after disasters that have occurred in the past with characteristic geology and vegetation indicated. Conditions symptomatic of potential future landslides and floods will be stressed.

Miyaguchi, K (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 4, 1979, pp 4-5, 3 Fig., 1 Tab.

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00 195721

SUBSIDENCE PROBLEMS CAUSED BY ROCK-TUNNELLING IN OSLO

A new railroad tunnel which will connect the east and west bound lines out of the city of Oslo is presently under construction. One part of this tunnel goes through bedrock at a depth of 20-40 m below ground surface. Above and along the tunnel there are a number of clay filled depressions in the bedrock. Past experience has shown that leakage in connection with tunnels or excavations very easily can cause reduction of pore water pressures in a relatively thin sandy layer normally found at the bottom of these depressions, thus consolidation of the clay layer. Despite systematic grouting and lining, it has not been possible to prevent significant leakage into the tunnel. The causes and effects of this leakage on pore pressures and settlements in some of the depressions encountered so far along the tunnel are described. Also discussed are various schemes which have been tried to artificially infiltrate water back into the soil/rock mass around the tunnel.

International Conference on Evaluation and Prediction of Subsidence, Paper, Pensacola Beach, Florida, January 15-20, 1978.

Karlsrud, K (Norwegian Geotechnical Institute, Norway); Sander, L American Society of Civil Engineers 1978, pp 197-213

ACKNOWLEDGMENT: EI

ORDER FROM: ASCE

00 195727

RELIABILITY OF ESTIMATING ROCK EXCAVATION COST IN TUNNELING SPECIFICATIONS

Tunnel construction requires large investments, and all decisions influencing the cost of tunnel construction and maintenance should be based on reliable estimates. Since 30% to 50% of the total tunnel costs is accounted for by the cost of rock excavation, the reliability of estimating the quality and quantity of different rock classes in a specific project is an important problem to solve. This paper provides an answer to this and some other problems, focusing on reliability of rock classes. A New Austrian Tunneling method (NATM) is described.

Supply 7, 1978: Geological Reconnaissance. Tunneling-Mining-Rock Support-Power Plant Construction, Contributed to the Geomechanical Colloquium, 26th, Austrian Society for Geomechanics, Salzburg, October 13-14, 1977.

Kurzmann, E *Rock Mechanics, Felsmechanik, Mecanique des Roches* 1978, pp 53-65, 8 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

00 195906

SOME EXAMPLES OF DETECTION AND REPAIR OF FATIGUE DAMAGE IN RAILWAY BRIDGE MEMBERS

Examples of details that have caused fatigue damage in recently designed railway structures are given. Procedures for arresting crack growth and some repair details are described. Emphasis is placed on damage caused by secondary and out-of-plane effects often not considered by designers. /Author/

This paper appeared in TRB Research Record No. 676, Bridge Design, Evaluation, and Repair.

Sweeney, RAP (Canadian National Railways) *Transportation Research Record* No. 676, 1978, pp 8-14, 23 Fig., 9 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

00 195909

RADAR AND ACOUSTIC EMISSION APPLIED TO STUDY OF BRIDGE DECKS, SUSPENSION CABLES, AND MASONRY TUNNEL

Studies have been conducted that suggest that it is feasible to use acoustic-emission and radar techniques for the nondestructive testing of masonry and of bridge cables. The examination of the condition of a brick railroad tunnel was carried out by using both techniques. Radar was used to determine the conditions of several reinforced concrete roadways and bridge decks. Acoustic emission was used in a novel way involving the application of small stresses to bridge cables, and the resultant emission pattern was correlated with the condition of the cables. The equipment used is discussed in some detail, as are the uses of special techniques for obtaining and analyzing the data. Several means of loading the bridge cables to obtain

the acoustic emission were used; the use of an air hammer is the most effective technique found thus far. Several photographic techniques were developed to correlate the mass of data obtained from radar studies of roadways. These photographic techniques and the advantages of each are discussed in some detail. It is concluded that radar and acoustic emission are potentially useful tools for nondestructive testing of masonry and bridge cables. /Author/

This paper appeared in TRB Research Record No. 676, Bridge Design, Evaluation, and Repair.

Cantor, T Kneeter, C (Port Authority of New York and New Jersey) *Transportation Research Record* No. 676, 1978, pp 27-32, 8 Fig., 1 Tab., 5 Ref.

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00 196353
INVESTIGATING AND CHOOSING ENGINEERING FILTER FABRICS

Engineering filter fabrics can prevent mixing of soil layers, allow passage of fluids but not solids and strengthen roadbeds by spreading traffic loads. Appropriate tests, proper handling and proper installation techniques permit these materials to function to reduce track maintenance.

Schaaf, HL *Railway Track and Structures* Vol. 75 No. 6, June 1979, pp 25-26

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DOTL JC

00 196354
ENGINEERING FABRIC DEFERS SPOT MAINTENANCE AT MOPAC

Missouri Pacific uses engineering fabrics routinely in rehabilitating track at crossings, switches and spots where mud pumping is experienced. These geotextiles produce the highest return for soil stabilization and drainage, reducing maintenance costs at troublesome spots. To date only relatively shallow installations have been made. Qualities of the material used by MoPac are discussed.

Railway Track and Structures Vol. 75 No. 6, June 1979, p 28, 4 Phot.

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00 196355
FABRIC HELPS COUNTER SOIL PROBLEMS AT SOUTHERN YARD

At the new Linwood Yard in North Carolina a combination of filter fabric and densely-graded stone enables engineers to maintain a tight construction schedule and achieve stability in difficult subsoil conditions. Serviceability and costs of this method of construction are being appraised.

Railway Track and Structures Vol. 75 No. 6, June 1979, p 34, 3 Phot.

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00 196402
MODERN ECOLOGICAL WEEDING TECHNIQUES ON DB TRACKS [Moderne Aufwuchsbekaempfung auf Gleisanlagen der Deutschen Bundesbahn im Rahmen des Umweltschutzes]
No Abstract. [German]

Minde, G *Eisenbahningenieur* Vol. 30 No. 3, Mar. 1979, pp 101-106, 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

00 196470
CONSTRUCTION OF HYDRAULIC-FILL FOUNDATIONS FOR SUNKEN-TUBE TUNNELS

Investigations of hydraulic fills of underwater soil foundations between the bottom of the section and base of the trench were carried out when constructing the first sunken-tube vehicular tunnel in USSR. These investigations established that the stream of muck issuing from the pipeline underwater expands and its velocity decreases with distance. The rectilinear rays including an angle of about 30 degrees are the limits of expansion of

the stream. The stream of muck loses its transporting capacity with distance and soil particles settle within the spread, forming a portion of the foundation under the bottom of the immersed tunnel section. Continuous contact of the foundation surface with the bottom of the section is achieved by joining one portion to another by moving the pipelines under the sections, swiveling them through an angle of 30-45 degrees.

Melamut, DL *Hydrotechnical Construction* No. 5, May 1978, pp 462-467, 4 Ref.

ACKNOWLEDGMENT: EI

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DOTL JC

00 196622
ANALYSIS OF NATIONWIDE DEMAND FOR URBAN TRANSPORTATION TUNNELS

For the purpose of determining estimates of the amount of transportation-related tunneling activity likely to occur to 1990, a methodology was devised whereby the conditions necessary to justify the application of tunnel segments for mass transit facilities were identified and matched against the number of situations in which these conditions are likely to be fulfilled. A corollary outcome of the analysis is an appraisal of factors that affect the preference of one type of mass transit system over others and an understanding of the sensitivity of preferred system choice to these factors. A technical evaluation of supply and demand for alternative types of mass transit systems was conducted to determine the future viability of such systems for cities that do not have them. Results of city-by-city application of the methodology developed revealed that, with current construction costs and property values, three cities currently without mass transit systems--Detroit, Cincinnati, and Denver--would meet necessary conditions for tunneled systems by 1990. At the other extreme, tunnel distance was computed for conditions in which tunnel construction costs in real terms were postulated to fall to 40 percent of today's cost and right-of-way values to rise by 5 percent/year. Other sensitivity results for the preference of tunnels to new right-of-way and for the forecast of nationwide tunnel construction under other assumptions are also reported. /Author/

This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.

Myers, MG Wood, RK (Logistics Management Institute);
Battenberger, LB (Congressional Budget Office); Lago, AM (Ecosometrics, Incorporated) *Transportation Research Record* No. 684, 1978, pp 1-8, 5 Fig., 1 Tab., 17 Ref.

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DOTL JC

00 196623
FRACTURE CONTROL IN TUNNEL BLASTING

This paper describes a procedure for achieving control of the fracture plane in construction blasting. The conventional drill-and-blast technique is modified in three ways. First, side notches that extend the length of the borehole are used to control the initiation site for the cracks that produce the fracture plane. Second, the pressure in the borehole is maintained between specified limits by using light and cushioned charges. Third, stemming length is increased to avoid venting that could produce premature arrest of the crack that produces the controlled fracture plane. The procedures suggested have been validated by using fracture mechanics computations, two-dimensional experiments in rock and polymeric models, and field tests in large rock boulders. Fracture control in tunnel blasting can reduce the time and equipment required to make the opening cut while increasing the size and improving the quality of the cut. Fracture control can also reduce the cost of contouring the walls and roof of a tunnel and at the same time improve tolerances and reduce structural damage to the remaining rock. /Author/

This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.

Barker, DB Fourney, WL Dally, JW (Maryland University, College Park) *Transportation Research Record* No. 684, 1978, pp 8-14, 7 Fig., 1 Tab., 13 Ref.

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00 196624

IMPROVEMENT OF GROUND-SUPPORT PERFORMANCE BY FULL CONSIDERATION OF GROUND DISPLACEMENTS

A conceptual description of the ground behaviour around a tunnel and a quantitative analysis of the effects of the more important factors that influence tunnel support loads are presented. Axisymmetric finite element models of the advancing tunnel were used for the quantitative analysis. The variables considered in the investigation were the relative stiffness of the ground and the support, the constitutive behavior of the ground, and the delay of support installation. The conclusions of the study are that decreasing the relative stiffness of the support or increasing the delay of the support installation generally reduces the forces in the tunnel support but at the same time may induce greater amounts of detrimental yielding in the ground mass. Comments on the optimization or minimization of tunnel support loads are also included. /Author/

This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.

Schwartz, CW Einstein, HH (Massachusetts Institute of Technology) *Transportation Research Record* No. 684, 1978, pp 14-20, 11 Fig., 2 Tab., 8 Ref.

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00 196625

TUNNEL-BORING PENETRATION RATE AND MACHINE DESIGN

The experimental and theoretical findings of an ongoing research program on tunnel borability at the Colorado School of Mines are presented. A theoretical approach has been used to formulate predictor equations to calculate the forces involved in rock cutting with sharp and dull disc cutters. Concurrent with the theoretical analysis, extensive laboratory testing was undertaken with both sharp and artificially dulled disc cutters. These tests were carried out in three rock types and with full-size field cutters. Penetration, spacing, and edge angle, in that order, were found to affect cutting forces to a large extent whereas cutter diameter was found to be a variable of small significance. The effect of cutter wear on cutter forces was found to depend on the spacing of cuts and to decrease with increased spacing. It was concluded that wear is more detrimental to cutter performance at closer spacing of cuts. Predicted cutter forces were found to agree very well with those measured in laboratory cutting experiments. The theoretical behavior of dull cutter forces confirmed experimental observations in that the closer cuts were spaced the greater was the reduction in cutting efficiency of a disc cutter because of wear. Field boring data from a Jarva machine currently in operation in Chicago were procured and compared with predicted values, and agreement was very good. This represents an initial success in the application of the predictor equations to boring cases in the field. /Author/

This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.

Wang, FD Ozdemir, L (Colorado School of Mines) *Transportation Research Record* No. 684, 1978, p 21-28, 12 Fig., 1 Tab., 3 Ref.

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DOTL JC

00 196626

SOFT-GROUND TUNNELING BY GROUND FREEZING: A CASE HISTORY

A brief introduction to artificial ground freezing for temporary excavation retention during construction is presented. The major aspects that affect the suitability of ground freezing in a particular project are discussed. To illustrate the applicability of artificial ground freezing, a case history in Washington, D.C., is presented. The project consisted of a circular 3.8-m (12.5-ft) diameter sewer tunnel approximately 33.5 m (110 ft) in length that passed 2.7 m (8.9 ft) beneath four sets of railroad tracks. The design process, including the frozen-soil laboratory testing program and the computer modeling, is presented. An instrumentation program was used during construction to monitor the performance of the project. The instrumentation consisted of thermocouples to monitor ground temperatures and elevation monuments to monitor ground movement during construction. /Author/

This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.

Jones, JS Brown, RE (Law Engineering Testing Company) *Transportation Research Record* No. 684, 1978, pp 28-36, 10 Fig., 25 Ref.

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00 196627

PRACTICAL DESIGN OF CONCRETE DIAPHRAGM WALLS

Diaphragm walls constructed by the slurry trench method achieve their greatest economy when it is possible to use them as part of the permanent underground structure. To use these support-of-excavation structures as permanent components of a structure, engineers must be assured of their compatibility with structures built in an open excavation. There should be consistent reliability in applied loads, levels of stress, watertightness, durability, and performance. It is suggested that the use of diaphragm walls of precast concrete panels can provide reliable strength and durability and that use of a cement bentonite grout on the backside of the diaphragm wall to displace excess slurry can meet waterproofing requirements. It is recommended that plastic analysis be combined with ultimate strength methods in the design of these walls to resolve the problem presented by the complicated residual stress patterns generated in the diaphragm wall by the construction processes of excavation; installation, prestressing, and removal of braces; and backfilling. In addition, use of a built-in hinge in the diaphragm wall at the lowest brace facilitates control of residual moments. This approach can satisfy the need for reliability in stress levels in the structure. A structure so designed and constructed will be compatible with one built in an open excavation. /Author/

This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.

Iffland, JSB (Iffland Kavanagh Waterbury) *Transportation Research Record* No. 684, 1978, pp 37-43, 10 Fig., 14 Ref.

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DOTL JC

00 196628

THEORY OF ROOF BOLTING

There is currently an unfulfilled need in the field of rock mechanics for a rational, easily used system of rock bolt design. During the late 1950s and early 1960s, Panek and Lang performed independent studies on the nature of rock bolt behavior. Panek, working with bolt action in flat, laminated mine roof strata, attributed support to both suspension and friction and concluded that reinforcement by friction is a complex function of mine geometry, bolt spacing, and load. Lang, working with bolted gravel beams, developed essentially the same conclusions and, in effect, generalized Panek's work. By taking these two theories a step further, it is shown that rock support is a function of the rock bolt's power to enforce mechanical continuity on the rock. By using equations from two-hinged arch theory, it is possible to relate load directly to beam strength with the parameters of conventional structural analysis--load, strength, and beam geometry. Tables can thus be prepared that compare beam thicknesses and an offset dimension with span length. An example of such a table is included in the paper. /Author/

This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.

Dodds, DJ (Foundation Sciences, Incorporated) *Transportation Research Record* No. 684, 1978, pp 44-48, 6 Fig., 9 Ref.

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DOTL JC

00 196715

SUBWAY STRUCTURES RELATIVELY GOOD, OTHER ELEMENTS OF SUBWAY SYSTEM NEED REHAB

New York has postponed construction of its Second Avenue Subway but is going ahead piecemeal with the line between midtown Manhattan and Jamaica, Queens. Seventy percent of the Transit Authority capital budget is going into rehabilitation and modernization of existing lines. Elevated structures, despite ages up to 93 years, appear in good shape. Oldest subway, the 75-year-old Lexington Avenue IRT, is getting priority in rehabilitation of power and signal systems, and in refurbishing of the stations.

ASCE Civil Engineering Nov. 1978, p 67

ORDER FROM: ESL

DOTL JC

00 196931

IDEAL TRAINS AND IDEAL TUNNELS

This article discusses several ways of eliminating pressure transients due to single or passing trains in a railroad tunnel and presents theoretical mathematical models developed describing tunnel airflows. Elimination of pressure discontinuities and of annulus pressure gradient are analyzed.

Vardy, AE *Railway Engineer International* Vol. 4 No. 2, Mar. 1979, p 39, 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 196932

STUDY ON NEW TUNNEL CONSTRUCTION METHOD

A new construction method, which aims to construct a culvert for the roads, electric power lines, etc. beneath the railroad lines with less expense and with shorter construction period was developed. Using this method to construct a tunnel lining in the ground, some static and dynamic loading tests were carried out. As a result, a conclusion that this method could be put in practical use was gained.

Takeshita, S Ueno, T Kusama, H *Railway Technical Research Inst. Quarterly Reports* Vol. 19 No. 4, Dec. 1978, pp 151-155

ACKNOWLEDGMENT: EI
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DOTL JC

00 196933

EXPERIMENTAL STUDY ON THE EFFECT OF EMBEDMENT-DEPTH HAVING INFLUENCE UPON THE HORIZONTAL VIBRATION OF A SINGLE PIER

The effects of the embedment-depth for the resonance frequency and the maximum displacement are investigated by the horizontal vibration tests at a single pier on the object of a frail bridge, and the comparison between the coefficient of static soil reaction and that of dynamic one is done. The introduction of the coefficient of additional soil reaction is tried. The theoretical results for simplified models agree well with the experimental ones.

Okada, K Kawamata, J Harada, Y *Railway Technical Research Inst. Quarterly Reports* Vol. 19 No. 4, Dec. 1978, pp 147-150

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 197279

DESIGNING IMMersed TUNNELS

The article examines the factors which influence the design and construction of immersed tunnels in the Netherlands. Factors considered include alternative routes, nature of soil and varying width of river or waterway. A final choice should also take into account investment needed and road network layout. It is necessary to determine expected traffic volume and draught of ships using the waterway. Construction methods considered in the article include open excavation, shield-driving and immersed-tube techniques. Other aspects of tunnel construction considered are lighting and ventilation equipment, pumps and traffic signal equipment. /TRRL/

Glerum, A *Tunnels and Tunnelling* Vol. 11 No. 2, Mar. 1979, pp 29-32, 5 Fig., 5 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-240941)
ORDER FROM: ESL

DOTL JC

00 197280

HOOPS AND RINGS PUT TUNNEL IN A WATERPROOF SHEATH

The article describes the Goldsheath system of tunnel lining which makes use of a system of barrel hoop supports on the outside of concrete segmental tunnel lining rings. It is claimed that the lining system overcomes the limitations of previous linings and can be used with present day tunnelling techniques. The lining system is based on concrete segments expanding into an external restraint sheath or flexible hoop support system. The restraint hoops are wider than the segment rings and so overlap forming a continuous, waterproof sheath. /TRRL/

Goldsby, EF *Tunnels and Tunnelling* Vol. 11 No. 2, Mar. 1979, pp 60-61, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-240943)
ORDER FROM: ESL

DOTL JC

00 197281

PREDICTION OF GROUND SETTLEMENTS ASSOCIATED WITH SHIELD TUNNELLING

There is much uncertainty in estimating ground settlement associated with shield tunnelling due to the complicated interaction between tunnelling methods and soil characteristics. Accordingly, if the shape of the ground settlement could be quantitatively predicted, it would be very effective for the assessment of its influence on the existing structures. The shape of the ground settlement trough can be expressed as the product of the normal distribution function and the error function by introducing a mathematical model. The field observations were also carried out at the four sites of the shield tunnel construction in the metropolitan areas. A model test was carried out in which the settlements of sand layers were measured by x-ray techniques. It was concluded that: (1) the lateral and longitudinal profiles of the ground settlement trough are well fitted with the normal distribution curve and the error function curve, respectively. (2) the parameter which represents the width of settlement is roughly proportional to depth of tunnel and its proportional constant depends upon soil characteristics. (3) in clay the ratio of lost ground is positively correlated with ofs (simple overload factor) defined by construction conditions and soil characteristics. (4) consequently the maximum settlement can be calculated by using these relationships. /TRRL/

Yoshikoshi, W Watanabe, O Takagi, N (Tokyo Gas Company, Japan) *Soils and Foundation* Vol. 18 No. 4, Dec. 1978, pp 47-59, 17 Fig., 2 Tab., 11 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-240946)
ORDER FROM: ESL

00 197284

STATION EXCAVATIONS IN HARD ROCK FOR THE WASHINGTON METRO

Details are given of the construction of rock caverns for mass transit railway stations in Washington DC. Ten of the stations have been excavated in gneiss, schist and quartz where these vaulted rock excavations measure some 650 ft long, 45-50 ft high and 60 ft wide. The caverns are designed without interior supporting columns. For drilling and roof bolting operations four pneumatic Ingersoll-Rand, three-boom, rampmaster jumbos were used. The drills have penetration rates of 1 m/min on 50 mm diameter blastholes. A stabilator robot shotcrete unit following behind the jumbos spray a 50-100 mm layer of shotcrete to stabilise the rock face.

Tunnels and Tunnelling Vol. 11 No. 3, Apr. 1979, pp 57-58, 4 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-241070)
ORDER FROM: ESL

DOTL JC

00 197287

TYNE AND WEAR: BRIDGE N106 OVER THE RIVER TYNE

The bridge is designed to carry the Tyne and Wear Metro across the River Tyne between the centres of Newcastle and Gateshead. It is a continuous steel through-truss of three spans, the central river span being 164 M long. The 4000 T of structural steelwork are supported on reinforced concrete foundations and piers. The authors, representing the client, engineer and contractors, describe the planning of the bridge in the context of the metro, and the factors which affected its design. After discussing some of the special features of the design, the paper describes the construction of the foundations, piers and superstructure, illustrating in particular the erection methods which make this form of bridge construction practical and economical.

Layfield, P (Tyne & Wear Transport Executive); Taylor, G McIlroy, P (Fairhurst & Partners); King, C (Cleveland Bridge & Engineering Company); Casebourne, M (Cementation Construction Company) *Institution of Civil Engineers, Proceedings, Pt1* Vol. 66 No. PT1, May 1979, pp 169-189, 9 Fig., 2 Tab., 7 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-240958)
ORDER FROM: ESL

DOTL JC

00 197290

INVESTIGATING THE ALTERNATIVES FOR A DENMARK TO SWEDEN TUNNEL

The article discusses investigations being made into the possible construction of submerged concrete tunnels between Denmark and Sweden. A possible site would be at the narrowest part of the sound between Helsingør and Helsingborg with a width of about 5 km and a water depth of about 40 M. Three alternative locations for a railway tunnel link are shown. For a single track an asymmetrical oval section with a duct for services and evacuation has been proposed while for a double track the section would be rectangular with an intermediate wall. A 5400 M road tunnel north of the proposed rail tunnel locations is also detailed. The cross-section would be symmetrical with air ducts beside the traffic tunnels.

Larsson, NO (Swedish State Railways) *Tunnels and Tunnelling* Vol. 11 No. 3, Apr. 1979, pp 48-51, 10 Fig.

ACKNOWLEDGMENT: TRRL (IRRD-241069)
ORDER FROM: ESL

DOTL JC

00 197291

CROSS-CHANNEL LINK

The article summarises the results of a joint technical and economic examination by British Rail and the French Railways (SNCF) of a proposal to link the two systems by a single-track tunnel. This plan, while complete in itself, would not preclude the later development of a two-track system. The aim of the investigation is to achieve a low-cost fixed link based on a single-track tunnel system through which trains would operate in "flights" of 10 trains operating in each direction during a 3 hr cycle. Operating passenger and freight transport services, the tunnel would be used to about 60% capacity with trains running at a maximum speed of 120 km/hr.

Modern Railways Vol. 36 No. 368, May 1979, pp 189-191, 1 Fig., 2 Tab., 3 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-241071)
ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

DOTL JC

00 197344

ECONOMIC FACTORS IN TUNNEL CONSTRUCTION

This report describes a new cost estimating system for tunneling. The system is designed so that it may be used to aid planners, engineers, and designers in evaluating the cost impact of decisions they may make during the sequential stages of planning and design of urban transportation tunnels. In developing a cost estimating technique and method, an extensive review was made of currently available estimating systems. Techniques were adapted from the systems studied where applicable, and new methodologies were developed as needed for optimization. A detailed estimating technique is used in which units of effort are converted to obtain a base cost for a "standard" tunnel constructed in 1976 in Washington, DC. Correction factors may then be applied to obtain the costs in other time frames and geographic locations. The use of units of effort provides a technical base which does not change rapidly with time, but may be updated as changes in technology and productivity occur.

Prepared in cooperation with Singstad, Kehart, November, and Hurka, New York.

Foster, EL McDonald, R Wightman, W Toporoff, I
Underground Technology Development Corporation, Singstad, Kehart, November, and Hurka, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0025-7910, Feb. 1979, 306 p.

Contract DOT-TSC-1106

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294726/5ST, DOTL NTIS

00 197414

ALTERNATE METHODS OF AVALANCHE CONTROL. PHASE IV

The Alternate Methods of Avalanche Control project has been funded by the Washington State Highway Commission since August 1974 in order to develop simple, reliable and repeatable methods of triggering avalanche release which are free from the storage, handling and availability problems

of explosives and artillery shells and which can readily be applied to avalanche paths typical of the many smaller ones causing frequent hazards for highways. The research involved tests in both Washington and Colorado to permit evaluation of the control methods in diverse climates and snow conditions, leading to more generally applicable results than could be obtained at a single site. The technical and scientific aspects of the work in Colorado were coordinated by the San Juan Avalanche Project of the University of Colorado. Field work in Washington state and the general supervision of the program and the engineering design were carried out by the University of Washington Geophysics Program. The U.S. Forest Service at Alta, Utah, also joined in a cooperative test of our methods and equipment. This final report describes the 1977/78 tests and summarizes the results of the entire project.

See also report dated July 76, PB272364. Sponsored in part by Federal Highway Administration, Olympia, WA. Washington Div.

LaChapelle, ER Bell, DB Johnson, JB Lindsay, RW Sackett, EM
Washington University, Seattle, Washington State Department of Transportation, Federal Highway Administration, (WSDH-Y-1637) Final Rpt. WSDOT-19.3, July 1978, 62 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294780/2ST

00 197418

ANALYSIS OF GROUND-LINER INTERACTION FOR TUNNELS

Reported herein are the results of a study of ground-liner interaction for tunnels. The main factors considered in this study were the material properties of the ground and liner, tunnel depth, interaction between two parallel tunnels, position of liner installation relative to the tunnel face, and the type of loading to which the liner is subjected. Both analytical and numerical solution techniques are used to investigate ground-liner interaction for various loading conditions and construction sequences. The relationship between ground and liner material properties and the distributions of liner forces, stresses, and displacement resulting from interaction is illustrated for a circular liner inserted in an in situ stressed ground mass. This is accomplished through the use of an analytical solution derived for tunnels located at great depth. To illustrate the influence of the ground surface boundary on liner behavior, the finite element method is used to analyze tunnels located at shallow depths. The finite method is used to simulate the actual advancement of a tunnel through the ground mass. The axisymmetric finite element analyses performed for this part of the investigation yielded information as to the longitudinal distribution of ground stresses and displacements and liner forces and displacements for tunnels in which the liner was installed right at the advancing face, a short distance behind the face, and far behind the face. The finite element method is also used to examine the ground-liner interaction resulting from what is called the localized gravity loading condition. The problem of two adjacent and parallel tunnels is also considered in the study and the influence of pillar width and construction sequence is examined. It is concluded that it is important that the method of analysis selected be applicable to the problem being considered and that the results obtained be properly interpreted.

Ranken, RE Ghaboussi, J Hendron, AJ, Jr
Illinois University, Urbana, Transportation Systems Center Final Rpt. UIIU-ENG-78-2021, UMTA-IL-06-0043-78-3, Oct. 1978, 444 p.

Contract DOT-OS-70024

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294818/0ST

00 197442

DEVELOPMENT OF DESIGN PROCEDURES FOR STABILIZED SOIL SUPPORT SYSTEMS FOR SOFT GROUND TUNNELING. VOLUME IV. CASE HISTORY STUDIES, WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY SYSTEM

The practice of injecting chemical grouts into permeable soils in order to stabilize them for tunnel construction is a common procedure in Great Britain, Europe, and Japan. It is only within the last five years that this technology has been used in the U.S., namely, in the work for the Washington Metropolitan Area Transit Authority (WMATA) subway construction. This report documents five WMATA case histories where chemical grouting was used; information is provided as to the soil conditions, method of treatment, reason for treatment, and tunnel perfor-

mance. The document is the fourth in a series directed towards the subject of use of chemical injection technology to stabilize sand soils for ground movement control during tunneling. The research program has been carried out over the last three years at Stanford University. Other available project reports are: Volume I: A Report on the Practice of Chemical Stabilization Around Soft-Ground Tunnels in England, France, and Germany (PB-272 771), and Volume II: Preliminary Results (PB-273 064). The chemical grouting was used as an economic alternative to conventional underpinning. Ground movement data show that the settlements in the grouted areas were generally small (less than 50mm) and that no cases of serious ground runs occurred. The best ground control was achieved where the soils in the upper half of the tunnel cross-section and above the crown were uniformly groutable, and good, general construction and support practices were used. Grouting of the soils around the tunnel was less effective at movement control in cases where soil layers in the crown area were ungroutable.

See also Volume 2, PB-273064.

Clough, GGW Baker, WH Mensah-Dwumah, F
Stanford University, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-78-9, Oct. 1978, 170 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295022/8ST

00 197445

EXPERIMENTAL VERIFICATION OF A PNEUMATIC TRANSPORT SYSTEM FOR THE RAPID EXCAVATION OF TUNNELS. PART I. INSTALLATION OF TEST FACILITY

This report deals with the selection of a test site, the design of a test installation, equipment selection, the installation and start-up of a pneumatic pipeline system for the transportation of tunnel muck. A review of prior pneumatic applications (Appendix A) provided knowledge on the state-of-the-art and a basic background for the design of the test equipment and development of a tentative test program. A suitable site was found four miles from the campus, and the site was prepared, equipment ordered, installed, and checked-out. The installation comprises a muck preparation unit, blower-feeder assembly, two telescoping pipes in series, 500 ft. of 10-inch diameter pipe with a vertical lift of 160 ft. on a 27 degree slope. The test unit is a full scale 100 ton per-hour pneumatic transport system in a configuration suitable for application in a tunnel and capable of being extended under load to simulate service requirements. The test system developed has the capability to transport 100 tons/per hour of rock through a 10 inch pipeline approximately 550 feet long with vertical lift of 160 feet.

See also report dated January 1978, PB-281103, and Part 2, PB-295032.

Martin, JW Faddick, RR
Colorado School of Mines, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-7815, Mar. 1976, 112 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295031/9ST

00 197446

EXPERIMENTAL VERIFICATION OF A PNEUMATIC TRANSPORT SYSTEM FOR THE RAPID EXCAVATION OF TUNNELS. PART II. TEST PROGRAM

This study is the final phase of a muck pipeline program begun in 1973. The objective of the study was to evaluate a pneumatic pipeline system for muck haulage from a tunnel excavated by a tunnel boring machine. The system was comprised of a muck preparation unit, solids feeder and air blower, telescoping pipes and 500 feet of 10-inch diameter pipe. The system transported up to 100tph of simulated tunnel muck with maximum sizes ranging from 1/2 inch to more than 3 inches. The system components were tested for reliability and flexibility, wear and maintenance requirements, capacity, noise and dust levels, effect of moisture content, extensibility, and power requirements. The system was found to be low in capital cost, easy to operate, and readily extensible. The pneumatic pipeline was power-intensive and susceptible to elbow wear. For the pneumatic transport of coarse muck, moisture content was more important than particle size. Noise levels were high at the blower and muck preparation unit but could be reduced in actual practice. The system was found to be reliable except for the elbow wear.

See also report dated January 1978, PB-281103, and Part 1, PB-295031.

Martin, JW Faddick, RR

Colorado School of Mines, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-78-50, Dec. 1978, 154 p.

Contract DOT-TSC-1144

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295032/7ST, DOTL NTIS

00 197460

A QUANTITATIVE METHOD FOR ANALYZING THE ALLOCATION OF RISKS IN TRANSPORTATION CONSTRUCTION

The report presents a conceptual model of risk that was developed to analyze the impact on owner's cost of alternate allocations of risk among owner and contractor in mass transit construction. A model and analysis procedure are developed, based on decision analysis but extending the standard methodology to include: (1) explicit consideration of risk as an incentive to perform, and (2) the interaction between two decision-makers (owner and contractor) trading risk for price.

Levitt, RE Ashley, DB Logcher, RD Dziekan, MW
Massachusetts Institute of Technology, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0100) Final Rpt. DOT-TSC-UMTA-79-14, Apr. 1979, 156 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295099/6ST, DOTL NTIS

01 053310

OPTIMUM ADAPTATION OF THE CONVENTIONAL TRACK TO FUTURE TRAFFIC. SYNTHESIS OF THE TESTS ON TRANSFER FUNCTIONS OF MAINTENANCE MACHINES

The report deals with the performance of track maintenance machines from the point of view of the track geometry. The characteristics of these machines which had been expressed in terms of theoretical transfer functions in Technical Document No. 29 were the subject of tests to determine the actual transfer functions. This report permits the comparison of the track maintenance machines tested. It compares the theoretical transfer functions with the actual ones. The theoretical aspects of the treatment of these test results were evolved in Technical Document No. 77. The performance of none of the machines meets the characteristics of the theoretical transfers, and it is therefore recommended in the conclusions that additional research be made.

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

International Union of Railways D 117/RP 10, Oct. 1978, 26 p., 130 Fig.

ACKNOWLEDGMENT: UIC

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DOTL RP

01 053318

SPECTRAL ANALYSIS OF TRACK GEOMETRY FOR ASSESSING THE PERFORMANCE OF MAINTENANCE MACHINES

This document deals with the spectral analysis of the track geometry. The theory adopted here has been taken as a basis for assessing the actual transfer functions of track maintenance machines from recorded data assembled over the period from autumn 1976 to summer 1977. For the test results reference should be made to report No. 10 of ORE Committee D 117. In Part I of the present document, a brief survey is also given of the recording coaches used and their respective measuring systems. The theoretical performance of maintenance machines, already discussed in DT 29, is supplemented here by some considerations concerning the impact of measuring errors on the final results. Finally, Parts II and III of the report deal with the Fast Fourier Transform in numerical data analysis and with the impact of a finite record length on spectral estimates.

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

Esveld, C (Netherlands Railways)

International Union of Railways DT 77/D 117, Mar. 1978, 66 p., 38 Fig., 3 Tab.

ACKNOWLEDGMENT: UIC

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DOTL RP

01 053324

UNIFICATION OF THE GEOMETRY OF POINTS AND CROSSINGS WITH RAILS OF 60 KG/M PERMITTING HIGH SPEEDS ON THE DIVERGING TRACK. CONCLUSIONS AND RECOMMENDATIONS

This report contains the conclusions and recommendations of the Specialists Committee, following tests carried out on the lines of the SNCF, DB, FS, DR, SNCB and CFF. It deals more specifically with the choice of switches and crossings, permitting speeds of 100, 130, 160 km/h and higher.

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

International Union of Railways Final Rpt. D 121/RP 4, Oct. 1978, 18 p., Figs., 2 Tab., 2 App.

ACKNOWLEDGMENT: UIC

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DOTL RP

01 183907

THE BALLAST STORY: 1--THE FUNDAMENTALS

In this first of three installments, the purposes of ballast are discussed; the causes and effects of fouled ballast are described; and the benefits of clean ballast are examined. A method for calculating on-ground ballast costs is included.

Burns, DR *Railway Track and Structures* Vol. 74 No. 10, Oct. 1978, pp 26-28, 1 Tab., 2 Phot.

ORDER FROM: ESL

DOTL JC

01 189003

TRACK-LAYING MACHINE, FIRST IN U.S., PUTS IN CONCRETE TIES

A central unit in system that incorporates 15 types of track machines, that includes 160 men and stretches for a distance of 1 one-half miles along track is described.

Railway Track and Structures Vol. 74 No. 9, Sept. 1978, pp 32-35

ACKNOWLEDGMENT: EI

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DOTL JC

01 189004

ROCK UNLOADS CROSSTIES FROM GONDOLAS USING NEW SYSTEM

Method developed and described uses rubber-tired tractor with slide mountings on car walls. Tractor unloader is moved forward on car tops by cable winding on winch permanently mounted in bucket on machine. End of cable can be anchored to coupler.

Railway Track and Structures Vol. 74 No. 7, July 1978, pp 32-34

ACKNOWLEDGMENT: EI

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DOTL JC

01 189005

NEW UNIT RECOVERS TRACK SCRAP USING MAGNETIZED DRUMS

A self-propelled machine designed to pick up released rail anchors, bolts, spikes and even tie plates in a continuous operation as it moves over the track under its own power has been developed. Known as the Scrapper, the machine uses permanently magnetized drums for picking up material released from rail-laying or tie-renewal operations and delivering it over an inclined belt conveyor to a hopper.

Railway Track and Structures Vol. 74 No. 7, July 1978, pp 28-29

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

01 189010

EFFECT OF IMPERFECTIONS ON VERTICAL TRACK BUCKLING

The paper deals with the effect of geometric imperfections on the post-buckling characteristics of railroad tracks. The analysis is restricted to the case of vertical track buckling due to constrained thermal expansion in which the track is assumed to lift itself up over a finite span. The imperfections are categorized into two cases: Case (A) in which the region of imperfection is larger than the span of lift off and Case (B) in which the imperfection region is smaller than the span of lift off. It is shown that while a perfectly straight track does not exhibit bifurcation points from the undeformed state, the imperfect track does and that the bifurcation temperature in Case (A) is lower than in Case (B) for the same ratio of imperfection amplitude to span. Increasing the imperfection amplitudes reduces the bifurcation temperatures significantly. The bifurcation temperature as well as the safe temperature increase are higher for heavier tracks.

El-Aini, YM (Soundstrand Aviation) *ASCE Journal of the Engineering Mechanics Division* Vol. 104 No. 6, Dec. 1978, p 1327, 10 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

01 189012

THE K 355 PT MOBILE FLASH-BUTT WELDING APPARATUS IN USE ON AUSTRIAN FEDERAL RAILWAYS [Die fahrbare Abbrennstumpfschweissmaschine K 355 PT im Einsatz bei den Oesterreichischen Bundesbahnen]

Description of the K 355 PT mobile flash-butt welding equipment approved by the University of Vienna's technical testing and research laboratory. The OBB's use of this machine has required development of new methods and other equipment. The machine's performance shows that it can be profitably used in the future in the construction of welded track. [German]

Hannold, F *Eisenbahningenieur* Vol. 29 No. 9, Sept. 1978, pp 429-433, 10 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

01 189015

RAILS: THEORETICAL AND PRACTICAL CONSIDERATIONS CONCERNING STRESSES, MATERIALS USED, RAIL PROFILES, WELDING AND MAINTENANCE ON SITE AND IN WORKSHOPS [Die Eisenbahnschiene: Theoretische und praktische Hinweise zur Beanspruchung, Werkstoffbeschaffenheit, Profiwahl, Verschweissung und Behandlung in Gleis und Werkstatt] [German]

No Abstract.

Fastenrath, F
Ernst (Wilhelm) und Sohn KG DB: Dok 48 09, 1977, 437 p., 38 Tab., 281 Phot., 193 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Ernst (Wilhelm) und Sohn KG, Hohenzollerndamm 170, 1000 Berlin 31, West Germany

01 189019

RAILWAY BALLASTING MATERIALS [Sui pietrischi per massicciate ferroviarie]
No Abstract. [Italian]

Piepoli, G *Ingegneria Ferroviaria* Vol. 33 No. 6, June 1978, pp 567-580

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

01 189026

ADAPTING THE BALLAST BED FOR VERY HIGH SPEED

Calculation of dynamic wheel-load scatter as speed rises and combating level and line deterioration by alleviating ballast pressure build up using blanketing and adequate ballast depth to decrease stiffness. Assessment of heavier track panels to combat lift and buckling.

Eisenmann, J *Railway Engineer International* Vol. 7 No. 1, July 1978, pp 16-18, 8 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

01 189037

ON THE STABILITY OF LONG WELDED RAILS DURING REPLACEMENT OF SLEEPERS [Zur Stabilitaet des lueckenlosen Gleises beim Auswechseln von Schwellen]
No Abstract. [German]

Tschirkow, NS *Zeitschrift der OSShD* Vol. 21 No. 4, 1978, pp 13-17, 3 Fig., 3 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Warsaw, Poland

01 189042

RESTORING LOST LATERAL RESISTANCE TO THE TRACK
SNCF tests embrace consolidation, chemical injection and vibratory stabilisation when investigating restoration of stability subsequent to maintenance work. Establishes that mechanised procedure using DGS vibratory machine obviates post-maintenance speed restrictions.

Janin, G *Railway Engineer International* Vol. 7 No. 1, July 1978, pp 11-15, 5 Fig., 7 Tab., 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

01 189043

AUTOMATIC PRELIMINARY INSPECTION OF THE APPEARANCE OF RAIL SURFACE EDDY CURRENTS

Description of a new method for reliable detection of only those defects which are serious enough to cause rails to be rejected. The method adopted

is based on the use of eddy currents. The test apparatus used in 1977 when the method was developed is described together with the results obtained. The process currently being worked on should ultimately lead to the development of a large-scale welding complex.

Boehm, G *Rail International* Vol. 9 No. 10, Oct. 1978, pp 784-787, 8 Phot., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

01 189044

"GEISMAR" RELAYING METHODS

Comprehensive description of three methods for laying new track, replacing existing track or replacing complete turnouts. The first method involves laying pre-assembled panels after removal of existing track using hydraulic lifting trolleys; the second involves laying new track or repositioning existing track using portal gantries and the third involves laying or replacement of turnouts.

Carre, JF *Rail International* Vol. 9 No. 10, Oct. 1978, pp 776-783, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

01 189045

A NEW HIGHLY MECHANISED TECHNOLOGY FOR WORK SITES [Neue Arbeitstechnologie der hochmechanisierten Gleisbaustationen bei den SZD]

New techniques are required for track maintenance work on SZD lines with a high volume of traffic since interruptions in traffic can last from 4 to 6 hours and even 8 hours in some instances. It is essential to use highly-efficient track maintenance machines to reduce traffic stoppage times and increase productivity. The article describes the tasks handled by the different work sites and their locations, as well as the various types of semi-and fully automated machines used. [German]

Finitzkij, S *Zeitschrift der OSShD* Vol. 21 No. 3, 1978, pp 7-13, 3 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Warsaw, Poland

01 189046

INTERRUPTIONS IN TRAFFIC ARE NO LONGER NECESSARY ["Okno" ne trebuetsja]

The Institute of Transport Engineers at Rostov and the Track Maintenance Department conducted theoretical and practical studies to determine the possibility of eliminating internal stresses on jointless track without interruptions in traffic. The study of the lateral stability of long rail with ZB fastenings showed that a lateral rigidity of 500-730 kgf/mm was required for 15 km/h speeds. A clamp strap was placed directly under rail-bearing plates to obtain this rigidity. [Russian]

Eradze, DG Ajvazjan, GS *Put'i Putevoye Khozyaistvo* No. 7, 1978, 10 p., 1 Fig., 2 Tab., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: USSR Ministry of Railways, Novo-Basmanaya Ulitsa 2, Moscow B-174, USSR

01 189047

DURABILITY OF SLEEPERS [Procnost' spal]

The Laboratory for Cross Ties of the Kharkov Transport Engineering Academy carried out studies in 1975-1976 to ascertain the condition of sleepers which have had to sustain a 100-million freight tonnage over a period of 8 to 12 years. These studies have determined the volume of cross tie defects, the resistance of the concrete to cracks and frost as well as the degree of corrosion. The results are given in table form. [Russian]

Starosel'skij, AA *Put'i Putevoye Khozyaistvo* No. 7, 1978, 15 p., 2 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: USSR Ministry of Railways, Novo-Basmanaya Ulitsa 2, Moscow B-174, USSR

01 189066

THE BALLAST STORY: III--JUSTIFYING THE ALTERNATIVES

This third installment discusses two ways of justifying alternatives for correcting the problem of fouled ballast and illustrates their application. The justification is based on reclaiming ballast or on reducing track maintenance expense.

Burns, DR *Railway Track and Structures* Vol. 75 No. 1, Jan. 1979, pp 28-29, 1 Fig., 3 Tab.

ORDER FROM: ESL

DOTL JC

01 189758

PROBLEM OF BALLAST STABILISATION: JOINT OBB-SNCF TESTS [Le probleme de la stabilisation du ballast: essais communs OBB-SNCF.]

Description and results of tests carried out by the OBB and the SNCF on the artificial stabilisation of ballast by mechanical tamping, and influence of vibrations on adjacent track. [French]

Klotzinger, E Fortin, JP *Revue Generale des Chemins de Fer* Oct. 1978, pp 680-689, 6 Tab., 10 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

01 189761

EFFECT OF TRACK DEFECTS ON THE SUPERSTRUCTURE. DEVELOPMENT OF SUPERSTRUCTURE COMPONENTS [Einfluss der Gleisfehler auf die Oberbauelemente. Entwicklung der Oberbauelemente]

It is always necessary to increase the quality of track because of higher speeds and greater axle-loads. As well as adapting rail profiles, creating a suitable system as regards the design of ties and fastenings and increasing rail welding, particular attention should also be paid to modernizing infrastructure and use of machines for maintenance of superstructure. For a high degree of comfort at high speeds track needs to be good quality and have a long service life. [German]

Proell, F *Eisenbahntechnik* Vol. 13 No. 1, 1978, pp 3-6, 2 Tab., 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Bohmann Verlag, Canovagasse 5, A-1010 Vienna, Austria

01 189786

DR TRACK RECORDING COACH FOR MEASUREMENT AND EVALUATION OF THE GEOMETRIC CONDITION OF THE TRACK [Oberbaumesswagen der DR zur Messung und Bewertung des geometrischen Gleiszustands]

No Abstract. [German]

Steinert, J *Zeitschrift der OSShD* Vol. 21 No. 5, 1978, p 1, 4 Phot., 9 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Warsaw, Poland

01 190293

DEVELOPING MAINTENANCE MACHINERY FOR HIGH-SPEED TRACK

Restoration of faultless track geometry is the purpose of track maintenance work. Modern maintenance machines measure track geometry by measuring systems and change track position by lifting and slewing. The improved geometry is fixed by tamping. The usual way of operation is the automatic mode. Fully automatic lining and leveling methods use chord systems which are moved along the track and find a smoothed curvature within the length of the system. High speed track requires excellent geometry and sufficient strength. Research and development to meet the requirements are described.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Riessberger, K
Swets and Zeitlinger 1978, pp 459-463

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

01 190318

CONCRETE TIES IN JNR

Thirty years have passed since the JNR began to use concrete cross-ties. They now represent 30% of all ties used by JNR. Recently the number of concrete ties produced is down from former production levels. But demand for them has increased because they do reduce track maintenance requirements when they are used. This article reviews in detail the history of concrete tie development and use, explaining the technical work which had to be accomplished in their design and initial production.

Watanabe, K (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 3, 1978, pp 17-18, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: Japanese Railway Engineering

ORDER FROM: Japan Railway Engineers' Association, 2-5-18 Otemachi, Chiyoda-ku, Tokyo, Japan

DOTL JC

01 190331

EFFICIENCY OF METHODS TO PREVENT BALLAST FROM BEING UNDERMINED BY THE PRESENCE OF OTHER MATERIALS [Skuteczność zabezpieczenia podsypki tłuczwiowej przed zanieczyszczeniem]

Observations and experience of the PKP over several years in connection with efforts to overcome the problem of other extraneous materials in ballast. [Polish]

Zielinski, S *Drogi Kolejowe* No. 6, June 1978, pp 165-169, 3 Fig., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Drogi Kolejowe, Warsaw, Poland

01 190346

TESTS ON EXPANSION OF LONG WELDED RAILS [Badania rozprezania torow bezстыkowych]

Description and characteristics of research carried out by the Gdansk Technical University into the phenomenon of expansion on long welded rails on experimental track at the PKP. [Polish]

Brzozowski, A Koc, W *Drogi Kolejowe* No. 6, June 1978, pp 176-182, 8 Fig., 2 Tab., 1 Phot., 9 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Drogi Kolejowe, Warsaw, Poland

01 191266

AN OPTICAL TRACK GAGE MEASURING DEVICE

The invention is a system for measuring the gage of railroad tracks and includes a pair of sensor probes mounted a fixed distance apart on a wheeled vehicle traveling along two rails and each located in positions horizontally adjacent to one of the rails. Each of the probes retains spaced apart first and second collimated light sources that direct first and second light beams at incident angles against the inner surface of the adjacent rail head at points five-eighths of an inch from the top surface thereof. After reflection from the rail head the first and second beams produce images in an optical receiver also retained by the probe. A detector produces an output dependent upon the spacing between the first and second beam image centers which is in turn dependent upon the distance between the probe and the adjacent rail head. Thus, the measured distances provided by the two probes in addition to the fixed spacing therebetween establishes rail gage in a plane five-eighths of an inch below the top surfaces of the rails.

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Poirier, PJ

Department of Transportation PAT-APPL-962 239, No Date, 13 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-289166/1ST

01 191483

AUTOMATIC BASE GATE POSITIONING CIRCUIT

An automatic base gate positioning circuit for use in rail flaw detection is disclosed, which includes the generation of a string of uniformly spaced pulses corresponding to known rail depth, correlating said pulses with sonic echoes, averaging and storing the correlated signals, and developing a signal representing the rail depth for comparison with an echo from the rail base.

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of

Patents, Washington, D.C. 20231 \$0.50.

Rudis, RP Cecon, HL

Department of Transportation PAT-APPL-903-518, No Date, 12 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-290792/1ST

01 192246

AN EVALUATION OF PERFORMANCE REQUIREMENTS FOR CROSS TIES AND FASTENERS

This report was prepared as part of the Improved Track Structures Research Program managed by the Transportation Systems Center. This program is sponsored by the Office of Rail Safety Research, Improved Track Structures Research Division, of the Federal Railroad Administration. The report evaluates the technical basis for current tie and fastener specifications. Particular emphasis was placed on correlating track load data and service failure modes with tie/fastener strength requirements. This required a detailed review of the failure history and laboratory tests for the early, intermediate and new concrete tie designs used in several North American test installations. Limitations of current specifications are identified and specific modifications are recommended. A brief review of the development and performance of reconstituted timber ties and steel ties is also included.

Prepared in cooperation with Bechtel, Inc., San Francisco, CA. See also PB-279 316.

Prause, RH Kennedy, JC Arnlund, RC

Battelle Columbus Laboratories, Bechtel Corporation, Transportation Systems Center, Federal Railroad Administration Inrm Rpt. FRA-/ORD-78/37, Dec. 1978, 125 p.

Contract DOT-TSC-1044

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-294431/2ST, DOTL NTIS

01 193745

NETHERLANDS RAILWAYS APPROACH TO PERMANENT WAY MATTERS

The 1760-mile Netherlands Railways system is marked by operation of frequent passenger trains and relatively few freights. Track maintenance practices and the track structures are described. The Railways contracts its rail renewal programs with substantial welded rail installations being made. Considerable detail on track maintenance equipment is also given.

Bonham-Carter, R *Permanent Way Institution, Journal & Rpt of Proc* Vol. 96 Part 3, 1978, pp 150-165, 7 Fig., 1 Tab.

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DOTL JC

01 193748

NW SHAPES TRACK PRACTICES FOR HEAVY TONNAGE, MUCH CURVATURE

The detrimental effects on rail and other track components produced by unit train operations with 100-ton cars and six-axle locomotives are compounded on Norfolk and Western by heavy grades and curves. Wide gauge is countered with large tie plates, more spikes and reduced superelevation. Rail wear is lessened with rail lubricators and hardened rail on curves. Ballast requires frequent cleaning and high quality ballast is essential. Welded rail is used extensively and successfully. Track geometry and ultrasonic cars have major roles in producing data for track maintenance planning.

Durham, LA, Jr (American Railway Engineering Association) *Railway Track and Structures* Vol. 75 No. 3, Mar. 1979, p 38, 1 Phot.

ORDER FROM: ESL

DOTL JC

01 193753

A HEAVY HAUL EVOLUTION

Bessemer and Lake Erie, which had the first large fleet of 90-ton cars in the 1930s, has always emphasized track structures and track maintenance. While other heavy-haul railways exceed B&LE traffic density today, the road continues to pay close attention to its fixed plant. It has continuous welded rail, glued insulated joints, and regular maintenance programs for ballast, bridges and culverts.

Rougas, M (Bessemer and Lake Erie Railroad) *Progressive Railroadng* Vol. 22 No. 3, Mar. 1979, pp 45-48, 7 Phot.

ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

01 194494

RAILWAY TRACK FOUNDATIONS [Les couches d'assise de la voie ferree]

For the construction of new lines, the SNCF has established rules for laying track foundations with appropriate characteristics and sufficient thickness. These rules take account of present knowledge on soil mechanics in the surface layers under moving loads, and also of "rule-of-thumb" and theoretical considerations and experience gained in motorway construction, particularly as regards classification of track foundations. After an analysis of general principles and typical track bed structures, a study is made of protection against freezing and maintenance of existing track beds. [French]

Sauvage, R Richez, G *Revue Generale des Chemins de Fer* Vol. 97 Dec. 1978, pp 773-796, 1 Tab., 21 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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01 194496

M/W POLICY: CHARTING THE DIRECTION KEEPING ON COURSE

This article contains several detailed interviews with representatives from Burlington Northern, the longest American railroad system with 24,653 miles of line. These senior managers state their policy on track maintenance, on problems they have encountered and solutions adopted.

Railway Track and Structures Vol. 74 No. 11, Nov. 1978, p 22, 9 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

01 194497

INTERIM REPORT ON FAST PERFORMANCE EVALUATION: WOOD-TIE AND CONCRETE-TIE TRACK AT 150 MGT

The article reports on the results of experiments on the performance of track under an accumulated tonnage of 150 MGT. These tests are conducted on the FAST (Facility for Accelerated Service Testing) test circuit at Pueblo, Colorado, in the United States.

Kish, AE Dean, FE *Railway Track and Structures* Vol. 74 No. 11, Nov. 1978, pp 34-36, 4 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

01 194509

HIGH SPEED TRACK ON BR WESTERN REGION

The work done to adapt the London-Bristol line for high speeds of 125 m.p.h (200 km/h) is described in this article.

See also Part 1, RRIS 01 179132; Bulletin 7802.

Collins, RJ *Railway Engineer International* Vol. 4 No. 1, Jan. 1979, p 27, 3 Fig., 3 Tab., Refs.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

01 194628

SOME TRACK PROBLEMS ASSOCIATED WITH PROJECTED CONVENTIONAL HIGH SPEED NORTH AMERICAN LOCOMOTIVES

In looking to operation of 125-mph passenger trains in North America, the author examines British Railways practices in operating at these speeds. It is concluded that with dynamic rail forces already on the threshold of severe track deterioration from conventional passenger locomotives, higher speeds should not be permitted. Welded rail, new ballast sections and concrete ties will be required for high speed trains; track must be maintained to current 90 mph standards and not allowed to deteriorate. New track standards based on dynamic tolerances must be established. Winter conditions and heavy freight traffic in Canada will make it difficult to maintain Canadian track to British standards.

Sweeney, RAP (Canadian National Railways) *AREA Bulletin* Proceeding
Vol. 80 No. 669, Sept. 1978, pp 1-15, 1 Fig., 5 Tab., 7 Ref.

ACKNOWLEDGMENT: AREA
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01 194632

AUTOMATIC CONTROL OF ULTRASONIC RAIL-INSPECTION TRANSDUCERS

In a recent program at Battelle, supported by the Transportation Systems Center and the Federal Railroad Administration, technology was developed for automatically controlling the lateral position of the ultrasonic transducers used in rail-flaw inspection equipment. Several concepts were evaluated, two of which are described in this paper. One of these was a "trial and error" control technique in which an automatic control system would move the transducer a small amount, determine if the change in positions produces an increase or decrease in the signal level, and then move the transducers in the direction that increases the signal level from the ultrasonic transducer. The second concept evaluated was one where two additional receiver-only transducers are added on each side of an existing transducer. This measures an ultrasonic signal that has been transmitted through the web of the rail. The difference in signal levels at these receiver transducers is a continuous indication of the lateral position error of the transducers and is used as the control signal in a feedback control system to position the transducer laterally over the rail. Evaluation of the concepts consisted of experimental measurements and calculations to determine the desired transducers configuration and other system parameters. The continuous type system was selected as being better for the application and several systems were constructed and are currently operating on both government-and rail-road-owned vehicles. The preferred concept can be adapted, with minimal design modification, to most rail-inspection systems in use today.

Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference held April 12-14, 1979, Colorado Springs, Colorado.

Kaiser, WD (Battelle Columbus Laboratories)
Institute of Electrical and Electronics Engineers Tech Paper IEEE
79CH1454-8 IA, 1979, pp 30-36, 13 Fig.

ACKNOWLEDGMENT: IEEE
ORDER FROM: IEEE

DOTL RP

01 194637

MODERN CONCRETE CROSSTIE PRACTICE IN FRANCE AND MEXICO

(1) Considered briefly is the history of concrete crosstie development in France. Failure of some crossties in 1973 led to a determination of the failure modes and a rigorous analysis of the service load limits to be taken into account. New crosstie designs evolved from this investigation. Technical specifications and acceptance tests for crossties fabricated according to the new design criteria are described. New-concept crossties under current assessment are also described. (2) The reasons for the adoption of the concrete crosstie by Ferrocarriles Nacionales de Mexico (National Railways of Mexico) are presented. Details of manufacture and testing of these crossties are described. Specifications for concrete crossties are presented. Consideration is given to the performance of crossties and fasteners under service conditions. Some causes of crosstie failure are identified.

Original reports extracted from La Revue Generale des Chemins de Fer, February 1976 issue and translated by W.B. O'Sullivan and J.L. Harmsen.

Prud'homme, A Eriean, J Tena Bernal, M Tellez Gutierrez, R
Federal Railroad Administration FRA/ORD-79/02, Mar. 1979, 82 p.,
Figs., Tabs.

ACKNOWLEDGMENT: FRA
ORDER FROM: NTIS

PB-295715/AS, DOTL NTIS, DOTL RP

01 194648

INFLUENCE OF THE FORM OF GROUND PLAN ON THE EFFECT OF LOAD DISTRIBUTION OF THE SLEEPER

The stress distribution below three different forms of sleepers was calculated by means of the finite-element method. In the model of thought necessary for this consideration the ballast bed is replaced by a modifiable half-space. The results are described and evaluated. [German]

Klugar, K *DET Eisenbahntechnik* Vol. 26 No. 12, Dec. 1978, pp 507-510

ACKNOWLEDGMENT: British Railways

ORDER FROM: VEB Verlag Technik, Oranienburgerstrasse 13-14, 102 Berlin, East Germany

01 194650

NEW TRACK RECORDING METHODS. 1.2.

The first part of the paper presents a new track recording method for determining the position of the track under static load. Special features of this method are a very high accuracy (up to 1/10 mm) and the possibility to record the geometrical state of the track over longer sections up to several kilometres, rendering possible the detection of extra long-wave deviations. In conjunction with the position recording procedure, the rail-profile in each section is also recorded. The demands on the recording method are summarised, and details are given of the mathematical relations used to describe the track position. This is followed by a description of the recording procedure and its most essential components. Some results of the initial trials are given as examples. Part 1 concludes with an outlook on the future development trends. The second part describes a method for determining the dynamic track parameters, i.e. masses, stiffnesses and dampings. Starting with a detailed definition of the requirements, the recording concept is outlined, which is essentially based on the methods of experimental structure identification. Using a schematic, it is shown how the dynamic track parameters can be calculated from the measured results. A description of the experimental setup provided for tryout of the new method is followed by a report on the tests performed and the results obtained. [German]

See also Volume 102 No. 12 pages 367-374, December 1978 issue.

Budde, U Michels, W *Glaser's Annalen ZEV* Vol. 102 No. 11, Nov. 1978, pp 343-348

ACKNOWLEDGMENT: British Railways
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01 194652

DEVELOPMENT OF FATIGUE CRITERIA: APPLICATIONS IN THE CASE OF RAILS

A criterion for the use of steels gives, for a given type of steel and a particular rail, the maximum stresses that the metal will withstand without fatigue cracks appearing. The authors describe a physical model and a calculation method with which such a criterion may be obtained. Their article refers closely to the work of the ORE C 53 Specialists Committee. They give several examples of the plotting of stresses at different depths in a U 50 rail created by a wheel of a given weight under a given load. [French]

Dang-Van Gence, P *Revue Generale des Chemins de Fer* Vol. 97 Dec. 1978, pp 797-810

ACKNOWLEDGMENT: British Railways
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01 194674

TRACK SUPERSTRUCTURE IN TUNNELS [Eisenbahnoberbau im Tunnel]

After recalling that line electrification means that greater clearance is needed in tunnels, the author shows that to achieve this it may be better to use ballastless track rather than conventional track. He examines the characteristics of different types of ballastless track and the way they are laid. [German]

Kuchlbauer, S *Eisenbahningenieur* Vol. 29 No. 11, Nov. 1978, pp 512-520, 15 Phot., 9 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

01 195063

RAILROADING FOR PROFIT, PART II: THE TRACK

Good track is a major feature of successful railroads. A roundup of five chief engineers' opinions on a series of questions about track standards, track components, track maintenance, government regulations and research is the basis for this article. Statistics on track maintenance costs, roadway and structures capitalization, tie and rail installations, and employment for the industry are also given.

Welty, G *Railway Age* Vol. 180 No. 8, Apr. 1979, pp 38-43

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01 195067

TRACK FACTORY

Renewal of track on high-density, electrified main lines carrying both frequent freight and high-speed passenger trains is performed by German Federal Railway using a track relaying train. Planning, track design and work rules are all important along with the high-production equipment. Ballast cleaning and dynamic track stabilization are also functions of the renewal process.

Progressive Railroading Vol. 22 No. 5, May 1979, pp 74-76, 5 Phot.

ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

01 195093

DEFECTIVE RAIL: COST EFFECTIVENESS OF DETECTION, CONTROL

The specific scope of this report is to develop the overall methodology necessary to describe the defect growth, inspection, rail failure, and to a lesser extent derailment processes, to conduct a preliminary analysis with available data, and to outline a program to collect the data necessary to complete the analysis.

Railway Track and Structures Vol. 74 No. 12, Dec. 1978, pp 26-27

ACKNOWLEDGMENT: British Railways

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01 195109

PRESSRESSED SLEEPERS FOR HIGH-SPEED LINES CARRYING DENSE TRAFFIC VOLUMES [Podklad strunobetonowy przewidziany dla linii o duzym natezeniu ruchu i zwiakszonych predkosciach]

Description and characteristics of the new PSB-76 sleeper, and of the formulae used for vertical stress. Diagrams of infrastructure constraints. Reinforcement system and type of spring fasteners selected. Comparison between this sleeper and other types used by Railways in the Federal Republic of Germany, the United States and Japan. [Polish]

Dysko, A. *Drogi Kolejowe* Vol. I-25 No. 11-12, Nov. 1978, pp 315-321, 12 Fig., 1 Phot., 12 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Drogi Kolejowe, Warsaw, Poland

01 195110

PROTECTION AND REINFORCEMENT OF RAILWAY INFRASTRUCTURE USING INSULATING MATERIALS (SYNTHETIC FIBRE) [Ochrona i wzmocnienie podtorza kolejowego vlokminami]

Shortcomings in current methods used to combat infrastructure deformation. The potential application of synthetic fibers to provide a watertight layer between the ballast and earth or sand. Methods for use of this material and the results obtained under various conditions. [Polish]

Sikora, R. *Drogi Kolejowe* Vol. I-25 No. 11-12, Nov. 1978, pp 333-341, 17 Fig., 12 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Drogi Kolejowe, Warsaw, Poland

01 195130

TRACK LEVELLING AND STRAIGHTENING EQUIPMENT [Komplekt dlja pod"enki i rihovki zeleznodoroznogo puti]

No Abstract. [Russian]

Titjunik, NA Mocalov, VA *Transportnoye Stroitel'stvo* No. 2, 1979, pp 29-30, 3 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

01 195134

NEW STANDARD FOR RAILWAY BALLAST [Novyj GOST dlja ballastnogo sloja zeleznodoroznogo puti]

No Abstract. [Russian]

Varyzgin, ES *Transportnoye Stroitel'stvo* No. 2, 1979, pp 7-9, 2 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

01 195547

INDUSTRIAL ENGINEERING IN M/W: THESE RAILROAD IE'S CITE PROBLEMS, BUT SEE AN EXPANDING ROLE

Industrial engineering can contribute to solution of problems of productivity in track maintenance operations and with track maintenance equipment. Four engineers are interviewed on IE and point out special problems of production measurement in maintenance, citing also the availability of data which needs proper interpretation to be used properly.

Railway Track and Structures Vol. 75 No. 4, Apr. 1979, p 30

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01 195549

PLANNING COST-EFFECTIVE TIE RENEWAL

The author outlines a systematic procedure for determining crosstie requirements and for weighing various tie replacement options based on independent studies of tie life in curved and straight track under different traffic densities and of rate of deterioration of new ties.

Abbott, RA *Railway Track and Structures* Vol. 75 No. 4, Apr. 1979, p 44, 2 Fig., 3 Tab.

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01 195679

SOVIETS PREPARE TO REPLACE TRACK AT OVER 1000 M/H

Traffic density is so great on Soviet Railways' trunk lines that most track maintenance is now carried out on the basis of complete replacement. Some 40,000 track-km is relaid or undergoes medium maintenance each year. Practical relaying speeds of 600 m/h are achieved, with trains able to run at 60 km/h as soon as the line is reopened to traffic, but machines able to replace track at the rate of 1,200 to 1,500 m/h are currently under development. The work of building and stripping track panels, increasingly mechanised and automated, takes place under factory conditions where productivity can be maximised.

Isaev, KS *Railway Gazette International* Vol. 135 No. 5, May 1979, p 423, 3 Fig., 1 Tab., 4 Phot.

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01 195681

RAIL RECLAMATION PROVIDES PROFIT AND TRAINING

In salvaging 27 miles of continuous welded rail from an abandoned Lehigh Valley mainline, L.B. Foster Co. had to develop new methods. Rail was handled in 1,475 ft strings, being loaded into coupled gondola cars through a trailer-mounted threader.

Railway Track and Structures Vol. 75 No. 5, May 1979, p 45, 3 Phot.

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01 195688

PRESENT FEATURE OF TURNOUTS

To reduce maintenance requirements, JNR is using heavier rails in turnout and has designs based on concrete slabs and on wooden ties in ballastless trackbeds. Movable point frogs are used in high speed lines.

Kagami, M (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 4, 1979, pp 19-20, 4 Fig., 3 Phot.

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01 196105

COMPUTER AIDS CP MAINTENANCE

The Roadway Maintenance Management System (RMMS) is CP Rail's computer-based system for monitoring maintenance of way costs and productivity and for planning purposes. RMMS is an information storage and retrieval system that not only assures management control but also detects trends in track maintenance requirements and will eventually be the basis for track maintenance standards.

Progressive Railroading Vol. 22 No. 6, June 1979, pp 81-82, 1 Phot.
ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker
Drive, Chicago, Illinois, 60606

DOTL JC

01 196106
STRESSES AND DEFORMATIONS IN RAILWAY TRACK.
VOLUME III

Research carried out during the period May 1977-April 1978 on the behaviour of granular materials and footings used in railway track is reported. The work concentrated on three areas: the investigation of the effects of particle size and grading on the behaviour characteristics of eight ballasts, the determination the optimum spacing-to-breadth ratio for ties using three model footings in sand, and the examination of the theoretical effects on compacted ballast of increasing the axle loadings, using a 37 cm circular footing on sand. This work completes the current project investigating stresses and deformations in railway track. The use of broader gradings, which offers significant improvements in terms of resistance to settlement and increased strength, is recommended. Ballast materials tested are ranked in terms of relative service life and resistance to abrasion. The use of broader ties at the same spacing-to-breadth ratio, which offers a significant improvement in resistance to degradation of track geometry, is recommended. The current (20") spacing appears optimum for the 8" wood ties, given the practical constraints on closer spacing. On the basis of the results obtained from the model circular footing track, it is recommended that the wheel loading on compacted ballast should not be increased without first performing a skin lift to help prevent the development of centrebinding.

Sponsored by Transport Canada Research and Development Bulletin 7901. Sponsored by Transport Canada Research and Development Centre, Canadian National and Canadian Pacific.

Raymond, GP Roney, MD
Canadian Institute of Guided Ground Transport Final Rpt. CIGGT
Rpt. 78-16, Nov. 1978, 149 p., 97 Fig., 9 Tab., 38 Ref., 1 App.

Contract DOT-103620

ACKNOWLEDGMENT: CIGGT
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01 196107
BALLAST SELECTION AND GRADING: A SUMMARY REPORT
[Materiaux et granulometrie des ballasts: rapport recapitulatif]

A recommended procedure for ballast selection and a new grading specification for railway ballast are presented. These recommendations are based on experimental and field results developed over the period 1971-78. The ballast selection procedure offers an improved sequential screening process to eliminate undesirable materials, and permits the classification of surviving ballasts in terms of maximum speed and annual gross tonnage classes. Eleven CP and ten CN ballasts, which were tested during the experimental program, are classified using this system. A broader grading specification is recommended for use in track. This offers significant advantages, especially with top quality ballasts, in terms of resistance to plastic deformation (and thus to differential settlements of track) and superior strength (which improves lateral stability). A complete listing of the Tables of Contents for the annual reports of the project and an explanation of the non-standard ballast classification tests are included as appendices. [French]

Sponsored by Transport Canada Research and Development Centre, Canadian National and Canadian Pacific.

Raymond, GP Boon, CJ Lake, RW
Canadian Institute of Guided Ground Transport CIGGT Rpt. 79-4, Apr. 1979, 50 p.

Contract DOT-105324

ACKNOWLEDGMENT: CIGGT
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01 196356
SPOT-WORK PRACTICES--ORGANIZATION AND EQUIPMENT

A problem for maintenance of way departments is accomplishing minor track repairs at minimum cost with as much mechanization as possible. Available equipment and the practices of Burlington Northern, Soo Line, Rio Grande, Conrail and Missouri Pacific are described.

Railway Track and Structures Vol. 75 No. 6, June 1979, p 38, 10 Phot.

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01 196389
THE FORMS AND CHARACTERISTICS OF RAILHEAD CRACKS
[A vasuti sinekban vese alaku toressek megjelenesi formal]
No Abstract. [Hungarian]

Beres, L *Kozlekedestudomanyi Szemle* Vol. 28 No. 9, Sept. 1978, pp 392-397, 10 Phot., 7 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Lapkiado Vallalat, Lenin Korut 9-11, 1073 Budapest 7, Hungary

01 196396
NEW TECHNIQUE TO EXTEND SERVICE LIFE OF WOODEN SLEEPERS IN POLAND [Neues Verfahren zur Verlaengerung der Liegezeit von Holzschwellen in Polen]
No Abstract. [German]

Dudzinski, J Lawniczak, M *Die Holzschwelle* Vol. 74 No. 88, Feb. 1979, pp 24-34, 2 Tab., 7 Phot., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Studiengesellschaft fuer Holzschwellen-oberbau EZ, Waldstrasse 11, 5300 Bonn-Ippendorf, West Germany

01 196397
PERMANENT WAY TECHNOLOGY AND QUALITY OF TRANSPORT ON THE AUSTRIAN FEDERAL RAILWAYS [Fahrwegtechnik und Transportqualitaet der Oesterreichischen Bundesbahnen]

Increases in axle-weights and speeds of railway vehicles have required new forms of superstructure to be developed. Heavy, welded rails, concrete ties and new points and crossings guarantee traffic safety. Mechanised maintenance and superstructure renewal have improved the quality of the track. Line capacity is being increased by constructing new sections and improving line layout. [German]

Jaworski, R *ÖBB-Journal* No. 11, 1978, pp 3-6, 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Austrian Federal Railways, Elisabethstrasse 9, 1010 Vienna, Austria

01 196400
MAINTENANCE OF LONG WELDED RAIL [O remonte rel'sov besstykovogo puti]

The article describes the methods used on USSR Railways to discern and avoid transverse cracks and rail breakage. [Russian]

Linev, SA *Put'i Putevoye Khozyaistvo* No. 4, 1979, 18 p., 1 Fig., 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

01 196401
BASIC PRINCIPLES FOR LONG-TERM SUPERSTRUCTURE MAINTENANCE PLANNING [Grundsätze fuer eine langfristige Planung in der Oberbauerhaltung]

After reminding the reader of the need to know long-term track-installation maintenance requirements, the authors list the theories applied to ascertain requirements and plan work in order to achieve maximum economic viability.

Naue, KH Jakobi, F *Eisenbahningenieur* Vol. 30 No. 3, Mar. 1979, pp 79-89, 4 Phot., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

01 196450
MATHEMATICAL MODELS FOR TRACK STRUCTURES

Fifteen mathematical models are developed here to predict stresses and deflections due to vertical and lateral wheel loads in track structures for establishing design and maintenance procedures. The modelling approach utilizes a series of models to simulate various aspects of track structures.

Several models are developed for the same objective with simpler models for preliminary studies and more complex and versatile models for more comprehensive studies. The models are evaluated with regard to capabilities and agreements with published test data. Model predictions agree well with test data for cases in which test data are complete for purposes of model validation. Such is the case for models predicting rail stresses and deflections. Tie and ballast-subgrade models cannot be properly validated for lack of complete test data. No test data is available for validation of rail joint and fastener simulations and models incorporating track irregularities and non-linear response characteristics. Test data generated under a carefully controlled environment are required to validate the models. A limited parameter study is conducted with each of the models. The parameter investigations are meant to be illustrative rather than comprehensive. It is suggested that additional parameter investigation be undertaken with emphasis on track design parameters.

So, W Martin, GC Singh, B Chang, IC Chang, EH
Association of American Railroads Technical Center Res Rpt. AAR
R-262, Apr. 1977, 219 p., 53 Ref.

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

DOTL RP

01 196521

INDUCTION HEATING OF RAILWAY SWITCHES

A new 50 Hz method of inductive heating of railway switches to remove snow and ice has been worked out and is presented in this paper. The method consists in direct electric heating of the rails of a switch or a turnout. It has many technical advantages and is economically profitable. When removing snow from the turnouts by this method the electric energy consumption is by ca. 35% smaller than with the traditional resistance method. The production costs of the inductive heaters are smaller than those of resistance heaters, and their durability is practically infinite, thus reducing considerably the maintenance costs of this method of thawing.

Horoszko, E (Academy of Mining and Metallurgy, Poland) *Elektrowa-
erme International* Vol. 36 No. B6, Dec. 1978, p B328

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

01 196535

INVESTIGATION ON THE DURABILITY OF TEST RAIL PADS BY THE FIELD AND QUALITY TESTS

Tie pads for concrete cross ties and for concrete-slab track reduce track degradation and maintain resistivity to assure operation of the signal

circuits. These pads, once made of natural rubber are now made primarily of synthetic rubber, were examined in the course of developing new rail fasteners and new track structures. Results of several quality tests and of the degradation of these pads in long field service are given.

Sawada, T Watanabe, M *Railway Technical Research Inst, Quarterly
Reports* Vol. 20 No. 1, Mar. 1979, p 26, 10 Fig., 4 Tab.

ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji,
Tokyo, Japan

DOTL JC

01 196934

AUTOMATIC CALCULATION OF TRACK RE-ALIGNMENT

[Calcul automatique de la rectification du trace de la voie]

The operational research problem that can be solved by linear programming is discussed. The article explains the calculation method employed. It gives two applications of the method as examples: the Rhone right-bank line when it was electrified and the Alsace line (Strasbourg-Basle) in preparation for the TGV endurance trials at 280 km/hr. [French]

Sauvage, G Canionik, J-P Blanc, P *Revue Generale des Chemins de Fer*
Vol. 98 Feb. 1979, n.p.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

01 197277

UTILISATION OF STEELPLANT

SLAGS.SYMPOSIUM.WOLLONGONG, FEBRUARY,1979. PAPERS

Papers presented at the symposium reflect an increasing recognition of the role of steelplant slags in their various forms as acceptable alternative materials to naturally occurring rock for use in concrete, construction, highway and airport construction, bituminous pavements, manufacture of concrete masonry blocks, railroad ballast, sewerage filter medium, manufacture of cement, as an alumina source in the glassmaking industry and various other uses. Steel furnace slags are also being recycled to blast furnaces as a flux and source of manganese. Slag utilisation in this manner is contributing to the conservation of our natural resources and environment. /TRRL/

Australasian Institute of Mining and Metallurgy Monograph Feb. 1979,
138 p.

ACKNOWLEDGMENT: TRRL (IRRD-238097), Australian Road Research
Board

ORDER FROM: Australasian Institute of Mining and Metallurgy, Illawarra
Branch, 191 Royal Parade, Parkville, Victoria, Australia

02 053305

PERMISSIBLE MAXIMUM VALUES FOR THE Y AND Q FORCES AS WELL AS THE RATIO Y/Q. LIMIT VALUES FOR THE Y AND Q FORCES FROM THE POINT OF VIEW OF RAIL STRESSES

First a survey is given of the previous studies and of the possible criteria to be retained. The calculation methods used for determining the stresses in the rail are then described. The first results are presented graphically by giving, as a function of the Y and Q loads, the maximum tensile and shear stresses occurring in a UIC 60 rail for a load applied between two sleepers.

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

International Union of Railways C 138/RP 2, Oct. 1978, 26 p., 9 Fig.

ACKNOWLEDGMENT: UIC

ORDER FROM: UIC

DOTL RP

02 053315

ADHESION OF LOCOMOTIVES FROM THE POINT OF VIEW OF THEIR CONSTRUCTION AND OPERATION. SYNTHESIS REPORT: THE CURRENT STATE OF KNOWLEDGE ABOUT WHEEL-RAIL ADHESION

This is the final report. It describes the current state of knowledge about wheel-rail adhesion, referring to the work carried out by the Committee itself (RP 2-13) and to an extensive body of literature. Theoretical considerations as well as the results of many tests are described.

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

International Union of Railways B 44/RP 14, Apr. 1978, 62 p., 28 Fig.

ACKNOWLEDGMENT: UIC

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DOTL RP

02 053320

INTERACTION BETWEEN VEHICLES AND TRACK. LINEAR THEORY VALIDATION EXPERIMENT USING A BOGIE VEHICLE

An experiment is described in which the behaviour of a bogie vehicle with linear suspension parameters is compared with the mathematical model proposed by Committee C 116. Results are presented for two values of primary lateral suspension stiffness. Only the behaviour at the stability margin is compared with theory. Satisfactory agreement is found for the low stiffness case: with the high stiffness value it appears that a true instability was not obtained. This, and the question of subcritical response, require further study. However, useful confirmation of the C 116 mathematical model is demonstrated.

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

International Union of Railways C 116/RP 6, Oct. 1978, 37 p., 39 Fig., 6 Tab.

ACKNOWLEDGMENT: UIC

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DOTL RP

02 183782

DYNAMIC RESPONSE OF A SINGLE TRACK RAILWAY TRUSS BRIDGE

A lumped mass model of a railway truss bridge is developed. The model considers only the vertical degree of freedom of each truss joint. The vehicle system is idealized as a three degree of freedom model consisting of the carbody and wheel-axle sets. Dynamic interaction equations for the bridge-vehicle system are derived and solved using the numerical integration method. Impact factors for member forces and nodal deflections are generated under the action of a single or a series of three moving vehicles. Finally, a limited parametric study is performed to determine the influence of vehicle speed, vehicle suspension characteristics and sprung mass on impact factors. /Author/

This paper appeared in Transportation Research Record No. 665, Bridge Engineering, Volume 2. Proceeding of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Dhar, CL Chu, KH (Illinois Institute of Technology); Garg, VK (Association of American Railroads) *Transportation Research Record* No. 665, 1978, pp 73-80, 11 Fig., 1 Tab., 12 Ref., 1 App.

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02 186848

THE U.S. DOT/TSC TRAIN PERFORMANCE SIMULATOR

A Train Performance Simulator (TPS) is a computer program which simulates the operation of a train over a railway route. It may be used for a variety of purposes to determine the effects of some operational strategy or equipment change upon schedules and energy consumption. The general characteristics of a TPS are discussed, including requirements for route and train input data and fundamentals of the mathematical models available. The USDOT/TSC TPS is a relatively complex, but simple to use, example of a general-purpose TPS. Its features are described and the operating cycle of the program is examined. The mathematical model is discussed in detail. A wide variety of output data may be specified and many output options exist. Instructions for setting up the input data or running the TPS are not given, but samples of output are included.

Hazel, ME

Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-77/48, DOT-TSC-FRA-78-15, Sept. 1978, 48 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-287815/5ST

02 189018

A STUDY OF THE KINEMATICS OF THE RAIL CONTACTS OF A LOCOMOTIVE BOGIE WITH INDIVIDUAL DRIVE AXLES ON CURVED TRACK [Kinetostatyka współpracy wozka lokomotywy o indywidualnym napędzie zestawów kół z torem w łuku]
No Abstract. [Polish]

Kostro, J Piotrowski, J *Pojazdy Szynowe* No. 1, 1978, pp 26-35, 1 Tab., 15 Phot., 20 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Pojazdy Szynowe, Warsaw, Poland

02 189062

VALIDATION OF TRAIN OPERATIONS SIMULATOR COMPUTER PROGRAM

The Train Operations Simulator (T.O.S.) computer model was developed to simulate the performance of a train composed of diesel-electric locomotives and freight cars. The calculated performance parameters include speed and distance as a function of time, longitudinal coupler forces and L/V ratios. This report presents the validation of the T.O.S. through comparison with test data obtained from the Southern Pacific Steel Coil Train test. Simulations of normal train handling and split service power braking to a full stop are presented.

Low, EM Garg, VK

Association of American Railroads Technical Center AAR Rpt. R-335, Nov. 1978, 35 p., 24 Fig., 3 Ref.

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

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02 189063

RAIL OVERTURNING GAUGE WIDENING FIELD TEST

In order to investigate the rail rollover phenomenon, a series of in-track tests were performed in Chicago, Illinois. During these tests, a single rail in the track structure was subjected to combinations of lateral, vertical, and longitudinal loading. The deflection of the rail was carefully monitored. The tests indicated that even under the most severe load combinations, the rail never did overturn although significant widening of the gauge was recorded. Additionally, the effect of the longitudinal loads in combination with the vertical and lateral loads was quite dramatic indicating the significance of this load component.

Heron, D Flassig, A

Association of American Railroads Technical Center AAR Rpt. R-323, Nov. 1978, 18 p., 11 Fig., 1 App.

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

DOTL RP

02 189755

RELATION BETWEEN THE ADHESION OF ELECTRIC LOCOMOTIVES AND THE COEFFICIENT OF FRICTION AT THE RAIL [Zavisimost' scepnenija elektrovozov ot koeficienta trenija na poverhnosti rel'sov]
No Abstract. [Russian]

Cerepasenec, RG *Vestnik VNIIT* No. 6, 1978, pp 19-22, 2 Fig., 2 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

02 189800

SUSPENSION DYNAMICS--VOLUME 2-TRUCK SUSPENSION

This study is a further extension of the Harmonic Roll Series case studies reported on by Track Train Dynamics, Phase I, in Volumes I to IV (R-172, R-173, R-174, and R-184). It is the second part of an extensive parametric study conducted during Track Train Dynamics, Phase II. The first part was reported as Volume I Suspension Dynamics (R-224). The purpose is to aid car and truck designers by showing the effects on roll and bounce performance of changes in various parameters of the car truck system. Computer simulation for a complex parameter study provides an efficient and safe method for identifying performance trends.

Love, RB Hussain, SMA
Association of American Railroads Technical Center Tech Rpt. AAR Rpt R-350, Dec. 1978, 163 p., 15 Fig., 5 App.

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

DOTL RP

02 189801

DRAFT GEAR/CUSHIONING UNIT OPTIMIZATION FOR TRAIN ACTION INTERIM REPORT

This interim report describes the work done to date under Task 5-Draft Gear/Cushioning Unit Optimization of the Track Train Dynamics program. Existing analysis tools for estimating train action forces were reviewed. Alternative approaches for analytical representation of currently used draft gears and cushioning units were considered. Based on this initial work, it was concluded that a test fixture car was required to obtain test data on force-velocity-displacement under train action conditions. A test arrangement was conceptualized, designed, and constructed. Concurrently, software was developed for reduction of test data. DTAM, a simulation model developed within the TTD program, will be used for optimization of draft gear/cushioning unit characteristics for train action using typical, severe, and extreme operating conditions which have been defined.

Track Train Dynamics Phase II-Task 5.

Morella, NA Punwani, SK Scott, MA Shum, KL
Association of American Railroads Technical Center Intrm Rpt. AAR Rpt R-308, Nov. 1978, 122 p., Figs., 3 App.

Contract DOT-FR-64228

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

DOTL RP

02 190282

DYNAMICAL ANALYSIS OF SUSPENSION SYSTEMS

Suspension systems with spatial kinematics are modeled by multibody systems consisting of rigid bodies, springs, dashpots and joints. The nonlinear and linearized equations of motion are found by a computerized method in symbolical representation. The dynamical analysis of the vehicle's riding comfort, riding safety and joint forces is presented. An example shows the application of the method.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the 5th Vehicle Systems Dynamics (VSD) Symposium and 2nd Int Union of Theoretical and Applied Mechanics (IUTAM) Symposium, Technical University of Vienna, Austria, September: 19-23, 1977.

Schiehlen, WO (Stuttgart University, West Germany)
Swets and Zeitlinger Proceeding 1978, pp 40-48, 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

02 190287

STUDIES OF THE DYNAMICS OF VEHICLES WITH CROSS-BRACED BOGIES

Cross-bracing is a method whereby the wheelsets of a bogie are directly connected in such a way that the yaw movement of one causes a yaw in the opposite sense of the second, while at the same time the wheelsets are laterally restrained one to the other. The effect of cross-bracing is examined and the implications of the different options upon the curving performance discussed. The most significant result of poor curving is wear of both wheels and rails, so that there is consequently a financial incentive to obtain a good performance from the bogies. It is shown that the technique improves the curving performance of bogies in terms of the geometric relationship between the wheelset and the track and more importantly reduces the wheel/rail forces. It is concluded that cross-bracing is a potentially valuable technique in that for a given performance in terms of top speed the curving performance of a bogie can be improved over that of a more conventional design.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Pollard, MC
Swets and Zeitlinger 1978, pp 518-526, 6 Ref.

ACKNOWLEDGMENT: EI
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02 190288

ANALYSIS OF THE LATERAL DYNAMICS OF A RAILWAY VEHICLE WITH SPECIAL REFERENCE TO BOGIE DESIGN

This study is intended to analyze the lateral dynamics including the hunting stability and the forced vibration of a bogie vehicle consisting of a 17-degrees-of-freedom system. The nonlinearities of the system are not taken into consideration to avoid the complexity of calculation. The equations of motion are derived from LaGrange's Equation, J. Kalker's creep theory is applied to evaluate the contact tangential forces and torques around the vertical axis acting between wheel and rail. For the analysis of the forced lateral vibration, sinusoidal misalignment of tracks is taken into consideration. Equations of motion are given in matrix form and numerical calculations are carried out by an electronic digital computer. The principal purpose of this study is to determine the optimum values of the design parameters such as the stiffnesses and the damping coefficients of each stage of suspension system (primary and secondary) of the bogie.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Matsui, N (Tokyo Car Corporation)
Swets and Zeitlinger 1978, pp 509-517, 2 Ref.

ACKNOWLEDGMENT: EI
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02 190289

ANALYSIS OF TIME DEPENDENT TRANSIENT PHENOMENA OF NONLINEAR COUPLED SWINGING SYSTEMS OF VARIABLE STRUCTURE AND CONDITIONAL CONNECTIONS

A train consists of spring-connected masses vibrating under the action of external forces variable with time. In adverse cases, very great forces arising in the draw gear may tear the train. This paper examines a train formed by cars with continuous draw bar. The train consists of a locomotive of mass $M_{sub 0}$ and of cars of masses $M_{sub i}$. Forces between cars are transferred by draw and buffer gears. Buffer and draw gear of the locomotive can be modeled by a spring of nonlinear characteristics, and with it a damper in parallel of nonlinear characteristics, directly connected with mass $M_{sub 0}$. Buffer gears of the cars are similar to those of the locomotive, but the draw gears are connected with mass $M_{sub i}$ via a continuous draw bar of mass $M_{sub i}$ and an undamped draw spring $K_{sub i}$. Force transfer between adjacent vehicles is achieved through conditional connections: the continuous draw bar cannot transmit compressive forces, and the buffer spring cannot transmit tension. Thus, the structure of the system varies with time, depending on the connections between the adjacent vehicles.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle

System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Horvath, K
Swets and Zeitlinger 1978, pp 490-499, 3 Ref.

ACKNOWLEDGMENT: EI
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02 190290

RAILWAY CONTACT FORCES: COHERENCE FUNCTIONS AND MODEL VERIFICATION

A mathematical model for the dynamical responses of railway vehicles to track roughness has to be verified by experiments. This paper discusses the use of coherence functions for verification. One example of the coherence function between a lateral rail input signal and the lateral motion of a bogie is given. It is shown that important conclusions about the possibility of using experimental signals for the verification of models can be drawn from their coherence function. A simple method for model verification is the comparison of the power spectral density functions of measured and calculated signals. The accuracy of this method is investigated and illustrated with an example.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Broersen, PMT (Alberta Research Council, Canada)
Swets and Zeitlinger 1978, pp 500-508, 5 Ref.

ACKNOWLEDGMENT: EI
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02 190291

RUNNING STABILITY AND RAILWAY VEHICLE TRANSFER FUNCTIONS, SOLVED BY THE METHOD OF STATISTICAL LINEARIZATION

This paper deals with the transfer function of the lateral vibration of a railway vehicle with two bogies, where the lateral displacement of the wheel-set across the rail is taken into consideration. For the forces acting between the wheel and the rail J. J. Kalker's relations were applied. Since the problem is nonlinear due to the geometric relations in the wheel-rail contact, the method of statistical linearization was used. This method is advisable for random excitation of the vehicle, when the excitation is given by lateral deviation of the rail. The results of the classically linearized system and conclusions were drawn as to the applicability of both methods.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September, 19-23, 1977.

Rus, L
Swets and Zeitlinger 1978, pp 481-489, 6 Ref.

ACKNOWLEDGMENT: EI
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02 190292

STABILITY AND FORCED VIBRATIONS OF A 4-AXLED RAILWAY VEHICLE WITH ELASTIC CAR BODY

The problem of lateral stability and critical speed on the one hand and, on the other, the problem of forced vehicle oscillations are two main problems of a railway vehicle moving on a straight track. Assuming a linear system, an answer to the question of stability is obtained from the solution of the homogeneous equations of motion, i.e. from the eigenvalues. The linearized differential equations of motion of a four-axled railway vehicle with an elastic body are automatically formulated and solved with the aid of a general multiple-body program. The bogie is optimized for high critical speeds. The stability and the behavior of the complete vehicle when subject to harmonic and stochastic excitation due to track irregularities are examined.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Gasch, R (Technical University of Berlin, West Germany); Hauschild, W Kik, W Knothe, K Steinborn, H Swets and Zeitlinger 1978, pp 464-480, 17 Ref.

ACKNOWLEDGMENT: EI
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02 190294

RAILWAY WHEELSET LATERAL EXCITATION BY TRACK IRREGULARITIES

The lateral excitation of a railway wheelset by plan view track irregularities has been investigated experimentally using an elastically suspended model coned wheelset running on rollers moved so as to simulate on-track velocity conditions. J.J. Kalker's force-creepage relationships are used in formulating linear equations of motion from which predictions of wheelset steady-state frequency response are obtained. The measured behavior is predicted very closely when careful control is exercised over the experiment such that the wheel-rail contact parameters are accurately known. This contrasts with attempts to obtain similar correlation from field experiments using full vehicles, which have not been so successful. The results of the present work suggest that this is likely to be a consequence of inaccurate estimation of the operative contact parameters, and/or linearization problems, rather than errors in the basic theoretical description of the wheelset excitation mechanism.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Illingworth, R
Swets and Zeitlinger 1978, pp 450-458, 9 Ref.

ACKNOWLEDGMENT: EI
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02 190295

LATERAL RAIL IRREGULARITIES--MEASUREMENT AND APPLICATION

Railway vehicles are excited to vibrations by various effects. One of these effects which presents an important source of excitation, are the lateral rail irregularities. High safety and comfort require small irregularities and a high quality suspension system. This quality depends on a lot of different vehicle data. To acquire these data, experiments and field tests are unsuitable. Computer simulation can yield results during the design period, provided that the simulation model is representative enough and that the rail irregularities are known. This paper presents a mathematical model for the simulation of lateral railway dynamics, caused by lateral rail irregularities. The chosen model represents a two-axled wagon running on rails which allow a lateral displacement. The rail irregularities are defined, the measurement is explained and the results are discussed. The ride behavior is then simulated and compared with the corresponding measurements.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Helms, H (Technical University of Braunschweig, West Germany); Strothmann, W Swets and Zeitlinger 1978, pp 430-449

ACKNOWLEDGMENT: EI
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02 190296

ASCERTAINMENT OF THE BEHAVIOUR OF A MOVING RAILWAY VEHICLE BY MEANS OF REDUCED PARAMETERS

The equations of motion of a railway vehicle can be tackled in an efficient way by introducing reduced (dimensionless) quantities (variables and parameters). This is shown for the case of a purely straight track and parasitic displacements which are so small that the system can be linearized. The coefficients of the various terms in the equations turn out to depend on a restricted number of reduced parameters. Further on, the reduction can be carried out in such a way that some of the parameters always are about equal to zero, some others always are about equal to unity, another set of

parameters remains anyhow in a restricted interval, whereas the remaining parameters (the reduced velocity and the reduced spring rigidities) in principle can change from zero to infinity. In view of the stability investigation, there was developed a computer program yielding root locus configurations by means of a plotter.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September, 19-23, 1977.

de Pater, AD (Delft University of Technology)
Swets and Zeitlinger 1978, pp 416-429, 3 Ref.

ACKNOWLEDGMENT: EI

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02 190297

NEW GUIDE SYSTEM FOR A WHEEL-RAIL VEHICLE

One of the main factors determining the upper limit of the conventional railway vehicle is the truck hunting that inevitably becomes unstable at high speed. Though cylindrical and/or independently-rotating wheels can remove this problem, the vehicle equipped with them needs some guide mechanisms. In this paper, the author discusses the fundamental characteristics concerning the stability of motion of the guided cylindrical-and-independently-rotating-wheel truck.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Koyanagi, S (Japanese National Railways)
Swets and Zeitlinger 1978, pp 407-415

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

02 190298

BEHAVIOUR OF TRACTIVE UNITS AT SKIDDING WITH DIFFERENT KINDS OF PROPULSION AS A DYNAMICAL AND A STATISTICAL PROBLEM

The present-day trend of all Railway authorities toward higher power to reduce travel times has made a well-known problem acute: that of slipping. In addition present changes in the technology of traction as well as operational requirements lend special importance to this question. Among the most significant of these innovations are: use of shunt and three-phase motors in the drive unit, development of newer mechanical transmission systems, which incorporate a hollow shaft, mounted elastically between the motor and the axle, and whose mass can no longer be neglected, higher dynamic wheel loading, wheel diameter made smaller for the purpose of reducing wheel-set mass which possesses also decreased friction, suspension of the axle in the bogie in all degrees of freedom, connection of up to 6 axles by a common Cardan shaft, tandem operation as well as operation from the other end of the train, so that the engine driver is not able to observe slipping in the remotely controlled engine and to take the required action. The author discusses the effects of these innovations on the problem of slipping.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Krettek, O

Swets and Zeitlinger 1978, pp 369-387, 6 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

02 190299

VARIATION OF CONTACT WHEEL-RAIL FORCES AFTER OVERREACHING CREEP-SLIP ADHESION BOUNDARY

The paper deals with the dynamical analysis of wheel-rail forces occurring in an individual axle-driving system of diesel locomotives under the conditions when the adhesion level is overtaken. The seven degree of freedom-system performs a model where a rigid car body, a bogie frame, primary and secondary suspensions, a resilient wheel and an axle-hung traction motor are considered. For this model the linearized characteristic

of the traction motor for the definite speed region and experimentally obtained nonlinear creep-slip characteristics are assumed. The resulting equations of motion were solved for a particular driving system by means of a numerical program on a digital computer. The main influence upon the magnitude of the wheel-rail forces after the transition of the creep-slip point, the slope of slip characteristics, the slope of electric motor characteristics, the value of damping coefficient and the ratio of moments of inertia of the traction motor rotor and the wheelset results. There exists a limiting value of critical damping of an axle-driving system which assures that the magnitudes of the developed wheel-rail forces are negligible and that no self-excited vibrations in the driving system can occur.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Zahradka, J

Swets and Zeitlinger 1978, pp 357-368, 4 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

02 190300

GENERAL QUASI-STATIC CURVING THEORY FOR RAILWAY VEHICLES

The problem of calculating the quasi-static forces developed when railway vehicles negotiate curved track has been studied by many different workers. However, although theories have been developed which are relevant to particular situations, no general theory has been available until the present time. Now, a new, nonlinear theory has been established by the authors of this paper which deals with the real geometry of the wheel/rail contact, as well as the saturation of the creep force/creepage relationship. A comprehensive series of tests has been carried out with different vehicles on various test sites, confirming that the new theory gives excellent agreement with the measured results for all the cases considered.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the Vehicle System Dynamics (VSD) Symposium, 5th, and Int Union of Theor and Applied Mech (IUTAM) Symposium, 2nd, Technical University of Vienna, Austria, September 19-23, 1977.

Elkins, JA Gostling, RJ

Swets and Zeitlinger 1978, pp 388-406, 12 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

02 190304

RAIL PASSENGER VEHICLE LATERAL DYNAMIC PERFORMANCE IMPROVEMENT THROUGH ACTIVE CONTROL

Operation of conventional rail vehicles is limited by a number of dynamic problems including ride quality, curve negotiation and hunting. Active control is investigated as a technique for improving rail vehicle performance at high speeds. An automatic controller of specified configuration and structure is defined based on the physics of the wheel-rail interaction dynamics which allow a decomposition of dynamic constraints into selected frequency bands and a methodology for selecting the controller parameters is presented. Two controller case studies are examined to demonstrate the effectiveness of controller configuration on rail vehicle performance in terms of ride quality and tracking errors on tangent track while allowing specified curve negotiation requirements to be met. Estimates of control power requirements are also obtained which show that the controller configurations considered produce improvements in vehicle performance--reductions of rms vehicle accelerations by a factor of between 5 and 6 reduction of rms tracking errors by a factor of between 4 and 5--with modest expenditures of control power--between between 1.5 and 2 kw per truck at a vehicle speed of 68.58 m/sec.

Paper presented at ASME Meeting, December 10-15, 1978.

Sinha, PK (Intermetrics, Incorporated); Wormley, DN Hedrick, JK
American Society of Mechanical Engineers Conf Paper ASME 78-WA/DSC-14, Dec. 1978, 16 p., 22 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

02 190333

A PARAMETRIC STUDY OF TRACK SUPPORT SYSTEM

The authors of the article describe a few uses of infinite continuous laminated structural supports (ICLSS) in some case studies and sensitivity analyses, which are intended to establish the effects of different parameters on the "static and dynamic-elastic response" of the system. The parameters studied are: rail size, sleeper size, sleeper spacing, wheel loading, the crib-ballast effect and ballast and subgrade support conditions on the deflections of the rail under the running wheel load.

Prasad, B Garg, VK *Rail International* Vol. 9 No. 11, Nov. 1978, pp 834-844, 6 Fig., 10 Tab., Refs.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

02 190336

AERODYNAMICS OF HIGH-SPEED TRAINS. STATE OF THE ART IN WHEEL/RAIL RESEARCH SUMMARISED [Die Aerodynamik schnellfahrender Zuege. Ein Ueberblick ueber den Stand der Erkenntnisse in der Rad/Schiene-Forschung]

No Abstract. [German]

Glueck, H *Die Bundesbahn* Vol. 54 No. 11, Nov. 1978, pp 863-870, 16 Phot., 17 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

02 190349

ON THE MECHANISM OF WHEEL/RAIL CONTACT [Ueber die Mechanik des Kontaktes zwischen Rad und Schiene]

No Abstract. [German]

Kalker, J *Glaser's Annalen ZEV* Vol. 102 No. 7-8, July 1978, pp 214-218, 9 Phot., 14 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

02 190357

INFLUENCE OF TRACK FORM AND TRAIN OPERATING LOAD ON TRACK-HEIGHT CHANGE

The main reason for the change in the height of the ballasted track under the train load is the altered seating of the ties on the ballast. The track transmits vertical forces which cause granular ballast movement and a sagging of the track. Depending on the condition of the line, the calculated mean ballast compression under a 20-tonne axle is between 0.10 and 0.14 N/sq mm. Taking account of all load-increasing influences, the maximum can be up to two to three times the mean value. For permanent-way practice, knowledge of the height-changing effect of various ballast compression values caused by different track and bed forms is of special importance. Laboratory tests have given factors which have an influence on the track-changing effect of various ballast compression forces. Use of these equivalents, which lie between the first and fourth power, show that for the light track form (S 54 rails, sleeper length 260 cm, sleeper spacing 65 cm), we can expect almost three times the height change which results with the present UIC 60-240-60 design, and the latter almost twice that of the UIC 60-B75-60 design. A cost comparison shows that the light construction, in spite of its lower first cost, is the least favorable form owing to its high maintenance costs. A law was developed to determine evaluation figures by means of which various train configurations can be assessed with respect to their track loading. With the application of the fourth-power law for ballast compression and height change, the load values for the selected passenger trains were in part less, and in part up to 67 per cent greater than for the locomotive-hauled Inter-City trains. The track loading produced by the extra-heavy ore-carrying freight train was up to 45 times that caused by the locomotive-hauled Inter-City train. [German]

Henn, W *Archiv fuer Eisenbahntechnik* No. 33, Nov. 1978, pp 51-64

ACKNOWLEDGMENT: British Railways
ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

02 190358

DIFFERENTIAL-GEOMETRIC DETERMINATION OF MOTION CHARACTERISTICS IN HIGH-SPEED CURVES

Correct geometric layout of railway routes for speeds between 120 and 200 km/h and speeds beyond 200 km/h calls for exact determination of the motion characteristics (speed, acceleration and "h" vectors, etc.). In high-speed train running there is a change in the significance of the individual vectors governing motion and in addition to speed and acceleration the higher-order kinematic characteristics ("h" vectors, etc.) become determinative for the rail-curve geometry. Employing the differential-geometric method, the author describes the determination of the higher-order vectors by way of vector analysis. This is a new and hitherto unused method for the geometric layout of high-speed rail routes. Bearing in mind the determination of the motion characteristics, it can be seen that using higher-order kinematic vectors as scalar quantities is a very coarse approximation. The need to employ the method described here is all the more apparent if one does not assume a constant speed, but takes into account the actual speed conditions. It can therefore be seen that the correct geometric layout of high-speed rail routes calls for the vectoral determination of the actual motion characteristics, as described in this article. [German]

Megyeri, J *Archiv fuer Eisenbahntechnik* No. 33, Nov. 1978, pp 65-67

ACKNOWLEDGMENT: British Railways

ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

02 190360

INVESTIGATING THE CURVE-RUNNING BEHAVIOUR OF HEAVY ORE-RAILWAY LOCOMOTIVES

The article compares the running gear of heavy diesel-electric ore-railway locomotives as investigated on the basis of Heumann's minimum method. The following parameters were varied: wheelset arrangement (C'C', B'B'B', B'B'B'B', D'D'), bogie wheel centres, wheelset load and distance between bogie pivots. Locomotives with and without bogie transverse coupling are compared. The necessary combinations for the traction power of the given trains are taken from those locomotives which proved best in the investigations into the various wheelset arrangements. Reference is also made to the great differences in the anticipated track loadings. [German]

Bucholz, KH *Archiv fuer Eisenbahntechnik* No. 33, Nov. 1978, pp 33-38

ACKNOWLEDGMENT: British Railways

ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

02 191066

FREIGHT CAR TRUCK DESIGN OPTIMIZATION. VOLUME VII. RESULTS REPORT FOR TEST SERIES 1

The field testing in Test Series 1, Phase I, of the Truck Design Optimization Project (TDOP) was conducted for the purpose of evaluating an existing 70-ton (63.6-mt) freight car truck. The truck was tested with many different configurations based upon various combinations of conditions: 4 track types, 2 gib, and 3 side bearing clearances, speed conditions varying from 10 to 79 mph (16 km/hr to 127 km/hr), and curvatures ranging from 1 degree to 9 degrees. The data from approximately 90 tests are contained on 35 magnetic tapes, and the results are plotted on several hundred graphs. While only a portion of the graphs is included in the Series 1 Results Report, the massive amount of data collected and processed during Phase I make it mandatory that the reader become familiar with both the scope of testing in Test Series 1, and the means by which locations within the test matrix of each section may be pinpointed.

For preceding Volumes, see RRIS 02 175504; Bulletin 7802.

Southern Pacific Transportation Company, Federal Railroad Administration Final Rpt. FRA/ORD-78/12. VII, TDOP-76-026, May 1978, 400 p.

Contract DOT-FR-40023

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291904/1ST, DOTL NTIS

02 191290

DYNAMIC ANALYSIS TO ESTABLISH NORMAL SHOCK AND VIBRATION ENVIRONMENTS EXPERIENCED BY RADIOACTIVE MATERIAL SHIPPING PACKAGES

The objective of this study, is to determine the extent to which the shocks and vibrations experienced by radioactive material shipping packages during normal transport conditions are influenced by, or are sensitive to, various structural parameters of the transport system (i.e. package, package supports, and vehicle). This will enable us to identify those parameters which significantly affect the normal shock and vibration environments in order to provide the basis for determining the forces transmitted to radioactive material packages. Determination of these forces will provide the input data necessary for a broad range of package-tiedown structural assessments. This is the second quarterly report on this work. The first quarterly report presented a work plan consisting of seven tasks. Progress on these tasks during this reporting period is discussed.

Fields, SR Mech, SJ

Hanford Engineering Development Laboratory, Nuclear Regulatory Commission Prog Rpt. HEDL/TME-78/41, NUREG-CR-0161, Nov. 1978, 25 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-290316/9ST

02 191335

FREIGHT CAR TRUCK DESIGN OPTIMIZATION. VOLUME VIII. RESULTS REPORT FOR TEST SERIES 2 AND 5

This results report contains information reduced from the Truck Design Optimization Project (TDOP) data tapes and organized into an appropriate graphical output. These results encompass data from Test Series 2 and data from the 70-ton (63.6-mt) mechanical refrigerator car used in Test Series 5. Test Series 5 also included data from a 100-ton (90.9-mt) boxcar on cylindrical profile wheels with spring variations and snubbing supplements. These results will be reported with other 100-ton (90.9-mt) boxcar data in Test Series 3 Results Report. In this report, results from Test Series 2 and 5 are compared with the base case results described in TDOP Results Report For Series 1 Tests. Testing was expanded in Series 5 to evaluate harmonic roll characteristics on a specially prepared track, and the results from these tests are used to establish a base case for harmonic roll characteristics.

See also Volume 1, PB-278698.

Southern Pacific Transportation Company, Federal Railroad Administration Final Rpt. FRA/ORD-78/12.VIII, TDOP-76-27, May 1978, 232 p.

Contract DOT-FR-40023

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-290663/4ST; DOTL NTIS

02 191481

DYNAMIC ANALYSIS TO ESTABLISH NORMAL SHOCK AND VIBRATION OF RADIOACTIVE MATERIAL SHIPPING PACKAGES

A calculation sequence was developed to simulate the behavior of the coupler subsystem for the cask-rail car and the lead car it impacts during humping operations. This coupler submodel was tested successfully, but additional development and better input data are required. The results must be compared to the actual performance of a coupler before the submodel can be considered an accurate simulation.

Fields, SR Mech, SJ

Hanford Engineering Development Laboratory, Nuclear Regulatory Commission Prog Rpt. HEDL-TME-78-74, NUREG-CR-0448, Dec. 1978, 35 p.

Contract NRC-60-78-354

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291027/1ST

02 191535

EXPERIMENTAL STUDIES OF DYNAMIC IMPACT RESPONSE WITH SCALE MODELS OF LEAD SHIELDED RADIOACTIVE MATERIAL SHIPPING CONTAINERS

Preliminary experimental studies of dynamic impact response of scale models of lead-shielded radioactive material shipping containers are pres-

ented. The objective of these studies is to provide DOE/ECT with a data base to allow the prediction of a rational margin of confidence in over-viewing and assessing the adequacy of the safety and environmental control provided by these shipping containers. Replica scale modeling techniques were employed to predict full scale response with 1/8, 1/4, and 1/2 scale models of shipping containers that are used in the shipment of spent nuclear fuel and high level wastes. Free fall impact experiments are described for scale models of plain cylindrical stainless steel shells, stainless steel shells filled with lead, and replica scale models of radioactive material shipping containers. Dynamic induced strain and acceleration measurements were obtained at several critical locations on the models. The models were dropped from various heights, attitudes to the impact surface, with and without impact limiters and at uniform temperatures between -40 and 175 deg C. In addition, thermal expansion and thermal gradient induced strains were measured at -40 and 175 deg C. The frequency content of the strain signals and the effect of different drop pad compositions and stiffness were examined. Appropriate scale modeling laws were developed and scaling techniques were substantiated for predicting full scale response by comparison of dynamic strain data for 1/8, 1/4, and 1/2 scale models with stainless steel shells and lead shielding. (ERA citation 04:008695)

Robinson, RA Hadden, JA Basham, SJ

Battelle Columbus Laboratories, Department of Energy Sept. 1978, 168 P.

Contract W-7405-ENG-92

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

BMI-2001

02 194508

INTERACTION OF VEHICLE AND TRACK

Much of the informal discussion at the recent Railway Engineer's Forum meeting centered upon limiting impact forces. This report tells of measures taken to reduce these forces and to minimize rail defects.

Botwright, K *Railway Engineer International* Vol. 4 No. 1, Jan. 1979, pp 34-37, 9 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

02 194630

ELECTRIC AND DIESEL LOCOMOTIVES IN OPERATION--A RAILWAY MAN'S EXPERIENCE

In the computer era, we too often lose sight of the physical properties of the components making up an electric locomotive. When we go from one component to another, for example from the tapchanger to the thyristor, the physiology of a locomotive is completely changed from both the electrical and the mechanical viewpoints. Not enough attention is given to the alteration undergone by a locomotive in its service life (for example, the wheel wear) and also because of operating decisions concerning the differences accepted in service between the diameters of the wheels on the same locomotive; and these decisions are not in fact independent of the electrical diagram of the locomotives. Also, the calculation of the loads which a locomotive will haul is not as obvious as the locomotive purchase contracts lead one to believe. All these questions are not the province of the constructor alone, but the combined manufacturer plus user, and the latter's influence is considerable. This paper shall therefore summarize what a user has observed during his career in the design and utilization of locomotives.

Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference held April 12-14, 1979, Colorado Springs, Colorado.

Nouvion, FF (Traction Export, France)

Institute of Electrical and Electronics Engineers Tech Paper IEEE 79CH1454-8 1A, 1979, pp 5-23, 14 Fig.

ACKNOWLEDGMENT: IEEE
ORDER FROM: IEEE

DOTL RP

02 194640

THE INVESTIGATION OF LOCOMOTIVE DYNAMICS VIA A LARGE DEGREE OF FREEDOM MODELING

An analytical model of a locomotive due to S. Levy is modified to accept random track input and used as the basis of a locomotive study with 63 degrees of freedom. This model differs from precursors in that it is faster,

it accepts nonlinear suspension components and wheel/rail interactions, it includes routines so that track irregularities may be incorporated by means of vertical and lateral PSD curves, it accounts for adhesion limits, checks derailment conditions, and provides time histories of generalized variables. With this code, a specific locomotive model, similar to the General Electric Company's U33-C locomotive, is evaluated to ascertain what changes in either the model or the track parameters will permit higher safe speeds. This parametric study addresses speeds in the range of 70 to 280 ft/sec. (21.34 to 85.34 m/sec), three classes of track, 4, 5, and 6, primary suspension stiffnesses from 18 to 300 klbs/ft. (.263 to 4.38 MN/m), wheel flange clearances from .05 to .75 inches (1.27 to 19.1 mm) and the effect of vertical and lateral rail stiffnesses in the ranges of .5 to 8 and .25 to 4 Mlbs/ft. (7.3 to 117 and 3.65 to 58.4 MN/m), respectively. The results generally agree well with current standards governing safe running speeds on various class tracks. They indicate that at speeds equal to accepted safe operating speeds on class 4, 5, and 6 tracks, the rms values of the vertical forces at the contact of the first wheel and rail do not increase beyond 25% of the nominal vertical load at this point. Under these same conditions, maximum wheel-rail separations, if they occur, are for each case less than the wheel flange height assumed one inch (25.4 mm); for class 6 track, no separations larger than the flange height occur even at 280 ft/sec. (85.34 m/sec.).

Contributed by the Rail Transportation Division for presentation at the Joint Railroad Conference April 25-26, 1979 of the ASME.

Patadia, S (General Electric Company); Craft, WJ (North Carolina Agricultural and Technical State U)
American Society of Mechanical Engineers Conf Paper 79-RT-1, Jan. 1979, 6 p., 13 Fig., 10 Ref.

ACKNOWLEDGMENT: ASME
ORDER FROM: ESL

DOTL RP

02 194647 INSTRUMENTED LOCOMOTIVE WHEELS FOR CONTINUOUS MEASUREMENTS OF VERTICAL AND LATERAL LOADS

A new method has been developed to continuously measure lateral and vertical forces between a locomotive wheel and rail. The technique utilizes strain gages applied to a typical locomotive wheel plate to generate sinusoidal waveforms which are electronically combined to provide continuous signals proportional to the lateral and vertical components of the net wheel loading. Two wheel axle sets and signal processors have been assembled incorporating this technique. These wheelsets have been used in extensive field testing of locomotives and the results have shown that crosstalk between lateral and vertical force signals, temperature effects, and lateral wheel orientation on the rail effects have been effectively minimized. This paper describes the continuous force measurement concept and instrumentation details. The use of these wheelsets provides researchers with a valuable tool for furthering the study of the dynamics of wheel and rail interaction.

Contributed by the Rail Transportation Division of ASME for presentation at the Joint ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979.

Modransky, J Donnelly, WJ Novak, SP Smith, KR (General Motors Corporation)
American Society of Mechanical Engineers Conf Paper 79-RT-8, Feb. 1979, 8 p., 16 Fig., 4 Ref.

ACKNOWLEDGMENT: ASME
ORDER FROM: ESL

DOTL RP

02 194869 FLEXIBLE GUIDANCE FOR HIGH SPEED TRAMS [Elastische Fahrleitung fuer Schnell-Strassenbahnen]

Because of the increase in the driving speeds and the conversion of the earlier tramway systems into an attractive and modern city tramway, it is also necessary to modernise and adapt the guidance systems to the higher speeds. A modern system of this type, which has been developed in Switzerland, is fully described. [German]

Wittgenstein, M *Internationales Verkehrswesen* Vol. 29 No. 6, Nov. 1977, pp 399-401, 4 Fig.

ACKNOWLEDGMENT: TRRL (IRRD 307602), Federal Institute of Road Research, West Germany
ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

02 194877 FREIGHTCAR VIBRATION TEST AND ANALYSIS COMPARISON-- VALIDATION OF FRATE

A nonlinear computer program for Freight Car Response Analysis and Test Evaluation (FRATE) has been developed under the sponsorship of the Federal Railroad Administration. The computer program incorporates a model of a Trailer on Flat Car (TOFC) configuration. Validation of the FRATE/TOFC program is being accomplished through comparison of analysis results to the results of vibration tests performed on a TOFC configuration at the Rail Dynamics in Pueblo, Colo. Lab. Validation criteria include resonant frequency, deflection shape at resonance and amplification of input motions. This paper presents a brief review of the FRATE/TOFC computer program, a summary of TOFC vibration test results and comparisons of test and analysis results. Procedures followed to achieve acceptable agreement between test and analysis are reviewed.

For Meeting held November 27-30, 1978.

Kachadourian, G (Mitre Corporation); Tsai, NT
Society of Automotive Engineers Preprint SAE 781049, 1978, 16 p., 12 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

02 194880 10 YEARS' OPERATION OF THE DYNAMIC TESTING PLANT FOR SUSPENSION GEAR [Dix ans d'exploitation du banc d'essai dynamique des suspensions]

The dynamic testing plant for suspension gear, which forms part of the Vitry-sur-Seine Testing Center, in France, was installed in 1966 and, after various adjustments had been made, became fully operational in October 1967. The article reviews the work completed over the last ten years. It describes the different types of tests carried out on series produced or prototype rolling stock. It analyzes the testing techniques which can be of the harmonic or non-harmonic kind. Difficulties have arisen in connection with some of these techniques and the article explains the methods that have been employed to overcome them. [French]

Sauvage, G Doreau, R *Revue Generale des Chemins de Fer* Vol. 97 No. 5, May 1978, pp 312-319

ACKNOWLEDGMENT: EI
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DOTL JC

02 195082 POWER SUPPLY SYSTEMS AND COMMUNICATION FACILITIES OF THE CHASSIS DYNAMOMETER [Energieversorgungsanlagen und Kommunikationseinrichtungen des Rollpruefstandes]

A dynamometer was constructed for the railroad maintenance shop of the West German Railroad System at Munich-Freimann. The instrument is used for testing railroad vehicles. The electrical and telecommunication installations of this plant are described. [German]

Kieffer, HH *Elektrische Bahnen* Vol. 49 No. 10, Oct. 1978, pp 263-269

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

02 195083 TESTING INSTALLATION CHASSIS DYNAMOMETER IN MUNICH-FREIMANN, WEST GERMANY [Die Versuchsanlage Rollpruefstand in Muenchen-Freimann]

Equipment is described which is capable of testing the running characteristics of gears and vehicles and the interaction of vehicle and track. These tests yield data on the fundamental research of vehicle running and on track construction as well as on the development of rail vehicles. The dynamometer incorporates computer equipment, so that all kinds of practically occurring track conditions can be simulated under a variety of running conditions, independently for the left-hand and right-hand sides. [German]

Althammer, K *Elektrische Bahnen* Vol. 49 No. 10, Oct. 1978, pp 257-263, 14 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

02 195092

STABILITY CRITERIA FOR ARTICULATED RAILWAY VEHICLES POSSESSING PERFECT STEERING

The general form of the equations of motion of multi-body articulated railway vehicles are used to establish the conditions which the elastic stiffness matrix, which describes the nature and configuration of the suspension elements connecting the various bodies, must satisfy in order to achieve both perfect steering on circular curves and dynamic stability. The resulting criteria are then used to discuss the properties of various multi-axle configurations which are either typical of current practice or possibilities for future designs.

Wickens, AH *Vehicle System Dynamics* Vol. 7 No. 4, Dec. 1978, pp 165-182

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

02 195101

REAL TIME PROCESSOR FOR RAILWAY CAR AXLE YAW-SIGNALS

A system is described which processes, in real time, the signals derived from a laser track-side optical system to obtain the yaw-angle between the rail car axle centerline and the normal to the rails. The digital output signal is recorded with a line printer.

Zwarts, CMG *NRC Canada, Quarterly Bulletin, Div Mechanical Eng* No. 3, 1978, pp 33-55, 8 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

02 195114

ANALOGUE COLLECTION ON THE LINE

Describes the application of a high speed 16-bit microcomputer in a real-time signal processing system for data from the wheel of a high speed railway vehicle.

Systems International Vol. 7 No. 1, Jan. 1979, pp 36-37

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Gershire Limited, 106 Church Road, London SE19 2UB, England

02 195115

A TENSOR METHOD FOR 3-DIMENSIONAL GEOMETRIC PROBLEMS. APPLICATION TO A PROBLEM IN RAILWAY VEHICLE DYNAMICS

The model used in developing the method is a rigid body moving in such a way that at least one point in the body retains its position in space. This motion is described by a second-order tensor. Considerable effort is devoted to defining this tensor in such a way as to yield a method satisfactory both theoretically and in practical application. The method is applied to a problem concerned with the dynamics of railway vehicles. The forces that steer a wheelset so that it stays on the track are generated in the surfaces of contact between the wheels and the rails. The forces in the contact surface depend among other things on the shape of the surface, and the shape depends on the position of the surface. Thus it is essential to be able to compute the contact positions. [Swedish]

Sjoestedt, L Bjaeresten, NA *Tidskrift foer Dokumentation* DNR 90/78-43, 1977, 100 p., 5 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Royal Swedish Academy of Engineering Sciences, Box 5073, S-102 42 Stockholm 5, Sweden

02 195116

A NON-LINEAR MODEL OF A TWO-AXLE RAILWAY VEHICLE

Mathematical models of railway vehicles were developed in the course of earlier studies at Saab-Scania AB during the period 1970-1976. These permit stability analysis of small-perturbation dynamics of vehicles with separate axles, with bogies and with double bogies. One model was also programmed for a hybrid computer system and allows time history simulation. The purpose of the present study is to develop a mathematical model of a two-axle freight car running on flexible track. The wheel/rail contact forces and the axle suspensions are represented by non-linear functions, as are the track irregularities. The mode will be implemented on a hybrid computer system. The fully developed hybrid simulator will be run with known track

data. The results will be used for comparison with the behavior of the corresponding real freight car running on the same track. [Swedish]

Sjoestedt, L Lindqvist, B *Tidskrift foer Dokumentation* DNR 89/78-43, 1977, 19 p., 7 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Royal Swedish Academy of Engineering Sciences, Box 5073, S-102 42 Stockholm 5, Sweden

02 195121

THE HORIZONTAL DISTURBANCE FUNCTION OF A TRACK. MEASUREMENT AND APPLICATION [Horizontale Stoerfunktion eines Gleises. Messung und Anwendung]

After using a mathematical model in calculating the transverse horizontal movement of a two-axle car on non-rigid track, the theoretical functions of horizontal-rail disturbance were assessed and measured on a section of secondary line between Celle and Brunswick. For purposes of comparison the behaviour of a bogie car was also measured. The data obtained has been incorporated to a large extent in the vehicle-track mathematical model. [German]

Strothmann, W
Technical University of Braunschweig, West Germany DB: Dok 4838, 1978, 178 p., 16 Tab., 77 Phot., 81 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Technical University of Braunschweig, West Germany, Fakultät fuer Maschinebau und Elektrotechnik, D-3300 Braunschweig, West Germany

02 195123

THE EFFECT OF SEQUENCES AND COMBINATIONS OF TRACK IRREGULARITIES ON THE DYNAMIC INTERACTION OF FREIGHT CARS ON THE TRACK [Vlijanie posledovatel'nostej i socetanj nerovnostej rel'sovoj kolei na dinamičeskoe vzaimodejstvie gruzovyh vagonov i puti]

No Abstract. [Russian]

Erskov, OP *Vestnik VNIIZT* No. 8, 1978, pp 35-39, 6 Fig., 1 Tab., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

02 195136

DETERMINATION OF FORCES IN NEGOTIATION OF CURVES

Minimum force diagram explained and demonstrated in an example evaluated by Professor Heumann who developed the method which is simple and effective.

Railway Engineer International Vol. 7 No. 3, Nov. 1978, pp 75-78, 4 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

02 195143

CURRENT PROBLEMS CONCERNING VEHICLE DYNAMICS AND INTERACTION WITH TRACK [Problematica attuale della dinamica dei veicoli e dell'interazione con la via]

The author first recalls that recent progress in the field of wheel-rail interaction is largely the result of long welded rails, and continues by pointing out that research workers now have special computers enabling extremely elaborate models to be used for simulation of the entire dynamic phenomenon associated with vehicle running, at simulated speeds of up to 500 km/h. [Italian]

Frullini, R *Ingegneria Ferroviaria* Vol. 33 No. 11, Nov. 1978, pp 951-956, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

02 195144

STUDY OF THE MECHANICS OF ROLLING STOCK AT HIGH SPEEDS [Studi sulla meccanica del materiale rotabile ad alta velocita]

The author gives an account of general techniques and methods followed by different Railways to increase speeds, and introduces the problem of vehicle

running stability by emphasising the importance of carrying out studies and tests on bogies with independent wheels. Using theoretical and experimental observations and considerations, the author describes results obtained up to the present, and in conclusion lists problems which still have to be solved concerning the reduction of track and rolling stock maintenance costs. [Italian]

Santanera, O *Ingegneria Ferroviaria* Vol. 33 No. 11, Nov. 1978, pp 957-973, 32 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

02 195692

**RDL USERS GUIDE. PART I-PERFORMANCE CAPABILITIES.
PART II-PLANNING, SCHEDULING, AND BUDGETING**

The Rail Dynamics Laboratory of the Transportation Test Center at Pueblo, Colo., is capable of investigating wheel/rail interaction and vehicle dynamics. Part I summarizes performance capabilities of RDL and its major components: Vibration Test Unit (VTU), Roll Dynamics Unit (RDU). Part II indicates general policies and specific information on pretest planning, test program scheduling, test program planning, test conduct and budgeting.

Transportation Test Center Mar. 1978; 43 p., 12 Fig., 2 Tab., 2 App.

ORDER FROM: Transportation Test Center, Rail Dynamics Laboratory, Pueblo, Colorado

DOTL TF 200.U75

02 196357

**PLANS SET FOR MAJOR REBUILDING OF FAST TRACK
SECTIONS**

Tests of concrete-tie and wood-tie track under comparable conditions, expansion of rail-metallurgy experiment, appraisal of granite ballasts in curved track and feasibility of filter fabrics for improving support conditions will result from changes at Pueblo test facility. Some sections will remain as at present to continue current test conditions.

Railway Track and Structures Vol. 75 No. 6, June 1979, p 48, 1 Fig., 1 Tab.

ORDER FROM: ESL

DOTL JC

02 196378

**RAIL DYNAMICS LABORATORY: A UNIQUE RAIL VEHICLE
VIBRATION TEST FACILITY**

The Rail Dynamics Laboratory is being built to facilitate investigations of rail vehicle dynamics. The laboratory is equipped with two test machines: a roll dynamics unit for imparting rotation to the wheels of a rail vehicle, and a vibration test unit for applying vibration to the rail vehicle wheels. These units and their application are described in detail.

Collected Technical Papers AIAA ASME Struct Struct Dyn Materials Conference, 19th, Bethesda, Maryland, April 3-5, 1978.

Dorland, WD (Federal Railroad Administration)
American Institute of Aeronautics and Astronautics Tech Paper 1978, pp 67-74

ACKNOWLEDGMENT: EI
ORDER FROM: ESL, AIAA

02 196398

**SYMPOSIUM ON THE HIGH-SPEED TESTS CARRIED OUT BY
THE DB ON THE GUETER SLOH-NEUBECKUM HIGH-SPEED
LINE BETWEEN 1973 AND 1978 [Symposium ueber die
Schnellfahrversuche der DB auf der Schnellfahrstrecke
Guetersloh-Neubeckum, 1973 bis 1978]**

Seven DB specialist reports are presented and discussed in this revue, which contains the results of the tests carried out on vehicles (coach bogies, E 103 locomotives), track superstructure, current collection, braking and noise pollution. [German]

Leichtbau der Verkehrsfahrzeuge Vol. 23 No. 1-2, Jan. 1979, pp 11-35, Photos., Refs.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Leichtbau der Verkehrsfahrzeuge, Rosenheimer Strasse 145, Munich 80, West Germany

38

02 196447

USER'S MANUAL. LOCOMOTIVE TRUCK HUNTING MODEL

Truck hunting, or secondary hunting, is inherent with vehicle design and is characterized by severe oscillations of the truck or wheelset relative to the carbody. Once truck hunting starts, it continues to worsen as locomotive speed increases. This program predicts critical velocity at which oscillations become unstable and provides information about mode shape and oscillation frequency. Input consists of physical constants characterizing suspension elements and wheel/rail interactions, along with a velocity range to be investigated. One use of this program is a design tool which allows one parameter of the suspension to be varied to study its influence on critical speed. This manual presents a summary of the model, describes required input and the programs output along with interpretations. Some typical runs are also presented.

Garg, VK Hartmann, PW Martin, GC
Association of American Railroads Technical Center AAR R-227, No Date, 182 p., 4 Fig., 8 App.

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

DOTL RP

02 196448

USER'S MANUAL. FREIGHT CAR HUNTING MODEL

The freight car hunting program predicts the critical velocity at which oscillations become unstable. It also provides information about mode shape and frequency of the oscillations. By mode shape, it is meant the relative magnitudes of the component's motions. Input to the program consists of physical constants characterizing the suspension elements of the freight car and the railwheel interaction, a velocity range that is to be investigated, and the program options that tailor the output for different needs. One of the uses of this program is a design tool. By varying one parameter of the suspension system, it is possible to study its influence on the critical speed of hunting. This report represents the user manual documentation for the Freight Car-Hunting Model.

Cheung, THW Garg, VK Martin, GC
Association of American Railroads Technical Center AAR R-251, Feb. 1977, 108 p., 3 Fig., 9 Ref., 6 App.

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

DOTL RP

02 196449

**PROGRAMMING MANUAL. FLEXIBLE BODY RAILROAD
FREIGHT CAR MODEL**

This report represents the programming manual documentation for a Flexible Body Railroad Freight Car Model. The program described is for developing the generalized motion of a freight car in particular the bounce and roll behavior of a car travelling over jointed track. The program can be used for designing freight cars, predicting rock and roll speed region and studying derailments due to rocking or high speed bouncing. The program can only study one car at a time. Various component loadings are also listed.

Tse, YH Martin, GC
Association of American Railroads Technical Center AAR R-260, Mar. 1977, 48 p., Figs.

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

DOTL RP

02 196451

**TECHNICAL DOCUMENTATION. TRAIN OPERATIONS
SIMULATOR**

This report represents the technical manual documentation for the Train Operations Simulator (T.O.S.) program. Brief descriptions of the program's subroutines, basic theory, and a sample problem illustrating the program's use are included. The T.O.S. is designed to simulate the performance of a train composed of diesel-electric locomotives and conventional freight cars. Its calculated performance parameters include speed and distance (as a function of time), drawbar forces, and quasi-static L/V ratios.

Low, EM Garg, VK
Association of American Railroads Technical Center AAR R-269, Aug. 1977, 106 p.

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

DOTL RP

02 196454

PROGRAMMING MANUAL. LOCOMOTIVE TRUCK HUNTING MODEL

The locomotive truck hunting model can predict the critical velocity at which oscillations become unstable. It also provides information on the mode shape and frequency of the oscillation. The mode shape describes the relative magnitudes of the components' motions. Input to the program consist of physical constants characterizing the locomotive suspension and rail-wheel interaction, the velocity range to be investigated, and options to select the form of output. This program may be used as a design tool by investigating the influence of the parameters on the critical hunting speed. This report is the programmer's guide, which documents the numerical techniques and the control of the data processing involved in the Locomotive Truck Hunting Model. It also describes the necessary operating requirements of the program.

Hartmann, PW Garg, VK
Association of American Railroads Technical Center AAR R-278, Sept. 1977, 181 p., 2 Ref.

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

DOTL RP

02 196524

PARAMETRIC STUDY TO RELATE RAILCAR SPEED PERMISSIBLE COMBINATIONS OF TRACK GEOMETRY DEVIATIONS

A passenger railcar was modeled using quasi-linear, frequency domain computer simulation models to compute lateral and vertical rms wheelset forces and relative displacements over a range of speeds, in response to power spectra representations of track geometry deviations in surface, alignment, and crosslevel. A simplified wheel-climb criterion (Lateral to Vertical Force Ratio, L/V) was used to estimate the margin of safety for wheel-climb and to impose limits on combined track geometry deviations, which result in development of lateral and vertical forces which would cause a commonly used threshold value to be exceeded on a statistical basis. "Constant performance" contours of speed versus combined track geometry deviations are developed for selected L/V threshold values and exceedance probabilities.

Di Masi, FP (Department of Transportation); Weinstock, H *ASME Journal of Dynamic Systems, Meas and Control* Vol. 100 No. 4, Dec. 1978, pp 252-259, 15 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

02 196983

USERS' MANUAL FOR PROGRAM FOR CALCULATION OF KALKER'S LINEAR CREEP COEFFICIENTS

A program written in FORTRAN IV is described that uses the Hertz theory of rolling contact between two bodies and Kalker's linearized theory of creep to determine the geometry of the contact patch between railway vehicle wheel and rail and the creep coefficients that characterize the linearized creep forces between wheel and rail. The program input, output and the subroutines used are described herein and the results are in the form of printout. The manual includes program listings, sample deck set ups and sample run outputs. Two other user's manuals for determination of creep forces and moments have been issued under this contract. These are "Users' Manual for Kalker's Simplified Nonlinear Creep Theory" by J.G. Goree and E.H. Law and "Users' Manual for Kalker's Exact Nonlinear Creep Theory" by J.G. Goree.

Haque, I Law, EH Cooperrider, NK
Clemson University, Federal Railroad Administration, Association of American Railroads Technical Center Tech Rpt. FRA/ORD-78/71, Mar. 1979, 36 p., 3 Fig., 2 Tab., 9 Ref., 3 App.

Contract DOT-OS-40018

ORDER FROM: NTIS

PB-297802/AS, DOTL NTIS

02 196989

TESTS OF THE AMTRAK SDP-40F TRAIN CONSIST CONDUCTED ON CHESSIE SYSTEM TRACK

This report describes tests of an SDP-40F train consist conducted on Chessie System track during June 1977. The tests consisted of the operation of two typical AMTRAK passenger consists, one powered by two SDP-40F's and the other by two E-8's, over a variety of track conditions. The objectives of the tests were to compare dynamic performance of the SDP-40F locomotive with the E-8, and to determine the sensitivity of the SDP-40F response to track geometry variations, operational parameters and truck configuration changes. Data was obtained on the lateral and vertical wheel/rail loads and carbody accelerations under a variety of speeds, track geometry and track surface conditions. Modifications of the SDP-40F trucks were also made and tested. Each locomotive was tested in a consist representative of passenger service over a variety of operational track conditions. In general, the SDP-40F lateral wheel/rail loads in selected curves showed a tendency to increase above curve balance speed at a faster rate than that of the E-8. A means was developed for accurately predicting lead axle lateral force levels in 2 degree curves as a function of speed and track geometry variations. A new strain gage configuration was developed which will greatly improve the accuracy of lateral rail loads measurements.

Tong, P Brantman, R Greif, R Mirabella, J
Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-79/19, DOT-TSC-FRA-79-14, May 1979, 260 p., Figs., Tabs., 8 App.

ORDER FROM: NTIS

PB-297711/AS, DOTL NTIS

02 196990

A MULTIPURPOSE TRAIN PERFORMANCE CALCULATOR: USER'S MANUAL

This manual documents a Train Performance Calculator (TPC) program which simulates the operation of a passenger train over a rail route. The Input for the program is the track data for the route, the characteristics of the locomotive, the type and number of cars, and the number of passengers. The output from the TPC is in the form of tables showing speed, time, and fuel used; and in the form of graphs showing speed, time, and fuel used versus distance traveled. The TPC has been in use for two years to study the energy intensity of Amtrak trains in the New York to Buffalo Corridor.

Heilman, H Kahrs, C Williams, G
Union College, Federal Railroad Administration Final Rpt. FRA-/ORD-79/17.I, Dec. 1978, 81 p., Figs.

Contract DOT-FR-8027

ORDER FROM: NTIS

PB-296392/AS, DOTL NTIS

02 196991

A MULTIPURPOSE TRAIN PERFORMANCE CALCULATOR: VOLUME II PROGRAMMERS' REFERENCE MANUAL

This manual documents a train performance calculator (TPC) program which simulates the operation of a passenger train over a rail route. The input for the program is the track data for the route, the characteristics of the locomotive, the type and number of cars, and the number of passengers. The output from the TPC is in the form of tables showing speed, time, and fuel used; and in the form of graphs showing speed, time and fuel used versus distance traveled. The TPC has been in use for two years to study the energy intensity of Amtrak trains in the New York to Buffalo Corridor.

Heilman, H Kahrs, C Williams, G
Union College, Federal Railroad Administration Final Rpt. FRA-/ORD-79/17.II, Dec. 1978, 84 p.

Contract DOT-FR-8027

ORDER FROM: NTIS

PB-296393/AS, DOTL NTIS

03 053307

ELASTIC SYSTEMS FOR TRACTION AND SHOCK GEAR (SIDE BUFFERS AND CENTRE BUFFERS). ACCEPTANCE TESTS FOR THE ELASTIC SYSTEM OF TYPE "RING SPRING B 612 B" FOR THE AUTOMATIC COUPLER

The subject of the report is the acceptance tests with the elastic system of type "Ring spring B 612 B". All the tests specified in the "Elastic systems-Wagons" leaflet were made and successfully concluded. ORE Specialists Committee B 36 recommends that the elastic system of type "Ring spring B 612 B" be accepted.

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

International Union of Railways B 36/RP 21, Oct. 1978, 27 p., 21 Fig., 8 Tab.

ACKNOWLEDGMENT: UIC
ORDER FROM: UIC

DOTL RP

03 053308

ELASTIC SYSTEMS FOR TRACTION AND SHOCK GEAR (SIDE BUFFERS AND CENTRE BUFFERS). ACCEPTANCE TESTS FOR THE "RHEINMETALL 129-11U" ELASTIC SYSTEM FOR THE AUTOMATIC COUPLER

The report deals with the acceptance tests with the "Rheinmetall 129-11U" elastic system. All tests provided for in leaflet "Elastic systems-wagons" were carried out and successfully concluded. ORE Specialists Committee B 36 recommends acceptance of the elastic system "Rheinmetall 129-11U".

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

International Union of Railways B 36/RP 20, Oct. 1978, 19 p., 20 Fig., 3 Tab.

ACKNOWLEDGMENT: UIC
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DOTL RP

03 053311

MODERN SUSPENSION SYSTEM FOR TWO-AXLED WAGONS. PROGRESSIVE SUSPENSION FOR WAGONS TO BE BUILT IN FUTURE FOR HIGH SPEEDS

The report describes studies made with running gear constructions for speeds over 120 km/h. The results of tests in the field up to 140 km/h and on the rigs with two different designs and, for comparing a progressive parabolic spring are given.

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

International Union of Railways B 134/RP 3, Oct. 1978, 27 p., 47 Fig., 7 Tab.

ACKNOWLEDGMENT: UIC
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DOTL RP

03 053321

MODERN SUSPENSION SYSTEM FOR TWO-AXLED WAGONS. PROGRESSIVE SUSPENSION-FIELD TESTS

The report contains the results of field tests with some different types of progressive axle suspensions discussed in RP 1 and represents a supplement to this report.

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

International Union of Railways B 134/RP 2, Oct. 1978, 15 p., 4 Fig., 2 Tab.

ACKNOWLEDGMENT: UIC
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DOTL RP

03 053322

CONDITIONS WHICH SHOULD BE COMPLIED WITH BY WAGON COMPONENTS FOR 22 T AXLELOAD. HAULING TESTS WITH WHEELSETS OF GRADE R7 AND R8 STEEL

Two wheelsets manufactured in France from grade R7 and grade R8 steel were submitted to hauling tests over a distance of 40 km at braking powers

of up to 47 kW. The deformations and temperatures measured during the tests showed that the wheelsets were suitable for being fitted to wagons for operation in railway service at 22 t axleload.

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

International Union of Railways B 142/RP 2, Oct. 1978, 18 p., 11 Fig.

ACKNOWLEDGMENT: UIC
ORDER FROM: UIC

DOTL RP

03 053323

WHEELSETS WITH ASSEMBLED AXLEBOXES: DESIGN, MAINTENANCE AND STANDARDISATION. MAINTENANCE OF WHEELSETS WITH ASSEMBLED AXLEBOXES

This report gives the recommendations relating to the maintenance of wheelsets with assembled axleboxes arrived at after detailed analysis of the means and methods used by the various Administrations.

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

International Union of Railways B 136/RP 7, Oct. 1978, 79 p., 7 Fig.

ACKNOWLEDGMENT: UIC
ORDER FROM: UIC

DOTL RP

03 053326

CONDITIONS WHICH SHOULD BE COMPLIED WITH BY WAGON COMPONENTS FOR 22 T AXLELOAD. STRENGTH TESTS OF THREE DESIGN VARIANTS OF Y 25 C BOGIE WITH A 22 T AXLELOAD

The report covers the description and the results of strength tests of three design variants of the Y 25 C bogie, i.e. types Y 25 Cst, DB-684, and Y 25 Csm as initially designed for a 20 t axleload. The purpose of these tests was to investigate their suitability for a 22 t axleload. The findings of the tests carried out on PKP tracks and on the railway test ring at Velim (CSSR) are included in the report.

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

International Union of Railways B 142/RP 1, Oct. 1978, 18 p., 13 Fig., 10 Tab.

ORDER FROM: UIC

DOTL RP

03 053327

WHEELSETS WITH ASSEMBLED AXLEBOXES: DESIGN, MAINTENANCE AND STANDARDISATION. INTERCHANGEABILITY OF ROLLER BEARINGS FOR AXLEBOXES

Recommendations are made for the dimensions essential for the interchangeability of cylindrical, spherical, taper roller bearings and cartridge bearings, based on the journal dimensions of the standardised wheelsets for wagons.

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

International Union of Railways B 136/RP 8, Apr. 1978, 32 p.

ORDER FROM: UIC

DOTL RP

03 189064

STRESS ANALYSIS OF THE BETHLEHEM STEEL CORPORATION J-33 STEEL WHEEL

The effective stresses caused by thermal and mechanical loads are analysed by means of the finite-difference program "TRUMP" and the finite-element program "WHEEL". This study reports the results of the analysis.

Shum, KL Garg, VK

Association of American Railroads Technical Center AAR Rpt. R-317, June 1978, 23 p., 9 Fig.

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

DOTL RP

03 189065

FREIGHT CAR DYNAMICS-DEMONSTRATION TEST & ANALYSIS VOLUME II-FORCED VIBRATION, DYNAMIC STRESS ANALYSIS AND FATIGUE LIFE PREDICTION

Free vibration characteristics of a rail flat car structure were investigated in Volume I using three different finite element models. These models were validated through the comparison of the predicted vibration mode shapes and frequencies with test results. Further validation of the models is performed here through comparison of the analytical transfer function with test results. The values of the transfer functions are computed, using NASTRAN, at five different locations along the center line of the flat car. Experimental values at these locations are found to be in good agreement with the computed results. A fatigue life evaluation of an arbitrarily selected member of the flat car is performed to demonstrate the application of finite-element structural dynamics analysis to fatigue life prediction. The fatigue life values obtained using this approach, are then compared with the so called ad hoc approach which uses a nominal stress value obtained from a pseudo-dynamic (augmented static) analysis.

Prasad, B Garg, VK Zarembski, AM Yau, JF
Association of American Railroads Technical Center Tech Rpt. AAR Rpt. R-322, June 1978, 69 p., Figs., Tabs., 10 Ref., 2 App.

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

DOTL RP

03 189070

PHASE 09 FINAL REPORT ON BOTTOM FITTINGS PROTECTION TEST PROGRAM

In response to a Notice of Proposed Rulemaking issued by the Environmental Protection Agency, the AAR mandated certain requirements to reduce the probability of loss of lading in derailments. This study was undertaken to determine the fatigue life and assess the protective capability of skids. Five designs were fabricated and applied to cars equipped with various type outlets and appropriately strain gaged. In addition, three "base" tests were conducted on cars without protective skids. This report describes the entire test program and analysis and conclusions are given. An Addendum to this report will be issued at a later date that will include an analysis of strain gage data of the destructive impact tests to determine if any existing engineering method of analysis is applicable and the results of the "fail-safe" siphon pipe test.

RPI-AAR Tank Car Safety Research and Test Project, an RPI-AAR Cooperative Program.

Kunz, El Olson, LL
Association of American Railroads Technical Center Res Rpt. RA-09-4-41, AAR Rpt. R-343, Dec. 1978, 44 p.

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

DOTL RP

03 189748

REMOVABLE EXTRUDED ALUMINIUM PARTITIONS FOR RAILWAY VEHICLES [Verriegelbare Trennwände aus Aluminium-Strangpressprofilen fuer Schienenfahrzeuge]

The system of separating panels and air cushions to protect goods in transit is not entirely suitable for mixed consignments with different types of goods. Ten Hbis 295 wagons have therefore each been fitted with 6 aluminium partitions weighing only 1200 kg including the slides and fastenings, designed to withstand a 15-tonne pressure. This new system of dividing freight wagons by means of removable partitions has passed all loading tests satisfactorily. [German]

Blank, W *Leichtbau der Verkehrsfahrzeuge* Vol. 22 No. 5, Sept. 1978, pp 78-79, 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Leichtbau der Verkehrsfahrzeuge, Rosenheimer Strasse 145, Munich 80, West Germany

03 189749

USE OF LIGHT-WEIGHT METAL ON THE PROTOTYPE FAD 150 WAGON [Ausrustung des Prototyps Fad 150 mit Leichtmetallteilen]

The 6-axle Fad 150 wagon is being designed for economical ore transport, and has been planned with a loading capacity of 100 t and a tare of 32 t for a 22-tonne axle load. The weight of the prototype is 35.59t, and to reduce this, experiments are being made to fit side walls and discharging flaps made to the lightweight metal Al Mg Si 1 F 32. After a year's use, the condition of these lightweight walls was found to be satisfactory, enabling the designers to reduce the wagon weight by 2.25 t. [German]

Schneider, F *Leichtbau der Verkehrsfahrzeuge* Vol. 22 No. 5, Sept. 1978, pp 76-78, 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Leichtbau der Verkehrsfahrzeuge, Rosenheimer Strasse 145, Munich 80, West Germany

03 189750

THE PROTOTYPE SHIS 708 TYPE 4-AXLE WAGON WITH AN ALUMINIUM TELESCOPIC HOOD [Der Prototyp des vierachsigen Haubenwagens Shis 708 mit Aluminium-Hauben]

No Abstract.

Waldstaetten, WV *Leichtbau der Verkehrsfahrzeuge* Vol. 22 No. 5, Sept. 1978, pp 73-76, 3 Tab., 7 Phot., 1 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Leichtbau der Verkehrsfahrzeuge, Rosenheimer Strasse 145, Munich 80, West Germany

03 189794

NEW TYPE COACHES FOR THE MODERNISATION OF LOCAL TRAINS

Locomotive-drawn coaches are operated on city suburban services. However JNR has recently developed a new coach with wider entrances and automatic doors in order to improve the quality of local services. This new series of coaches are used mainly on suburban services and on supplementary medium-distance trains at weekends.

Okada, N *Japanese Railway Engineering* Vol. 18 No. 1, 1978, pp 22-23, 1 Fig., 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

03 189810

PERSPECTIVE PROBLEMS OF NOISE ABATEMENT IN RAIL VEHICLES

Precalculations of internal noise in the project stage are based on acoustic characteristics still obtained experimentally today. For studying variants the method of statistical energy analysis is available, which needs a few experiments only for determining characteristics and is also suited for ascertaining insulating values of constructions. Selected problems serve to show the advantages of this analysis, permitting an acoustic project almost without experiments on the basis of electronic data processing and finishing acoustic problems in the sense of economic optimizations. [German]

Ivanaukas, J *DET Eisenbahntechnik* Vol. 26 No. 10, Oct. 1978, pp 407-409

ACKNOWLEDGMENT: British Railways
ORDER FROM: VEB Verlag Technik, Oranienburgerstrasse 13-14, 102 Berlin, East Germany

03 189813

OPTIMUM VIBRATIONAL DESIGN OF BOGIES FOR LOCAL TRANSPORT [Zur frage der Schwingungstechnisch Guenstigen Auslegung von Drehgestellen fuer Nahverkehrsbahnen]

The paper describes the performance of bogies and reports on the results of calculations dealing with problems in the field of the theory of stability and the traveling round curves. From these results a new bogie concept is derived which is illustrated by a schematic diagram. [German]

Krettek, O *Glaser's Annalen ZEV* Vol. 102 No. 7-8, July 1978, pp 218-227, 40 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

03 190285

WELDING'S ROLE IN THE FABRICATION OF FRENCH RAILWAY CARRIAGES

A description is given of the types of welding employed in the fabrication of steel and aluminum alloy chassis/bodies for French railroad cars. Mass production techniques are employed, and fabrication of the aluminum bodies is facilitated by the use of specially extruded sections.

Nicolas, C *Welding and Metal Fabrication* Vol. 46 No. 8, Oct. 1978, p 517

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

03 190314

ADMINISTRATIVE SYSTEM FOR TRUCK AND TRUCK PARTS OF SHINKANSEN ROLLING STOCK

Trucks of Shinkansen cars are inspected twice between general overhauls to assure the safety of parts essential to continued high-speed operation. To extend the reliability of the cars and reduce the inspection times, a system is used which replaces trucks that are to be inspected by others which are being returned to service after being inspected. This article explains the control system for trucks and their parts, including the speed and accuracy of handling the large number of documents involved with the inspection.

Hirota, Y (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 3, 1978, pp 8-9, 1 Fig., 1 Tab.

ACKNOWLEDGMENT: Japanese Railway Engineering

ORDER FROM: Japan Railway Engineers' Association, 2-5-18 Otemachi, Chiyoda-ku, Tokyo, Japan

DOTL JC

03 190339

COMFORT IN COACHES. BBC COMPACT UNITS FOR AIR CONDITIONING AND ELECTRONIC TEMPERATURE CONTROL [Komfort in Reisezugwagen. BBC-Kompaktaggregate fuer Luftaufbereitung und elektronische Temperaturregelung].

No Abstract. [German]

Strub, P *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 827-831, 7 Phot., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

03 190343

A DEVICE FOR THE DETECTION OF WHEEL-FLATS

A flat wheel runs badly causing problems and damage. It is necessary to identify difficulties and take suitable steps as soon as possible. The device used for this purpose is described here. It was designed in an attempt to find a solution.

Shioya, A Wada, K *Railway Technical Research Inst, Quarterly Reports* Vol. 19 No. 3, Sept. 1978, 139 p., 3 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

DOTL JC

03 190359

DESIGN FOR TOMORROW'S PASSENGERS

The article covers in general terms passenger vehicle design progress over the last two decades. The development of bogie design techniques is examined, as is the progress in vehicle body structure design. Reference is made to the Mk. I, II and III coach designs and to the A.P.T.

Sephton, B *International Railway Journal* Nov. 1978, p 15

ACKNOWLEDGMENT: British Railways

ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010

DOTL JC

03 191670

A STUDY TO ACCOMMODATE THE ELDERLY AND HANDICAPPED ON EXISTING COMMUTER RAIL COACHES

The report examines the feasibility of making the existing Detroit-Pontiac commuter rail service more readily accessible by the elderly and handicapped. It examines three types of railroad coaches (1500, 4800, and 9600 series cars) currently owned by the Southeastern Michigan Transportation Authority (SEMTA) as well as existing rail stations in the overall analysis to provide rail service for the elderly and handicapped. The report is definitive toward the methods required to modify the interiors of these cars to accommodate the onboard handicapped passenger (including bathroom facilities). The report also presents innovative concepts to the problem of boarding/unloading the handicapped. Some of the conclusions presented are the following--(1) that present commuter rail facilities are not accessible for ingress/egress by the unassisted elderly and handicapped; and (2) that two of the three types of railcars owned by SEMTA can be modified to accommodate the elderly and handicapped providing that each station platform complement the proposed car modification. The guidelines used as reference material for this study were the Michigan 'General Rules' of the Construction Code Commissions Barrier Free Design Graphics. This report provides numerous diagrams depicting floor arrangements and the proposed modifications to these cars.

Prepared in cooperation with Southeastern Michigan Transportation Authority, Detroit. Sponsored in part by Michigan Dept. of State Highways and Transportation, Lansing.

Klauder (Louis T) and Associates, Southeastern Michigan Transportation Authority, Urban Mass Transportation Administration, Michigan Department of Transportation, (UMTA-UTD-30) Final Rpt. UMTA-TUD-30-79-1, Dec. 1977, 79 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-292765/5ST

03 193761

CONSEQUENCES OF USING Q & T STEEL TO REDUCE WEIGHT AND INCREASE SERVICE LIFE OF RAILWAY FREIGHT CARS

It is shown that although the use of quenched and tempered steels can significantly reduce the structural weight of freight cars, the use of such material for this purpose will probably also drastically reduce the car's service life. The paper also concludes that, based upon recent research into the reasons for welded girder failure, the use of quenched and tempered steels for their highnotch toughness at low temperatures will not appreciably decrease and may, in fact, increase the incidence of fracture in freight car underframes. It is thus concluded that, as a general rule, the use of this and similar materials for the aforementioned purposes will yield only added expense to the owner of the car.

For Meeting held December 10-15, 1978.

Garrett, MF (Maxson Corporation) American Society of Mechanical Engineers Conf Paper n 78-WA/RT-18, 1978, 6 p.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

03 193767

INVESTIGATIONS OF CRACK GROWTH IN RAILROAD CAR WHEELS CAUSED BY THERMALLY INDUCED RESIDUAL STRESS CHANGES AND CYCLIC MECHANICAL LOADING

The elastic-plastic deformation of railroad car wheels as a result of heat input to the wheels during tread braking is analyzed using the deformation theory of plasticity incorporating material stress-strain behavior found as a function of temperature at a prechosen loading rate. The magnitudes of residual circumferential stress changes after cooling are studied to determine the likelihood of crack growth of certain size flaws in the wheel rim. Comparison with experimental crack growth data and experimentally measured permanent deformations of wheels after testing are used to check the accuracy of the computer predictions. Cyclic stresses from the supporting loads of the rail on the wheel are found by use of a finite element program which modeled the loads with a Fourier series expansion and are verified by comparison with experimental data. The magnitudes of these ranges of stress are considered along with the residual stress changes from thermal overloads to analyze the possibility of growth of these rim cracks in service. Finally, comparisons

with service failures are made in order to define the applicability of the method of analysis developed here.

Kipp, RM (Illinois University, Urbana) *Illinois University, TAM Report* No. 428, Aug. 1978, 128 p., 36 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

03 194132

SHAKER HEIGHTS TRAMS TAKE SHAPE IN PISTOIA

The articulated light rail cars for the Shaker Heights lines of the Greater Cleveland Regional Transit Authority are under construction at Breda in Italy. The 48 two-unit vehicles are described; body construction, chopper propulsion system, controls, air conditioning and seating were worked out with North American suppliers to assure a minimum of error.

Railway Gazette International Mar. 1979, p 241, 1 Fig.

ORDER FROM: ESL

DOTL JC

03 194134

TWO-AXLE INTERMODAL CAR

Trailer Train has developed a 98-ft prototype articulated piggyback car capable of handling two 45-ft trailers. The 58,000-lb car features four single-axle trucks and many standard freight-car components; the two units are connected by a drawbar. Laboratory and road tests are scheduled.

Progressive Railroading Vol. 22 No. 4, Apr. 1979, pp 66-68, 5 Phot.

ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

03 194507

SPOTLIGHT ON WHEELSETS

Brief account of the congress held in 1978 at Colorado Springs in the United States. Several specialists from various railroads considered the various different aspects of this problem. Their remarks are reported briefly in this article.

Progressive Railroading Vol. 21 No. 12, Dec. 1978, pp 46-50, 5 Fig., 1 Tab., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

03 194636

ADDENDUM TO PHASE 09 FINAL REPORT ON BOTTOM FITTINGS PROTECTION TEST PROGRAM

This is an addendum report to RPI-AAR Tank Car Safety Research and Test Project Report No. RA-09-4-41 (AAR R-343) dated December 22, 1978. This addendum report includes the strain gage rosette analysis of the destructive impact tests of the protective skirts and the results of the siphon pipe tests. The results of the strain gage tests were used in an attempt to apply an existing engineering method of analysis of the skid designs. The analysis method utilized a Welding Research Council computer program called "WERCO." While correlation between test results and calculated stress values were not consistent for some skid designs, it was concluded that the "WERCO" program offered an excellent approach to initiate a protective skid design study. Based on results of the overall test program, recommendations are made for revisions to the AAR Specifications For Tank Cars for "protection of bottom discontinuities on new non-pressure tank car tanks." Recommendations are also made in regard to the usage of the fatigue analysis test data, outlet nozzle design test data, and a siphon pipe installation system, on protective skid equipped cars, that will be effective in preventing the pipe from being pushed out of its top housing.

RPI-AAR Tank Car Safety Research and Test Project.

Kunz, EL Olson, LL
Association of American Railroads Technical Center Res Rpt.
RA-09-4-41A, AAR Rpt. R-364, Apr. 1979, 38 p., Figs.

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

DOTL RP

03 194641

NEW LOCOMOTIVE HAULED PUSH-PULL COMMUTER CARS FOR MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

This paper provides a description of the technical details of locomotive hauled push-pull commuter cars being built by Pullman Standard for the Commuter Rail Division of the Massachusetts Bay Transportation Authority. It also provides a brief review of where the push-pull concept originated, its advantages, and its development over the past 20 years.

Contributed by the Rail Transportation Division of ASME for presentation at the Joint ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979.

Curtis, RD (Pullman-Standard Car Manufacturing Company)
American Society of Mechanical Engineers Conf Paper 79-RT-2, Jan. 1979, 9 p., 13 Fig., 1 Ref.

ACKNOWLEDGMENT: ASME
ORDER FROM: ESL

DOTL RP

03 194642

CONVENTIONAL VERSUS SELF-STEERING RADIAL TRUCKS FOR HIGH-SPEED PASSENGER TRAINS

The performance of self-steering, articulated and non-articulated trucks on high-speed passenger trains was compared to a standard conventional passenger truck. Linear, lateral stability analyses and quasilinear, steady-state curving analyses were used to evaluate criteria of a design speed of 125 mi/h (200 km/h), and wheel tread and rail head wear in curves. Based on the results of this analytical study, the self-steering articulated truck would reduce wear in curves by a factor of two. However, an improvement in the steering characteristics of conventional non-articulated trucks would reduce wear in curves by a factor of four.

Contributed by the Rail Transportation Division of ASME for presentation at the Joint ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979.

Doyle, GR, Jr (Battelle Columbus Laboratories)
American Society of Mechanical Engineers Conf Paper 79-RT-3, Jan. 1979, 11 p., 8 Tab., 4 Tab., 13 Ref.

ACKNOWLEDGMENT: ASME
ORDER FROM: ESL

DOTL RP

03 194643

THE LRC COACH TRUCKS AND SUSPENSION

This paper describes some of the practical engineering aspects in the design of suspension systems (trucks) for railway vehicles. Several important and interesting considerations in suspension design are discussed with particular reference to the LRC coach trucks. The Dofasco power banking truck is a major engineering innovation in the design of the Canadian LRC (Light-Rapid-Comfortable) railway coach. The active banking mechanism tilts the car body on curves an amount which depends on the degree of track curvature and superelevation and train speed, thus ensuring passenger's comfort. The hydraulic banking system which is activated by sensors, allows an effective tilt of the car body of 8.5 deg, to nullify the centrifugal forces at speeds 35 to 40 percent faster than possible with conventional passenger coach equipment. This results in a significant increase of average trip speed. The philosophy of truck design and development is outlined. The various phases of the development include conceptual design, suspension performance, structural integrity, production and testing. The paper also outlines quasi-static and dynamic analyses used to assist in the suspension design.

Contributed by the Rail Transportation Division of ASME for presentation at the Joint ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979.

Elmaraghy, WH Gaiser, JA Bexon, HJ (Dominion Foundries and Steel, Limited, Canada)
American Society of Mechanical Engineers Conf Paper 79-RT-4, Jan. 1979, 8 p., 8 Fig.

ACKNOWLEDGMENT: ASME
ORDER FROM: ESL

DOTL RP

03 194644

A NEW RIGID FRAME TRUCK

Due to its characteristics, the rigid frame truck can operate in high-speed freight trains without undue stress on track or lading. This type of truck has

been standard in Europe since 1960 and has proved satisfactory in service. However, certain fatigue defects appeared in the chassis, leading to its redesign in 1974. The paper describes the failures and solutions devised. The final testing of the truck in the laboratory and in service are reviewed in detail.

Contributed by the Rail Transportation Division of ASME for presentation at the Joint ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979.

Guillaumin, J-C
American Society of Mechanical Engineers Conf Paper 79-RT-5, Jan. 1979, 8 p., 8 Fig.

ACKNOWLEDGMENT: ASME
ORDER FROM: ESL

DOTL RP

03 194646**HIGH ADHESION TRUCK FOR ELECTRIC LOCOMOTIVES**

The use of high adhesion principles has enabled the South African Railways to achieve maximum performance from its latest d-c electric locomotives. Their improved performance has been due to a combination of advances in electrical technology and the development of high adhesion trucks. This paper describes the improved features with particular emphasis on the trucks. The design principles required for high adhesion, the theoretical improvement to be expected, and the actual performance results obtained on the Railways are presented.

Contributed by the Rail Transportation Division of ASME for presentation at the Joint ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979.

Jackson, KL (General Steel Industries, Incorporated); Franz, PM (Scaw Metals, Limited); Ferreira, IW (South African Railways); Dooley, IM (Reunert & Lenz, Limited)
American Society of Mechanical Engineers Conf Paper 79-RT-7, Jan. 1979, 8 p., 14 Fig., 2 Tab.

ACKNOWLEDGMENT: ASME
ORDER FROM: ESL

DOTL RP

03 194653**IMPROVING THE SOUND AND HEAT INSULATION OF RAIL VEHICLES WALLS**

The function of a rail vehicle wall is essentially determined by the mean sound insulation value R and the coefficient of heat transition $k_{sub 1}$. Measures taken for improving the sound absorption coefficient differently operate on the heat insulation. While the application of an antinoise compound does not influence $k_{sub 1}$, R increases by 4 to 5 dB, different insulating materials used in the intermediate space changing $k_{sub 1}$ considerably, but R to a small degree only. The inside wall material has an opposite influence, so that either a good sound insulation or a good heat insulation remains to be chosen. By these rules the wall design will be facilitated. [German]

Toepfer, K *DET Eisenbahntechnik* Vol. 26 No. 12, Dec. 1978, pp 504-505

ACKNOWLEDGMENT: British Railways
ORDER FROM: VEB Verlag Technik, Oranienburgerstrasse 13-14, 102 Berlin, East Germany

03 194660**SOUND-ABSORBING RAILWAY WHEELS FOR METROPOLITAN PUBLIC TRANSPORT**

Damping systems for railway wheels have meanwhile been developed to a level rendering possible a substantial contribution to the efforts made in adhering to and minimising the specified noise emissions of rail vehicles. Sound-absorbing wheels are an efficient means to suppress the noise in sharp curves. In addition, they result in a marked reduction of the rolling noise, while the increase in wheel mass is insignificant. [German]

Huebner, H *Glaser's Annalen ZEV* Vol. 102 No. 11, Nov. 1978, pp 336-342

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

03 194668**INSPECTION PLANNING AND TESTING FOR NEW RAILWAY LOCOMOTIVES AND ROLLING STOCK**

No Abstract.

Kilshaw, NC Stables, JR *Railway Engineer International* Vol. 4 No. 1, Jan. 1979, pp 49-51, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

03 194673**GUARANTEE OF THE QUALITY OF SEATS IN PASSENGER COACHES [Qualitaetssicherung der Sitze in Reisezugwagen]**

Details of the analytical methods used for defining optimum seat positioning in passenger coaches in relation to different criteria: quality and comfort for passengers, strength of the materials used, lowest cost to the railway.

Kalkbrenner, E *Eisenbahningenieur* Vol. 29 No. 11, Nov. 1978, pp 495-504, 9 Phot., 16 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

03 194677**DEVELOPMENT AND CHARACTERISTICS OF HAULED PASSENGER STOCK [Evoluzione e tipizzazione del materiale rimorchiato viaggiatori]**

After reviewing the most outstanding recent innovations, and describing the main criteria selected for FS passenger stock, the writer, who is Manager of the FS Rolling Stock Department, defines the essential characteristics of 5 categories of coaches according to the services that each must provide. [Italian]

Cardini, E *Ingegneria Ferroviaria* Vol. 33 No. 10, Oct. 1978, pp 863-874, 2 Tab., 20 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

03 195099**USING X-RAY TO CHECK WELDS**

General American Transportation Corp. is one of the world's largest manufacturers of railroad tank cars. The huge size of their product can be no excuse for poor inspection. Making tanks to carry tons of liquid requires a finely tuned inspection program to help provide the integrity of these enormous rolling cylinders. Radiography has played a key role in their inspection program. For more than 30 years, extensive radiographic tests have been performed to check tank welds. X-rays give an inside look at almost all of the welded seams.

Kraska, IR (General American Transportation Corporation) *Quality Progress* Vol. 11 No. 12, Dec. 1978, pp 22-23

ACKNOWLEDGMENT: EI
ORDER FROM: American Society for Quality Control, 161 West Wisconsin Avenue, Milwaukee, Wisconsin, 53203

03 195106**PLASTICS IN THE CONSTRUCTION OF ROLLING STOCK-PRESENT STATE AND FUTURE PROSPECTS FOR PLASTICS USES BY THE FEDERAL GERMAN RAILWAY**

Plastics are making a major contribution towards optimum design of rolling stock, as in the case of other vehicles. The extent of present-day applications and recognisable trends for the future form the subject of this article, with special reference to the problems relating to rolling stock. For figures and table see German text. [German]

Cabos, HP Fischer, HJ *Kunststoffe-German Plastics* Vol. 68 No. 10, Oct. 1978, pp 54-57, Figs., Tabs., 4 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

03 195111

FREIGHT CAR INSPECTION [Badania diagnostyczne wagonow towarowych]

Description of measuring equipment proposed by the COBiRTK for wear checks on wheels, buffers and truck center plates. Account of a semi-automatic control post for car exchange control which provides details of car component wear in the form of a printed information sheet. [Polish]

Czaplinski, R *Trakcja i Wagony* VI-25 No. 11-12, pp 310-316, 20 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Trakcja i Wagony, Warsaw, Poland

03 195129

PRE-SERIES PRODUCTION HIGH SPEED TRAINS. FIRST RESULTS [Les rames TGV de preserie. Les premiers resultats]

The first pre-series high speed train was delivered without interior fittings in July 1978 and fitted with measuring devices to check it systematically in trials with single phase current in the Alsace plain, with d.c. current between Paris and Tours and on lines in the Pyrenees. Tests mainly concerned endurance, braking, stability and comfort. [French]

Metzler, JM *Revue Generale des Chemins de Fer* Vol. 98 Jan. 1979, pp 47-50, 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

03 195686

AUTOMATIC MEASURING SYSTEM FOR PANTOGRAPHS AND WHEELS OF THE SHINKANSEN ELECTRIC CARS

Since 1974 JNR Railway Technical Research Institute has been developing an automatic system for measuring critical dimensions of pantographs and wheels of the high-speed Shinkansen electric cars as they run through a monitoring station at repair shops. Measured by the prototype device are pantograph wear and upward pressure, wheel tread and flange wear, wheel diameter and back-to-back gauge, and abnormal wheel vibrations. Reliability and data processing of results are being studied.

Hirota, Y (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 4, 1979, pp 15-16, 1 Fig., 1 Tab., 2 Phot.

ORDER FROM: ESL

DOTL JC

03 196359

RAILROADING FOR PROFIT: EQUIPMENT

Continuing the "Railroading for Profit" series, the roles of locomotives and freight cars in greater revenue production and cost control are examined through interviews with mechanical department officers. Designing, specifying and maintaining cars and locomotives are discussed, along with statistics indicating the magnitude and challenges of the maintenance of equipment function on today's railroad.

Welty, G *Railway Age* Vol. 180 No. 12, June 1979, p 32, 5 Phot.

ORDER FROM: ESL

DOTL JC

03 196369

FREIGHT STOCK FOR THE DEVELOPMENT OF COMBINED ROAD-RAIL TRAFFIC [Il materiale merci per lo sviluppo del traffico combinato strada-rotaiia]

An examination is made of the various technical problems of vehicle gauge and axle load which determine an optimum choice of the types of railway wagons for this type of transport. A brief summary of what has already been carried out in Europe both for the technique of horizontal and vertical loading of the load units on the wagons is given. [Italian]

Ritossa, E (Ferrovie dello Stato, Italy) *Ingegneria Ferroviaria* Vol. 33 No. 10, Oct. 1978; pp 875-883

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

03 196376

ULTRASONIC INSPECTION OF RAILWAY TRACTION AND ROLLING STOCK AXLES

Axles of traction and rolling stock in use by British Rail are subjected to in-service ndt using three mandatory ultrasonic techniques; these are an

end-wise scan, a near end-low angle scan and a high shear wave scan. The use of these three scans ensures that the whole axle is tested, not just the traditional cracking zones.

Farley, P (British Railways Board Research Department) *NDT International* Vol. 11 No. 6, Dec. 1978, pp 287-293, 8 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

03 196377

DESIGN OF A CRASHWORTHY LOCOMOTIVE CAB

A crashworthy locomotive cab has been designed with a structure capable of deflecting an overriding vehicle upward and over the cab, resisting secondary impact and providing a survivable volume for the crew. The design treats the deflection shield and the underframe requirements. In addition a structural framework for the cab is designed using USAAMRDL KRASH computer program. The response of the structure in crash conditions has been obtained. Examples of the deformation and representative strain energy distribution are shown. Results of the investigation are discussed.

Collected Technical Papers AIAA ASME Struct Struct Dyn Materials Conference 19th, Bethesda, Maryland, April 3-5, 1978.

Widmayer, E (Boeing Vertol Company)

American Institute of Aeronautics and Astronautics Tech Paper 1978, pp 84-91

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, AIAA

03 196385

ON RUNNING STABILITY OF THREE-PIECE BOGIE AND ITS PREVENTION OF TRUCK HUNTING

The three-axle bogie is easy to assemble, dismantle and maintain. But at low speeds hunting may occur. The article shows that an axle which is spring-suspended in relation to the vehicle frame is an effective means for preventing this phenomenon. The optimum degree of stiffness in the supports needs to be established to achieve a maximum critical speed.

Yokose, K *Railway Technical Research Inst. Quarterly Reports* Vol. 19 No. 4, Dec. 1978, pp 163-168, 12 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

DOTL JC

03 196393

INFLUENCE OF TRACK PARAMETERS ON THE EXTENT OF RAIL FATIGUE [Vlijaneto na parametrite na zeleznija p't v'ruh intenzivnostta na stranicnoto iznosvane na rselite v krivi s malki radiusi]

No Abstract. [Bulgarian]

Mircev, M Nedjalkov, G *Zelezopaten Transport* Vol. 54 No. 2, 1979, pp 28-33, 6 Fig., 1 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Ministry of Transport, 9-11 Levski Street, Sofia, Bulgaria

03 196405

DEVELOPMENTS IN THE TRANSPORT OF MINERAL OIL PRODUCTS IN TANK-WAGONS [Entwicklung auf dem Gebiet des Transportes von Mineraloel-Produkten in Eisenbahn-Kesselwagen]

The author discusses in turn the development of tank-wagons from 2 to 4 bogie axles, progress made in loading and unloading techniques, the introduction of trainloads, the safety of this type of rolling stock. He also comments on recent regulations introduced in the RID (International Regulations concerning the Carriage of Dangerous Goods) with special reference to compressed, liquid or pressurised gases. [German]

Janssen, RJ *Eisenbahn-technische Rundschau* Vol. 28 No. 1-2, Jan. 1979, pp 19-26, 7 Phot., 7 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

03 196406

THE SPS 719, A SPECIAL CAR FOR THE TRANSPORT OF PIPING, WOOD [SPS 719: ein Spezialwagen zum Transport von Rohren und Holz]

Description of a new DB flat car especially intended for the transport of piping, rough and sawn timber. The car is fitted with extra-strong stanchions and an integrated device for load fastening. A report on the advantages of this car for both users and the Railways: easier handling and operating, safety, lower maintenance costs. [German]

Haun, HG Hanke, M *Eisenbahntechnische Rundschau* Vol. 28 No. 1-2, Jan. 1979, pp 11-16, 12 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

03 196538

ITALY'S PENDOLINO: A SUCCESSFUL EXPERIMENT

Development of a tilting train by Italian State Railways is seen as an economic advantage over track modifications that would otherwise be required for high-speed passenger service. The ETR 401 is designed to achieve a 30% speed increase on lines with maximum conventional design speed of 160 km/h and a top speed of 250 km/h on high-speed track. Prototype tests have shown the active suspension to be effective and durable; other facets of the trainset's design are seen to require modification.

Camposano, P (Italian State Railways) *International Railway Journal* June 1979, p 76, 6 Phot.

ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010

DOTL JC

03 196540

BETTER TRACK WOULD BOOST GIANT WAGON EFFICIENCY

North American railroads have moved rapidly to the 100-ton freight car, achieving new levels of productivity and simultaneously experiencing difficulty both with cars and track. The evolution of the heavy and high-capacity cars over the past two decades is discussed.

Houser, FN (Transportation Research Board) *International Railway Journal* June 1979, p 104, 8 Phot.

ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010

DOTL JC

03 196943

SWISS CONTRIBUTION TO THE DEVELOPMENT OF EQUIPMENT FOR PASSENGER COMFORT IN RAIL PASSENGER COACHES

It has taken about half a century for equipment for passenger comfort in rail passenger coaches to progress from the electric heater fitted under the bench seat to the electronically controlled air conditioning system. The author describes this development step-by-step and shows how Swiss railways and Swiss industry pioneered advances in this field.

Diefenhardt, P *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 823-826

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

03 196981

PREVENTION OF ROLLER BEARING-INITIATED BURNOFFS IN RAILROAD FREIGHT CAR JOURNALS

The objective of this program was to determine the technical feasibility and cost effectiveness of constructing three separate devices for the prevention of catastrophic roller bearing-initiated, railroad journal failure. 1. Construction of a low cost axle cap bolt which would replace one of the three bolts in a standard bearing assembly, and which would contain a self-powered, maintenance free transmitter to signal a train crew in the event of roller bearing overtemperature, was proven feasible. This is technically and economically superior to current wayside temperature sensing devices, and has the capability of preventing burnoffs associated with bearing failure by any mechanism. 2. The prevention of bearing overlubrication by use of

automated ultrasonic test methods was seen to be feasible. Use of such a device in a railroad repair track would prevent regreasing a freshly greased bearing and thereby save the costs of setouts and derailments caused by overlubrication. 3. The early detection of bearing component damage (spalling, brinelling, and particulate contamination) by use of "Shock Pulse Analysis" techniques was also seen to be feasible. Use of an automated device in a railroad wheel shop could save the costs of burnoffs associated with progressive damage, and also of investigative bearing teardown as a result of derailment.

Allen, GE Lucas, JR Tomlinson, FH
SKF Industries, Incorporated, Federal Railroad Administration,
Transportation Systems Center Final Rpt. FRA/ORD-78-16,
DOT-TSC-FRA-79-5, Jan. 1979, 284 p., Figs., Tabs., 8 Ref., 6 App.

Contract DOT-TSC-935

ORDER FROM: NTIS

DOTL NTIS

03 196984

ON-BOARD FAILURE-PROTECTION REQUIREMENTS FOR RAILROAD-VEHICLE EQUIPMENT

An analysis of the 1975 railroad-equipment-caused accidents was made. Data reported to the FRA were the primary source of derailment information; however, data from other sources were also used. Individual cause codes were consolidated into groups which had a common characteristic that might be used to detect the presence of the defect. Fifteen cause codes were identified to account for two of every three accidents. Existing on-board failure-detection systems were evaluated. A developmental on-board equipment failure-prevention system was identified. Purchase costs are given in terms of yearly damage loss due to accidents, allowable system-payback period, and fraction of accidents the system is intended to prevent. A development effort in the area of on-board sensor technology is recommended. This effort is directed toward the production of a multi-sensor protection system which may provide a maximum reduction in equipment failures while also being cost-effective.

Smith, RL Frarey, JL
Shaker Research Corporation, Federal Railroad Administration,
Transportation Systems Center Final Rpt. FRA/ORD-78-72,
DOT-TSC-FRA-79-6, Mar. 1979, 206 p., Figs., Tabs., 4 Ref., 8 App.

Contract DOT-TSC-1029

ORDER FROM: NTIS

PB-297678/AS, DOTL NTIS

03 196993

REFERENCE BOOK ON FREIGHT CAR REPAIRS

This reference book presents the basic dimensions and weights of freight car parts, standards for consumption of materials, tolerances used in various types of repairs; the defects commonly encountered in freight cars, and methods for their elimination. The third edition of the reference book has been revised to include new types of cars introduced on the railroads and changes which have occurred in the official instructions, rules, and state standards. The reference book is intended for foreman, crew chiefs, and other engineering and technical workers involved in the maintenance of railroad cars. The chapters in the reference book are: (1) Basic characteristics of cars, (2) General information on the maintenance and repair of cars, (3) Wheel pairs, (4) Axle boxes with friction bearings, (5) Axle boxes with roller bearings, (6) Coils and springs, (7) Trucks, (8) Coupler devices, (9) Automatic brakes, (10) Car frames, (11) Car bodies, (12) Electric welding during car repair, (13) Car painting, (14) Containers, (15) Saw-timber used in car repairs, (16) Metal products used in the repair of cars, (17) Basic requirements for cars in operation, and appendices.

Partial translation available for reference. Contact Technology Planning Officer, FRA, Office of Research and Development.

Alekseyev, VD
Transport Publishing House 1970, 464 p., 289 Tab.

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852.

03 196997

EXAMINATION OF STRESSES IN RAILWAY WHEELS AFTER FITTING TIRES [A vasuti kerekabronos felhuzas utani feszultsegi viszonyainak vizsgalata]

Following the increase in the speed of freight trains, a significant rise has been noted in the number of cases of damage to tires. To find out the causes, MAV has made a detailed study of the strength of solid centre wheels. The article reports on the results obtained after various inspections and examinations carried out at the Research Institute. [Hungarian]

Raonky, P *Kozlekedestudomanyi Szemle* Vol. 28 No. 11, Nov. 1978, pp 500-507, 12 Phot., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Lapkiado Vallalat, Lenin Korut 9-11, 1073 Budapest 7, Hungary

03 197004

FIAT Y 0270 S BOGIES FITTED TO STANDARD EUROPEAN COACHES [Les bogies Fiat Y 0270 S equipant les voitures standard europeennes]

Comprehensive technical and photographic documentation on this new bogie which is proof of the similarity of French and Italian notions of passenger-coach bogies. [French]

Caire, D *Chemins de Fer* No. 335, Mar. 1979, pp 76-81, 14 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Association Francaise des Amis des Chemins de Fer, Gare de l'Est, Paris 10e, France

03 197010

BOGIE DESIGN FOR RAPID TRANSIT VEHICLES

No Abstract.

Higton, JA *Railway Engineer International* Vol. 4 No. 2, Mar. 1979, pp 47-50, 17 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

03 197017

POSSIBLE METHOD FOR MODERNISING BOGIE SUSPENSION IN FREIGHT CARS BY USING DISC SPRINGS [Mogucnost modernizovanja ogibljenja rtnih postolja zeleznicnih teretnih kola ugradnjom tanjirastih opruga]

In this study the author discusses the features of a new method of bogie suspension in which disc springs are used. Positive results were obtained in tests, but calculations in connection with the optimum number of disc springs are not yet available, and the study does not provide much information on this point. [Serbo-Croatian]

Milojevic, AV *Zeleznice* Vol. 35 No. 4, Apr. 1979, pp 28-35, 8 Fig., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Zeleznice, Belgrade, Yugoslavia

03 197441

USER'S GUIDE FOR THE INTERACTIVE SCHEDULING PROGRAM: PRELIMINARY CALENDAR VERSION

The Office of Transportation Management of the Urban Mass Transportation Administration (UMTA), in conjunction with the Transportation

Systems Center (TSC), designed and developed the Interactive Scheduling Program (ISP) to assist rail-transit operators in the scheduling of preventive maintenance. The ISP was first applied to the scheduling of warranty inspections for the new Light-Rail Vehicles (LRV's) acquired by the Massachusetts Bay Transportation Authority (MBTA). The warranty for these vehicles covers a 2-year period, and requires scheduled inspections every 45 days. While the ISP is designed for the LRV's, its scope could easily be broadened to aid any property with equipment whose maintenance is conducted on a calendar basis. This document describes the user's guide for the preliminary calendar version of an ISP. A computerized scheduling system is described that is designed to operate on a real-time or on-line basis. By utilizing a set of program commands, the user is allowed to enter and extract data relative to vehicle warranty scheduling. A scheduling algorithm was developed for this program which incorporates a variable work window whose purpose is to minimize fluctuations in the daily workload. This minimization results in less required manpower and overtime, therefore resulting in a reduced maintenance cost. The program operates on a five consecutive year span for the years between 1976 and 2000.

Downey, PJ

Transportation Systems Center, Urban Mass Transportation Administration Handbook DOT-TSC-UMTA-77-43, UMTA-MA-06-0074-78-1, Aug. 1978, 30 p.

Contract DOT-MA-06-0074

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295021/0ST, DOTL NTIS

03 197453

COST SAVINGS POTENTIAL OF MODIFICATIONS TO THE STANDARD LIGHT RAIL VEHICLE SPECIFICATION

This report describes an assessment of the Standard Light Rail Vehicle (SLRV) specification to determine whether the relaxation or modification of some requirements could result in a significant reduction in vehicle costs. A Technique of Assessment by Structured Interviewing was applied to include judgments and ideas by each facet of the industry concerning modifications to the specification which would be acceptable and could reduce car costs. A five-stage filtering process was used to select 20 cost reducing modifications from an initial list of 640 candidate specification modifications. The large list resulted from an in-depth review of the current specification. The final set of 20 areas were analyzed quantitatively to estimate cost savings that might be realized. SLRV cost savings of 16 percent are shown to result by implementing the 15 specification modifications which are termed as having acceptable impact upon mission performance. The remaining five modifications have major impact upon mission performance (e.g., unidirectional operation, doors on only one side, simplified friction brakes, no articulation, and elimination of compressed air). Cost savings of 25 percent are shown to result from specifying a bidirectional, non-articulated car with simplified friction brakes and no compressed air and which also incorporates the 15 specification modifications with acceptable impact on mission performance.

McGean, TJ Elms, CP Cooke, FAF Bamberg, W Lea (ND) and Associates, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-79-9, Feb. 1979, 173 p.

Contract DOT-TSC-1495

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295070/7ST, DOTL NTIS

04 185714

DESIGN AND APPLICATIONS OF FLYWHEELS (CITATIONS FROM THE NTIS DATA BASE)

The design and varied applications of flywheels and reaction wheels are investigated in these Government-sponsored research reports. Such diversified applications as satellite stabilization, surface vehicle propulsion, energy transfer devices, and inertia or friction welding are reviewed. (This updated bibliography contains 258 abstracts, 74 of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Sept. 1978, 263 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTIS/PS-78/0997/3ST

04 185715

DESIGN AND APPLICATIONS OF FLYWHEELS (CITATIONS FROM THE ENGINEERING INDEX DATA BASE)

The design and varied applications of flywheels and reaction wheels are investigated in these research reports gathered in a worldwide literature survey. Such diversified applications as satellite stabilization, surface vehicle propulsion, energy transfer devices, and inertia or friction welding are reviewed. (This updated bibliography contains 222 abstracts, 42 of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Sept. 1978, 228 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTIS/PS-78/0998/1ST

04 188996

CURRENT RECOVERY BY REGENERATION BRAKING OF ELECTRIC VEHICLES IN A TRANSIT SYSTEM [Stromrueckgewinnung durch nutzbremsen von Schienenfahrzeugen im Nahverkehr]

Feedback of the regenerated energy into the supply system during electric braking of motor vehicles reduces considerably the total energy consumption, especially for transit railway systems. Although this fact has been known for a long time, such regenerative braking has been of limited propagation due to the lack of suitable control devices which could be applied in an economic way. Power electronics nowadays offer possible creation of regenerative braking circuits using chopper control systems which are capable of accomplishing braking energy feedback into supply system within the entire speed range of the vehicle. After explanation of the circuits being proposed the results of the energy feedback measurements during electric braking are detailed which have been carried out for the modern light rail vehicles of the Transport Authority Hannover. Based on the existing service conditions in Hannover an average energy amount of 25% compared with the consumption required during motoring will be resupplied into the overhead system during braking if chopper control technique is used. [German]

von Moellendorff, H (AEG-Telefunken Berlin, West Germany);

Wagner, R *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 99 No. 6, June 1978, pp 334-338, 4 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

04 188997

MICROPROCESSOR-BASED SUPERVISING SYSTEM OF HIGH-SPEED ELECTRIC RAILCARS

The microprocessor has made it possible to realize on-board digital control systems. This paper describes a microprocessor-based on-board system which supervises the states of train operation and of the apparatus installed on the high-speed electric railcars for the Shinkansen lines in Japanese National Railways and also presents various kinds of information to a motorman.

This paper was presented at the IECEC 4th Annual Conference Proceedings, IECEC '78: Ind Appl of Microprocess, held in Philadelphia, Pennsylvania, March 20-22, 1978.

Yasukawa, S (Japanese National Railways); Kaneda, H Kitayama, T
Institute of Electrical and Electronics Engineers Proceeding n

78CH1312-8 IECEC, 1978; pp 227-232

ACKNOWLEDGMENT: EI
ORDER FROM: ESL, IEEE

04 189024

ECONOMIC MAINTENANCE OF ELECTRIC LOCOMOTIVES IN RAILWAY SHEDS [Wirtschaftliche Unterhaltung der elektrischen Lokomotiven im Bahnbetriebswerk]

No Abstract. [German]

Sohst, D Greschke, KH *Eisenbahningenieur* Vol. 29 No. 10, Oct. 1978, pp 458-464, 4 Tab., 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

04 189032

IMPRESSIVE SERVICE RUNNING BY RTG POWERED BY TURMO XII GAS-TURBINE

Twelve months service on SNCF following intensive evaluation with Turbomeca Turmo XII gas-turbine fitted in an RTG Turbotrain set established marked economies to bring such propulsion into line with good diesel running costs and consumption.

Senac, G *Railway Engineer International* Vol. 7 No. 2, Sept. 1978, pp 49-51, 4 Fig., 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

04 189740

ASEA THYRISTOR CONTROLLED LOCOMOTIVE, SERIES EL 16, OF THE NORWEGIAN RAILROAD SYSTEM [ASEA-Thyristorlokomotive Baureihe EL 16 der Norwegischen Staatsbahnen]

A four-axle locomotive is described which attains a maximum speed of 140 km/hr with a gross weight of 80 t. It is capable of pulling trains for which normally a six-axle locomotive of conventional design with 105 t gross weight would be necessary. The mechanical and electric equipment of the EL 16 locomotive is designed to make it especially fit in the severe winter climate and steep slopes. The locomotive develops a power output of 4440 kw and continuous traction of 205 kN at 78 km/hr. [German]

Elektrische Bahnen Vol. 49 No. 6, June 1978, pp 158-162, 1 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 189742

CONTINUOUS DEVELOPMENT OF THE PERIODIC REPAIR SYSTEM FOR THE MAINTENANCE OF ELECTRIC TRACTION UNITS IN THE WORKSHOPS OF THE OPERATING MACHINE SERVICE OF THE WEST GERMAN RAILROAD SYSTEM [Fortentwicklung des Fristensystems fuer die Instandhaltung Elektrischer Triebfahrzeuge in den Werkstaetten des Betriebsmaschinendienstes der Deutschen Bundesbahn]

In recent years extensive trials concerning the extension of period and the reduction of volume of work have been carried out for the preventive maintenance of electric tractive units. These trials had the aim to reduce considerably maintenance demands and, at the same time, to increase the availability of vehicles. In order to have object-related maintenance measures, the planning of the sequence of operations and detailed work instructions are separately prepared for each vehicle type. [German]

Pfeiffer, H Solt, W *Elektrische Bahnen* Vol. 49 No. 7, July 1978, pp 179-186

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 189795

TUBULAR-AXLE INDUCTION MOTORS FOR RAILWAY TRACTION

A 3-phase electric-traction system for railway vehicles is described. The traction motor is an inside-out induction machine, built within a tubular

axle, driving the wheels directly without gearing. The concept offers potential savings in manufacturing and maintenance costs. Good agreement has been obtained between predictions and measured performance on a series of experimental motors, and production versions are now being designed.

Stokes, RW *Institution of Electrical Engineers, Proceedings* Vol. 125 No. 10, Oct. 1978, pp 959-966, 18 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

04 189808

NOVEL TRACTION SYSTEM FOR RAILWAY APPLICATIONS

Traction systems employing the simple and rugged a.c. induction motor have long been the dream of railway engineers. Variable-frequency solid-state inverters have made that dream a reality, and many railway authorities and manufacturers around the world are developing such systems using conventional polyphase induction motors driving the wheels through gears. The Research & Development Division of British Rail has succeeded in building an induction motor entirely within a tubular axle and its gears which arise with conventional arrangements are eliminated.

Spooner, E *Electronics and Power* Vol. 24 No. 10, Oct. 1978, pp 737-740

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

04 190269

FURTHER DEVELOPMENTS IN THE STIRLING ENGINE

[Weiterentwicklungen am Stirlingmotor]

In the first part the stirling cycle for a double acting engine is discussed. In the engine by Rinia the heat cycle takes place between the cold underside of the piston in a first cylinder and the warm top face of a second adjoining cylinder. Between the cylinders there are the relevant heat exchangers, the heater, the regenerator and the cooler. The working gas contained therein flows with oscillations through the heat exchangers. The operations are described in detail. The control of the operations is discussed (particularly control of pressure level, short circuit control, intermittent short circuit control, control of cylinder volume, control of cylinder clearance). Finally comparisons are made between types of control with the conclusion that the main types of control, i.e. control of cylinder volume, pressure level control and intermittent short circuit control, have their advantages and disadvantages. For certain applications they could achieve particular significance. In the second part differing engine concepts of the following manufacturers are discussed: Philips, Holland; Ford, USA; United Stirling Sweden AB, Sweden; M.A.N-MWM, Germany; M.A.N-MWN/Battelle Institute; Harwell, United Kingdom Energy Authority. [German]

Zacharias, F *Motortechnische Zeitschrift* Vol. 38 No. 9, Sept. 1977, pp 371-377, 17 Fig., 1 Phot., 17 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-307541), Federal Institute of Road Research, West Germany
ORDER FROM: ESL

04 190277

APPLICATIONS OF KINETIC ENERGY STORAGE TO TRANSPORTATION SYSTEMS

The recent rediscovery of the flywheel as an effective energy storage system, coupled with the growing public and government awareness of the need for energy-efficient passenger vehicles, has led to a resurgence of development activity in kinetic energy storage systems. Programs are currently underway by UMTA and DOE which will make use of pure flywheel and flywheel-assisted propulsion for a wide range of vehicles including subway cars, commuter trains, transit buses, passenger automobiles, and postal vans. The background and status of these ongoing activities is described, along with other planned flywheel applications, such as the recuperation of braking energy from freight trains on long downgrades.

Lawson, LJ (AiResearch Manufacturing Company) *High Speed Ground Transportation Journal* Vol. 12 No. 3, 1978, pp 1-27, 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 190278

DEVELOPMENT OF PISTON RINGS FOR HIGH OUTPUT ENGINES IN EUROPE

A minimum of blow-by is achieved with the use of chromium plated or molybdenum coated rings that are sharp edged on one side. The proven chrome rings of the past can be significantly improved with respect to their scuff resistance and wear behavior by means of a new running surface topography. The service life of chromed rings is considerably lengthened as a result of the development of the so called layered chrome process. Plasma coatings--as is generally known--similarly provide the ring with an extended working life. However, they have the disadvantage of the occasional breakout in the coating. The plasma welded coating developed at Goetzwerke solves this problem and provides in addition a high wear capacity due to its extreme thickness. Coil spring loaded rings are chiefly used as oil scraping rings which guarantee a considerably lower scatter in oil consumption due to close tolerances for contact land and spring.

For Meeting held November 5-9, 1978.

Dueck, GE

American Society of Mechanical Engineers ASME 78-DGP-18, 1978, 6 p., 2 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

04 190306

A PERSONAL PHILOSOPHY ON DIESEL ENGINE DESIGN

Many conflicting factors in the design of medium-speed diesel engines must be resolved. Performance characteristics in various applications, manufacturing costs, maintainability, reliability and environmental effects must all be considered. The customer's intended application must be a guiding factor in engine design.

Ephraim, M, Jr (General Motors Corporation) *Railway Gazette International* Vol. 135 No. 2, Feb. 1979, pp 135-138, 2 Fig., 5 Phot., 2 Ref.

ORDER FROM: ESL

DOTL JC

04 190315

AGE DETERIORATION OF ELECTRONIC EQUIPMENT ON RAILWAY ROLLING STOCK

Recently electronic apparatus involving transistors and integrated circuits has been used extensively on rolling stock. This trend is evident particularly on the Shinkansen where the automatic train control system and other controls using low-voltage electronic auxiliary systems are applied. In the course of reliability tests of these electronic components, it is important to know that their aging characteristics are not negligible and to understand if the results of these tests reflect these conditions. This article explains how one detects aging and takes it into account in the course of inspection of the Automatic Train Control equipment on Shinkansen cars.

Ohba, Y (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 3, 1978, pp 10-12, 5 Fig., 3 Tab.

ACKNOWLEDGMENT: Japanese Railway Engineering
ORDER FROM: Japan Railway Engineers' Association, 2-5-18 Otemachi, Chiyoda-ku, Tokyo, Japan

DOTL JC

04 190332

DEVELOPMENT AND LIMITS OF ELECTRIC TRACTION CONTROLS [Sviluppo e limiti degli azionamenti elettrici di trazione]

After recalling the limits of wheel/rail adhesion, discussing the pros and cons of three-phase motors in relation to d.c. motors and giving some ideas on how converters work, the author concludes that the various solutions being developed are aimed mainly at weight reduction and simplification of the different parts of the controls. [Italian]

Lanzavecchia, L *Ingegneria Ferroviaria* Vol. 33 No. 7-8, July 1978, pp 670-673, 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

04 190338

HEAVY SHUNTING LOCOMOTIVES. CONVERTER TECHNIQUE FOR TRACTION ENGINES WITHOUT COLLECTOR [Schwere Rangierlokomotiven. Umrichtertechnik mit kollektorlosen Fahrmotoren]

An asynchronous motor, which provides certain advantages, can be used for the propulsion of railway vehicles in combination with impulse-controlled direct-alternating thyristor converters. The Swiss Federal Railways recently made use of this technique for the production series of heavy shunting locomotives. This article describes operating experiments and points out the limitations of the new technique at its present stage of development. [German]

Gerber, M Winter, P *Schweizerische Technische Zeitschrift* Vol. 75 No. 1, 1979, pp 24-27, 9 Phot., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Buechler und Co AG, Seftigenstrasse 310, CH 3084 Wabern, Switzerland

04 190344

COMPARATIVE STUDY OF THE DIFFERENT TYPES OF ELECTRIC TRACTION MOTORS IN THEIR SPECIFIC SPHERES OF APPLICATION [Vergleichende Studie ueber die verschiedenen elektrischen Traktionsmotor-Typen in ihrem spezifischen Anwendungsbereich]

The different types of power supplies for traction motors are studied and compared in this article. The article also suggests various parts that could be used to develop the best possible tractive units; the traction motor is the focal point of the author's attention. [German]

Moser, R *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 795-810, 6 Tab., 11 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

04 190345

THREE-PHASE DRIVE FOR RAIL VEHICLES IN THE 80'S EVEN FOR PUBLIC SHORT-DISTANCE PASSENGER TRAFFIC [Drehstromantrieb fuer die Schienenfahrzeuge der 80er Jahre, auch im OEPNV]

No Abstract. [German]

Amler, J *Verkehr und Technik* Vol. 31 No. 10, Oct. 1978, pp 379-382, 5 Phot., 14 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Schmidt (Erich) Verlag, Herforder Strasse 10, 4800 Bielefeld, West Germany

04 190351

10,000 ELECTRIC RUBBER-RING RESILIENT AXLE DRIVES [10000 Gummiringfederantriebe fuer Elektrische Triebfahrzeuge]

The running performance of the resilient rubber-rings is discussed. The resulting rubber-ring transmission group comprising the resilient rubber-ring drive with rubber suspension drive and rubber-ring cardan drive is critically assessed with regard to its best service applications. [German]

Kloss, G *Glaser's Annalen ZEV* Vol. 102 No. 9, Sept. 1978, pp 255-261, 23 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 190363

DIESEL LOCOMOTIVES

The book contains general information on mainline locomotives, the theoretical aspects of these vehicles, and their design and construction. The authors set forth the technico-economic bases in the choice of the principal parameters of mainline locomotives. They examine the basic parameters of power plants and transmissions, the construction and design of auxiliary systems, body and truck frames and suspensions. The requirements placed on sanitation and hygienic facilities are stated. Sample calculations of traction characteristics are given. This book is intended for the use of engineering and technical personnel of locomotive plants, design bureaus, scientific-research institutions engaged in planning and improvement of

locomotives, and also for the engineering-technical personnel of the rail-transport industry. [Russian]

Abstract only translated in English. Book available for reference purposes at the Office of R&D, FRA. Contact Technology Planning Officer.

Mashinostroyeniye Publishing House 1976, 544 p., 45 Tab.

ACKNOWLEDGMENT: FRA

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

04 190364

TYPE 2TE116 DIESEL LOCOMOTIVE [Teplovoz 2TE116]

This book presents basic technical data on the diesel locomotive. The equipment installed on the locomotive is described and some information is provided on equipment tuning. Primary attention is devoted to the diesel engine, pneumatic and hydraulic systems, auxiliary equipment, electrical systems, and other apparatus. The principles of operation and tuning of the electric transmission are examined in detail. This book is intended for diesel locomotive engineers and their aides and depot employees. [Russian]

Abstract only translated in English. Book available for reference purposes at the Office of R&D, FRA. Contact Technology Planning Officer.

Filonov, SP

Transport Publishing House 1977, 320 p.

ACKNOWLEDGMENT: FRA

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

DOTL RP

04 190365

PASSENGER DIESEL LOCOMOTIVE TYPE TEP 70 [Passazhirskii teplovoz TEP 70]

This book examines the design features of the TEP 70 diesel locomotive and its components, including its 2A-9DG diesel generator systems, electrical equipment, and underframe. This book is intended for diesel locomotive engineers, and also may be useful to students of professional technical schools and to engineering technical personnel. [Russian]

Abstract only translated in English. Book available for reference purposes at the Office of R&D, FRA. Contact Technology Planning Officer.

Buikov, VG

Transport Publishing House 1976, 232 p., 7 Tab.

ACKNOWLEDGMENT: FRA

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

DOTL RP

04 190366

DEPOT REPAIR OF ALTERNATING CURRENT ELECTRIC LOCOMOTIVES [Depovskoi remont elektrovozov peremennago toko]

The book presents general information on modern systems and organization of depot repair of alternating current electric locomotives. Described are the basic servicing technology; the TR-1, TR-2, and TR-3 types of running repair of VL60, VL60K, VL80K, and VL80T electric locomotives; the flow (assembly) lines and the automation of production processes; and problems in economics, technical safety and industrial sanitation. In comparison with the 1st edition, published in 1971, this book has taken into consideration all the changes associated with the improvement of the alternating current electric locomotive repair system. This book is intended for technicians and depot locomotive repair personnel and may be useful to engineers and students in railroad transportation secondary school institutions. [Russian]

Abstract only translated in English. Book available for reference purposes at the Office of R&D, FRA. Contact Technology Planning Officer.

Transport Publishing House 2nd Edit 1976, 440 p., 22 Tab.

ACKNOWLEDGMENT: FRA

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

04 190367

RULES OF THE DEPOT REPAIR OF DIESEL LOCOMOTIVES OF THE TYPE TE3 AND TE10 [Pravila depovskogo remonta teplovozov tipa TE3 i TE10]

This book presents general information on the fusing, welding, heat treatment, and fastening of parts during diesel locomotive repair. Detailed

treatment is given to preventive inspections, minor periodic repairs, major periodic repairs, and "lift" repairs of the diesel locomotives. Appendix 1 deals with size tolerances of parts and components; appendix 2 deals with performance requirements for rheostatic tests of TE3 and TE10 diesel locomotives following depot and unplanned repair; appendix 3 deals with test requirements of electrical machines on the diesel locomotives; appendix 4 deals with technical conditions for acceptance of fuel pumps and test stand testing; appendix 5 deals with component and system lubrication; and appendix 6 deals with parts subject to ultrasonic or magnetic checking during depot repair of type TE3 and TE10 diesel locomotives. [Russian]

Abstract only translated in English. Book available for reference purposes at the Office of R&D, FRA. Contact Technology Planning Officer.

Transport Publishing House 1969, 312 p., 12 Tab., 6 App.

ACKNOWLEDGMENT: FRA

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

04 190369

LOCOMOTIVE INTERNAL COMBUSTION ENGINES

[Lokomotivnye dvigateli vnutrennego sgoraniya]

This book covers the principles of operation, operating processes, fundamentals of diesel locomotive internal combustion engine dynamics, engine components, and locomotive gas-turbine plants. Primary attention has been directed at diesel locomotive engines. This book is intended for engineering-technical personnel working in the field of railroad transportation. [Russian]

Abstract only translated in English. Book available for reference purposes at the Office of R&D, FRA. Contact Technology Planning Officer.

Volodin, VI

Transport Publishing House 1978, 239 p., 15 Tab.

ACKNOWLEDGMENT: FRA

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

04 190396

LIQUID-COUPLED INDIRECT-TRANSFER EXCHANGER APPLICATION TO THE DIESEL ENGINE

The efficiency of turbocharged diesel engines can be increased by cooling the charge air. A design approach is presented for liquid-coupled indirect-transfer heat exchanger systems to perform the air-cooling function. The two advantages most commonly cited for this approach to charge-air cooling are (1) the heat exchangers involved are easily packaged so that their shapes can be controlled by judicious design, and (2) simple gas ducting allows for compact machinery arrangements and relatively low charge-air pressure drop. An analytical approach to the design of liquid-coupled indirect-transfer heat exchanger systems is presented. Performance curves are constructed on the basis of this analysis. Four important design conditions, evident from observing these performance curves, are outlined. These performance curves serve as a guide for the design of a liquid-coupled charge-air cooling system.

Paper presented at ASME Meeting, November 5-9, 1978.

Eastwood, JC (AiResearch Manufacturing Company)

American Society of Mechanical Engineers N78-DGP-21, 1978, 8 p., 7 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

04 191750

WAYSIDE ENERGY STORAGE STUDY

No abstract available.

Set includes PB-293857 thru PB-293860 as RRIS 04 191751-Volume I thru RRIS 04 191754-Volume IV respectively; Bulletin 7902.

AiResearch Manufacturing Company, Transportation Systems Center, Federal Railroad Administration 4 Volumes, Feb. 1979, 994 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-293856-SET/ST

04 191751

WAYSIDE ENERGY STORAGE STUDY. VOLUME I. SUMMARY

Volume I summarizes an in-depth application study which was conducted to determine the practicality and viability of using large wayside flywheels

to recuperate braking energy from freight trains on long downgrades. The study examined the route structures of nine U.S. railroads and identified various wayside energy storage system (WESS) configurations. The optimum means of transferring energy from the train to the wayside was by means of a high-voltage ac catenary from either regenerative electric locomotives or modified dual-mode (diesel-electric/electric) locomotives. The application of WESS was then analyzed for four specific routes of typical U.S. railroads. These routes and the annual returns on investment (ROI's) resulting from WESS deployment on existing railroads were as follows: Atchinson, Topeka, and Santa Fe (Los Angeles to Belen), 27.1 percent; Black Mesa and Lake Powell, 17.3 percent; Conrail (Pittsburgh to Harrisburg), 22.0 percent; Union Pacific (Los Angeles to Salt Lake City) 20.2 percent.

See also RRIS 04 191750; Bulletin 7902. Also available in set of 4 reports PC E15, PB-293 856-SET.

Lawson, LJ Cook, LM

AiResearch Manufacturing Company, Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-78/78, I, DOT-TSC-FR-79-7.I, Feb. 1979, 79 p.

Contract DOT-TSC-1349

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-293857/9ST, DOTL NTIS

04 191752

WAYSIDE ENERGY STORAGE STUDY. VOLUME II. DETAILED DESCRIPTION AND ANALYSIS

Volume II summarizes an in-depth application study which was conducted to determine the practicality and viability of using large wayside flywheels to recuperate braking energy from freight trains on long downgrades. The study examined the route structures of nine U.S. railroads and identified various wayside energy storage system (WESS) configurations. The optimum means of transferring energy from the train to the wayside was by means of a high-voltage ac catenary from either regenerative electric locomotives or modified dual-mode (diesel-electric/electric) locomotives.

See also RRIS 04 191750. Bulletin 7902. Also available in set of 4 reports PC E15, PB-293 856-SET.

Lawson, LJ Cook, LM

AiResearch Manufacturing Company, Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-78/78,II, DOT-TSC-FRA-79-7.II, Feb. 1979, 291 p.

Contract DOT-TSC-1349

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-293858/7ST, DOTL NTIS

04 191753

WAYSIDE ENERGY STORAGE STUDY. VOLUME III. ENGINEERING ECONOMICS ANALYSIS: DATA AND RESULTS

Volume III contains the detail of the engineering economics analysis which showed attractive returns on investment for deployment of WESS on existing U.S. railroads.

See also RRIS 04 191750; Bulletin 7902. Portions of this document are not fully legible. Also available in set of 4 reports PC E15, PB-293 856-SET.

Lawson, LJ Cook, LM

AiResearch Manufacturing Company, Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-78/78, III, DOT-TSC-FRA-79-7.III, Feb. 1979, 570 p.

Contract DOT-TSC-1349

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-293859/5ST, DOTL NTIS

04 191754

WAYSIDE ENERGY STORAGE STUDY. VOLUME IV. DUAL-MODE LOCOMOTIVE: PRELIMINARY DESIGN STUDY

A preliminary design study was conducted to confirm the technical viability and economic attractiveness of the dual-mode locomotive concept based on the most common U.S. road locomotive, the SD40-2. The study examined the existing characteristics of the base locomotive and ensured that operation in the diesel mode would not be compromised by a locomotive which has

a pantograph, transformer, converter, and choke added to permit operation from a 50 kV catenary. The study concluded that the concept is technically viable (although some equipment is only available overseas) and is economically attractive, the top line modification cost being \$217,500.

See also RRIS 04 191750; Bulletin 7902. Also available in set of 4 reports PC E15, PB-293 856-SET.

Lawson, LJ Cook, LM

AiResearch Manufacturing Company, Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-78/78, IV, DOT-TSC-FRA-79-7.IV, Feb. 1979, 54 p.

Contract DOT-TSC-1349

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-293860/3ST, DOTL NTIS

04 191881

LITHIUM/IRON SULFIDE BATTERIES FOR ELECTRIC VEHICLES

Recent progress in the development of $\text{LiAl/FeS}/\text{sub } \pi/$ batteries for electric vehicles has indicated the possibility of near-term commercialization of a version of the battery that utilizes monosulfide (FeS) positive electrodes in conjunction with low-cost, iron-alloy current collectors. Eagle-Picher Industries, Inc., was awarded a one-year contract to fabricate a 40-kWh battery of this type, which will be tested in a van at ANL in 1979. Multiple-electrode cells having a specific energy of about 100 Wh/kg are now under test. Conceptual design problems for a compact insulating jacket, which will maintain the battery temperature at 450 deg C, appear to have been solved. With such a jacket, the energy efficiency of the battery would be decreased by only 3 to 5% as a result of heat losses if the temperature of the battery is permitted to fluctuate by 20 to 50 deg C. A commercial prototype of the FeS-type battery that could be developed by 1981 to 1983, depending on the rate of funding available, would be expected to have a specific energy of about 100 Wh/kg, an energy density of 200 Wh/liter t a 4-h discharge rate (including the weight and volume of the jacket and hardware), and a specific power of 100 to 125 W/kg. Work is also underway on a version of the battery that would utilize FeS sub 2 positive electrodes, which use molybdenum current collectors at present and may require the future development of less expensive current collectors to be commercially attractive. These batteries would ultimately have about 30 to 40% higher specific energy and 50 to 75% higher specific power than the FeS-type batteries.

Symposium on electric vehicle, Philadelphia, PA, USA, 2 Oct 1978.

Nelson, PA Chilenskas, AA Steunenberg, RK

Argonne National Laboratories, Department of Energy 1978, 24 p., 7 Fig., 4 Tab., 78

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

CONF-781006-2

04 192065

ENERGY STORAGE WITH AMBIENT TEMPERATURE RECHARGEABLE LITHIUM BATTERIES

An ambient temperature rechargeable lithium battery with characteristics suitable for load-leveling and electric vehicle applications was developed. The battery was to use an organic electrolyte and a dissolved depolarizer. Studies were made of transition metal depolarizers. Their major problem was excessive self-discharge. The depolarizer of choice is lithium/polysulfide, which is very soluble and discharges and recharges readily. Its self-discharge reaction with lithium is slow and leads to soluble lower polysulfides. The initial problems of this system which operates a little above room temperature (approximately 50 degrees Centigrade) were moderate rate capability and modest recharging of the lithium electrode. Effort was directed at improving the recharging of the lithium electrode and its performance was greatly improved. Improvements in the cycling performance were in large part due to the development and refinement of techniques for the preparation of high purity electrolyte. It was found that a procedure in which the solvent is passed through a column of neutral alumina, the electrolyte prepared and pre-electrolyzed in a specific way, then passed through a second column of alumina gives the best cycling results. Promising lithium cycling results were achieved using an aluminum alloying substrate and a one molar lithium arsenic fluoride/tetrahydrofuran electrolyte.

Brummer, SB Dampier, FW Koch, VR Rauh, RD Reise, TF
EIC Corporation, National Science Foundation Final Rpt.
NSF/RA-780382, Jan. 1978, 284 p.

Contract NSF-AER75-03779

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-290934/9ST

04 193763

OPTIMIZATION SCHEME FOR PREDICTING MINIMUM FUEL CONSUMPTION BY TRANSPORT DIESEL ENGINES [Skhema prognozirovaniya minimal'nykh raskhodov topliva transportnykh dizeler] A scheme for predicting the minimal average operational fuel consumption by newly designed transport diesel engines by means of mathematical or physical modeling of their working cycles is proposed. Examples of realization of such a scheme in application to the problem of selection of the main thermodynamic and design parameters of the promising diesel locomotive (16 ChN 25/27) and marine (6 ChN 26/34) diesel engines, assuring their high fuel economy under operating conditions, are presented. [Russian]

Shokotov, NK Gotskalo, BL Moroz, VI *Izvestia Vysshikh Uchebnykh Zavedenii, Mashinostr* No. 8, 1978, pp 91-93

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

04 193768

SIMULATION OF INVERTER/INDUCTION-MACHINE SYSTEMS INCLUDING DISCONTINUOUS PHASE CURRENTS

The study includes the analysis and simulation of inverter-fed squirrel-cage induction-machine drives. The particular drive used for experimental validation was a 120 degree square-wave inverter feeding a tubular axle induction motor developed for rail traction by the British Railways Board. The system and its operation in self-excited braking are described. An original analogue model of the inverter is developed that is suitable for the simulation of commonly used types of inverters. Results from the real system and from the simulation compare well for both transient and steady-state operation.

Lockwood, M *Electric Power Applications* Vol. 1 No. 4, Nov. 1978, pp 105-114

ACKNOWLEDGMENT: British Railways

ORDER FROM: Institution of Electrical Engineers, Publishing Department, P.O. Box 8, Southgate House, Stevenage, Herts SG1 1HQ, England

04 193775

RESEARCH TOWARD IMPROVED FLYWHEEL SUSPENSION AND ENERGY CONVERSION SYSTEMS

This report describes CSDL efforts on a NSF-sponsored study to conceptualize and develop advanced concepts for suspension and energy conversion systems for use in conjunction with flywheel energy storage. These flywheel and energy conversion studies were directed toward the utilization of flywheel energy storage for utility load-leveling during peak power periods, both at the residential and utility levels, for complementing windmill or photovoltaic systems, and for transportation systems. A detailed set of system requirements which would allow two-way power flow between a high-speed flywheel shaft and a 60-Az line was outlined. A study of existing conversion system types indicated that the system requirements could best be met with a new concept. Therefore, a special-purpose integrated rotating machine and power-switching stage were designed. Quantitative techniques were developed to analyze the energy conversion and control systems. An economic study of existing bearing types indicated that magnetic bearings have the greatest potential for development for use in stationary flywheel energy storage systems with long storage cycles, although a newly developed ball bearing would be superior for moving applications and some short storage cycle stationary applications. A special-purpose low-loss magnetic suspension system was designed which will allow efficient 24-hour cycle energy storage. A computer model of the flywheel and suspension system was developed to aid in the determination of critical suspension and control parameters and evaluation of system performance.

Eisenhaure, D Oberbeck, G O'Dea, S Stanton, W

Draper (Charles Stark) Laboratory, Incorporated Final Rpt. Nov. 1977, 181 p.

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

PB-278679

04 193776

OVERVIEW OF FLYWHEEL ENERGY STORAGE COMPONENT DEVELOPMENT

Sandia Laboratories is charged with advancing components technology for flywheel energy storage systems. Portions of this work are being done-in-house, the balance on contract with outside agencies. At this writing, seventeen specific efforts can be identified. These comprise seven tasks under the heading of composite wheel development, four under bearings, three under vacuum seals, and three under general vacuum technology.

Information Exchange Conference held October 24, 1978, Luray, Virginia.

Woods, RO

Sandia Laboratories SAND-78-1999C, CONF-781046-8, 1978, 14 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

04 194500

THREE-PHASE CURRENT ELECTRIC LOCOMOTIVES

[Elektrische Lokomotiven in Drehstromtechnik]

In April 1979, the DB will take delivery of five prototype locomotives in the E 120 series. The Bo' Bo' Locomotive (5.6kW, 160 Km/h), equipped with asynchronous three-phase current traction motors, will be supplied with 15 kV, 16 2/3 Hz single-phase current from the overhead contact line. [German]

Maier, A *Deine Bahn (DB)* Vol. 6 No. 11, 1978, pp 666-670, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Eisenbahn-Fachverlag, Am Linsenbergr 16, 6500 Mainz, West Germany

04 194501

SP47 DIESEL LOCOMOTIVE [Lokomotywa spalinowa SP47]

Technical parameters for developing the 3000 HP SP47 Diesel locomotive, which incorporates an ac-dc type electric transmission and will be used for passenger trains with a weight of 600t and a maximum speed of 140 km/h.

Pahl, Z *Trakcja i Wagony* Vol. I-25 No. 10, Oct. 1978, pp 273-281, 2 Fig., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Trakcja i Wagony, Warsaw, Poland

04 194512

TEN YEARS DEVELOPMENT OF THE GAS TURBINE FOR TRACTION PURPOSES [Dix annees de developpement de la turbine a gaz de traction]

No Abstract. [French]

Señac, G *Revue Generale des Chemins de Fer* Vol. 98 Jan. 1979, pp 23-46, 2 Tab., 19 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

04 194633

SITE-SPECIFIC ANALYSIS OF REGENERATION ON THE PATCO AND PAT CASTLE-SHANNON TROLLEY LINES

The use of regeneration as an energy conservation strategy was studied on the Delaware River Port Authority's Lindenwold Line (PATCO) and the Port Authority of Allegheny County (PAT) Castle-Shannon Trolley Line. These transit systems are quite different from each other in both operating and physical characteristics; the former characteristic of a commuter railroad and the latter a light rail vehicle system. The energy management simulation model, developed at Carnegie-Mellon University over the past two years, was used to realistically duplicate the operation of the systems under conditions of no regeneration and regeneration with both natural and assured receptivity. Although these two systems differ physically and operationally, energy savings on a percent basis under conditions of assured receptivity without on-board storage are rather similar--PATCO (28-32%),

PAT (30-35%). On-board storage presents less savings--PATCO (25%), PAT (23%)--principally because of the additional weight required of the storage devices and associated control. Under conditions of natural receptivity, savings are smaller--PATCO (5-9%), PAT (10-12%). There are so many physical and operational parameters in a transit system which can affect the energy savings upon application of regeneration, that it is both necessary and desirable to do site-specific studies of this type when planning regeneration capability for either a new or existing transit system.

Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference held April 12-14, 1979, Colorado Springs, Colorado.

Uher, RA (Carnegie-Mellon University)

Institute of Electrical and Electronics Engineers Tech Paper IEEE 79CH1454-8 IA, 1979, pp 37-46, 16 Fig., 5 Tab., 11 Ref.

ACKNOWLEDGMENT: IEEE

ORDER FROM: IEEE

DOTL RP

04 194655

COMPARISON OF CONVERTER SYSTEMS FOR TRACTION STOCK WITH THREE-PHASE TRACTION MOTORS

This is a theoretical examination of the individual components required for the various methods of current feed from the overhead line system for the purpose of operating electric traction stock fitted with three-phase motors. Critical consideration is given to the individual components, and their mode of action is examined with respect to the effect on network, freedom from harmonics, and power factor. The article also deals with energy regeneration with electric brakes and the ancillary equipment necessary. Consideration is also given to diesel-electric traction, and the article concludes with a comparison of the individual systems. [German]

Dreimann, K *Eisenbahntechnische Rundschau* Vol. 27 No. 12, Dec. 1978, p 799

ACKNOWLEDGMENT: Maritime Policy and Management

ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

04 194669

TRACTIVE UNIT DRIVE SYSTEMS FOR HIGH SPEED TRAFFIC [Die Antriebskonzeption von Triebfahrzeugen fuer den Schnellverkehr]

No Abstract. [German]

Rappenglueck, W *Elektrische Bahnen* Vol. 49 No. 12, Dec. 1978, pp 306-320, 4 Tab., 20 Phot., 24 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

04 194671

THE REVERSE CONDUCTING THYRISTOR AND ITS APPLICATION [Der rueckwartsleitende Thyristor und seine Anwendung]

The reverse conducting thyristor is a thyristor associated with an anti-parallel diode on a silicon crystal: Insofar as this eliminates a block in the thyristor, losses can be considerably reduced. The two components are prevented from interfering with each other by means of built-in protection rings. A simple method for assessing heat stress is described, as are several applications (chopper, converter, electric filter) for which this thyristor offers technical and cost advantages. [German]

De Bruyne, P Jaecklin, AA *Brown Boveri Review* Vol. 66 No. 1, 1979, pp 5-10, 2 Tab., 10 Phot., 11 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

04 194816

STATISTICAL APPROACH TO DETERMINING THE EFFECTS OF SPEED, LOAD, OIL AND COOLANT TEMPERATURE ON DIESEL ENGINE SPECIFIC FUEL CONSUMPTION

The engines use in the study were the Cummins VT-903 (turbocharged) and the Caterpillar 3208, both being direct-injection and four-cycle. The data were taken for the Cat 3208 engine using a fractional factorial statistical method which reduced the total test matrix from 256 to 64 data points. The

experimental data are used in the development of BSFC regression equations as a function of load, speed, outlet coolant temperature and inlet oil temperatures. A mathematical parameter for expressing quantitatively the change of BSFC per 10 degree F change in coolant and oil temperature is presented. It was found that an increase in the coolant and/or oil temperatures had the effect of reducing BSFC in both engines.

Prepared for SAE Meeting Nov. 13-16 1978.

Yousry, M Johnson, JH Pandit, SM *Society of Automotive Engineers Preprints* SAE 780971, 1978, 30 p., 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

04 194864

STATE OF THE ART: WHAT OF THE FUTURE?

[Standort-Bestimmung: Wie Geht es Weiter?]

This report reviews new sources of energy, new drive mechanisms and the possibilities of new transport systems. Energy sources covered are methanol, hydrogen and liquid bottled fuels, and details are presented of the type of production, range of possibilities for the vehicle, technical and economic problems. The types of engines proposed are diesel, wankel, stratified charge engines, electro, stirling motors, hybrid-drive, gas turbines and fuel cells, all of which are suggested as possible new drive systems. In addition to the motor vehicle, the Bundesbahn, the federal railway system, (with its TEE and Inter-City trains), the underground railway, tramway and trolley buses, magnetic suspension technology and suspended railway, may also be classified as a modern and future orientated means of transport. /TRRL/ [German]

Seifert *Polizei Technik Verkehr* Vol. 22 No. 10, Oct. 1977, pp 389-392, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 307654), Federal Institute of Road Research, West Germany

ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

04 194872

LOCOMOTIVES UNDERGROUND

Haulage on rail tracks in underground mines is compared with movement by means of troughed belt conveyors. It is suggested that one of the main advantages of rail transport is the ability to provide smooth running conditions in carrying minerals, men and materials. The use of diesel locos, introduced into underground mines in Britain in 1939 is discussed in relation to new design concepts such as those based on the availability of hydrostatic transmission. Reference is made to various designs such as the hunslet rack locomotive, rauma-repola parkano train systems and overhead monorail locos. Battery locomotives are considered to have advantages of independent mobility, simplicity and inherent safety, low maintenance costs, and to have no problems associated with ventilation, heat generation or noise. The use of both battery and trolley locomotives is described, and reference made to their use in various countries apart from Britain. Control systems, including computer control and automatic car discharge are described, and the haulage capacities of electric locomotives related to grade and weight of locomotives in short tons is tabulated. A manufacturers' guide is provided on electric and diesel types, electric locomotives and diesel locomotives.

Mineralogical Magazine Vol. 138 No. 4, Apr. 1978, pp 313-329, 6 Fig., 1 Tab., 13 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 238746)
ORDER FROM: ESL

04 194875

NEW 3000-V DC LOCOMOTIVE TYPE E 656-CAIMANS-OF THE ITALIAN RAILROAD SYSTEM [Die neue 3000-V-Gleichstromlokomotive E 656--Caimano--der Italienischen Staatsbahnen]

The introduction, by the Italian railroad authorities, of the locomotive class E 656 for heavy and fast passenger traffic is reported. This locomotive rated for 160 km/hr has the wheel arrangement Bo'Bo'Bo. Designed for 4800 kw, this locomotive represents the highest-performance tractive units of the Italian Railroad System. The locomotive is described, with special emphasis on improvements in comparison with the E 646 from which the new class has been developed. [German]

Masi, E *Elektrische Bahnen* Vol. 49 No. 8, Aug. 1978, pp 198-202

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 195059

SIMULATION SHOWS HOW CHOPPERS CAN SAVE ENERGY

Chopper-type controls cause lower energy loss for transit trains than does resistance control of traction-motor voltage. Because choppers do involve first cost and weight penalties, the reduction in electric power demand must be accurately predicted before rolling stock is ordered. These savings depend on physical characteristics of the route, pattern of service, power supply sectioning and maximum overvoltage to be tolerated.

Railway Gazette International Vol. 135 No. 4, Apr. 1979, pp 300-304, 7 Fig., 2 Phot., 9 Ref.

ORDER FROM: ESL

DOTL JC

04 195060

AMTRAK'S 200 KM/H LOCOS SPEARHEAD REVISED NORTHEAST CORRIDOR PLANS

Delivery this year of the first of 30 tri-voltage locomotives capable of operation at 200 kph marks an important milestone in the Northeast Corridor Improvement Project. Built by Electro-Motive Division in conjunction with ASEA of Sweden, the Rc4 design locomotives will operate, along with refurbished Metroliners, to provide fast, frequent services in the Corridor.

Railway Gazette International Vol. 135 No. 4, Apr. 1979, pp 305-307, 1 Phot.

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04 195061

THREE-PHASE AND SIMOTRAC COMBINED IN MUELHEIM

The prototype light rail vehicle delivered to Muelheim combines three-phase traction motors with a drive utilizing hollow axles called Simotrac and designed to save weight and space. A series of other light rail and rapid transit vehicles with three-phase motors are in service or on order for Germany and Austria.

Railway Gazette International Vol. 135 No. 4, Apr. 1979, pp 319-320, 1 Phot.

ORDER FROM: ESL

DOTL JC

04 195084

SERVICE IMPROVEMENT OF THE QUENCHABLE NONSYMMETRIC BRIDGE CIRCUIT IN MULTIPLE-UNIT TRAINS TYPE ET 420 [Betriebsertuechtigung der Loeschbaren Unsymmetrischen Brueckenschaltung (LUB) in den Triebzuegen ET 420]

The electric multiple units series ET 420 for West German urban rapid transit systems are equipped with phase angle control, which is operated as sequence control of two converter bridges in order to diminish the reactive power requirements. Some years ago three multiple units had been additionally equipped with a quenching circuit at one of the bridges in order to improve the power factor. It is shown how this installation has been gradually improved to meet operational requirements. [German]

Binswanger, M Pfister, F *Elektrische Bahnen* Vol. 49 No. 10, Oct. 1978, pp 270-276, 7 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 195085

ELECTRIC EQUIPMENT OF THE FIRST AC SERIES LOCOMOTIVE, TYPE 7E, FOR THE SOUTH AFRICAN RAILROAD SYSTEM [Die Elektrische Ausruestung der Ersten Wechselstrom-Serienlokomotive Baureihe 7E fuer die Suedafrikanischen Eisenbahnen]

The introduction of electric traction on the first railroad line electrified with ac 25 kv 50 Hz between Ermelo and the new seaport Richards Bay during the second half of 1978 is reported. The article deals with the electric installation of the thyristor locomotives envisaged for use on this line which is essential for coal export. [German]

Deppisch, G *Elektrische Bahnen* Vol. 49 No. 10, Oct. 1978, pp 250-257, 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 195088

ELECTRIC TRACTION UNITS, THEIR CARE AND MAINTENANCE FROM THE VIEWPOINT OF THEIR UTILIZATION [Elektrische Triebfahrzeuge, ihre pflege und Unterhaltung unter dem aspekt ihres Einsatzes]

The principal objectives of the maintenance in the engine sheds and repair shops for electric traction units of the West German Railroad System are explained. Research activities concerned with causes of damage and wear are reported. These activities coupled with rationalization of maintenance work recently have made it possible to reduce the number of production hours for maintenance. Since nevertheless the specific prime cost has grown because of increased labor costs, future efforts should be directed towards an intensified reduction in the number of the specific production hours. [German]

Frerk, HW *Elektrische Bahnen* Vol. 49 No. 9, Sept. 1978, pp 225-229, 2 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 195105

PROSPECTS FOR DEVELOPMENT IN MANUFACTURE OF ELECTRIC EQUIPMENT FOR MAIN-LINE ELECTRIC LOCOMOTIVES

The basic trends in the development of the manufacture of modern equipment for traction electric drives are analyzed. They include: Continued transition from contact-type equipment to contactless both in power circuits and in control and auxiliary-drive circuits for electric locomotives. The development of combination (contact-contactless) control, regulation, and protection systems; transition to digital components and automatic systems, to microprocessors and control microcomputers; studies aimed at developing current collectors for high speeds; development of universal normalized test and research methods for the entire set of traction electric equipment; standardization of equipment.

Galev, NP Lobanova, LS Bondarenko, EM *Soviet Electrical Engineering* Vol. 48 No. 9, 1977, pp 1-4

ACKNOWLEDGMENT: EI
ORDER FROM: Allerton Press, Incorporated, 150 Fifth Avenue, New York, New York, 10011

04 195118

ACCEPTANCE TESTS ON MECHANICAL TRANSMISSIONS FOR THE PARIS-SOUTH EAST HIGH SPEED TRAINS AT THE VITRY TEST CENTRE [Les epreuves d'homologation des transmissions mecaniques du TGV Paris-Sud-Est au centre d'essais de Vitry]

With the use of traction motors designed to be mounted on the body of the powered vehicles, it was necessary to set up a test bench at the Vitry Test Centre to carry out acceptance tests on the transmission systems. After describing the general principles of how the bench works, the authors analyze the acceptance testing programme. [French]

Sauvage, G *Revue Generale des Chemins de Fer* Feb. 1979, pp 72-80, 12 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

04 195125

SELECTION OF A RATIONAL METHOD AND TESTING PROGRAMME FOR SYNCHRONOUS GENERATORS FOR HIGH-POWER LOCOMOTIVES [Vybor racional'nogo metoda i shemy ispytaniya tjagovyh sinhronnyh generatorov moschnykh lokomotivov]

No Abstract. [Russian]

Nesterov, NG *Vestnik VNIIZT* No. 8, 1978, pp 22-26, 4 Fig., 3 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

04 195127

THE ENERGY-SAVING ELECTRIC CAR [Der stromsparende Triebwagen]

The three-phase electronic control motor is replacing the d.c. motor used for more than a century for suburban traffic. It has been tested since 1975 with trains in Nurnberg and since 1978 on the Vienna metro. The advantages of this motor are energy savings (up to 25%), smooth running, regenerative braking, less wear and easier maintenance because there are no collectors or carbon brushes. [German]

Nahverkehrspraxis Vol. 26 No. 10, 1978, 501 p.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Arnold Verlag, Siegburg Strasse #5, 4600 Dortmund, West Germany

04 195132

ELECTRIC LOCOMOTIVE IN THREE-PHASE CURRENT TECHNIQUE

An outline of the development of electric traction over the past 100 years. Recent developments in the characteristics and performance of the three-phase asynchronous motor are emphasised.

Gueldenpenning, AUW *Institution of Mechanical Engineers Proceedings* Vol. 193 No. 6, 1979, pp 39-46, 9 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

04 195137

CONSIDERING THE ASYNCHRONOUS MOTOR IN THE TRACTION MODE

No Abstract.

Giovanardi, G *Railway Engineer International* Vol. 7 No. 3, Nov. 1978, pp 87-88, 5 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

04 195544

THE DIESEL FROM D TO L-1

This series of four articles covers design, characteristics, operation and maintenance of all the components making up the diesel-electric locomotive. Part 1, Beginning an examination of today's motive power--from the bottom up, covers underframe and trucks, traction motors and axle gearing. Part 2, Cycles and cylinders, discusses diesel engines, water cooling system, lubricating oil systems, fuel system, and air filtration system. Part 3, Stopping and starting, describes hood and operating cab, braking systems, auxiliary power, main generator or alternator, and control concepts. Part 4, Magnets, mathematics and maintenance, includes descriptions of electro-magnetism, throttle control, governor, power and tractive force, comments on maintenance, and purchasing and specifying locomotives.

Parts 2, 3 and 4 of this series can be found in "Trains" Vol. 39 No. 7, 8, and 9, respectively: May 1979, pp 44-51, June 1979, pp 46-51 and July 1979, pp 44-49.

Smith, VL *Trains* Vol. 39 No. 6, Apr. 1979, pp 22-29, Photos.

ORDER FROM: Kalmbach Publishing Company, 1027 North Seventh Street, Milwaukee, Wisconsin, 53233

DOTL JC

04 195693

THREE PHASE AC TRACTION STUDY FOR MULTIPLE UNIT TRAINS ON NEC. LETTER REPORT 18

This study involves the time and energy performance of three-phase AC induction motors applied to MU trains in the Northeast Corridor. The AC motor, as compared with existing DC Metroliner motors, has higher power-to-weight and power-to-volume capabilities, is more rugged, and costs less. Trip time performance equal to that of a DC-driven improved Metroliner should be achievable without AC motors driving every axle. Configurations using some motorless axles or cars should be considered.

Stallkamp, JA
Jet Propulsion Laboratory Oct. 1978, 33 p., 8 Fig., Tabs., 1 App.

ORDER FROM: Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, 91103

DOTL RP

04 195694

THREE PHASE TRACTION FOR HIGH SPEED PASSENGER SERVICE ON NEC. LETTER REPORT 19.

Configurations of multiple-unit trains for the Northeast Corridor having AC induction traction motors but capable of matching improved Metroliners with DC motors are investigated. Economics and performance of the independent car, married pair and three-car set are investigated; each such configuration would have only half as many motors as existing Metroliners.

Jet Propulsion Laboratory Jan. 1979, 12 p., 1 Fig., 5 Tab., 2 App.

ORDER FROM: Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, 91103

DOTL RP

04 196367

OPERATION OF THE MEANS OF TRACTION. PROBLEMS, EVOLUTION, AND FUTURE PROSPECTS [L'esercizio dei mezzi di trazione. Problemi, evoluzione e prospettive future]

The Italian Railroads stock of electric locomotives is described, its utilization is analyzed, the maintenance and repair of the locomotives and the availability of maintenance and repair plants is discussed. Proposals for improvements in this field are outlined. [Italian]

Maffei, G *Ingegneria Ferroviaria* Vol. 33 No. 9, Sept. 1978, pp 748-752

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 196368

HIGH-PERFORMANCE ELECTRIC LOCOMOTIVES [Locomotive elettriche ad elevate prestazioni]

The considerations underlying the project and operational directions followed by the Italian State Railways (F.S.) in developing their concept of acquisition and use of new high-performance electric tractive stock are summed up. [Italian]

Camposano, P *Ingegneria Ferroviaria* Vol. 33 No. 9, Sept. 1978, pp 743-747

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 196370

TRANSISTORIZED AUXILIARY POWER SUPPLY FOR ROLLINGSTOCK

Various systems are used as the auxiliary power supply of rollingstock, depending on the type of car. One application of transistors to an auxiliary power supply for rollingstock is described.

Sugiyama, S Sugimoto, T Okamoto, K Ohori, Y *Fuji Electric Review* Vol. 24 No. 2, 1978, pp 72-77

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

04 196384

THYRISTOR CONTROL SYSTEM FOR HIGH HARMONICS REDUCTION IN SINGLE-PHASE RECTIFYING DEVICE

No Abstract.

Matsushita, T *Railway Technical Research Inst. Quarterly Reports* Vol. 19 No. 4, Dec. 1978, pp 156-162, 1 Tab., 18 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Ken-yusha, Incorporated, HIKARICHO 1-45-6, Kokubunji, Tokyo, Japan

DOTL JC

04 196394

ELECTRONICS AS A MEANS OF OPTIMIZING LOCOMOTIVE OPERATIONS. ENERGY SAVED AND TRAFFIC REGULATED THANKS TO ELECTRONIC EQUIPMENT INSTALLED ON BOARD [L'elettronica ottimizza il funzionamento dei mezzi di trazione. Economia di energia en regolazione delle marcia grazie agli equipaggiamenti elettronici installati a bordo]

No Abstract. [Italian]

Garnier, JP *Ingegneria Ferroviaria* Vol. 34 No. 1, Jan. 1979, pp 18-30, 23 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

04 196404

FS ELECTRIC LOCOMOTIVE FLEET: PROSPECTS FOR EXTENSIVE RENEWALS [Parco locomotive elettriche delle FS: prospettive di un radicale rinnovamento]

Problems in selecting characteristics for future stock. Survey of most up-to-date techniques in this field: power supplies for direct current and asynchronous tractive units and their electronic equipment. The author concludes by reiterating both the present composition of the FS electric locomotive fleet and development prospects. [Italian]

Cavagnaro, M *Ingegneria Ferroviaria* Vol. 34 No. 1, Jan. 1979, pp 3-13, 11 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

04 196460

CHOPPER CONTROLLED ELECTRIC CARS FOR NAGOYA MUNICIPAL TRANSPORTATION BUREAU

In Nagoya City, Nos. 1, 2, and 4 subway lines are now in commercial operation. To expand the urban traffic network, construction work on the No. 3 subway line with an overall length of about 20 km has been carried out. A section of 8 km was opened for service in March 1977. Eighteen cars (basically for four-car train formation), and a number of machines including chopper control equipment have been delivered for the No. 3 subway line. These electric cars were designed by utilizing up-to-date techniques and sophisticated electronic technology. Their semi-stainless bodies requiring no painting permit easy maintenance. Chopper control equipment with regenerative braking is adopted for energy saving. Air cooling equipment is mounted for better service to passengers. The car body design and chopper controller—salient features of these cars—are described.

Yuzurihara, S Kimura, K *Hitachi Review* Vol. 27 No. 4, Dec. 1978, pp 379-384

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

04 196461

NEW CLASS H TRACTION MOTOR

There is a growing tendency to boost the capacity of traction motors for rolling stock. At the same time the motors are subject to rigid restrictions in weight and dimensions. To raise motor capacity it is therefore necessary to improve the insulation system. The IEC provides that the insulation system of the Class H traction motor must continuously endure temperatures up to 180 degree C. For the purpose of improving reliability, a Class C insulation system capable of withstanding 220 degree C continuously has been developed. The Class C insulation system mainly consists of mica and a Class C solventless type varnish, isocyanurate oxazolidone (IO) resin. The liquid IO resin can be vacuum-impregnated at room temperature and has an extremely long pot life. Furthermore the cured IO resin maintains room-temperature characteristics at temperatures up to 220 degree C. By combining the resin with principally inorganic materials the 220 degree C performance is achieved.

Hakamada, T Miya, H Narahara, T *Hitachi Review* Vol. 27 No. 7, Dec. 1978, pp 385-390

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

04 196517

SOME POSSIBILITIES OF REGULATING CONTROLLED RECTIFIERS ON LOCOMOTIVES [Některé možnosti řízených usměrňovačů na lokomotivě]

Various possibilities of controlling the controlled rectifiers on electric locomotives in ac traction systems are considered. The effects of various designs of the control circuits on the properties and possibilities of both the control and the traction are investigated and a new method, the so-called control with interlaced voltage pulses, is analyzed. This new control method has an equal effect as doubling the number of secondary windings. The effects on ripple are evaluated with regard to magnetic coupling between the smoothing reactor windings. [Czech]

Danzer, J *Elektrotechnický Obzor* Vol. 67 No. 9, 1978, pp 529-535

ORDER FROM: ESL

04 196522

OPTIMAL CONTROL OF ON-BOARD AND STATION FLYWHEEL STORAGE FOR RAIL TRANSIT SYSTEMS

The energy efficiency of rail transit systems using regenerative braking is enhanced by flywheel storage elements used to store energy not accepted by the wayside power rail. In this paper three storage system control concepts are examined: armature and field control of on-board flywheels, and field control of a station-based storage device. The energy recovery efficiency and performance characteristics of each system are determined subject to optimal control laws derived to minimize energy loss. The resulting control systems are bilinear, due to the use of separately excited DC traction and flywheel motors as continuously variable transmissions. The three systems yield similar energy recovery efficiencies for deceleration, with the advantages of each for practical applications discussed.

Sweet, LM (Princeton University); Keane, MJ *ASME Journal of Dynamic Systems, Meas and Control* Vol. 100 No. 4, Dec. 1978, pp 284-290, 11 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 196537

MOTIVE POWER: FACING THE CHALLENGE

While locomotives once limited the performance of railroads, today's traction—notably electric—alters the situation so that optimum operating characteristics can be established and locomotives developed to meet these requirements. Diesel locomotives and diesel or turbine rail cars have also contributed to the current operating concepts. The author discusses power supply, catenary systems, dual current and/or dual voltage operations, maintenance planning, electrical equipment, high speed capabilities and other facets of today's locomotive and rail-car design.

Coget, G (French National Railways) *International Railway Journal* June 1979, p 21, 10 Phot.

ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010

DOTL JC

04 196929

ENERGY PROBLEMS IN METROPOLITAN RAILWAYS

This paper reports the specific energy consumption per passenger-kilometer or per passenger-journey on typical metropolitan railways, discussing this in two parts—fixed installations and rolling stock. After citing measures taken to minimize energy consumption by traction and non-traction functions, there is discussion of regenerative braking, thyristors, reversible substations, ac induction traction motors and energy storage. Appendices include results of a survey of representative metropolitan railways, description of thyristor-controlled choppers and inertia storage equipment.

From the 43rd International Congress Helsinki, 10-15 June 1979 International Metropolitan Railways Committee.

Haftner, GH (London Transport Executive); Hanocq, R *International Union of Public Transport* 1979, p 3b1-28, Figs., 3 App.

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

04 196935

TURBOCHARGERS FOR TRACTION DIESEL ENGINES

By using turbochargers the power output of a diesel engine can be increased to between 2.5 and 3 times that of the naturally aspirated engine. Since the power output determined for a definite type of engine, as well as the limits imposed on the overall dimensions of the locomotive, call for relatively small engines with high outputs, this accounts for the importance of the turbocharger in this field of application. The author deals with the problems that had to be solved during development of the turbocharger, to enable it to satisfy the requirements of the railways.

Wehrlein, M *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 836-839

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 196938

BO'BO' MOTOR-COACHES CLASS BE 4/4 OF THE WYNENTAL AND SUHRENTAL RAILWAY (WSB)

Starting with the change of schedules in 1980, the Wynental and Suhrental Railway will introduce a timetable with fixed intervals between trains and so considerably extend the service it offers. WSB's route is single-track throughout. With a fixed-interval timetable it is very important for trains to arrive on time at the crossing places because delay of one train also affects the others. Hence the ratio of tractive effort to the mass of the train must remain substantially constant even during peaks of traffic. The concept which has hitherto prevailed, of making up a train from a motor-coach and one or two trailer or driver-trailer coaches, has therefore been abandoned, and a composition of motor-coach and driver-trailer coach is envisaged as the service unit. For this purpose the Railway has ordered 13 motor-coaches with chopper control, which can run also in multiple control together with conventional rheostatically controlled vehicles. Technical data for the vehicles are listed. The traction equipment is described and vehicle control is explained.

Werder, J *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 756-763

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 196939

TEN YEARS OF THE BBC DIRECT DC CONVERTOR FOR SHORT-DISTANCE VEHICLES

This article describes some of the experience gained from the purposeful use of available technologies, and then describes the present direct dc convertor technology situation, with special emphasis on single-pulse convertor elements as part of the traction equipment for short-distance vehicles. Studies and tests on the first deliveries resulted in a basis being established for all further activities in this sphere. The low-loss, stepless convertors led without exception to improved utilization of the vehicles as a result of increased transport speed, while at the same time consuming considerably less energy.

Knapp, P *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 777-785

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 196940

SUBURBAN TRAINSETS CLASS 9000 OF FERROVIA PAULISTA (FEPASA), SAO PAULO, BRAZIL

Ferrovias Paulista concluded a contract with a Franco-Brazilian consortium for the delivery of 50 six-coach trainsets for 3000 v with chopper control. The authors describe the trainsets, paying particular attention to the electrical equipment.

Bieri, P Garnier, JP Rodrigues Navarro, G Neveux, Y *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 816-822

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 196941

COMMUTATOR TRACTION MOTORS FOR LOCAL TRANSPORT SERVICES

This article deals in detail with commutator traction motors for local rail transport services. The methods of installation dictated by the various bogie designs and the trend in the design of these motors are described.

Haas, H *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 786-794

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 196942

TWO-COACH TRAINSETS CLASS BE 8/8 BUILT IN 1976 FOR THE FORCH LINE, ZURICH

In recent years the Forch Line has developed from a line bearing mainly excursion traffic into a full-status commuter service within the regional transport pattern. In order to meet the demands of future timetables with fixed intervals between trains, the Forch Line put into service at the end of 1976 three two-coach trainsets class Be 8/8 with an axle arrangement of B'B' B'B'. The dual-voltage vehicles (for 600 and 1200 V) are designed as "all-electric" vehicles, having conventional switchgear, electronic control of motoring and braking, as well as electrically controlled, spring-assisted brakes. Their design is largely based on constructional elements used in the articulated trams "2000 series" of the Zurich Municipal Transport Authority. The electrical equipment of these new vehicles is briefly but comprehensively described.

Frech, W *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 764-770

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 196944

TRANSISTORIZED BATTERY CHARGERS

A range of battery chargers for railway coaches which are based on choppers with high clock frequencies has been developed. As a result, axle-driven battery chargers can be replaced by static equipment on rolling stock used for international traffic.

Tapavica, K *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 832-835

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 196988

OBSERVATIONS BY U.S. RAILROAD DELEGATION OF SOVIET ELECTRIC AND DIESEL-ELECTRIC LOCOMOTIVE TECHNOLOGY

In its Sixth Meeting held in Moscow in August 1977 the Joint American-Soviet Railroad Working Group agreed that a U.S. railroad delegation would visit the USSR for 12 days in the second quarter of 1978 to study the design, development, manufacture, repair, maintenance, and operations of Soviet electric and diesel locomotives. As a result, an eight member U.S. delegation made this visit in May/June 1978. Each member prepared a separate informal trip report of his observations. This report is a compilation of the individual reports (which are retained, along with some pictures and printed material, in the files of FRA). This report contains an Executive Summary, individual sections on locomotive design/manufacture, locomotive maintenance/repair, and locomotive operations as well as supporting appendix material. Prior to the visit, more than 90 specific questions were submitted to the Ministry of Railroads. Answers to these questions, as translated by the Soviets, were obtained in written form and through discussions and observations. The body of this report utilizes a format of questions and answers.

Spanton, DL
Federal Railroad Administration Final Rpt. FRA/ORD-79/16, Mar. 1979, 84 p., 8 App.

ORDER FROM: NTIS

DOTL NTIS

04 196992

MODEL 2TEIOL DIESEL LOCOMOTIVE [Teplovoz 2TEIOL]

This book provides the basic technical characteristics and illustrates the operation of the 2TEIOL diesel locomotive. Special attention is devoted to

describing the design of the 10D100 diesel engine, the electrical equipment, the underframe, and auxiliary equipment. Examined in detail are the electrical control circuits and the excitation diagram of the diesel locomotive. The first edition of this book was issued in 1970. This book is intended for engineers and their firemen and can also be used as a textbook by students in technical schools and engineer-training schools.

Abstract only translated in English available for reference purposes only. Contact Technology Planning Officer, FRA, Office of Research and Development.

Stepanov, VR
Transport Publishing House 1974, 320 p., 24 Tab.

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

04 196994

STANDARD CONTROL PANELS FOR DB PASSENGER COACHES [Einheitsschalttafel fuer die Reisezugwagen der Deutschen Bundesbahn]

Description of work to perfect standard control panels. Presentation of a new panel currently undergoing trials in Bpmz coaches and urban railway coaches. Stress is laid on the particular importance of control and diagnostics installations on the control panel. [German]

Rohlfing, G *Eisenbahningenieur* Vol. 30 No. 4, Apr. 1979, pp 147-154, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Vérlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

04 196998

FLYWHEEL GENERATOR MAY HEIGHTEN THE THRIFT OF ECONOMIC RAIL TECHNIQUE [Vliegwiellaggregaat kan zuinige railtechniek mogelijk nog zuiniger maken]

The Netherlands railways are participating in the Dutch national research program "Energy storage in flywheels", which has been established to make a cost-benefit analysis of flywheel driving. This analysis comprises the application possibilities in stopping trains, and in substations and buses. [Dutch]

Haan, FJ de *Koppeling* Vol. 18 No. 731, May 1979, pp 6-7, 2 Fig., 1 Tab., 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Netherlands Railways Limited, Moreelsepark 1, Utrecht, Netherlands

04 197005

SERIES E499.2 ELECTRIC EXPRESS LOCOMOTIVE [Locomotive électrique d'express serie E499.2]

The new Czech E499.2 locomotive, with a maximum speed of 140 km/h, is to be used for fast and express trains on the Prague-Kosice line supplied with 3 kV direct current. Description of the main components of this locomotive, which after changing the reduction ratio of the gear, can be used for speeds of up to 200 km/h. [French]

Palik, F *L'Industrie Lourde Tchécoslovaque* No. 4, 1979, pp 29-33, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Artia, Ve Smeckach 30, 111 27 Prague 1, Czechoslovakia

04 197273

VISCOUS DAMPER QUALIFICATION ON DIESEL LOCOMOTIVE ENGINES-- A CASE HISTORY

This paper presents some results of a study in measuring the performance characteristics of viscous vibration dampers that are used on diesel locomotive engines. The material contained within this report was obtained with the cooperation of the Atchison Topeka and Santa Fe Railway Co (ATSF) and relates to the viscous dampers that are used on large diesel engines of the type manufactured by the Electromotive Division of General Motors (EMD). The study was motivated by an abnormally high incidence of crankshaft failures on the EMD 20-645E3 engines, many of which have shown indications of torsionally induced features. Tear-down inspections of many dampers removed from the failed units proved that they were defective. The objective of this study was to develop, if possible, a method for determining the quality of dampers in an operating environment on the engine. The paper gives details of the test method developed. The total tie-up

time for a locomotive, using this technique, is less than 15 minutes, including installation and removal of the signal pick-up sensor. Damper qualification on the engine has become a reality at a low cost. Even without benefit of predictive aids, such as the manufacturer's system mass elastic data, a reliable technique of experimental prediction has been developed which, in the long run, will tend to reduce the maintenance costs of these locomotive engines and allow them to survive for a greater length of time.

Hershkowitz, H (Sci-Atlanta Incorporated) *Noise Control Vibration Isolation* Vol. 10 No. 1, Jan. 1979, pp 15-19, 4 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 197285

PROPULSION SYSTEM PERFORMANCE REQUIREMENTS FOR GUIDED URBAN TRANSIT SYSTEMS

A methodology is presented for analyzing different performance levels, such as acceleration, deceleration, top speed and peak power to weight ratios, of transit vehicles. The optimization of these levels is desirable to attain certain performance objectives, including the maximization of line and station capacity and the minimization of travel time, capital costs, operating costs and energy consumption. Presented is a method which analyzes the trade-offs involved to achieve various levels of these objectives. The report describes the measures of propulsion system performance and the factors to be considered in their determination, and relates them to the design characteristics and parameters of a typical lrt system. Additional factors which may affect the selection of performance parameters are discussed, namely, the effect of curves, grades and spot speed restrictions. A set of values is recommended which could be used as design guidelines until more definitive studies can be performed on specific applications.

Dawson, WR Dalton, PM
Ontario Ministry of Transportation & Communic, Can Monograph No. RR212, Aug. 1977, 22 p., 26 Fig., 3 Tab., 7 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-240996), Roads and Transportation Association of Canada

ORDER FROM: Ontario Ministry of Transportation & Communic, Can, 1201 Wilson Avenue, Downsview, Ontario M3M 1J8, Canada

04 197438

TRANSIT CAR PERFORMANCE COMPARISON STATE-OF-THE-ART CAR VS. PATCO TRANSIT CAR, NYCTA R-46, MBTA SILVERBIRDS

The first phase of this contract authorized the design, development, and demonstration of two State-Of-The-Art Cars (SOAC). This document reports on the gathering of comparative test data on existing in-service transit cars. The three transit cars selected for testing were the PATCO transit car, the NYCTA R-46 transit car, and the MBTA Silverbird transit car. These cars were instrumented and then run in simulated revenue service while data was gathered. The results of these tests are reported in this document in a comparative format with the SOAC data recorded at each of the properties. The SOAC was found to be superior to all three of these existing transit cars in the area of noise reduction. The SOAC ride quality is better than the R-46 and the Silverbird, but not as good as the PATCO transit car. The SOAC propulsion system was inefficient while operating on the New York and Boston route structures, and only marginally better than the PATCO transit car in Philadelphia.

McNeal, C

Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration, Final Rpt. D332-10008-1, UMTA-MA-06-0025-78-5, 7802, 112 p.

Contract DOT-TSC-580

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294985/7ST

05 053309

BRAKE PADS FOR DISC BRAKES AND COMPOSITION BRAKE BLOCKS. REPRODUCIBILITY AND COMPARABILITY OF BRAKE TESTS ON FULL-SCALE BRAKE DYNAMOMETERS

Investigations on six full-scale brake dynamometers which were made in connection with the problems of reproducibility and comparability are described in the report. The results of this work formed the basis for the conditions, requirements and recommendations which will have to be met by brake dynamometers, and the test procedure for carrying out a programme of acceptance tests, for disc brake pads and composition brake blocks.

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

International Union of Railways B 126/RP 4, Apr. 1978, 41 p., 46 Fig., 4 Tab.

ACKNOWLEDGMENT: UIC
ORDER FROM: UIC

DOTL RP

05 189036

IMMOBILISATION TECHNIQUE FOR A HIGH SPEED TRAINSET DEVELOPED BY THE SAB [Technique d'immobilisation d'une rame TGV a L'arret, mise en oeuvre par la Societe SAB]

Description of a spring immobilisation brake controlled by the auxiliary reservoir and of a spring immobilisation brake activated by the air brake cylinder (solution used for the high speed train). [French]

Vie du Rail Outremer Aug. 1978, pp 29-31, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Office Central des Chemins de Fer d'Outremer, 38 rue la Bruyere, Paris 9e, France

05 190307

HYDROKINETIC BRAKES ON THE PROTOTYPE APT

To keep within the braking distance allowed by existing signaling, British Rail's three prototype advanced passenger trains (APT-P) are being equipped with a novel form of hydrokinetic brake based on the same principle as the fluid coupling. Braking energy heats water which is cooled in radiators after each stop is completed, thus allowing service braking from 200 km/h to be repeated at frequent intervals. Without the HK brake, articulation of APT-P trailer sets might have proved impractical because of the high loading on non-powered axles which cannot be braked electrically.

Beacon, A Marshall, JJ (British Rail) *Railway Gazette International* Vol. 135 No. 2, Feb. 1979, p 150, 6 Fig., 2 Phot., 6 Ref.

ORDER FROM: ESL

DOTL JC

05 191446

PASSENGER VEHICLE BRAKING STUDY

The report is a summary of currently available brake components and braking systems that might be applicable to 150-mph passenger service. The summary includes an analysis of the braking problem, a description of braking systems now in use and an evaluation of several advanced braking systems. The report reviews whether or not eddy-current brakes should be developed for use on Amcoaches and/or Metroliners in high-speed service in the Northeast Corridor. This report also considers what systems or components should be developed in the event that eddy-current brakes prove unusable.

Serocki, J Scofield, R
ENSCO, Incorporated, Federal Railroad Administration Tech Rpt.
FRA/ORD-78/33, May 1978, 84 p.

Contract DOT-FR-64113

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292650/9ST

05 194511

SYNTHETIC BRAKE-SHOE INSERTS FOR RAILWAY VEHICLES [Zapatitas de material sintetico para vehiculos ferroviarios]

No Abstract. [Spanish]

Martin Martin, J *AIT-Revista* No. 25, Dec. 1978, pp 29-35, 9 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

05 194634

SAFE BRAKING MODEL FOR A RAIL RAPID TRANSIT SYSTEM

Safe braking distance is an important consideration in signaling block design for rail rapid transit systems. Historically, block design has developed in accordance with empirically determined stopping distances from various operating speeds plus a safety margin, frequently 35 percent. Because of the impact of poor wheel/rail adhesion and vehicle equipment failures on actual train performance during braking, it became necessary to use a more comprehensive and scientific technique for determining safe braking distance requirements for block design. The safe braking model is an analytic approximation of the performance of automatic train protection equipment, its interaction with passenger vehicle propulsion and braking equipment, and the resulting train performance while decelerating from an initial speed to a stop. The safe braking model considers performance parameters of train control equipment, certain wayside and vehicle characteristics, and performance parameters of vehicle subsystems, and it provides an analytic tool for evaluating the impact of each on safe braking distance. In order to achieve a high level of confidence in the safe braking distance calculations, the safe braking model must be conservative, considering failure modes and worst-case equipment performance parameters which can affect train braking. This paper describes the safe braking model in terms of a train speed-distance profile during braking. The safe braking distance is described in terms of vehicle characteristics and components of the speed-distance profile. Input parameters required to define each component of the safe braking distance are identified, the safety impact of each is discussed, and typical values are presented.

Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference held April 12-14, 1979, Colorado Springs, Colorado.

Becher, MC (De Leuw, Cather and Company)
Institute of Electrical and Electronics Engineers Tech Paper IEEE
79CH1454-8 IA, 1979, pp 47-53, 3 Fig., 8 Ref.

ACKNOWLEDGMENT: IEEE
ORDER FROM: IEEE

DOTL RP

05 194645

"CLOSE HEADWAY" OPERATION FOR BAY AREA RAPID TRANSIT (BART)

The original decision to signal BART for 90-sec headways was based on limited data collected mainly under "dry" and simulated adverse track conditions. Subsequent natural condition testing demonstrated that the corresponding 2.7 mph/sec design brake rate assumption could not be relied on in "wet" or rainy weather; and, consequently, BART has had to operate with station-to-station separation of trains and severe speed reduction penalties. The above restrictions have, at times, caused a well-publicized throughput problem for the transit system. An initial test program was conducted by BART in the winter of 1975, making possible identification of important variables influencing train braking performance. However, firm conclusions regarding safe stopping distances could not be reached based on the 1975 data. In order to solve BART's stopping distance problem and provide "close headway" operation to the public as originally promised, a major full-scale test program was conducted during the winter months of 1977-1978 to accurately determine train braking performance under adhesion-limited conditions. This program made use of some basic concepts from the statistical theory of experimental design. The main results and conclusions of this study, recommending safe and efficient "close headway" operation for BART, is the subject of this paper.

Contributed by the Rail Transportation Division of ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979.

Leon, GB (Science Applications, Incorporated); Brumberger, NA (Bay Area Rapid Transit)
American Society of Mechanical Engineers Conf Paper 79-RT-6, Jan. 1979, 12 p., 14 Fig., 9 Tab., 9 Ref.

ACKNOWLEDGMENT: ASME
ORDER FROM: ESL

DOTL RP

05 195070

INDUCTIVELY-COUPLED CONNECTORS FOR SIGNALLING AND BRAKE CONTROL ON LONG FREIGHT TRAINS

Sixty tuned, inductively-coupled, connector pairs (120 units) have been prepared for field testing. A set of these connectors has been subjected to a series of electrical and mechanical tests. Some additional units have been tested to destruction in heating and impact tests. The connectors have an efficiency of 92 per cent, a power handling capability of 100 watts, a passband of 15 kHz, and an operating-temperature range of minus 94 degrees F to 200 degrees F. A demonstration transmission line carrying three communications and signalling channels was set up with 54 connector pairs in series. Ways of increasing the connector efficiency have been investigated, and a proposal for a device combining the air-pressure and electric lines has been presented. The principal recommendation coming out of this work is that the device should be field tested on a unit train.

Sponsored by Transport Canada Research and Development Centre, Canadian National Railways, and C P Rail.

Aitken, GJM

Canadian Institute of Guided Ground Transport Final Rpt. CIGGT Rpt 78-17, Dec. 1978; 35 p., Figs., 6 Ref., 5 App.

Contract TDC 15ST.T8200-77527

ACKNOWLEDGMENT: CIGGT

ORDER FROM: CIGGT

DOTL RP

05 195100

ELECTRIC BRAKING OF ELECTRIFIED URBAN TRANSIT VEHICLE

Problems connected with regeneration of electric energy are discussed and relationships are given for calculating the regeneration efficiency of electrified vehicles and the contact system, as well as the over-all regeneration efficiency. To increase the effectiveness of electric braking, electric traction motors of urban-transit vehicles must be operated in a regime realizing maximum braking capacity. Here in the high-speed range, for existing series of traction motors it is best to use a traction regime characterized by simultaneous variation in armature current and excitation current in a manner ensuring constant maximum voltage between commutator bars. For constant pairwise series-parallel connection of traction motors and follow-up resistive-regenerative braking at maximum permissible subway-car speed, regeneration efficiency is about 64% of the kinetic energy of the train, and is nearly independent of the load carried by a car.

Prolygin, AP Mosyagin, KG *Soviet Electrical Engineering* Vol. 48 No. 9, 1977, pp 12-18

ACKNOWLEDGMENT: EI

ORDER FROM: Allerton Press, Incorporated, 150 Fifth Avenue, New York, New York, 10011

05 195138

THE ELECTRONIC ANTI-SLIP DEVICE ON THE ET 420 POWER CAR [Der elektronische Gleitschutz beim Triebzug ET 420]

ET 420 electric power cars were not initially equipped with an anti-slip device, and on many occasions, locked wheels caused damage. Because of this, an electronic anti-slip device was developed and installed on these vehicles. A detailed description is given of the device, which has proved to be a very profitable investment. [German]

Schott, W Zoufal, K *Elektrische Bahnen* Vol. 50 No. 1, Jan. 1979, pp 18-22, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

05 195713

RECTIFIERS FOR BRAKING ENERGY RECOVERY IN ELECTRIC RAILROAD TRAINS [L'onduleur statique pour la recuperation de l'energie de freinage des vehicules electriques ferroviaires]

The rectifier operation is explained and illustrated by several recent implementations. The prerequisites for introducing it into the networks, as well as the harmonics thus created, are discussed. The use of thyristor rectifiers is particularly recommended because of its energy-effectiveness. [French]

Sauvain, H (Ateliers de Secheron, Switzerland); Lambin, E *Bulletin de l'Association Suisse des Electriciens* Vol. 69 No. 18, Sept. 1978, pp 990-994, 6 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

05 196949

MINING RAIL AND SHUNTING ACCIDENTS: RETARDER AND BRAKE DEVELOPMENTS

The author discusses some brake and track retarder systems currently available. The rail described is assymetrical in cross-section, shaped to facilitate slope independent track braking. It reduces rail to tire pressure on rubber-tired locomotives and permits conventional rail vehicles to be trapped against derailment.

Railway Engineer International Vol. 4 No. 2, Mar. 1979, pp 35-36

ACKNOWLEDGMENT: EI

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DOTL JC

05 197008

INDUSTRIAL USES OF FRICTION: BRAKING. SPECIAL CASE OF A RAILWAY APPLICATION: RAIL BRAKES FOR MARSHALLING YARDS [Les utilisations industrielles du frottement: le freinage. Cas particulier d'une application ferroviaire: les freins de voie pour gares de triage]

Concise description of different types of rail brake, study of the most frequently-found clasp brakes, and efficiency studies. [French]

Jutier, J *Revue Francaise de Mecanique* No. 66, 1978, pp 47-56, 7 Tab., 17 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Revue Francaise de Mecanique, Paris, France

05 197015

THE MAV INERT AND FRICTION TEST-BENCH FOR BRAKES [Schwungmassen-Bremsreibpruefstand der MAV]

Main parameters, drawing and description of the facility. Electrical layout of the measuring equipment. Methods used for measuring brake-shoe pressure and friction forces; braking speed, distance and duration; wheel and brake-shoe temperature; brake-shoe wear. [German]

Heller, G Vajda, J *Zeitschrift der OSSHd* Vol. 22 No. 1(123), 1979, pp 13-15, 3 Fig., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Warsaw, Poland

06 053306

SOME ASPECTS OF THE TRANSMISSION OF SAFETY INFORMATION

This report presents a description of the basic problems related to the transmission of safety information by electronic means.

Restrictions on the use of this document are contained in the explanatory material. This Technical Document (DT) was compiled within the scope of the activities of the ORE Specialists Committee for A 118.

International Union of Railways ORE A 118/DT 86, Nov. 1978, 16 p., 1 Fig.

ACKNOWLEDGMENT: UIC
ORDER FROM: UIC

DOTL RP

06 053328

TRANSMISSION OF DATA TO 9600 BITS/S. REPORT ON THE COMPREHENSIVE PROCEEDINGS OF THE A 145 COMMITTEE

This report gives the results of the tests carried out by the Committee in 1977 and 1978 and the conclusions drawn from the: Modems: TRT (France), CODEX (USA), RACA-MILGO (GB), SAT (France) Circuits: PARIS-FRANKFURT, LUCERNE-ROME, VIENNA-WARSAW. It describes only the main results. The complete records of measurements with modems are given the "Modem book" issued by ORE AZ 32, and the complete records of measurements with circuits are held by ORE where they can be consulted.

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

International Union of Railways Final Rpt. A 145/RP 1, Oct. 1978, 100 p., 65 Fig.

ORDER FROM: UIC

DOTL RP

06 053329

ELECTRONIC TEST INSTALLATION (VIENNA ARSENAL). WORK DONE AT THE ELECTRONIC TEST INSTALLATION IN THE YEAR OF 1976/1977 (FROM 1ST SEPTEMBER 1976 TO 31ST DECEMBER 1977)

This is the tenth annual report on the work done by the Research and Test Institute for Electronics in Railway Technology (abbreviated designation: Electronic Test Installation), which is operated in Vienna jointly by the Office for Research and Experiments (ORE) of the International Union of Railways (UIC) and the Austrian Federal Research and Test Institute Arsenal (BVFA). In this year, the tenth year since the opening of the installation, the agreement of co-operation between the institutions referred to above was superseded by a new agreement with a life of five years. For this reason a technical meeting of several days duration was held. In the course of the year under review, the Electronic Test Installation was engaged in work on the following subjects: 1. Data transmission technique. Preparatory tests were made by the A 145 Specialists Committee for five European Railways concerning the HERMES data transmission network planned by UIC at 9600 bits/s on railway circuits. As part of these tests three different modems were subjected to type tests. 2. Work done for the A 103 Specialists Committee. On the basis of the report on the interference analyses made by the Electronic Test Installation, which had been prepared during the preceding financial year, the A 103 Specialists Committee produced the specifications of performance for equipment used to test the transmission of information in a train. Preliminary studies were made to measure such transmission systems and to assess their quality. 3. Safety tests of automatic warning installations for track maintenance gangs for the A 124 Specialists Committee. After the investigations begun in the preceding year, two other automatic warning installations for track maintenance gangs were tested for their reliable operating. 4. Other railway orders. Interference with telecommunication circuits by various modes of traction was measured, on behalf of NS on their system.

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

International Union of Railways AZ 32/RP 10, Oct. 1978, 74 p., 62 Fig.

ORDER FROM: UIC

DOTL RP

06 053330

PROPAGATION OF RADIO WAVES. RADIO PROPAGATION IN RAILWAY STATIONS--REPORT NO. 2

This report presents the results of experimental work carried out in order to complement published information on how radio propagation is affected by features found in railway stations (such as platform roofs, etc.). These results are presented in the form of basic curves and correction factors, intended to simplify the task of the project engineer.

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

International Union of Railways A 133/RP 2, Oct. 1978, 32 p., 19 Fig.

ORDER FROM: UIC

DOTL RP

06 053331

PROPAGATION OF RADIO WAVES. RADIO PROPAGATION ALONG RAILWAY LINES--REPORT NO. 3

This report presents the results of experimental work carried out in order to complement published information on how radio propagation is affected by the geometry, terrain, construction and equipment commonly found along railway lines. These results are presented in the form of basic curves and correction factors, intended to simplify the task of the project engineer.

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

International Union of Railways A 133/RP 3, Oct. 1978, 46 p., 20 Fig.

ORDER FROM: UIC

DOTL RP

06 185686

COLLISION AVOIDANCE SYSTEMS (A BIBLIOGRAPHY WITH ABSTRACTS)

Collision avoidance systems in three modes of transportation (i.e. air, surface, marine) are investigated in these research reports. Section 1 pertains to air transportation. Traffic scheduling, automatic ground based stations, and onboard warning systems are researched. (Contains 247 abstracts) Section 2 delineates sensors and detectors relative to marine transportation collision avoidance. (Contains 53 abstracts) Section 3 relates to engineering research relative to highway and rail collision avoidance. (Contains 36 abstracts) (This updated bibliography contains 336 abstracts, 36 of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Aug. 1978, 344 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTIS/PS-78/0883/5ST

06 188998

IEEE TECHNICAL PAPERS PRESENTED AT THE JOINT ASME/IEEE/AAR RAILROAD CONFERENCE, 1978

This publication contains the seven IEEE papers from the Conference. The subjects discussed include the technical feasibility of high-voltage dc electrification, research for developing a universal signal and train control system for U. S. railroads, the impact of electromagnetic interference on railroad classification yards, new electric locomotives for Taiwan, computer control and computer assisted dispatching, and regenerative braking as a means of energy conservation. The seven papers are indexed separately.

Joint ASME IEEE AAR Railroad Conference, St Paul, Minnesota, April 11-13, 1978. Contains the following RRIS Citations: 06 173787, 13 173788, 04 173789, 06b 173790, 06 173791, 06 173792 and 13 173793 in RRIS Bulletin 7802.

Institute of Electrical and Electronics Engineers Tech Paper n-78CH1345-8 IA, 1978, 46 p.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL, IEEE

06 189000

WAYSIDE-TRAIN RADIO OF THE FRENCH NATIONAL RAILWAYS [Les liaisons radio avec les trains a la S.N.C.F.]

The system described was designed to enable two-way radio telephone conversations to be made between the drivers of trains in motion on the one hand and traffic controllers, sub-station supervisors and staff at certain

stations on the other, as well as between the drivers of trains in the same radio section. The equipment also enables a driver to set off a "radio warning" if there is an immediate danger to traffic. An alarm signal is received by the traffic controller if a train is stopped by the automatic vigilance device. The article explains how the system functions and its advantages, particularly as regards safety and the free flow of traffic. It contains a technical description of the equipment and its operation. [French]

Huet, J Delavergne, R. *Revue Generale des Chemins de Fer* Vol. 97 June 1978, n.p.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

06 189013 MICROPROCESSORS

The author presents a simple layman's definition of a microprocessor and then shows some of the many steps in the evolution of the train description system, in which considerable use is made of them.

Porter, CA
Institution of Railway Signal Engineers Oct. 1978, 12 p., 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Institution of Railway Signal Engineers, 1 Ashbourne Close, London W5, England

06 189016 NEW TRAIN FOR MECHANICAL LAYING OF CABLE CONDUITS [Nouveau train de pose mecanique des caniveaux] No Abstract. [French]

CFF-Bulletin Vol. 55 No. 11, 1978, pp 204-206, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Swiss Federal Railways, Hochschulstrasse 6, CH-3000 Berne, Switzerland

06 189048 THE AFB AUTOMATIC TRAIN CONTROL EQUIPMENT ON ET 420 AND ET 403 RAILCARS AND LZB CONTINUOUS AUTOMATIC TRAIN CONTROL FOR SHORT AND LONG DISTANCE TRAFFIC [Die Automatischen Fahr-und Bremssteuerungen der Triebzuege ET 420 und ET 403 im Zusammenwirken mit der Linienzugbeeinflussung im Nah-und Fernverkehr] No Abstract. [German]

Strecker, H Landes, W *Elektrische Bahnen* Vol. 48 No. 9, Sept. 1978, pp 230-239, 1 Tab., 13 Phot., 7 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

06 189060 DISPATCHING BY COMPUTER: WHY? HOW MUCH? HOW SOON?

Centralization and computerization of train dispatching have reached various levels on different railroads. Minicomputers and microprocessors are adding new dimensions to dispatching. Examples of levels of sophistication on Chessie System, Louisville & Nashville, Frisco and British Columbia Railway are described, along with general observations on automation of train movements and planning.

Armstrong, JH *Railway Age* Vol. 180 No. 3, Feb. 1979, p 20, 3 Phot.
ORDER FROM: ESL

DOTL JC

06 189075 UNION PACIFIC FIRST TO USE OPTICAL FIBERS

An optical fiber cable, in replacement of a conventional coaxial cable, is being used for transmission of closed circuit television car identification data at Union Pacific's Denver, Co., yard. For a year it will be tested for performance under conditions of vibration, ice and wind loading, and changing temperatures. Advantages are absence of crosstalk, high bandwidth, and resistance to electromagnetic interference.

Progressive Railroadng Vol. 22 No. 1, Jan. 1979, p 93, 2 Phot.
ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

06 189741 PROOF OF PERFORMANCE OF RADIO TELEPHONY ON TRAINS FROM THE POINT OF VIEW OF TRACTION [Die Bewahrung des Zugbahnfunks aus der Sicht der Zugfoerderung]

The installation of radio telephone facilities on trains of the West German railroad system is reported. Technical solutions associated with the implementation are discussed, along with possible uses from the viewpoint of the train personnel. Examples of operational difficulties are cited when radio telephony was a valuable aid in eliminating them. Proposals for better utilization of radio telephony on trains are presented. [German]

Enser, H *Elektrische Bahnen* Vol. 49 No. 7, July 1978, pp 176-179

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

06 189753 AN IMPROVED METHOD OF CONTROLLING SPACES BETWEEN CARS DURING AUTOMATIC SHUNTING

[Modernizacija sistemy opredelenija hodovyh svojstv vagonov]
Trackside scanners along the route followed by the cars being shunted record data which is processed by the central computer and transmitted to the track retarder control units, which adjust the braking power according to the information received by the computer. [Russian]

Abuzin, AI *Avtomatika, Telemekhanika i Svyaz* No. 11, Nov. 1978, pp 14-17, 5 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

06 189754 EEA-4 TYPE ELECTRIC MOTORS FOR SWITCH POINTS: TECHNICAL AND OPERATING REQUIREMENTS AND TESTS [Elektryczny napęd zwrotnicowy typu EEA-4: wymagania techniczno-eksploatacyjne i badania]

A description of the operation of electric motors for switchpoints with turnouts of various kinds. The resistance of the points to displacement is determined and analysed, and the results shown on a graph. The article also describes technical and operating requirements for switchpoint electric motors, and the main functions of such motors. [Polish]

See also Volume I-25 No. 9 pages 225-261 dated September 1978.

Lepich, S *Automatyka Kolejowa* Vol. I-25 No. 7-8, July 1978, pp 193-198, 20 Fig., 3 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Automatyka Kolejowa, Warsaw, Poland

06 189771 ELEMENTS FOR FAST ELECTRIC-PROCESSING OF SIGNALS FOR THE OPTIC TRANSMISSION OF INFORMATION BY MEANS OF GLASS FIBRES [Bausteine zur schnellen elektrischen Signalverarbeitung fuer die optische Nachrichtenebertragung mit Glasfasern]

Conductors of electric waves by means of glass fibres, which constitute extremely wide-band circuits, enable the pulse modulation procedure to be used in future optic transmission systems up to the range of Gbit/s in cases where several km of line are involved. At the entry to the exit from the actual optic circuit a semi-conductor laser (transmitter) or photodiode (receiver) is fitted which converts electric into optic signals and vice versa. [German]

Russer, P
Bundesministerium fuer Forschung und Technologie DB: Dok 4828, 1977, 39 p., 16 Phot., 14 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Bundesministerium fuer Forschung und Technologie, Stresemannstrasse 2, Postfach 120370, D-5300 Bonn 12, West Germany

06 189772 DESIGN OF FAIL-SAFE ELECTROMAGNETIC TRAIN-SPEED SENSOR

Describes the design of a fail-safe sensor used for the detection of the speed of a moving railway vehicle.

Hill, RJ *Institution of Electrical Engineers, Proceedings* Vol. 125 No. 11, Nov. 1978, p 1239, 14 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

06 189807

INTERNATIONAL SIGNALLING PROJECTS

The author has visited a number of overseas Railways and discussed their problems and modernization proposals. He outlines their preferences, standards and requirements and the way in which these have developed.

Fews, JH

Institution of Railway Signal Engineers Adv Paper Nov. 1978, 16 p., 16 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Institution of Railway Signal Engineers, 1 Ashbourne Close, London W5, England

06 190309

INVESTIGATION OF IMPROVED CLOSED-CIRCUIT TELEVISION AND AUTOMATIC STENCIL-READING SYSTEMS FOR CAR IDENTIFICATION

This report presents the results of a study performed by ARINC Research Corporation under contract to the Research and Test Department of the Association of American Railroads to investigate improved closed-circuit television (CCTV) and automatic stencil-reading systems for freight car identification. Technologies related to classification yard CCTV systems, optical character recognition and pattern recognition, and techniques for applying ownership marks and numbers were investigated. Conclusions regarding the potential value of these technologies for applications within the railroad operating environment were reported.

Pruitt, GK Miller, JT

ARINC Research Corporation Final Rpt. Pub-1346-01-1-1866, Feb. 1979, v.p., Figs., 3 App.

ACKNOWLEDGMENT: AAR

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

DOTL RP

06 190316

TRAIN RADIO COMMUNICATION SYSTEM USING LEAKY COAXIAL CABLE (LCX)

The Tohoku and Joetsu Shinkansen lines which are being built are to have a telecommunications system using leaky coaxial cables. This will increase the number of telephone circuits which are necessary for the administrative functions and for serving the public while also increasing the telecommunications capacity. The author describes the leaky coaxial cables and the telecommunication/train radio systems which are to be installed on the two new lines.

Kishimoto, T (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 3, 1978, pp 13-14, 4 Fig.

ACKNOWLEDGMENT: Japanese Railway Engineering

ORDER FROM: Japan Railway Engineers' Association, 2-5-18 Otemachi, Chiyoda-ku, Tokyo, Japan

DOTL JC

06 190317

APPLICATION OF ATC TO BUSY LINES WITH COMMUTER TRAIN TRAFFIC

The JNR has adopted the ATC system for the Shinkansen line to assure the safety of trains at high speed. On almost all other lines the ATS system has been used. But lately the train safety system has been reviewed and improved. In a selection process, any of three systems can be adopted, depending on the importance of the lines and their traffic density. The systems are the ATC, the new ATS with speed sensing, and the existing ATS. The JNR is in the process of increasing the use of ATC on lines with heavy traffic that serve major cities.

Yagi, M (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 3, 1978, pp 15-16, 2 Fig.

ACKNOWLEDGMENT: Japanese Railway Engineering

ORDER FROM: Japan Railway Engineers' Association, 2-5-18 Otemachi, Chiyoda-ku, Tokyo, Japan

DOTL JC

06 190320

TRANSIT SYSTEMS THEORY

Written as an engineering textbook, this book attempts to analyse the workings of transit systems, concentrating in particular on automation.

Anderson, JE

Lexington Books-Teakfield Limited No Date, n.p.

ORDER FROM: Lexington Books-Teakfield Limited, 1 Westmead, Farnborough, Hants GU14 7RU, England

06 190329

CONCEPT OF A VEHICLE SURVEILLANCE SYSTEM AS DESCRIBED FOR THE EXAMPLE OF WAYSIDE HOT BOX DETECTION EQUIPMENT [Konzeption eines ortsfesten Fahrzeugüberwachungssystems, erläutert am Beispiel der stationären Heisslauferortungsanlagen]

A study aimed at defining the monitoring points for wayside rail vehicle surveillance and their distribution along the line sections, in such a way as to obtain optimum results concerning cost and effectiveness. In this connection a statistical survey must be made, assuming a gradual realization of the total system in the form of separate subsystems. [German]

Schrader, U *Glaser's Annalen ZEV* Vol. 102 No. 10, Oct. 1978, pp 303-307, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

06 190337

HIGH SPEED RAIL TRAFFIC CONTROL [Steuerung des Schienenschnellverkehrs]

High traffic density on the lines and the efforts to reach higher speeds have resulted over the last 20 years in a rapid restructuring of train control techniques. Process calculators have already appeared in partial control fields or control systems as a whole. The DB's new lines have given considerable impetus to the rapid introduction of simplified signalling and the use of continuous automatic train control. The near future will see the appearance of a remote-control system using commercial microcomputers. [German]

Wehner, L *Die Bundesbahn* Vol. 54 No. 11, Nov. 1978, pp 835-840, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

06 191738

SIGNALING AND TRAFFIC CONTROL SYSTEM STANDARDS. VOLUME 1

This document defines the standards and specifications to be applied to the signaling and traffic control system of the Northeast Corridor Improvement Project. The document is in two volumes. Volume 1 contains the standards and specifications generally applicable to the design of the basic signaling and traffic control system and those specifically associated with the vital portion of the system to be installed on or near the tracks. Typical circuits and drawing format requirements are included.

Supersedes PB-283 651.

De Leuw, Cather-Parsons and Associates, Federal Railroad Administration Final Rpt. F205-50, FRA/NECPO-79/6, Feb. 1979, 98 p.

Contract DOT-FR-76048

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-293515/3ST, DOTL NTIS

06 194502

RADIO-ELECTRIC INTERFERENCE CAUSED BY TRACTIVE UNITS EQUIPPED WITH PROTOTYPE CHOPPERS [Zakłocenia radioelektryczne wytwarzane przez pojazdy trakcyjne wyposażone w prototypowe urządzenia]

Principles relating to radio-electric interferences caused in chopperised electric trainsets. Criteria for measuring such interferences and results obtained during comparative measurements of interferences in electric powered trainsets in series EN57 (chopperised) and series EW58 (with rheostatic control).

Markowski, R *Pojazdy Szynowe* No. 2, 1978, pp 30-38, 11 Phot., 7 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Pojazdy Szynowe, Warsaw, Poland

06 194503

**EXPERIMENTAL TELECOMMUNICATION LINE.
CONSTRUCTION AND OPERATION [Eksperymentalna linia
radiowa. Prace przygotowawcze. Budowa i eksploatacja]**
No Abstract. [Polish]

See also the October 1978 issue pages 273-278.

Jebam, W *Automatyka Kolejowa* Vol. I-25 No. 9, Sept. 1978, pp 244-249

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Automatyka Kolejowa, Warsaw, Poland

06 194629

**RAIL CAR IDENTIFICATION USING PATTERN RECOGNITION
TECHNIQUES**

Identification of rail car numbers is a basic function needed to check train consists at classification and interchange points throughout the system. Visual car number reading and verification has traditionally been the method used to accomplish this. Recently a number of automatic techniques have been tested for car identification, and a colored label system has been widely implemented but found to be inadequate in the railroad environment. A car imaging and automatic pattern recognition approach is discussed in this paper which attempts to read the painted block numbers on all car sides. A method for detecting the presence of the car number block in a scan of the car side is discussed in detail.

Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference held April 12-14, 1979, Colorado Springs, Colorado.

Anuta, PE
Institute of Electrical and Electronics Engineers Tech Paper IEEE
79CH1454-8 IA, 1979, pp 1-4, 5 Fig., 1 Tab., 3 Ref.

ACKNOWLEDGMENT: IEEE
ORDER FROM: IEEE

DOTL RP

06 194656

**INVESTIGATING THE COMPATIBILITY OF
THYRISTOR-CONTROLLED DIRECT-CURRENT RAILWAYS
WITH THE SIGNALLING AND COMMUNICATION
EQUIPMENT**

Detailed studies have shown that additional alternating currents result in the power supply systems when d.c. control technology is employed on local-transport rail vehicles, but the influence on the signalling, communication and data systems is small in view of the chosen dimensions of the vehicle equipments. By adopting suitable measures on the vehicle itself and on the affected railway subsystem, those plant components can be made compatible which were found to be inadequate in measurement of the S/N ratio. [German]

Wagner, R *Eisenbahntechnische Rundschau* Vol. 27 No. 12, Dec. 1978, pp 821-828

ACKNOWLEDGMENT: British Railways
ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

06 194681

**THE LOGISAFE SAFETY SYSTEM BASED ON
SUB-ASSEMBLIES [Das Sicherheitsbausteinsystem LOGISAFE]**

LOGISAFE is a binary electronic system of sub-assemblies designed to meet the highest safety standards with optimum reliability. It has been developed for incorporation into the control equipment used in numerous spheres such as transportation, with particular reference to rail transport, energy production and distribution, and the technique of methods. [German]

Jentsch, W *Signal und Draht* Vol. 70 No. 12, Dec. 1978, pp 275-284, 17 Phot., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

06 194685

**EFFECTS OF THE SUN'S RAYS ON THE BEHAVIOUR OF
PONAB SYSTEM EQUIPMENT (HOT BOX DETECTORS)**
[Vlijanje solnecnog izlucenija na rabotu apparatury PONAB]

The authors describe the approximate calculation of the seasons, days and length of the periods during which the sun's rays could upset the working of PONAB system equipment. [Russian]

Sajdurov, PS Bykov, J *Avtomatika, Telemekhanika i Svyaz* No. 12, Dec. 1978, pp 7-10, 4 Fig., 2 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

06 194688

**CONSIDERATIONS ON REMOTE CONTROL AND REMOTE
OPERATION OF TECHNICAL INSTALLATIONS (FUSTE)**
[Gedanken zur Fernueberwachung und-steuerung technischer
Einrichtungen (FUSTE)]

The article describes the possible use of remote-control systems for a whole range of applications on the DB. It goes on to explain the related rationalization measures and gives examples of implementation of such systems. [German]

Karl, W *Signal und Draht* Vol. 70 No. 12, Dec. 1978, pp 271-275, 8 Phot., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

06 195066

A NEW ERA FOR TELECOMMUNICATIONS

The past two decades have been marked by railroad use of microwave systems, data systems, electronic PBX equipment, transistorized radio equipment and coaxial and fiber optic cables. Government regulations involving telecommunications equipment are being revised with impacts on railroads' own systems. Continuing industry innovations such as facsimile, word processing, dispatcher consolidation, crew management systems, centralized waybilling, cardless yard and high-speed data networks along with greatly increased telephone requirements have increased communications requirements.

Robertson, HM (Union Pacific Railroad) *Progressive Railroadng* Vol. 22 No. 5, May 1979, p 31, 6 Phot.

ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

06 195079

**NEW CRITERIA FOR THE LAYOUT OF THE MODERN
CENTRALIZED CONTROL POINTS OF BIG PASSENGER
STATIONS [Nuovi criteri per l'impostazione dei moderni apparati
centrali nelle grandi stazioni viaggiatori]**

Starting from an empirical analysis of plant characteristics and the levels of utilization of some big stations, an examination is made of the relationship between operational programming (timings, turns of rolling stock and means of traction, reception track allocation, shunting, interferences, etc.), and the planning of investments. An evaluation is made of further margins of possible exploitation of two big Italian stations as well as the probable improvements which can be achieved with the installation of modern centralized control points. Some (working hypotheses) are advanced on the priority to be given to investment. Interventions of the organizational type (rationalization of operating programs and work methods), and the connected investment into the (human factor) (professional training of personnel, analyses of experiences on other networks, etc.) can give important results in the short and medium term; in the longer term, great advantages can be obtained by means of the acquisition of new rolling stock and installation of modern centralized control points. One should not overlook infrastructural interventions, especially with regard to the layout of the lines at the entry of stations, the lines for the parking and cleaning of rolling stock, locomotive depots, etc. [Italian]

Rizzotti, S *Ingegneria Ferroviaria* Vol. 31 No. 7-8, July 1978, pp 659-669

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

06 195080

DATA TRANSMISSION NETWORK OF THE ITALIAN STATE RAILROADS [La rete di trasmissione dati delle FS]

A description is given of the Italian railroads data transmission network. The development of various subsystems is described namely of: the personnel and accountability control, passenger demand control, rolling stock circulation control, freight demand control, etc. A number of diagrams illustrate the article. [Italian]

Cirillo, B Manzini, V *Ingegneria Ferroviaria* Vol. 31 No. 7-8, July 1978, pp 698-705

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

06 195081

RECENT TENDENCY IN AUTOMATIC TRAIN PROTECTION (ATP) EQUIPMENT

With the increasing demand for railway transport, faster trains and higher intensity service are being called for. On the other hand, there is a growing need for safety. To meet all these requirements, automatic train protection (ATP) equipment must be introduced. Recent advances in electronics technology have brought great improvements to ATP equipment. As latest trends in ATP equipment, this report discusses the train control method and operation method. It is pointed out that digitalized pattern control type ATP equipment is increasing.

Takaoka, T *Hitachi Review* Vol. 27 No. 6, Oct. 1978, pp 321-326, 4 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

06 195117

AUTOMATION OF MARSHALLING YARDS AT THE SNCF [L'automatisation des triages a la SNCF]

Automation in the yards mainly concerns two functions: control of switches and crossovers and control of retarders. The humping technique currently used requires two different sets of retarders at intervals; the orders given by the brake servo come from a mini or microcomputer. The article recounts the development of automation and outlines future trends. [French]

Hochstrasser, C Descamps, G *SNCF-Informations Techn-Direction de l'Equiptement* No. 18, Dec. 1978, pp 3-12, 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Societe Nationale des Chemins de Fer Francais, 92 rue Bonaparte, 75 Paris 6e, France

06 195119

USE OF VIBRATING BLADES OR PITCH CONTROLLERS FOR SIGNALLING PURPOSES [L'application des lames vibrantes ou des diapasons aux circuits electriques de ligne utilises en signalisation]

Electric circuits in lines used for signalling purposes should be highly available and ensure safe transmission of information. To achieve these ends, the SNCF uses vibrating blades, pitch controllers and filters for making the transmitters and receivers for these circuits. [French]

Ponchon, B *SNCF-Informations Techn-Direction de l'Equiptement* Vol. N No. 8, Dec. 1978, pp 27-37, 19 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Societe Nationale des Chemins de Fer Francais, 92 rue Banaparte, 75 Paris 6e, France

06 195142

AUTOMATIC TRAIN CONTROL [Zugsteuerung und Zugsicherung]

Description of the "Automatic train control" research project supported by the Federal Research and Technology Ministry. The purpose of the project was to find the best possible solutions for train speed control and to work out the best systems. Among results, mention can be made of elements which seem promising for an optimum system, a proposed system and a method to prove that safety conditions are met in the case of electronic circuits. [German]

Kuhn, H *Eisenbahningenieur* Vol. 30 No. 1, Jan. 1979, pp 16-19, 2 Phot., 1 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

06 195719

TRAIN OPERATION CONTROL SYSTEM FOR HIGH SPEED RAILWAY

In 1964 the Shinkansen made its debut between Tokyo and Shin Osaka. It was extended westward to Okayama in March 1972 and then on the Hakata in March 1975. It is now a more than 1000-km long traffic artery of Japan and is functioning smoothly. The condition needed of the train operation control system for a high-speed mass-transport railway and how to meet these conditions are explained.

AFIPS National Computer Conference Expo Conference Proceedings Vol. 47, Anaheim, California, June 5-8, 1978.

Hayashi, Y (Japanese National Railways); Yokota, S Nauchi, T American Federation of Info Processing Societies 1978, p 1249

ACKNOWLEDGMENT: EI

ORDER FROM: American Federation of Info Processing Societies, 210 Summit Avenue, Montvale, New Jersey, 07645

06 195720

ADVANCEMENTS IN AUTOMATIC TRAIN CONTROL FOR RAPID TRANSIT SYSTEMS

A versatile and proven solid-state train control system has been operating on the Paris Metro since 1970. An updated version of this system is now being offered in the U.S. Unique features of this system are: track circuits for train detection that have a block detection accuracy better than one foot with continuously-welded rail, and are virtually immune to propulsion return-current harmonics; a highly flexible two-way data link between the trains and the wayside using a remote inductive antenna; and extensive use of lightweight, fail-safe solid-state relays in both wayside and carborne equipment.

Conference Rec IAS Annual Meeting 13th, Toronto, Ontario, October 1-5, 1978.

Petrie, DM (Boeing Company); Milnor, RC Institute of Electrical and Electronics Engineers Proceeding IEEE n 78CH1346-6 IA, 1978, pp 397-400

ACKNOWLEDGMENT: EI

ORDER FROM: IEEE

06 196379

RAIL-TRANSIT PEOPLE-MOVER HEADWAY COMPARISON

For many years, the General Railway Signal Company has supplied control systems for conventional rail transit. Headways for these systems range from minutes or hours down to as low as 75 s. In the last few years, the company has supplied control systems for people-mover applications in which minimum headways of 10-20 s have been achieved. There are many factors working together to permit achievement of this large reduction in headway. These factors are identified and evaluated for their impact on capacity. The fundamentals underlying the disparity in headway are discussed from the viewpoint of potential for increased capacity of rail transit.

Auer, JH (General Railway Signal Company) *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 28-35, 2 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

06 196380

PROGRAMMABLE DIGITAL VEHICLE CONTROL SYSTEM

A programmable digital vehicle control system or PVDCS is based upon a microprocessor and is designed to replace the hardwired discrete components traditionally used in the on-board control of automated rapid transit vehicles. The PDVCS can easily be adapted for use in any automated transit system. A breadboard PDVCS has been programmed to perform the basic longitudinal control system functions, including closed-loop emergency braking, and has been subjected to closed-loop laboratory testing. Prototype tachometers and a seventh-order nonlinear analog computer simulation of motor, brake, and vehicle dynamics were used to close the control loop for test purposes; command scenarios were input manually. The test results demonstrate the feasibility of microcomputers in on-board vehicle control and show their capability to meet the performance requirements associated with a short headway (3 s) system.

Lang, RP (Boeing Company); Freitag, DB *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 80-87

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

06 196407

COMPUTER APPLICATION IN RAPID TRANSIT

The report comprises 4 articles on the systems and up-to-date installations on the 4 following metropolitan railways; Hong Kong, Paris (RATP), Atlanta (MARTA) and London (London Transport).

Institution of Railway Signal Engineers Jan. 1979, pp 1-24, 16 Phot., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Institution of Railway Signal Engineers, 1 Ashbourne Close, London W5, England

06 196525

NEW AUTOMATIC TRAIN CONTROL SYSTEM

ATC is a train safeguard system which reduces the train speed automatically according to speed limiting signals. In this system, the ATC signal is continuously transmitted from track-circuits divided into several sections. This signal is received by receivers mounted on cars. The digital arithmetic parallel process ATC system has simultaneously a high reliability factor and adequate fail-safe factor.

Yamaguchi, T (Toshiba Corporation); Kojima, S Masuko, Y *Toshiba Review* No. 118, Nov. 1978, pp 15-18, 4 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

06 196539

SIGNALLING: MOVING TOWARDS AUTOMATION

British Railways has centralized traffic control covering wide areas; adopted solid-state electronics to signaling except for safety signaling; used micro-processors and other computers for routing; investigated automatic train operation; utilizes jointless track circuits even in electrified territory; and continuously studies advanced technology for both signaling and communications applications.

Cardani, AA (British Railways Board) *International Railway Journal* June 1979, p 86, 5 Phot.

ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010

DOTL JC

06 196714

A GREEN LIGHT FOR ADVANCED TRAIN CONTROLS

Second generation train-control functions include automatic train supervision (ATS) with computers monitoring train location and performance to modify stopping times and running time between stations. Systems developed in the U.S., Britain, France and Germany are described and compared. Transposed cables, moving blocks, centralized computer control and microprocessors are used in various combinations to achieve various levels of sophistication.

Kalra, PS (Bechtel Corporation) *IEEE Spectrum* Vol. 16 No. 2, Feb. 1979, pp 44-49, 4 Fig.

ORDER FROM: ESL

DOTL JC

06 196948

CENTRALISED SIGNALLING CONTROL AND SUPERVISION OF THE SERVICES ON THE LONDON UNDERGROUND

It is the policy of London Transport to supervise the operation of its railroad services from central control rooms, each covering at least one line. The lines

are, where possible, operated independently of each other so that a disruption in any part of the system is contained, leaving the remainder unaffected. Each room is connected to local signaling interlockings which normally operate individually in an automatic mode. If there is a disruption, delays are minimized by regulating the service from the central control room. Traffic regulators in these rooms are able to coordinate the routing of trains through the various local interlockings; each traffic regulator is provided with a control console from which changes may be carried out.

Int Conference on Centralized Control Systems, 2nd, London, England, March 20-23, 1978.

Heaton, MW
Institution of Electrical Engineers IEE Conf Publ n 161, 1978, pp 72-75

ACKNOWLEDGMENT: EI
ORDER FROM: ESL, Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England

DOTL JC

06 196999

AUTOMATION STUDY GROUP. TRANSPORT-LINKED OPERATIONS: OUTLOOK FOR THE EARLY 1990'S [Groupe de reflexion automatisations. Operations liees aux transports: scenario pour le debut des annees 90]

Summary view of various rail transport sectors which may lend themselves to automation over the next 10-15 years. The operations investigated are those involved in:--a freight consignment from St Pol-de-Leon to Frankfurt-on-Main:--a couple travelling from Cergy to Marseille. [French]

SNCF-Direction des Etudes Generales & de Recherche SNCF Cat. 60 N24, Feb. 1979, 145 p., Tabs., Photos.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Societe Nationale des Chemins de Fer Francais, 92 rue Bonaparte, 75 Paris 6e, France

06 197002

MAN AND MACHINE: THE MEANING OF INTERACTIVE STRUCTURES IN COMPUTERISED TRAFFIC CONTROL [Mensch und Maschine: Die Bedeutung interaktiver Strukturen bei Systemregelungen im Verkehr]

No Abstract. [German]

Pierick, K *Die Bundesbahn* Vol. 55 No. 3, Mar. 1979, pp 201-204, 3 Phot., 14 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

06 197286

DICOS, A TIME-TABLE COORDINATION SYSTEM [DICOS, een dienstregelings coördinatie systeem]

The Netherlands Ministry of Transport, the Amsterdam Public Transport Corporation and the Automatic Traffic Systems section of the Delft Technical University developed means of improving regularity, punctuality and synchronised running of public transport systems. They are being tried on tram line No. 1 in Amsterdam. The article gives the basic philosophy and details of vehicle location and identification methods, hard-and software plus the information system for drivers and passengers. Further reports on this project will follow. [Dutch]

Breur, MWKA *Verkeerskunde* Vol. 30 No. 4, Apr. 1979, pp 171-175, 1 Fig., 4 Phot., 2 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-240968), Institute for Road Safety Research
ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands

PB14656

07 186143

VISUAL PERFORMANCE ASSESSMENT THROUGH CLEAR AND SUNSCREEN-TREATED WINDOWS

Reflective sunscreen filters are frequently bonded to vehicle windows to reduce interior heat and brightness. The present study was conducted to investigate the optical properties of and visual performance through clear and sunscreen-treated glass panels that served as windows in an observation booth. Five combinations of external and internal brightness levels were used. Light transmission values through the clear, gold, silver, and bronze panels were 92, 20, 18, and 8 percent, respectively. Visual performance tests were conducted at 6 m (20 ft) on 12 subjects with normal visual acuity and color vision. Two tasks were conducted under brightness levels on the external display and in the subject's booth, respectively, of 1:1, 5:1, 50:1, 5:5, and 50:5 fL. Visual acuity using Landolt C figures and scores on a contour identification task were minimally impaired for any luminance ratio when the clear (control) panel was used. With the sunscreen panels, scores on both tests decreased as a function of target brightness and panel density. With one external/internal luminance ratio(5:1), identification of signal light colors was generally impaired while viewing through sunscreen materials. Decreases were particularly evident for green and red lights presented at intermediate and low intensity levels. (Author)

Welsh, KW Rasmussen, PG Vaughan, JA
Federal Aviation Administration FAA-AM-78-28, Aug. 1978, 17 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A059750/OST, DOTL NTIS

07 189058

EMPLOYMENT REQUIREMENTS OF MASS TRANSIT: A CASE STUDY OF THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

No Abstract.

Prepared in cooperation with Dept. of Labor, Employment and Training Administration.

Binion, ML Fleming, TF, Jr Rogers, KW
Bureau of Labor Statistics Aug. 1978, 44 p., Refs.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO
ORDER FROM: GPO

07 189779

PSYCHOLOGICAL FEATURES OF A TRAIN DRIVER'S NIGHT DUTY [Psychologiczna charakterystyka pracy nocnej maszynisty pojazdu trakcyjnego]

Night work characteristics with respect to a train driver, from the "man/work" point of view. Negative and positive factors in night work, and potential adaptation of technical systems to the human organism. [Polish]

Rotter, T *Trakcja i Wagony* Vol. I-25 No. 6, June 1978, pp 189-191, 1 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Trakcja i Wagony, Warsaw, Poland

07 189809

WHAT THE PASSENGER CONTRIBUTES TO PASSENGER COMFORT

An individual's reaction to a vehicle environment depends not only on the physical inputs but also on the characteristics of the individual. Surveys of airline passengers were conducted on board regularly scheduled commuter flights. Sex of the respondent and attitude toward flying were found to have important influences on passenger comfort. Individual differences were also found regarding (1) perceptions of environmental variables, (2) the importance of factors as determinants of comfort, and (3) the ease of and frequency of performing activities in flight.

Richards, LG Jacobson, ID Kuhlthau, AR *Applied Ergonomics* Vol. 9 No. 3, Sept. 1978, pp 137-142

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

07 190276

EVALUATION OF THE RIDE QUALITY IN VEHICLES AND A SUGGESTION FOR AN INTERNATIONAL PARAMETER FOR URBAN TRANSPORT

The results of a study conducted in the Federal Republic of Germany are discussed and show that while travelling in vehicles the human body suffers from mechanical vibrations which may impair its well-being, proficiency and possibly even health safety. The amount of impairment depends on the actual acceleration, frequency, exposure time to the vibration, and direction of the vibration with respect to the body.

Becker, K *High Speed Ground Transportation Journal* Vol. 12 No. 3, 1978, pp 73-85

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

07 190283

NDT RELIABILITY AND HUMAN FACTORS

The authors first discuss the production inspection evaluations made by different inspectors using different nondestructive testing (NDT) techniques but on the same test parts with implanted defects. The techniques involved the magnetic particle inspection and Delta Scan ultrasonic inspection on D6 ac steel parts, and liquid penetrant inspection on aluminum aircraft parts. Secondly, the ways of reducing the effects of human factors on NDT reliability are discussed.

Herr, JC (General Dynamics Corporation); Marsh, GL *Materials Evaluation* Vol. 36 No. 13, Dec. 1978, pp 41-46, 3 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

07 190995

SUMMARY REPORT OF THE NATIONAL SURVEY OF TRANSPORTATION HANDICAPPED PEOPLE

A major effort has been undertaken by the Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation (DOT) in response to Congressional interest in and legislation for the "planning and design of mass transportation facilities to meet special needs of the elderly and handicapped." The total endeavor involves a number of parallel and interdependent areas of activity ranging from a national survey to identify and quantify the transportation handicapped population to a national perspective of the state of the art concerning transportation for transportation handicapped people. As a first step in this multi-phased program, UMTA funded a comprehensive national study using probability techniques and procedures which provide quantified information on the transportation handicapped population in urban areas of the United States. This information includes the number of transportation handicapped people, their characteristics, their current transportation behavior, the perceived barriers that inhibit using public transportation as often as they would like, and an assessment of solution alternatives designed to improve transportation for transportation handicapped people. The national survey is considered to be a major component of the total endeavor since it establishes a firm base of knowledge on the transportation handicapped population on a national basis, which until now did not exist.

See also reports dated Oct 76, PB-263 868, and Sep 78, PB-290 161.

Grey Advertising, Incorporated, Urban Mass Transportation Administration, (UMTA-NY-06-0054) UMTA-NY-06-0054-78-2, June 1978, 96 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291765/6ST, DOTL NTIS

07 191932

NIGHT VISION AND DARK ADAPTATION (A BIBLIOGRAPHY WITH ABSTRACTS)

Research reports are cited on the physiological aspects of night vision, as applied to human engineering for motor vehicle operators, pilots, military personnel, and other persons who must perform in low intensity illumination.

Harrison, EA
National Technical Information Service Mar. 1979, 136 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTIS/PS-79/0151/5ST

07 192096

RAILROAD/HIGHWAY ACCIDENT REPORT: SEABOARD COAST LINE/AMTRAK PASSENGER TRAIN/PICKUP TRUCK COLLISION, PLANT CITY, FLORIDA, OCTOBER 2, 1977

At 8:25 p.m., e.d.t., on October 2, 1977, westbound Seaboard Coast Line/Amtrak passenger train No. 57 struck a northbound pickup truck at a grade crossing in Plant City, Florida. The collision occurred when the pickup truck proceeded past the railroad crossing flashing signals onto the track and into the path of the train which was traveling at 70 mph. The 10 occupants of the pickup truck were killed; neither the crew of the train nor its 30 passengers were injured. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the pickup truckdriver, who was under the influence of alcohol, to stop short of the railroad tracks in response to the warnings of an approaching train and an activated railroad crossing flashing signal.

National Transportation Safety Board NTSB-RHR-78-2, Dec. 1978, 27 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291807/6ST, DOTL NTIS

07 193762

MOTION SICKNESS: SOME THEORETICAL AND PRACTICAL CONSIDERATIONS

A brief outline is given of the sensory rearrangement theory which seeks to define the essential nature of the nauseogenic stimulus. A wide range of provocative situations is classified as involving either a visual-inertial conflict, or a canal-otolith conflict or both. A number of behavioral measures by which the passenger can minimize the risk of motion sickness are described. Also considered are quantitative studies of vertical oscillatory motion, factors influencing motion sickness susceptibility (sex, age, exposure-history, receptivity and adaptability and personality characteristics), and the paper concludes with recommendations regarding the most effective use of anti-motion sickness drugs.

Reason, J (Manchester University, England) *Applied Ergonomics* Vol. 9 No. 3, Sept. 1978, pp 163-167, 15 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

07 195090

THE EFFECTS OF VIBRATION FREQUENCY AND DIRECTION ON THE LOCATION OF AREAS OF DISCOMFORT CAUSED BY WHOLE-BODY VIBRATION.

Although much research has been devoted to the determination of equivalent comfort contours for human response to whole-body vibration little consideration has been given to the source of the feelings that give rise to such comfort contours. This paper shows that for vertical vibration there is a distinct difference in the locations of discomfort on the body at different frequencies and that the locations are not much affected by the vibration level. For horizontal motions, feelings of discomfort predominated in the lower abdomen and buttocks irrespective of vibration frequency or direction. A semantic scaling technique indicates the maximum sensitivity to vertical vibration acceleration in the 4 to 6 Hz range, but for both fore-and-aft and lateral vibration there is a decrease in sensitivity with increasing frequency above 2Hz.

Whitham, EM Griffin, MJ *Applied Ergonomics* Vol. 9 No. 4, Dec. 1978, pp 231-239

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

07 196360

INTERVIEWING JOB APPLICANTS

Ground transportation, including railroads, has not generally used professional recruiters for executives and trainees. While interviewing is the most common selection technique, the process needs to be carefully planned and executed. Establishing rapport plus getting and giving information are part of interviewing.

Railway Age Vol. 180 No. 12, June 1979, p 56

ORDER FROM: ESL

DOTL JC

07 196361

LOCOMOTIVE ENGINEER TRAINING PROGRAM REQUIREMENTS AND COST-BENEFIT ANALYSIS

This is a study of the need for and type of training programs necessary to develop locomotive engineers for future railroad requirements. The current status of such training in the railroad industry is also examined. Benefit cost analyses are made of training systems needed to produce 2000 apprentice locomotive engineers annually. It was concluded that productivity and safety goals mandate such a system.

Sterling Systems Incorporated, Brotherhood of Locomotive Engineers
Apr. 1978, 135 p., 8 Fig., 21 Tab., 22 Ref., 1 App.

ORDER FROM: Sterling Systems Incorporated, 4340 Connecticut Avenue, NW, Washington, D.C., 20008

DOTL RP

07 196527

INVESTIGATIONS INTO THE SKILLS OF TRAIN-DRIVING

Train driving as a control task is one-dimensional, yet very complex. This combination highlights certain problems in our understanding of skilled action. Investigations involving behavioural observations, plus interviews with over 200 drivers and inspectors, showed that the drivers utilise more information from outside the cab than is usually thought. The relevant variables were identified. The limitations to the driver's possible knowledge of the changing state of the system ahead of him lead the study to the goal-directed, purposive nature of his skill. What exactly does he have to carry in his head to achieve the observed successes in time-keeping and safety? Consideration is given to the form of internal representations of his outside world. Quasi-mathematical operations to solve time/distance trajectory equations are suggested. Enactive, rather than verbalised, storage of information is discussed. Some practical consequences for training and equipment design are drawn in conclusion.

Branton, P *Ergonomics* Vol. 22 No. 2, Feb. 1979, pp 155-164, 3 Fig., 9 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-240876)
ORDER FROM: ESL

DOTL JC

07 197009

ACCELERATION AND PASSENGER COMFORT IN RAPID TRANSIT VEHICLES

Demonstrates theoretically that with properly controlled traction and braking profiles, considerably higher rates than are accepted at present would be perfectly feasible.

Hollingbery, PL *Railway Engineer International* Vol. 4 No. 2, Mar. 1979, pp 51-53, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

07 197012

THE PROVISION OF TRANSPORT FOR THE HANDICAPPED

A number of publications are reviewed dealing with the problems of, and the provision of transport for, individuals with mobility handicaps.

Ashford, NJ *Ergonomics* Vol. 22 No. 2, Feb. 1979, pp 189-197, 24 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

08 190274

EFFECTS OF LOCAL KNOWLEDGE AND SIGHT RESTRICTIONS ON DRIVER BEHAVIOR AT OPEN RAILWAY CROSSINGS

The behavior of road traffic was studied at an "open" railway crossing, i.e., a crossing protected by a static array of signs and with no automatic device warning of an approaching train. Drivers' head movements and mean approach speeds were obtained in order to assess the effects of local knowledge and sight restrictions on behavior. The crossing studied had a major visibility restriction for westbound traffic and trains on only 3 days a week. It was found that mean speeds at the crossbucks for cars and car derivatives were essentially similar on days with trains compared with days without trains. The mean reduction in approach speed of westbound traffic, however, was significantly greater than that for eastbound traffic on all days. This was not true of commercial vehicles which traveled somewhat more slowly eastbound because of a slight grade in the road. About one third of drivers looked left and right to see if a train was coming, one third looked only to the right, and the remaining one third did not look at all. Local knowledge of train movements did not materially influence behavior at this crossing.

Wigglesworth, EC *Journal of Safety Research* Vol. 10 No. 3, 1978, pp 100-107

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

08 191455

SUMMARY STATISTICS OF THE NATIONAL RAILROAD-HIGHWAY CROSSING INVENTORY FOR PUBLIC AT-GRADE CROSSINGS. SECOND EDITION. INVENTORY STATUS AS OF MAY 1978

In response to the Federal Railroad Safety Act of 1970, a joint government /industry effort to compile a national inventory of railroad-highway crossings was initiated in 1972 and completed in 1976. The inventory contains data on the physical and operational characteristics of all 402,000 railroad-highway crossings in the United States of which approximately 219,000 are public at-grade, 142,000 are private, 37,500 are public grade separated and 3,500 are pedestrian. This report presents comprehensive statistical summaries of the characteristics for all public at-grade crossings reported in the inventory as of May 1978. This information will be useful at the Federal, state and local levels for determining effective allocation of crossing improvement funds and developing R&D, legislative, information and education programs aimed at improving safety at crossings.

See also report dated Jun 77, PB-271 334. Portions of this document are not fully legible.

Hitz, JS
Transportation Systems Center, Federal Railroad Administration Final Rpt. DOT-TSC-FRA-78-19, FRA/OPPD-78/20, Sept. 1978, 156 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-293070/9ST

08 191687

PROCEEDINGS 1977 NATIONAL CONFERENCE ON RAILROAD-HIGHWAY CROSSING SAFETY HELD AT SALT LAKE CITY, UTAH ON AUGUST 23-25, 1977

The objective of the conference was to promote implementation of grade crossing safety improvement projects authorized by Federal, state, and railroad industry programs. The following topics were discussed: Crossing needs--Bi-modal safety and efficiency; Evaluation of current programs (Strengths and weaknesses of the grade crossing safety program, Labor, media and education roles in crossing programs); Highway grade crossing safety programs, establishing new priorities; Administration of grade crossing programs; New directions (Research projects, Role of the railroad signal department, and Crossing warning systems and surfaces and their proper application).

Prepared in cooperation with American Association of State Highway and Transportation Officials, Washington, DC., Association of American Railroads, Washington, DC., Federal Highway Administration, Washington, DC., and National Transportation Safety Board, Washington, DC.

Federal Railroad Administration, American Assn of State Hwy and Transp Officials, Association of American Railroads, Federal Highway Administration, National Transportation Safety Board Aug. 1977, 134 p.

70

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-293071/7ST

08 193342

RAILROAD-HIGHWAY GRADE CROSSING HANDBOOK

This handbook briefly describes how growth of railroads and highways resulted in a proliferation of grade crossings and then discusses the variety of methods developed to warn pedestrians and vehicles of approaching trains. It is aimed primarily at providing railroad, state and municipal personnel with information which can help in cooperative efforts to improve grade crossing safety and efficiency. The book describes conditions and requirements at crossing; facilitates understanding of the elements of crossing systems; provides a compendium of existing grade crossing technology; serves as a guideline to aid in implementing improvements to grade crossings; aids in understanding and applying new technology; and serves as a basic text for training programs.

Developed for U.S. DOT-Federal Highway Administration.

Texas Transportation Institute TS-78-214, Aug. 1978, 241 p., 77 Fig., 22 Tab., Refs.

ORDER FROM: GPO

DOTL RP

08 193730

SAFETY FEATURES OF STOP SIGNS AT RAIL-HIGHWAY GRADE CROSSINGS

The study objectives of this research project were to determine the advantages and disadvantages of selective use of highway stop signs as safety improvements at rail-highway grade crossings and to develop guidelines for their appropriate use or non-use. The study elements included a literature review, inventory and accident analysis, and field studies. Literature and inventory investigations were performed to determine current uses of stop signs. Accident analyses were performed to compare accidents for crossings with crossbucks only to accidents for crossings with crossbucks and standard highway stop signs. Field studies were performed to compare driver behaviors for crossbuck-only crossings to driver behaviors for similar crossings having a standard highway stop sign in addition to the crossbuck. Driver behaviors included speed profiles, looking behavior, and observance of stop signs. The study results indicate that stop signs are used more frequently in urban areas and crossings having stop signs tend to have higher train volumes. Accident analysis results indicate that rates for stop sign crossings are lower than rates for crossbuck-only crossings for higher vehicle-train exposure values. Field studies show that stop signs, when properly used, result in improved driver behaviors adequate for the detection and avoidance of trains. The study conclusions suggest that stop signs should be applied selectively only at hazardous passive grade crossings and should not be used indiscriminately at all passive grade crossings. Requirements for effective use of stop signs at grade crossings are listed in the report. /FHWA/

This report is in two volumes. Volume 1 is the Executive Summary, FHWA-RD-78-40. Volume 2 is the Technical Report, FHWA-RD-78-41.

Sanders, JH McGee, HW Yoo, CS
Biotechnology, Incorporated, Federal Highway Administration Final Rpt. FHWA-RD-78-40, Apr. 1978, 19 p.

SPONSORING AGENCY:

RESPONSIBLE INDIVIDUAL: Stewart, G (HRS-33)

Contract DOT-FH-11-9192

ACKNOWLEDGMENT: Federal Highway Administration, NTIS
ORDER FROM: NTIS

PB-295422/AS

08 194852

GRADE CROSSINGS: THE CLOSURE OPTION

Grade crossing closure is the least-used method of improving safety and simultaneously reduces maintenance both for track and signal equipment. Encouraged by a change in Indiana law, the Chicago South Shore and South Bend has successfully closed over 6 percent of its grade crossings over a four-year period. The regulatory and legal aspects of such a procedure are discussed, along with the impact of Federal assistance for grade crossing protection.

Mulrenan, CF *Railway Age* Vol. 180 No. 9, May 1979, pp 41-42, 1 Phot.

ORDER FROM: ESL

DOTL JC

08 195141

SAFETY EQUIPMENT INCORPORATED IN HS 64 TYPE AUTOMATIC LEVEL CROSSINGS IN STATIONS [Zugbediente Weguebergangssicherungsanlage, Bauart HS (Halbschranke) 64-Automatik, beim Einsatz in Bahnhöfen]

Level crossings in stations often involve several tracks and because they are in built-up areas, the safety of pedestrians is as important as that of road traffic. Working conditions in stations (train running, switching operations, and use of the gravity hump) are such that a special automatic HS 64 model has had to be developed for stations. There are two versions to ensure safety on a maximum of 2 to 4 tracks. [German]

Enseleit, E *Signal und Schiene* Vol. 22 No. 6, Nov. 1978, pp 284-288, 4 Fig., 2 Tab., 4 Ref.

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

08 195680

CROSSING WORK AND THE PUBLIC: AVOIDING CONTENTION, EXTRA COSTS

Beyond actual maintenance work, how railroad personnel deal with the public and its officials weighs heavily in overcoming grade crossing planning problems and added costs.

Moore, AD (Burlington Northern, Incorporated) *Railway Track and Structures* Vol. 75 No. 5, May 1979, p 35, 2 Phot.

ORDER FROM: ESL

DOTL JC

08 195702

RAIL-HIGHWAY GRADE-CROSSING ACCIDENTS/INCIDENTS BULLETIN

Annual publication of FRA Office of Safety containing accident reports and statistics of grade crossing accidents. First issued in 1935.

Federal Railroad Administration No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

08 196471

RAILROAD GRADE CROSSING PASSIVE SIGNING STUDY--PHASE 2

This article presents the results of a study to determine the effectiveness of new passive signing systems in warning drivers of the potential hazards at railroad grade crossings. Experiments were conducted over a 2-year period. With the new signs, drivers displayed more awareness (that is, increased percentage of head movements or looking for trains) at the crossings tested.

Coleman, J Koziol, JS, Jr Mengert, PH *Public Roads* Vol. 42 No. 4, Mar. 1979, pp 128-135, 2 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

08 197278

RAIL CROSSING ROAD TRAFFIC WARNING LANTERNS

Rail crossing road traffic warning lanterns are used in pairs at level crossings as "flashing red lights" to warn motorists of the approach to or presence on the crossing of a train. The optical performance of a warning lantern with 10V, 25w and 10V, 13w lamps was compared with that of a road traffic signal lantern with 250V, 100w and 12V, 25w lamps. It was concluded that (a) the 250V, 100w road traffic signal lantern is of superior performance (b) the 12V, 25w road traffic signal lantern is of inferior performance and (c) a road traffic signal lantern fitted with a 25w, halogen lamp may be of comparable performance relative to the 25w rail crossing warning lantern. However the latter may be of inadequate performance for its application and a better warning lantern is probably needed. Recommendations for further investigation of road/rail signal co-ordination and for field studies of rail crossing warning lantern performance are made. /Author/TRRL/

Bryant, JFM

Australian Road Research Board Monograph No. 240-2, Jan. 1979, 18 p., 4 Fig., 7 Tab.

ACKNOWLEDGMENT: TRRL (IRRD-239129), Australian Road Research Board

ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

08 197314

ANALYSIS OF NPRM STROBE LIGHTS ON LOCOMOTIVES

The regulatory analysis was prepared using the procedures developed in Railroad Safety Economics: A Guide for the Analysis of Regulations (prepared by IOCS, Inc., for the Federal Railroad Administration February 1978). It includes an evaluation of the effectiveness of strobe lights, an analysis of the benefits and a estimation of the costs of the proposed regulation, and a measure of the economic impact of the regulation on the railroad industry. The benefits of strobe lights are measured against the accident information for 1975 and 1976 contained in the Rail-Highway Grade-Crossing Accident/Incident data base. A methodology was developed, utilizing fault tree analysis, modeling and human factors analysis, to postulate the expected value of benefits associated with the use of strobe lights on locomotives. Fault tree analysis indicated those accidents which would be affected by the presence of strobe lights. Modeling and human factors analysis were then utilized to develop multipliers which estimated the reduction in the number of accidents for each applicable accident circumstance of the fault tree analysis.

Priest, WC Knoblauch, K

IOCS, Incorporated, Federal Railroad Administration Final Rpt. FRA- /OPPD-79/4, May 1978, 75 p.

Contract DOT-FR-7-505226

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-293483/4ST, DOTL NTIS

09 053312

STANDARDISATION OF WAGONS, DESIGNATIONS OF STEELS AND CAST-IRONS APPEARING IN THE PARTS' LIST OF THE STANDARDISATION DRAWINGS OF WAGONS

The present report is intended for establishing a comparison between the materials the most widely used by the railway Administrations in the construction of standard wagons. It replaces "ORE Collection No. 564", approved by the ORE B 12 Committee in December 1972.

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

International Union of Railways B 12/RP 28, Oct. 1978, 9 p., 28 Tab.

ACKNOWLEDGMENT: UIC

ORDER FROM: UIC

DOTL RP

09 053317

STANDARDISED EVALUATION FATIGUE STRENGTH DATA FOR WELDED JOINTS OF STRUCTURAL STEEL

Results of fatigue strength tests with welded joints given in relevant publications were evaluated using a uniform graphical method. The evaluation covered series of tests on cross joints with double fillet welds, K edge web welds or K edge weld and also bending tests on beams with continuous fillet welds, fillet welds and web plate cut-outs, butt welds in the flanges or web plate stiffener.

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

International Union of Railways ORE DT 70 (D130), Nov. 1978, 29 p., 29 Fig.

ACKNOWLEDGMENT: UIC

ORDER FROM: UIC

DOTL RP

09 169393

CASE STUDIES IN FRACTURE MECHANICS

A collection of more than thirty case studies is presented covering a wide range of practical engineering applications of fracture mechanics to design, inspection, maintenance, and failure analysis. The case studies are written by individual specialists within industry, government, and academia from the United States and Great Britain. The collection is divided into five sections corresponding to (1) Aerospace, (2) Joints and Mountings, (3) Pressure Vessels and Rotating Machinery, (4) Surface Vehicles, and (5) Materials. Most of the case studies are between twelve and fifteen pages in length and written to a standard format. The interdisciplinary nature of fracture applications is reflected in the case studies, and the reader is brought through a sequential development and solution of actual engineering problems in an interesting and economical manner. (Author)

Includes two articles: 1) A Fracture Mechanics based Assessment of the Railway Rail Failure Problem in the U. K. in Section 4.1.1 and 2) Development of Design and Test Criteria for the Structural Integrity of Rail Vehicle Mechanical Systems in Section 4.2.1.

Rich, TP Cartwright, DJ
Army Materials and Mechanics Research Center Final Rpt.
AMMRC-MS-77-5, June 1977, 471 p., Figs., Tabs., Refs.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

AD-A045877/8ST, DOTL RP

09 185481

PULSED HOLOGRAPHIC ANALYSIS OF LARGE VIBRATING VEHICLE COMPONENTS

Double-pulsed holography provides a measurement technique for the analysis of large surface areas of vibrating components. A particular advantage of holography is that it requires no contact with the vibrating object, and it gives a solution to a classical problem in the area of both acoustic and vibration analysis. The surface of a vibrating object is represented by a series of fringes which connect points that have equal amplitudes of displacement. Since holography is based on interferometry, the accuracy is within a fraction of the wavelength of light.

Gerhart, GR Arutunian, G
Army Tank-Automotive Res & Development Command June 1978, 14 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

AD-A056439/3ST

09 185483

STEEL FIBERS AS WEB REINFORCEMENT IN REINFORCED CONCRETE

The objective of this investigation was to determine the feasibility of replacing shear reinforcement (stirrups) with randomly distributed steel fibers for the prevention of diagonal tension (shear) failure in full-scale conventionally reinforced concrete beams. The following conclusions are based upon the use of steel fibers with deformed ends (Dramix) to replace stirrups: (1) Steel fibers can be used to replace stirrups in beams with no reduction in the ultimate design moment capacity; (2) Steel fibers increase the shear strength of concrete beams sufficiently to prevent catastrophic diagonal tension failure, while forcing the beam to fail in flexure; (3) ACI Code procedures can be used without modification to design reinforced concrete beams that contain steel fibers as shear reinforcement; (4) Low volume percentages of steel fibers have no effect upon the stiffness of full-scale beams; and (5) Steel fibers present a potentially more economic alternative to the use of stirrups in reinforced concrete design.

Williamson, GR

Army Construction Engineering Research Laboratory June 1978, 15 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

AD-A056496/3ST

09 185793

HANDLING OF FATIGUE DATA IN COMPUTER ANALYSIS

A program system called FATIMA, developed for the easy handling of fatigue data for later computer analysis, is described. The basic idea of its realization was to specify a standard format for data input and to use that standard also for file storage and data processing. The organization and the functions of FATIMA were explained with particular emphasis on five autonomous program routines designed for the input, the correction, the modification, the transfer, the retrieval and the selection of individual or grouped sets of data for processing. Each of these program routines is provided with extensive dialogue capabilities for easy application even by users less familiar with the details of the design philosophy of FATIMA.

Fischer, R Wendt, U

Laboratorium fuer Betriebsfestigkeit 1978, 25 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

N78-29498/OST

09 185796

THE METHOD OF MAXIMUM LIKELIHOOD APPLIED TO THE STATISTICAL ANALYSIS OF FATIGUE DATA INCLUDING RUN-OUTS

The application is described of the principle of maximum likelihood to the analysis of fatigue test results including run-outs. The particular method used is that developed by Edwards and called by him the method of support. The use of this method is described in determining means and standard deviations for test results, the determination of best-fit S-N curves with their associated standard deviations and the determination of the significance of differences between groups of results, different S-N curves and the determination of best common slopes and intercepts of such curves. A computer program is presented which was developed to perform the necessary calculations. Examples are given of the types of results produced by this analysis and of certain difficulties in interpretation.

Conf.-Presented at See Intern. Conf.: Appl. Of Computers in Fatigue, Coventry, 3-6 Apr. 1978 p 7.1-7.23.

Spindel, JE Haibach, E

Laboratorium fuer Betriebsfestigkeit ICAF-1036, 1978, 24 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

N78-29504/5ST

09 186484

PINE WOOD APPLICATIONS (A BIBLIOGRAPHY WITH ABSTRACTS)

The bibliography covers research conducted on pine wood. Wood properties for best utilization for furniture and wooden structures are covered. Tests

for acceptability for particle boards, plywood, and veneers are included. Wood preservatives and treatments are also described. (This updated bibliography contains 77 abstracts, 4 of which are new entries to the previous edition.)

Brown, RJ
National Technical Information Service Oct. 1978, 81 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTIS/PS-78/1102/9ST

09 186569

A COMPUTER GRAPHICS PROGRAM FOR GENERAL FINITE ELEMENT ANALYSES

Documentation for a computer graphics program for displays from general finite element analyses is presented. A general description of display options and detailed user instructions are given. Several plots made in structural, thermal and fluid finite element analyses are included to illustrate program options. Sample data files are given to illustrate use of the program.

Thornton, EA Sawyer, LM
Old Dominion University NASA-CR-157421, Aug. 1978, 50 p.

Grant NSG-1321

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

N78-32463/9ST

09 189001

INCREASING THE LIFETIME OF FORCE-FIT JOINTS

[Zwekszanie trawalosci polaczen wciskowych]

The application and characteristics of force-fit joints are described, as well as the operating conditions of this type of joint in wheel sets of rail vehicles. The results of performance tests are used to illustrate the fretting effect. The effect of protective coatings on the strength of force-fit joints and the quality of the bearing surfaces is discussed. The criteria for the selection of such coatings are cited. [Polish]

Karwala, K Kulikowski, H Tulecki, A *Przegląd Mechaniczny* Vol. 37 No. 12, June 1978, pp 15-18, 8 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

09 189034

RAILWAY AXLE IS JUST ONE ITEM TAPE CONTROL MAKES TWICE AS FAST

Call an axle a stepped forging and the benefits of BSC's new high speed, versatile, and accurate Rotherham plant can be appreciated.

Gale, K *Engineer* Vol. 247 No. 6396, Oct. 1978, pp 40-41, 1 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Morgan-Grampian, Incorporated, 16 West 61st Street, New York, New York, 10023

DOTL JC

09 189035

RADIO TRANSMISSION OF VALUES PERTAINING TO RAILWAY WHEELS IN MOTION [Drahtlose Messwertuebertragung von rollenden Eisenbahnrad]

No Abstract. [German]

Heiss, P *Eisenbahntechnische Rundschau* Vol. 27 No. 7-8, July 1978, pp 477-480, 5 Phot., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

09 189039

VIBRATION DEADENING USING CELLULAR PUR ELASTOMERS [Schwingungswdaempfung mit Hilfe von zelligen PUR-Elastomeren]

Use for deadening vibrations. Mechanical and dynamic properties presented in tubular form; Dynamically-stressed components used up to an ambient temperature of 60 deg. C. Characteristics of systems susceptible to vibration influenced by polymer properties. Examples of application on underground

railways, in the construction of the Rheda high-speed test-line (DB), in engine bearings, machine tools and car components. [German]

Alicke, G *Kunststoffe* Vol. 68 No. 8, 1978, pp 484-490, 2 Tab., 18 Phot., 5 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

09 189747

STRESS DISTRIBUTION ON SURFACE OF LOADED R-65 RAIL

Results are presented of an investigation by the tensometric method of the distribution, magnitudes, and signs of the stresses on the surface of an R-65 rail under load. The points of possible fatigue rupture are indicated.

Chelyshev, NA (Siberian Iron and Steel Institute, USSR); Tsvigun, VN Fastykovskii, AR *Steel in the USSR* Vol. 8 No. 2, Feb. 1978, pp 95-96, 6 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

09 189780

USE OF A GAMMA RAY DETECTOR TO CHECK RAILS WELDED BY MEANS OF ALUMINOTHERMY [Anwendung der Gammadefektoskopie an aluminothermisch geschweissten Schienen]

No Abstract. [German]

Meissner, K *Zeitschrift der OSShD* Vol. 21 No. 5, 1978, p 15, 1 Tab., 10 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Warsaw, Poland

09 189782

FISSURES CAUSED BY RAIL FATIGUE [Bildung von Ermuedungsbruechen im Schienenstahl]

By carrying out metallographic studies on rails the authors have succeeded in explaining the various stages in fissure formation due to rail fatigue. Results are presented in the form of diagrams and tables.

Beres, L *Zeitschrift der OSShD* Vol. 21 No. 5, 1978, p 8, 9 Phot., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Warsaw, Poland

09 189792

RESULTS OF ECSC RESEARCH: RUST RESISTANCE OF THE INSIDE OF HOLLOW STEEL SECTIONS [Resultats de recherches CECA: resistance a la corrosion de l'interieur des profils creux en acier]
This is a full theoretical and practical study into the rust resistance of the inner surfaces of hollow steel sections. Results are based on several experiments which are described at length.

Tissier, P *Acier/Stahl/Steel* Vol. 43 No. 2, 1978, pp 67-75, 1 Tab., 10 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Centre Belgo-Luxem d'Information de l'Acier, 47 rue Montoyer, B-1040 Brussels, Belgium

09 190305

RAILROAD BALLAST PRESCRIPTION: STATE-OF-THE-ART

A review of ballast prescriptions for specification writing is combined with new research data to outline typical requirements for selecting ballast. A method of classifying ballast for predicting performance is also given which should help in economic evaluation of different ballast sources. Ballasts used by railroads can be divided into three main grading divisions based on maximum particle size and dependent on maintenance procedures. These three sizes are nominally 65 mm., 40 mm., and 25 mm (2.5-in., 1.5-in., and 1.0-in.). Gradings used in Europe and Japan are generally uniform although evidence presented indicates broadly graded ballast should perform better. This resulted in recommended sizing and gradings. Particle shape requirements and tolerances are summarized. On minor lines, where a good rock source is not locally available, gravel ballast should be considered as an economic alternative to transported crushed rock.

Raymond, GP (Queen's University, Canada) *ASCE Journal of the Geotechnical Engineering Div* Vol. 105 No. 2, Feb. 1979, pp 305-322, 21 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

09 190319

RAIL STEELS, DEVELOPMENT, PROCESSING & USE

This 488-page book is aimed primarily at researchers and metallurgists. It has a wide-ranging introductory section, and subjects treated in detail include fatigue, strength and fracture, and the effects of alloy additions and special processing.

Heyden & Son GmbH No Date, 488 p.

ORDER FROM: Heyden & Son GmbH, Munsterstrasse 22, 4440 Rheine, West Germany

09 190342

HARDNESS METER FOR COMPACTED SNOW

In regions with heavy snow, the wheel flanges of trains considerably compact the snow and this poses a major problem as regards safety on Shinkansen lines. As a result, a meter has been developed for studying the dynamic properties and the breaking phenomenon of compacted snow. In this article, the formula for calculations using the various values measured is discussed.

Shinojima, K. *Railway Technical Research Inst. Quarterly Reports* Vol. 19 No. 3, Sept. 1978, pp 130-131, 2 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

DOTL JC

09 190355

MATERIALS ASPECTS OF ENGINEERING DISASTERS

From time to time the public is made aware of the inadequacies of engineering design, errors in construction of failures of materials by the publicity given to major engineering disasters. For many of the failures, both minor and major, the properties of the materials used contributed to, or were the prime cause of, the failure. Even in cases where the failure cannot be directly attributed to the materials used, a thorough examination, e.g. metallographic; chemical analysis, fractography, can indicate the main factors responsible for the failure. Little can be learned from a general review of engineering failures and it is necessary to look at some of the detail to appreciate how things go wrong and what precautions can be taken to ensure the maximum safety in future designs. This article concentrates on the role played by materials in a small selection of instances of failure.

Ball, JG Rawlings, RD *Engineering* Vol. 218 No. 12, Dec. 1978, p 1344

ACKNOWLEDGMENT: British Railways

ORDER FROM: ESL

DOTL JC

09 190356

AN EVALUATION OF ULTRASONIC PROBES BY THE PHOTOELASTIC VISUALISATION METHOD

An assessment of ultrasonic probe performance is described in which ultrasonic waves have been visualised by the photoelastic method. A qualitative examination of selected compressional, shear and Rayleigh wave probes has been produced. Ultrasonic wave generation and wave interactions with artificial and "natural" defects in glass testpieces are displayed. In addition the practicability of quantifying ultrasonic wave stresses has been demonstrated. Based on this examination the optimization of probe design in particular cases has become possible. Solutions to ultrasonic inspection problems within the railway industry are reviewed in which specially designed ultrasonic probes are employed. In particular the examination of axles and rails are discussed in which a variation in probe design was necessary due to features of defect orientation.

Hall, KG Farley, PG *British Journal of Non-Destructive Testing* July 1978, pp 171-184

ACKNOWLEDGMENT: British Railways

ORDER FROM: ESL

09 190664

WOOD FINISHING: WATER REPELLENTS AND WATER-REPELLENT PRESERVATIVES. REVISION

Water plays a key role in the rapid weathering of wood exposed outdoors, in the performance of exterior finished wood, and in the decay or rotting of

wood. Properly seasoned wood that stays dry is not subject to decay, to premature failure of paints and finishes, or to many of the other serious problems associated with weathering. There are some relatively simple wood treatments that can be used to slow down the pickup of water and help keep wood dry. These treatments are called water repellents (WR). When a preservative is added to a WR, it is called a water-repellent preservative (WRP). The composition of these two treating materials is very similar; both contain a substance that repels water (usually paraffin wax or related material), a resin or drying oil, and a solvent such as turpentine or mineral spirits. Addition of a preservative such as pentachlorophenol or copper naphthenate to a water repellent helps to protect wood surfaces against decay and mildew organisms.

Prepared in cooperation with Wisconsin Univ., Madison. Revision of report dated Aug 68, AD-674 403.

Feist, WC Mraz, EA

Forest Products Laboratory FSRN-FPL-0124-REV, 1978, 8 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

AD-A060650/9ST

09 190741

A STUDY OF MULTIPLE-SHAKER MODAL SURVEY TESTING

The principal objective was to examine and to assess the practical value of a method of multiple-shaker sinusoidal modal vibration testing known as Asher's method. Numerical studies which simulate the application of Asher's method and a unique experimental implementation of the method were completed. Another objective of the research was to develop and to demonstrate with numerical simulation a quantitative method for determining from transfer function data the number of dominant modes of vibration in sinusoidal structural response.

Hallauer, WLJ

Virginia Polytechnic Institute & State University Final Rpt.

NASA-CR-157890, 1978, 44 p.

Grant NSG-1276

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

N79-10447/7ST

09 191093

DEVELOPMENT OF QUALITY ASSURANCE TRAINING MANUAL TO ASSIST IN ESTABLISHING SOUNDNESS REQUIREMENTS FOR ALUMINUM AND STEEL CASTINGS

Samples of aluminum and steel casting flaws most commonly experienced in production were selected to be radiographed in order to develop quantitative and descriptive picture images of various radiographic reference standards. Graphic illustrations of flaw size and flaw distribution for various radiographic reference standards were depicted by using radiographs and associated cross-sectional photo-macrographs. These graphic illustrations of radiographic levels of acceptance will provide meaningful design criteria for establishing realistic standards of acceptance for new material applications. This report also furnishes operational guidance to quality assurance and radiographic personnel in their normal on-the-job duties. (Author)

Wulf, WF Phytilla, MV Catalano, SB Matichuk, D

Army Tank-Automotive Res & Development Command TARAD-COM-TR-12256, Aug. 1978, 66 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

AD-A061248/1ST

09 191528

THE COMPOUNDING METHOD OF ESTIMATING STRESS INTENSITY FACTORS FOR CRACKS IN COMPLEX CONFIGURATIONS USING SOLUTIONS FROM SIMPLE CONFIGURATIONS

This Data Item presents a method of estimating values of stress intensity factors for cracks that have developed in complex configurations and are close to several boundaries and/or other cracks. The method, which is simple and easy to apply, entails compounding known stress intensity factor solutions for cracks in simple configurations. Typical applications include components or structural elements such as aircraft structures, pressure vessels, rotating and reciprocating machinery etc., in which cracks may develop under working conditions.

Also pub. as ISSN-0141-3996 and ISSN-0141-4089. For information on

availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

Engineering Sciences Data Unit Limited Data Item ISBN-0-85679-240-3, 1978, 19 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

ESDU-78036

09 191547

COMBINING DATA FOR IMPROVED WEIBULL PARAMETER ESTIMATION

Weibull parameters are often used by experimentalists to characterize the fracture behavior of structural materials. Frequently several different types of tests are performed, and theory indicates that the parameters for each type should be the same, or have some specific relations to each other. In such cases, it is advantageous to combine the data to find the parameters best representing all the data. The present paper discusses techniques for carrying out this objective and analyzes two examples in detail to illustrate the principles involved. The first example compares uniaxial and equibiaxial fracture statistics. The second example discusses fracture statistics for single fibers of several different lengths. (Author)

Batdorf, SB Sines, G
California University, Los Angeles Tech Rpt. UCLA-ENG-7840, Sept. 1978, 30 p.

Contract N00014-76-C-0445

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A062613/5ST

09 191902

CONTACT PHENOMENA. I: STRESSES, DEFLECTIONS AND CONTACT DIMENSIONS FOR NORMALLY-LOADED UNLUBRICATED ELASTIC COMPONENTS

The item deals with the stresses and deflections of contacting bodies. The item gives data for the contact dimensions, normal approach, delta, surface and sub-surface stresses (for points on the axis of symmetry) together with the depth at which the maximum shear occurs, for dry, normally-loaded elastic bodies. Typical applications include civil, structural, machine tool, and automobile engineering, mechanical handling and mining equipment, printing, packaging, and textile machinery, and other fields of engineering involving concentrated contacts.

Also pub. as ISSN-0141-2590, 0141-4046, and 0141-4089. For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

Engineering Sciences Data Unit Limited Data Item ISBN-0-85679-239-X, 1978, 49 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

ESDU-78035

09 191957

STRESS CRACK PHENOMENA. VOLUME 4. FEBRUARY, 1978-FEBRUARY, 1979 (A BIBLIOGRAPHY WITH ABSTRACTS)

Stress analyses of various materials in which cracks are generated have been investigated in these reports. Stress corrosion, fracture mechanics, and crack propagation are also researched. Mathematical models, rock mechanics, and computer programs have been excluded from these reports. (This updated bibliography contains 198 abstracts, all of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Apr. 1979, 207 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTIS/PS-79/0270/3ST

09 193747

RAILROAD COUPLER SAFETY RESEARCH AND TEST PROJECT. STUDY OF THE FATIGUE LIFE CHARACTERISTICS OF CAST STEELS USED IN THE RAILROAD INDUSTRY

This investigation evaluated the fatigue properties of three commercial grades of cast steel utilized by the railroad industry. The tests were

conducted using a 3/4" thick, 10-inch long flat plate specimen tested in reversed bending about a zero mean load. The specimens were provided by different manufacturers with their actual cast surfaces. Significant differences in fatigue behavior were rationalized considering four parameters: hardness, surface conditions, decarburization and inclusions at the surface. From this analysis, it was concluded that pits or irregularities in the cast surface rather than surface roughness determine the final fatigue behavior. The detrimental effect of these pits increase with their size. The decarburization reduces the fatigue strength of the lower strength Grades B and C steels more than the higher strength Grade E. From the various types of inclusions produced at the surface by mold-metal or gas-metal reactions, those that penetrated from the cast surface with a crack-like oxide along the grain boundaries were the most deleterious to the endurance ratio at all tensile strengths. Casting surface defects as pinholes, laps, slag or sand inclusions caused large reductions of the endurance life. All surface problems caused a greater reduction in the fatigue strength of the higher tensile strength steels.

An RPI-AAR Cooperative Program.

Morella, NA Wallace, J Maino, R
Association of American Railroads Technical Center Tech Rpt. AAR Rpt. 299 No. 9, Feb. 1978, 122 p., Figs., Tabs., 2 App.

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

DOTL RP

09 193750

APPLICATION OF THE ACOUSTIC-ELASTIC EFFECT TO RAIL STRESS MEASUREMENT

An ultrasonic probe has been designed, evaluated, and shown capable of measuring longitudinal stress changes in railroad rails. The probe utilizes the effect of applied stress on wave velocity (acousto-elastic effect) to determine the stress change. In both laboratory and field evaluations, it has shown that the probe is capable of measuring stress changes.

Supported by the Federal Railroad Administration, DOT Contract OS-40091, with a contribution by the American Association of Railroads.

Egle, DM (Oklahoma University); Bray, DE (Texas A&M University)
Materials Evaluation Vol. 37 No. 4, Mar. 1979, p 41, 13 Fig., 9 Ref.

ORDER FROM: ESL

DOTL JC

09 193769

DESIGN OF PRESTRESSED CONCRETE

Offers a full understanding of the mechanics and behavior of prestressed concrete structures, at the same time providing insights into design methods and practices. Completely up-to-date, being fully consistent with all provisions of the newly-revised ACI 381-77 which governs design of this and other types of structural concrete. Author pays careful attention to the theory and design of precast pretensioned concrete members, which account for much of the U.S. market since the introduction of prestressed concrete in this country in the 1950s. Recognizing a current trend toward fuller exploitation of the potential of post-tensioned prestressed concrete for structures from ordinary slabs to long-span bridge construction, the author also presents a thorough foundation for the analysis and design of post-tensioned members, continuous as well as simple span.

Nilson, AH
Wiley (John) and Sons, Incorporated 1978, 526 p.

ORDER FROM: Wiley (John) and Sons, Incorporated, 605 Third Avenue, New York, New York, 10016

09 194135

DEVELOPMENTS IN PRESTRESSED CONCRETE-1

This volume provides up-to-date information on developments in prestressed concrete technology. It is aimed primarily at those engineers in the practice of prestressed concrete design, and at those contemplating research on any aspect of prestressed concrete. The following chapters are included: (1) Bending, Shear and Torsion (Kong, FK); (2) Prestressing Steels and Systems (Mallett, GP); (3) Creep of Prestressed Concrete (Evans, RH and Kong, FK); (4) Partial prestressing (Bennett, EW); (5) Prestressed Lightweight Concrete (Swamy, RN); (6) Composite Prestressed Concrete (Edwards, AD).

Applied Science Publishers Limited Monograph 1978, 259 p., Fig., Tab., 2 Phot., 10 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 237999)

ORDER FROM: Applied Science Publishers Limited, Ripple Road, Barking, Essex, England

B7811617

09 194495

DEVELOPMENT OF FATIGUE CRITERIA: APPLICATION IN THE CASE OF RAILS [Evolution des criteres de fatigue: application au cas des rails]

The article summarises fifteen years' work of particular complexity on the distribution of stresses in rails according to a number of parameters such as the diameter and weight of the wheels, and on the resulting data concerning the fatigue strength of known rail steels. A criterion is given for the use of different types of steel, which is represented by a graph. Other graphs show stress cycles under different conditions. [French]

Van, D Gence, P *Revue Generale des Chemins de Fer* No. 97, Dec. 1978, pp 797-810, 2 Tab., 16 Phot., 17 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

09 194661

THE UNACCEPTABLE FACE OF LUBRICATING OIL ADDITIVES

In order to extend the range of application of mineral lubricating oils, lubricant technologists attempt to enhance inherent oil properties by incorporating small amounts of additives. While there is little doubt that they succeed in their primary objective, additives by their very nature tend to be more reactive than the oils in which they are incorporated and there is always the risk of unexpected side effects in their use. This paper gives examples from industrial machines where lubricating oil additives have been responsible for serious lubrication problems and concludes that additives should only be used in situations where they are essential: full consideration should be given to possible harmful side effects.

Summers-Smith, D *Tribology International* Vol. 11 No. 6, Dec. 1978, pp 318-320

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

09 195695

FLAMMABILITY, SMOKE, TOXICITY, AND CORROSIVE GASES OF ELECTRIC CABLE MATERIALS

Organic polymers used as insulation and jacketing materials in electric cables, once ignited, burn and spread fire rapidly. Furthermore these polymeric components generate dense smoke as well as toxic and/or corrosive combustion products that severely limit the ability to control and extinguish a fire. This report contains the formal papers given at a workshop on flammability, smoke, toxicity, and corrosive gases of electric cable materials and in addition includes summaries of the workshop discussion sessions. Based on these activities, a number of conclusions and recommendations are presented for materials and design; testing for flammability, smoke, and toxicity and, to a lesser extent, corrosive gases; and detection devices.

National Materials Advisory Board Final Rpt. NMAB-342, 1978, 157 p., Figs., Tabs., Refs., 1 App.

Contract MDA-903-74-C-0167

ORDER FROM: National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, D.C., 20418

09 195715

LASER TREATING OF CYLINDER LINERS FOR DIESEL ENGINES TO INCREASE WEAR RESISTANCE

A multi-Kilowatt laser is now in use by the Electro-Motive Division of General Motors to achieve harder, more scuff-resistant cylinder liners in high-performance turbocharged diesel engines. The carbon dioxide laser beam system allows hardening to sufficient depth without heating the entire piece and thus precise dimensions of the liner structure can be maintained. To prevent the beam from boring through the metal and to provide uniform heating, the beam is kept moving across the metal surface. This is accomplished by rotating the metal piece continuously.

Industrial Heating Vol. 45 No. 9, Sept. 1978, pp 38-39

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

09 196100

METHODS FOR TESTING ROLLING STOCK AT THE EXPERIMENTAL LOOP OF TSNII MRT [Metodiki ispytani podvzhnogo sostavana eksperimental' nom kol'tse TsNII MPS]

This paper describes procedures for four types of tests on the Shcherbinka test track: (1) Cars with axle loads from 20.5 to 25 tons to be appraised with respect to wear, damage and residual deformation of track and rolling stock components; (2) Composition brake shoes and related wheel wear; (3) Dynamic and load testing of locomotives and multiple-unit cars prior to delivery; (4) Efficiency and operational characteristics of diesel-electric locomotives prior to delivery. [Russian]

Abstract only translated in English.

All-Union Labor Red Banner Railway Research Inst Tech Paper 1977, 13 p.

ACKNOWLEDGMENT: FRA

ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

09 196375

EFFECT OF INTERLAMELLAR SPACING OF PEARLITE ON THE ATTENUATION OF ULTRASOUND

The attenuation of ultrasound was studied in samples of pearlitic steel taken from railway wheels containing between 0.53 and 0.61% carbon. A strong dependence of ultrasonic attenuation on grain size was observed; in addition a relationship was shown between the interlamellar spacing of pearlite in the steel and the attenuation coefficient. The scattering losses in the Rayleigh zone of the pearlitic/ferritic steel were found to be proportional to the spacing of the cementite lamellae in the pearlitic structure.

Kopec, B *NDT International* Vol. 12 No. 1, Feb. 1979, pp 8-11

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

09 196388

STANDARDISATION OF MATERIALS AND EQUIPMENT

Standardization of components makes railway inspection and maintenance work easier and increases the reliability of transport. The author describes standardization in chopper control cars with regenerative braking, CTC systems, the automated operation of marshalling yards and traction motors for electric cars. He discusses methods for organizing this standardization in a way that will not hinder technical developments.

Musaka, Y *Japanese Railway Engineering* Vol. 18 No. 3, 1978, pp 4-5, 1 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

09 196452

METALLURGICAL EVALUATION OF BRITISH RAIL

A specimen of British UIC 860-A rail of 113 lb/yd (51.2 kg/m) section was examined as part of a survey of a variety of foreign and domestic rails manufactured through the utilization of improved alloys or unconventional processes. The British rail was produced by a continuous casting process. The continuous cast blooms, rather than the final rail section, are slow-cooled in this process. Data gathered during an extensive metallurgical investigation showed that this material meets all existing AREA specifications, except for a slightly high manganese content and the details of the slow cooling. It compares favorably with previously tested rail in regard to both metallurgical and physical properties.

Fleming, LD

Association of American Railroads Technical Center Res Rpt. AAR R-271 Proj H-111, June 1977, 16 p., 5 Fig., 4 Tab.

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

DOTL RP

09 196453

FRACTURE PROPERTIES OF AAR CAST STEELS

Fracture test data for AAR cast steels were developed by the Case Western Reserve University from samples provided by RPI foundries. The data involved Dynamic Tear (DT), Drop Weight Test (NDT) and Charpy V properties. Steels of Grades B, C (N&T), C (Q&T) and E, from various sources, were included in the study. This report presents interpretative fracture mechanics analyses of the data. The analyses clearly define the railroad service temperatures for which these steels feature brittle, semiductile and ductile fracture properties. The fracture properties were also examined in relationship to metallurgical variables, such as composition and microstructures. It is shown that the fracture properties of Q&T steels of C and E grades are seriously degraded by the presence of pearlitic microstructures. The importance of adequate alloy content (hardenability) and effective quenching of castings is emphasized by these data. Recommendations are presented for (1) optimization of fracture properties and (2) for revised AAR specifications based on DT test reference to fracture mechanics criteria.

Pellini, WS

Association of American Railroads Technical Center Res Rpt. AAR R-272 Proj H001, July 1977, 70 p., Figs., 5 Tab., 3 Ref., 2 App.

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

DOTL RP

09 196472

MATERIALS: KEY TO NEW ENERGY STORAGE SYSTEMS

Current R&D efforts aimed at evaluating concepts and prototype components for new energy storage systems are highlighted here. Special plastics, metals and ceramics are required for the mechanical, magnetic, chemical and thermal energy storage systems now contemplated for energy conservation. Considerable materials research is also underway in battery development programs for electric vehicle propulsion and stationary energy storage for load leveling at electric utilities.

Vaccari, JA *Product Engineering* Vol. 50 No. 1, Jan. 1979, pp 46-49, 3 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

09 196536

ROLLING CONTACT FATIGUE FAILURE OF BEARING STEELS, WHEEL STEELS AND CARBURIZED GEAR STEELS

An optimum heat treatment was developed for load-bearing steels. Friction quenching was used for studying the effect of heat damage of wheel treads on rolling contact fatigue strength. It was shown that no significant change in fatigue strength resulted in the friction quenched specimen. The effective depth of the case of carburized gear steels on rolling contact fatigue strength was also investigated; fatigue strength was raised significantly when case depth exceeded a certain minimum value.

Iijima, K Kigawa, T Yoshimura, T Kuroyanagi, K *Railway Technical Research Inst, Quarterly Reports* Vol. 20 No. 1, Mar. 1979, pp 32-38, 13 Fig., 3 Tab.

ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

DOTL JC

09 196980

FRACTURE RESISTANCE AND FATIGUE CRACK GROWTH CHARACTERISTICS OF RAILROAD WHEELS AND AXLES

The effects of chemical composition, temperature and loading rates on the plane strain fracture toughness K_{Ic} of railroad wheels have been determined. Similarly, the effects of these variables were determined for grade U and F railroad axles. The carbon content was determined to be the principal factor controlling K_{Ic} . Sensitivity to loading rate (K_{Ic} vs loading rate) was seen to be a function of the microstructure. Estimates have been made of the minimum size of crack, which could result in the failure of wheels and axles under adverse service conditions. Also investigated were the effects of chemical composition, heat treatment, temperature, stress ratio (R), environment and peak loads on the fatigue crack growth characteristics of wheels and axles. It was seen that the effects of R could be predicted by the Forman equation and that crack growth rates were predominantly affected by R. Otherwise, all values fell within the same scatterband. Predictions of crack growth to criticality as a function of cycles were made

for wheels and axles. Based on these calculations, it was concluded that detection of subcritical flaws with a good degree of confidence would only be possible for the classes A and sub A wheels and the grades U and F axles.

Carter, CS Caton, RG Guthrie, JL
Boeing Commercial Airplane Company, Federal Railroad Administration, Transportation Systems Center Final Rpt. FRA/ORD-77/50, DOT-TSC-FRA-77-20, Nov. 1977, 138 p., 71 Fig., 25 Tab., 32 Ref., 1 App.

Contract DOT-TSC-617

ORDER FROM: NTIS

PB-298312/AS, DOTL NTIS

09 197421

ELECTRICAL INSULATION FIRE CHARACTERISTICS. VOLUME I: FLAMMABILITY TESTS

In the crowded, confined environment of a rapid transit vehicle, it is essential that smoke emission from all sources be minimized. The adoption of test standards and guidelines for wire and cable used in these vehicles must be undertaken in an organized, well-coordinated program in which flammability, smoke emission, toxic gas evolution, and circuit integrity are treated as interrelated components of a system. As a result of this need, standard flammability, smoke emission, and circuit integrity tests were developed for electrical wire and cable insulating materials used in rapid transit system vehicles and wayside and track installations. The objective of the program was to determine if any of the currently used materials can provide a fire-safe environment in terms of low flame propagation, smoke emission, and gas evolution, and determine whether any of these can meet criteria which will be established by taking into account the fire hazards inherent in transit systems. Wire and cable insulating materials currently in use on rapid transit systems and new polymeric materials proposed for such systems, were requested from manufacturers who had given indication of interest in the program. These samples were tested and ranked with respect to their performance during the tests. The report presents a discussion of the need for such standard tests, the criteria for the selection of a test method, the development of the test details, and a description of the standard tests. The study concludes that the objectives of the program have been achieved. Other conclusions and recommendations are presented.

See also Volume 2, PB-294 841.

Meyer, LE Taylor, AM York, JA
Boeing Commercial Airplane Company, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UM-TA-MA-06-0025-79-1, Dec. 1978, 247 p.

Contract DOT-TSC-1221

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-294840/4ST

09 197422

ELECTRICAL INSULATION FIRE CHARACTERISTICS. VOLUME II: TOXICITY

The purpose of this research was to determine the relative inhalation toxicity of the thermal degradation products or gaseous pyrolysis of selected types of electrical wiring insulations. The specific materials to be evaluated were supplied by the Boeing Commercial Airplane Company and were selected from a much larger population on the basis of prior testing of properties other than toxicity. The contract work-statement required that toxicity be evaluated utilizing the basic principles of a system designed at the Civil Aeromedical Institute (CAMI) that was used for an earlier study of aircraft interior materials. The relative toxicities of the combustion products of 14 electrical wiring insulations were evaluated using animal incapacitation as a measure of toxicity. One gram insulation samples were pyrolyzed in a quartz combustion tube connected in-line with a 12.6-L-exposure chamber by an air re-circulation assembly to form a closed exposure system. Each material was pyrolyzed under three thermal degradation conditions and the time-to-incapacitation for the shortest time condition was used to rank the materials in order of their relative potential toxicity. A rank order for all 14 materials is presented on the basis of potential toxicity for equal weights of insulation and relative ranking by toxicity for equal lengths of conductor is presented for those materials supplied on conductors of equal gauge. Techniques are suggested for converting measured toxicity of an insulation on wire of one size to the equivalent toxicity of the same insulation on wire of a different size. The report presents cautions and limitations on the

discipline of combustion toxicology and presents suggestions for future research.

See also Volume 1, PB-294 840.

Crane, CR Endecott, BR Sanders, DC Abbott, JK
Civil Aeromedical Institute, Urban Mass Transportation Administration,
Transportation Systems Center Final Rpt. UMTA-MA-06-0025-79-2,
Dec. 1978, 102 p.

Contract DOT-TSC-RA-77-15

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-294841/2ST

10 053314

ACCEPTANCE TESTING AND MAINTENANCE OF DIESEL ENGINES. LIMITS FOR POLLUTANTS IN DIESEL ENGINE EXHAUST

This document defines the permissible limits for the emission of gaseous pollutants and smoke in railway traction diesel engines.

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

International Union of Railways B 13/RP 22, Apr. 1978, 24 p., 14 Fig., 3 Tab.

ACKNOWLEDGMENT: UIC
ORDER FROM: UIC

DOTL RP

10 185707

NITROGEN OXIDE AIR POLLUTION, PART 5. EMISSIONS STUDIES, VOLUME 2. 1975-AUGUST, 1978 (A BIBLIOGRAPHY WITH ABSTRACTS)

The bibliography cites studies on emissions from both stationary and mobile sources, emissions factors, regional emission inventories, and general studies. Air quality data is excluded. Nitrogen oxide detection and analysis, industrial control techniques, atmospheric chemistry, and biological effects are covered in Parts 1 through 4. (This updated bibliography contains 229 abstracts, 51 of which are new entries to the previous edition.)

Cavagnaro, DM
National Technical Information Service Sept. 1978, 235 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTIS/PS-78/0975/9ST

10 186613

DESIGN GUIDE FOR REDUCING TRANSPORTATION NOISE IN AND AROUND BUILDINGS

This design guide presents a unified procedure for the selection of noise criteria in and around buildings, for the prediction of exterior and interior noise levels arising as a consequence of transportation systems operations, and for the evaluation of the adequacy of building designs with regard to environmental noise. Noise criteria levels are suggested in terms of equivalent sound levels (Leq). Simplified predictive methods enable the estimation of noise levels arising as a consequence of highway, railway, and aircraft operations. The sound isolation provided by the building shell is estimated by means of a new single-figure rating system. Finally, design manipulations which may make possible the improvement of the acoustic conditions in and around buildings are suggested.

Library of Congress Catalog Card no. 76-58340.

Pallett, DS Wehrli, R Kilmer, RD Quindry, TL
National Bureau of Standards Final Rpt. NBS-BSS-84, Apr. 1978, 109 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-284988/3ST

10 186657

ALTITUDE AS A FACTOR IN AIR POLLUTION

Air pollution is affected by change in altitude. Cities with surface elevations above 1500 meters have atmospheric pressures which are approximately fifteen percent (15%) below pressures at sea level. Consequently, mobile sources designed to operate at pressures of one atmosphere perform less efficiently at high altitudes and emit greater amounts of hydrocarbons and carbon monoxide than those designed to operate at the lower atmospheric pressures. The net result is a photochemical smog problem which is further enhanced by the increased solar radiation of higher altitudes. The most significant effect of air pollution at high altitudes is upon human health. This is due primarily to the inhalation of carbon monoxide at the reduced oxygen concentrations of high altitudes. Particularly susceptible is the fetus exposed to hypoxia and elevated carboxyhemoglobin levels. There is insufficient evidence to support significantly increased ecological effects at high altitudes. Reduction in visibility is being observed in the vicinity of large metropolitan areas and near large industrial complexes at high altitudes.

Environmental Protection Agency Final Rpt. EPA/600/9-78/015, June 1978, 41 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-285645/8ST

10 186686

ENVIRONMENTAL ASSESSMENT OF COAL TRANSPORTATION

Work described in this report deals with (1) primary and secondary environmental impacts resulting from transportation of coal by slurry pipeline, railroad, barge, truck, and conveyor; (2) coal preparation and associated activities, such as loading and unloading, and (3) energy efficiencies of the transport modes.

Szabo, MF
Pedco-Environmental, Incorporated, Environmental Protection Agency
Final Rpt. EPA/600/7-78/081, May 1978, 165 p.

Contract EPA-68-02-1321

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-285936/1ST

10 186798

FULL SCALE SIMULATIONS OF ACCIDENTS ON SPENT-NUCLEAR-FUEL SHIPPING SYSTEMS

In 1977 and 1978, five first-of-a-kind full scale tests of spent-nuclear-fuel shipping systems were conducted at Sandia Laboratories. The objectives of this broad test program were (1) to assess and demonstrate the validity of current analytical and scale modeling techniques for predicting damage in accident conditions by comparing predicted results with actual test results, and (2) to gain quantitative knowledge of extreme accident environments by assessing the response of full scale hardware under actual test conditions. The tests were not intended to validate the present regulatory standards. The spent fuel cask tests fell into the following configurations: crashes of a truck-transport system into a massive concrete barrier (100 and 130 km/h); a grade crossing impact test (130 km/h) involving a locomotive and a stalled tractor-trailer; and a railcar shipping system impact into a massive concrete barrier (130 km/h) followed by fire. In addition to collecting much data on the response of cask transport systems, the program has demonstrated thus far that current analytical and scale modeling techniques are valid approaches for predicting vehicular and cask damage in accident environments. The tests have also shown that the spent casks tested are extremely rugged devices capable of retaining their radioactive contents in very severe accidents. (ERA citation 03:048515)

Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 Apr 1978. Microfiche copies only.

Yoshimura, HR
Sandia Laboratories, Department of Energy CONF-780458-1, 1978, 14 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-77-1623C

10 186805

ENVIRONMENTAL IMPACT OF ACCIDENT-FREE TRANSPORTATION OF RADIOACTIVE MATERIAL IN THE UNITED STATES

A recent study performed for the Nuclear Regulatory Commission (NRC) by Sandia Laboratories which considered transportation of radioactive materials in the United States suggests that a significant portion of the radiological impact results from accident-free transport. This paper explores the basis for that conclusion. (ERA citation 03:046893)

Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978.

Taylor, JM Smith, DR Luna, RE
Sandia Laboratories, Department of Energy CONF-780506-11, 1978, 5 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-78-0703C

10 188991

SYNTHESIS OF SOCIAL SURVEYS ON NOISE ANNOYANCE

Since noise was first recognized as a serious environmental pollutant, a number of social surveys have been conducted in order to assess the magnitude of the problem and to develop suitable noise ratings, such that, from a measurement of certain physical characteristics of community noise, one could reliably predict the community's subjective response to the noise. Recently, the author has reviewed the data from social surveys concerning the noise of aircraft, street traffic, expressway traffic, and railroads. Going back to the original published data, the various survey noise ratings were translated to day-night average sound level, and an independent judgment was made, where choice was possible, as to which respondents should be counted as "highly annoyed." The results of 11 of these surveys show a remarkable consistency. It is proposed that the average of these curves is the best currently available relationship for predicting community annoyance due to transportation noise of all kinds.

Schultz, TJ (Bolt, Beranek and Newman, Incorporated) *Acoustical Society of America, Journal of* Vol. 64 No. 2, Aug. 1978, pp 377-405

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

10 189007

CROSS-VENTILATION OF UNDERGROUND RAILWAY TUNNELS

The aerodynamic merits and demerits of cross-ventilating adjacent tunnels in underground rapid transit systems are discussed. Three types of cross-ventilation are considered, namely (a) numerous small holes in the dividing wall between the tracks in a cut-and-cover tunnel, (b) a curtailed dividing wall, and (c) passages linking separately bored tunnels. It is shown that considerable reductions in the air velocities expected on station platforms will result if the end regions of the tunnels are well cross-ventilated. Additionally, useful reductions in the aerodynamic drag force on trains can be expected if cross-ventilation is provided along the whole length of the tunnel. However, this is recommended only for low-speed systems because interaction between passing trains will cause large pressure fluctuations at high speeds.

For ASME Meeting held December 10-15, 1978.

Vardy, AE

American Society of Mechanical Engineers n 78-WA/FE-14, 1978, 10 p., 17 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

10 189025

NOISE POLLUTION AND PROTECTION IN ELEVATED, GROUND-LEVEL AND LOWERED LEVEL S-BAHN LINES

[Laermmissionen und Laermschutz bei Schnellbahnen in Hochlage, in ebenerdiger Fuehrung und in Tiefelage]

No Abstract. [German]

Blenneman, F *Forschung und Praxis* No. 21, 1978, pp 135-140, 6 Tab., 8 Phot., 5 Ref.

ACKNOWLEDGMENT: International Union of Railways; BD

ORDER FROM: Forschung und Praxis, Dusseldorf, West Germany

10 189743

REACTIONS TO RAILWAY NOISE IN GREAT BRITAIN

The 1975-76 national study of railway noise in Great Britain combined a noise measurement program and a social survey of the reactions of nearby residents to railway noise. The study utilized a complex probability sample of 2010 addresses grouped in sets of 5 adjacent addresses into 403 compact segments in 75 areas each approximately one mile long. Each of the 403 clusters of dwelling units became a physical noise measurement site. At these sites a total of over 3500 analog recordings of train pass-bys were made. For each pass-by the A-weighted equivalent sound level (Leq) was measured from these recordings using a dosimeter. Other A-weighted noise measures were read from level recorder traces. These noise measures together with railway operating timetables were used in a complex computer program to construct 10 descriptors of the railway noise environment for each of the 403 noise measurement sites. The noise measurements were preceded by the social survey interviews. To date the railway noise data have been summarized with ten alternative environmental noise indices representing

five concepts in noise index construction. The indices are evaluated in the paper in terms of the closeness of their relationship to annoyance.

Proceedings of the International Conference on Noise Control Engineering Inter-Noise '78: Des for Noise Control, San Francisco, California, May 8-10, 1978.

Fields, JM (Southampton University, England); Walker, JG
Noise Control Foundation Proceeding 1978, pp 585-590

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Noise Control Foundation, Box 1758, Poughkeepsie, New York, 12603

10 189744

NOISE SURVEY DESIGN AND THE PRECISION OF STATISTICAL RESULTS: FURTHER EVALUATION OF THE DESIGN OF A NATIONAL RAILWAY NOISE SURVEY

Because studies of human response to noise are based on samples it is virtually certain that a study's results never exactly describe the group or population from which the sample is drawn. To increase confidence in a study's accuracy various inferential statistics are calculated to indicate the likely precision of descriptive statistical estimators (mean, correlation, regression slope, etc). Community noise study reports have not often included the relevant inferential statistics. This is partly because most inductive statistics assume a simple random sample of the population when in fact most noise surveys are based on samples which are clustered around noise measurement points. Such samples require different statistical techniques, ones illustrated in this paper. The paper is the second in a series which examine the probability sample design of the National Railway Noise Survey of Great Britain.

Proceedings of the International Conference on Noise Control Engineering Inter-Noise '78: Des for Noise Control, San Francisco, California, May 8-10, 1978.

Fields, JM (Southampton University, England); Tomberlin, TJ
Noise Control Foundation Proceeding 1978, pp 597-600, 12 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Noise Control Foundation, Box 1758, Poughkeepsie, New York, 12603

10 189745

NOISE CONTROL OF STEEL RAILWAY BRIDGES IN SHINKANSEN

The noise caused by Shinkansen, the new trunk line system of Japanese National Railways where trains are operated at a speed of 210 km per hour, has become a serious problem for the people living along and near the lines. The problem is especially acute where the trains run on nonballast open floor type steel bridges. Japanese National Railways has investigated the characteristics of the noise. Considerably effective methods were developed, which reduce the noise level under or near the bridges by no less than 25 dBA, that is, from about 105 dBA to about 80 dBA.

Proceedings of the International Conference on Noise Control Engineering Inter-Noise '78: Des for Noise Control, San Francisco, California, May 8-10, 1978.

Abe, H (Japanese National Railways); Arai, M
Noise Control Foundation Proceeding 1978, pp 763-766

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Noise Control Foundation, Box 1758, Poughkeepsie, New York, 12603

10 189746

WHEEL-RAIL NOISE REDUCTION BY MEANS OF ABSORPTION BETWEEN THE RAIL

Noise measurements of a passing train at a distance 7.5 m from the middle of the track indicate that the rolling of the wheels over a straight, long welded rail without corrugations produces a noise with a broad-frequency spectrum. This is mainly radiated by the wheels, the rail and the structure (viaducts, bridges and tunnels). The conclusion to be drawn from the investigations of P.J. Remington are that in the noise, the wheel dominates in the sound radiation at the low frequencies, and the rail dominates over the rest of the frequencies. The physical explanation is that at low frequencies the wheel impedance rises as the frequency to the first power, which will be similar to the frequency dependence of a simple mass. For the rest of the frequencies the rail impedance agrees with the impedance of a simple beam-in-bending. In the low frequencies dips in the impedance result from

the rail resonance on the foundation, as the rail is a very inefficient radiator at these low frequencies; the frequencies around 100 Hz can only be radiated by a large construction like a viaduct or bridge.

Proceedings of the International Conference on Noise Control Engineering Inter-Noise '78: Des for Noise Control, San Francisco, California, May 8-10, 1978.

Riemens, S (Van Dorsser, Netherlands)
Noise Control Foundation Proceeding 1978, pp 771-774

ACKNOWLEDGMENT: EI
ORDER FROM: ESL, Noise Control Foundation, Box 1758, Poughkeepsie, New York, 12603

10 189769

NOISE MEASUREMENTS ON URBAN TRANSPORT RAIL VEHICLES (TRAMWAYS, URBAN RAILWAYS, UNDERGROUND) [Laermessungen bei neuen Schienenfahrzeuge des Stadtverkehrs (Strassenbahnen, Stadtbahnen, U-Bahnen)]
No Abstract. [German]

Biennemann, F Gross, K
Bundesministerium fuer Forschung und Technologie DB: Dok 4830, 1978, 159 p., 42 Tab., 185 Phot., 38 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Bundesministerium fuer Forschung und Technologie, Forschungsauftrag, Cologne, West Germany

10 189773

THE MODERN RAILWAY: GOOD OR BAD FOR THE ENVIRONMENT? [Die moderne Eisenbahn: umweltfreundlich oder nicht?]

Following comments on noise recordings and noise comparison between rail and road transport, the author concludes that rail transport emits less noise, fewer noxious substances and causes fewer accidents. It also requires less space and less energy than road transport. [German]

Hauck, G *Internationales Verkehrswesen* Vol. 30 No. 4, July 1978, pp 248-252, 1 Tab., 10 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

10 190264

NORTH EAST AREA LIGHT RAIL LINE-ENVIRONMENTAL IMPACT STATEMENT. DRAFT

The primary objective of the north east area public transport review was to determine the steps that must be taken in the next five or ten years to provide the basis of a public transport system to serve the needs of the north east suburbs of Adelaide at least until the end of the century. With this objective in mind and taking into account specific engineering, social, environmental, economics and land use criteria, the objectives of the proposed action, a light rail transit line, were developed. The study findings demonstrate the need for a major improvement to the transport system in the north east area. A number of options are described and some selected for detailed evaluation. Details of the preferred action in terms of the selected route and technical and other characteristics of the system, and a summary of probable environmental effects in terms of adverse and beneficial impacts are given. In a majority of the areas an LRT system or busway all or part of the Modbury transport corridor would best meet the required criteria and offer significant advantages over other transportation systems examined.

South Australia Department of Transport, Australia Monograph No Date, 139 p., 26 Fig., 8 Phot., Refs.

ACKNOWLEDGMENT: TRRL (IRRD-236744), Australian Road Research Board

ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

10 190273

PROBLEMS IN DETERMINING THE SIZE OF THE POPULATION AND CRITICAL GROUPS EXPOSED TO ENVIRONMENTAL NOISE

In order to better estimate how and to what extent people are affected by exposure to environmental noise, an attempt must be made to calculate first the size of the entire population exposed to certain levels of noise and,

second, groups within the population which are particularly sensitive to noise. Such a study has been started in the Federal Republic of Germany. It has been estimated that about 14 million people are exposed to sound levels of roughly 62 dB(A) and about 2 million to levels of roughly 70 dB(A). Nothing is yet known about the existence or size of sensitive groups within these populations, however, and the following report lists areas needing research in terms of this problem.

Gros, E Jansen, G *Journal of Sound and Vibration* Vol. 59 No. 1, July 1978, pp 137-138

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

10 190302

REFLECTION OF STEP-WAVEFRONTS FROM PERFORATED AND FLARED TUBE EXTENSIONS

The manner in which step-wavefronts reflect from perforated and flared extension tubes attached to the end of a simple tube is analyzed by using a numerical scheme based on the unidirectional method of characteristics. It is shown that the reflected wavefront can be longer than twice the length of the perforated tube, but that it cannot exceed twice the length of a flared extension. This difference is attributed to the non-linear response of flows through the ventilating holes to changes in the internal pressure. The optimum amount of ventilation is shown to vary with the square-root of the magnitude of the incident wavefront. Little dependence on the axial distribution of the ventilating holes is found. The use of such regions next to the exit portal of a railway tunnel is shown to be less advantageous than similar regions leading to the entrance portal.

Vardy, AE *Journal of Sound and Vibration* Vol. 59 No. 4, Aug. 1978, pp 577-589, 20 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

10 190328

PULSE NOISE VERSUS DISTANCE CHARACTERISTICS OF RADIO NOISE DUE TO SHINKANSEN ELECTRIC VEHICLES

Sometimes television sets near the Shinkansen line are affected by two types of radio interference. The "pulse noise versus distance" characteristics can be used to identify the places where such noise causes disturbances in television sets.

Yoshida, Y *Railway Technical Research Inst, Quarterly Reports* Vol. 19 No. 3, Sept. 1978, 138 p., 1 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

DOTL JC

10 190350

PHYSICAL SIZE DISTRIBUTION CHARACTERIZATION OF DIESEL PARTICULATE MATTER AND THE STUDY OF THE COAGULATION PROCESS

Diesel particulate matter in both the diluted and undiluted state is subject to the processes of coagulation, condensation or evaporation, and nucleation which causes continuous changes in its physical characteristics. The Electrical Aerosol Analyzer (EAA) is used to measure the diesel particle size distribution in the Michigan Technological University dilution tunnel for a naturally aspirated direct-injection diesel engine operated on the EPA 13 mode cycle. The design and development of accurate and repeatable sampling methods using the EAA are presented. These methods involve both steady-state tunnel and bag measurements. The data indicate a bimodal nature within the 0.001 to 1 millimicron range. The first mode termed the "embryonic mode" has a saddle point between 0.005 to 0.015 millimicron and the second mode termed the "aggregation mode" lies between .08 to .15 millimicron for the number distribution. The particle concentration decreases with time and the resulting size distribution function approaches an asymptotic steady-state solution indicating the self-preserving nature of particulate size distributions. Coagulation constants have been calculated for the diesel particles and are compared to theoretical values in the literature.

For Meeting held September 11-14, 1978.

Khatri, NJ (Michigan Technological University); Johnson, JH
Society of Automotive Engineers Preprint SAE 780788, 1978, 27 p., 18 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

10 190503

IN-SERVICE PERFORMANCE AND COSTS OF METHODS TO CONTROL URBAN RAIL SYSTEM NOISE. INITIAL TEST SERIES REPORT

The purpose of this project is to determine the acoustic and economic effectiveness of resilient wheels, damped wheels, wheel truing, and rail grinding for reducing wheel/rail noise on urban rail transit systems. The project consists of a six-phase series of field tests being performed on the Southeastern Pennsylvania Transportation Authority System's Market Frankford Line, and in-depth interviews with management and operating personnel of the North American steel wheeled rapid transit systems regarding their experience with the above mentioned noise abatement procedures. This is the third report of this project. The first two reports, the Experimental Design and the Test and Evaluation Plan contained the procedures to be followed in conducting the project. This report includes: (a) the results of the testing performed in Phases I, II, and III including tentative recommendations; (b) changes which have occurred to the Experimental Design and to the Test Evaluation Plan; (c) economic data for the wheel types, rail grinding equipment, and wheel truing equipment under consideration; (d) a preliminary discussion of problems and enumeration of constraints which are relevant to use of these techniques on other systems; (e) a summary of remaining testing to be accomplished under the program including recommended changes to the Experimental Design or to the Test and Evaluation Plan. It has been determined that overall noise reduction obtained by use of the various techniques is limited by the noise of the propulsion system.

Prepared in cooperation with Wilson, Ihrig and Associates, Inc., Oakland, CA. See also report dated May 76, PB-257200.

Shipley, RL Saurenman, HJ
De Leuw, Cather and Company, Wilson, Ihrig and Associates,
Incorporated, Transportation Systems Center Intrm Rpt. DOT-TSC-UMTA-78-32, Aug. 1978, 414 p.

Contract DOT-TSC-1053

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288838/6ST

10 191406

NOISE DEGRADATION OVER TIME IN RAIL RAPID TRANSIT CARS

The purpose of this effort was to study the degradation of noise quality of selected cars over time, and to relate this degradation to treatment events if possible. To this end, three trains were observed monthly for a period of seven months in an extensive collection and analysis effort. The three car types studied were: IRT cars comparable to the R17; IRT cars (R17), with a special design feature the "Traction Fault Detector"; and R46 cars. Because of the substantial measurement problems encountered, the project has in fact two sets of major results: (1) those relating to the novel data collection and analysis methods employed; and (2) those relating to wheel-rail interaction and degradation.

See also PB-292 032.

Slutsky, S McShane, WR Starace, JJ
Polytechnic Institute of New York, Urban Mass Transportation
Administration, (UMTA-NY-11-0002) Final Rpt. UMTA-NY-11-0002-79-2, Dec. 1978, 69 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292031/2ST

10 191407

NOISE ABATEMENT IN RAIL RAPID TRANSIT: EFFECT OF SOME VARIATIONS

Noise abatement in rail rapid transit is an expensive and complicated undertaking. Cost is minimized by selecting a proper mix of treatments to attain a specified noise objective, or target. Assessments of specific properties and development of an abatement methodology were accomplished in earlier works. In this report the abatement methodology is refined and a number of case studies conducted. This report focuses on changes in the system-wide treatment plan, the program cost, and the net impact due

to such factors as: variations in discount rate; changes in abatement target level; introduction of new cars; prohibition of certain treatments, such as resilient wheels and steel el barriers; and specification of certain treatments on a categoric basis. In the course of the studies, it was found that a system average noise level index is rather insensitive to system changes. A measure based upon percent of system exceeding certain noise levels is developed. Programs for in-train abatement were developed for 1976 and 1985 car fleet compositions, and estimated to be comparable in net effect. A program costing in the order of \$5.0 million annual cost for in-train abatement was found to have the greatest abatement per unit cost, although additional abatement is achieved with additional money. Effects of changes in the relative importance of different noise sources were studied. Additional studies on in-community abatement are reported herein, as are some ancillary in-train studies.

See also PB-292 031.

McShane, WR Slutsky, S
Polytechnic Institute of New York, Urban Mass Transportation
Administration, (UMTA-NY-11-0002) UMTA-NY-11-0002-79-1, Dec.
1978, 163 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292032/OST

10 191428

NOISE ASSESSMENT OF THE PORT AUTHORITY TRANSIT CORPORATION LINDENWOLD RAIL TRANSIT LINE

The report describes the noise climate on and near the Port Authority Transit Corporation (PATCO) Lindenwold High Speed Line. The PATCO urban rail transit line has approximately 14.2 miles of two-way revenue track (of which about four miles are in subway), and 12 stations. Noise level data is given for specific measurements made in cars, in stations, and along the non-subway wayside at appropriate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data are discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Spencer, RH Hinterkeuser, EG
Boeing Vertol Company, Transportation Systems Center, Urban Mass
Transportation Administration Intrm Rpt. DOT-TSC-UMTA-78-45,
Oct. 1978, 190 p.

Contract DOT-TSC-850

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292319/1ST

10 191429

NOISE ASSESSMENT OF THE SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY HEAVY RAIL TRANSIT SYSTEM

The report describes the noise climate on and near the Southeastern Pennsylvania Transportation Authority, (SEPTA), Broad Street Subway and Market-Frankford Elevated Line. The two SEPTA urban rail transit lines have approximately 22.6 miles of two-way revenue track (of which 13.1 miles are in subway), and 53 stations. Noise level data are given for specific measurements made in cars, in stations and along the non-subway wayside at appropriate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data are discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Spencer, RH Hinterkeuser, EG
Boeing Vertol Company, Transportation Systems Center, Urban Mass
Transportation Administration Intrm Rpt. DOT-TSC-UMTA-78-46,
Oct. 1978, 364 p.

Contract DOT-TSC-850

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292320/9ST

10 191431

NOISE ASSESSMENT OF THE GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY HEAVY RAIL TRANSIT SYSTEM

The report describes the noise climate on and near the Greater Cleveland Regional Transit Authority (RTA), formerly the Cleveland Transit System (CTS), Airport Line. The RTA urban rail transit line has approximately 19 miles of two-way revenue track (of which about one mile is in subway), and 18 stations. Noise level data is given for specific measurements made in cars, in stations, and along the non-subway wayside at appropriate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data are discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Spencer, RH Hinterkeuser, EG
Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-78-44, Oct. 1978, 172 p.

Contract DOT-TSC-850

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292331/6ST

10 191435

NOISE ASSESSMENT OF THE BAY AREA RAPID TRANSIT SYSTEM

The report describes the noise on and near the San Francisco Bay Area Rapid Transit System (BART). BART has approximately 75 miles of two-way revenue track (of which 19.7 miles are in subway) and 34 stations. Noise data is given for specific measurements made in cars, in stations and along the non-subway wayside at appropriate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data is discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Prepared by Wilson, Ihrig and Associates, Inc., Oakland, CA.

Wolfe, SL Saurenman, HJ Lee, PYN
Boeing Vertol Company, Wilson, Ihrig and Associates, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-78-43, Oct. 1978, 313 p.

Contract DOT-TSC-850

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292397/7ST

10 191440

NOISE ASSESSMENT OF THE NEW YORK CITY RAIL RAPID TRANSIT SYSTEM

The report describes the noise climate on and near the New York City Transit Authority (NYCTA) urban rail system, including the Staten Island Rapid Transit Operating Authority (SIRTOA). Noise level data is also presented for the Port Authority Trans-Hudson (PATH) urban rail system. The NYCTA (including SIRTOA) urban rail system has 485 stations and approximately 246 route miles, of which 137 miles are underground. Noise level data are given for specific measurements made in cars, stations and along the above ground wayside at approximate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data is discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

McShane, WR Slutsky, S Huss, MF
Polytechnic Institute of New York, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-NY-11-0010) Intrm Rpt. DOT-TSC-UMTA-78-53, Jan. 1979, 359 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292498/3ST

10 191677

NOISE ASSESSMENT OF THE CHICAGO TRANSIT AUTHORITY RAIL RAPID TRANSIT SYSTEM

The report describes the noise on and near the Chicago Transit Authority (CTA) urban rail transit lines. The CTA urban rail lines consist of

approximately 86 miles of two-way revenue track (of which 9.6 miles are in subway) and 155 stations. Noise data are given for specific measurements made in cars, in stations, and along the non-subway wayside at selected locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data is discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

See also report dated Sep 74, PB-238 113.

Silver, ML Buchus, RC Priemer, R
Illinois University, Chicago, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0025-79-8, Jan. 1979, 305 p.

Grant DOT-UMTA-IL-11-007

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292834/9ST

10 192346

CHEMICAL COMPOSITION OF EXHAUST PARTICLES FROM GAS TURBINE ENGINES

A program was conducted to chemically characterize particulate emissions from a current technology, high population, gas turbine engine. Attention was focused on polynuclear aromatic compounds, phenols, nitrosamines and total organics. Polynuclear aromatic hydrocarbons (PAH) were determined by HPLC, GC/MS and NMR techniques. Phenols and nitrosamines were isolated and then measured by gas chromatographic methods utilizing flame ionization detection and nitrogen detection. Total organics were determined by a backflush chromatographic procedure. The particulate matter was collected using a high capacity pumping system incorporating 293 mm diameter Teflon filters through which was passed up to 43 cu m of exhaust gas. Extraction of the organic matter was performed in a Soxhlet extractor using hexane. The engine was operated at idle, approach, climb and take-off power settings with low sulfur (0.007%S) and high sulfur (0.25%S) fuels. Most of the PAH were small 3-to-4 fused ring species. No nitrosamines were found and except in a few cases, at low levels, no phenols. PAH and total organic levels decreased with increasing power setting and were more concentrated in the exhaust from the low sulfur fuel. Less than 1% of the organic matter emitted from the engine was adsorbed on the particulate matter.

Robertson, DJ Elwood, JH Groth, RH
Pratt and Whitney Aircraft, Environmental Protection Agency Final Rpt. EPA-600/2-79/041, Feb. 1979, 178 p.

Contract EPA-68-02-2458

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292380/3ST

10 193764

CORROSION AND FOULING POTENTIAL IN DIESEL EXHAUSTS

The exhaust gases from five large diesel engines--1500 to 6400 kW (2000 to 8900 hp)--were sampled at three sites over a range of engine operating conditions using fuels with 0.05 to 0.8 percent sulfur. Measurements of SO₂, SO₃, CO, CO₂, H₂O, NO, NO_x, chlorides, acid dew point, peak rate temperature of acid deposition, particulate loading, particle sizing, particulate composition and smoke number were made to characterize the diesel exhaust. Total particulate emissions varied directly with fuel sulfur content. Fifty percent or greater of the total particulate emissions were less than or equal to 0.3 micrometers in size. The fouling and corrosion potential of diesel exhaust gas can be approximated given the fuel analysis and engine operating conditions.

Engel, PK (KVB, Incorporated); Silvestrini, R Thompson, RE
American Society of Mechanical Engineers n 78-WA/Fu-5, 1978, 12 p., 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

10 194866

OXIDES OF NITROGEN

Environmental health criteria for oxides of nitrogen are summarized as follows: summary and recommendations for further research; chemistry and

analytical methods; sources of oxides of nitrogen; environmental levels and exposures; effects on experimental animals; effects on man; evaluation of health risks from exposure to oxides of nitrogen. A copious list of references is included. /TRRL/

World Health Organization Monograph No. 4, 1977, 79 p., 3 Fig., 11 Tab., Refs.

ACKNOWLEDGMENT: TRRL (IRRD 238910)
ORDER FROM: World Health Organization, Geneva, Switzerland
7901092

10 195095

ENVIRONMENTAL PROTECTION FROM THE POINT OF VIEW OF THE RAILWAY ENGINEER

In the field of environmental protection, the railways can refer to small space and power requirements and to the low number of accidents. Using railways for the transport of dangerous goods as well as for waste disposal and water protection has no adverse effects on the environment. The nuisance caused by rail and road vehicle noise is difficult to measure according to a common standard reference, the cause for this being the differences in frequency composition and the variations with time. The various noise abatement measures on the lines and vehicles require a high cost and engineering effort, which are both not always in the right proportion to the success so that a critical approach is necessary. [German]

Frerk, HW *Glaser Annalen ZEV* Vol. 103 No. 1, Jan. 1979, pp 16-24

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

10 195128

A GUIDE TO NOISE IN LAND TRANSPORT [Guide du bruit des transports terrestres]

A collection of publications containing basic information on noise in road and rail transport, accompanied by specialized technical appendices. [French]

Also covered in May 1978 Volume.

French Ministry of the Environment, French Ministry of Transport
SNCF Cat 77 No. 13, Sept. 1976, p 56, Tabs., Photos.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: French Ministry of the Environment, 246 Boulevard Saint Germain., 75700 Paris, France French Ministry of Transport, 32 Avenue du President Kennedy, 75775 Paris, France

10 195707

FULL-SCALE SOUND DAMPING TESTS ON TWO STEEL BOX GIRDER RAILWAY BRIDGES [Schalldaempfungsgrofversuch an zwei Staehlernen Eisenbahn-Hohlkastenbruecken]

This paper presents full-scale structure-borne sound damping tests on two steel box girder railway bridges of the Hamburg S-Bahn network, using three-layer sandwich plates as the sound-damping material. The highly damped layers were of vinyl acetate copolymer of about 1 mm thickness (bridge I) and a two component material based on polyurethane of the same thickness as the constraining steel sheets (bridge II). In both cases the thickness of the noncarrying sheets was about 1/4 of the base plate thickness. The bridges, both with direct fixation of rail, were built in 1959. The sandwich plates were applied in two steps in 1976. Noise measurements were made before, between and after application of the sandwich plates. The decrease in the mean values of the sound pressure level was 13 dB (bridge I) and 18 dB (bridge II), measured for a full train passing at 40 km/h. The structure-borne sound decreased by 17 dB and 19 dB, respectively. Damped by three-layer sandwich plates against structure-borne sound the box girder bridges radiated nearly the same noise while a train passed by as the railway tracks behind the bridges. [German]

Hanel, JJ Seeger, T *Stahlbau* Vol. 47 No. 12, Dec. 1978, pp 353-361, 13 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

10 195717

STUDY ON THE MECHANISM OF TRAIN NOISE AND ITS COUNTERMEASURE-1. CHARACTERISTICS OF WHEEL VIBRATION

Recently, train noise has become a great social problem. One of its main causes has been reported to be the vibration of the wheels, but only a few studies in this area have been reported. The authors made a wheel noise and vibration testing machine which had two wheels simulating the train wheel and the rail. The relationship between the noise and the vibration was studied, and the following results were obtained. 1) The noise is caused by wheel axial vibration. 2) Wheel axial vibration can be theoretically modeled by the vibration of a circular plate with the boundary conditions that the inside circumference (axis) is fixed, the outside is free and one point on it is simply supported.

Sato, S (Kyoto University, Japan); Matsuhisa, H *JSME Bulletin* Vol. 21 No. 160, Oct. 1978, p 1475, 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

10 196113

ENERGY AND ENVIRONMENTAL ANALYSIS OF A PROPOSED COAL RAIL HAUL RATE INCREASE. ENVIRONMENTAL STUDY NO. 5

An analysis has been made of the potential environmental impacts of the request by the Burlington Northern Railroad for a proposed rate increase to haul coal from a mine in Wyoming to the J.T. Dealy coal-fired power plant of the San Antonio City Public Service Board. The proposed rate increase by the railroad would raise the cost of moving the coal from the present \$11.94 per ton to \$18.23 per ton; the effect would be to make the coal less competitive than fuel oil and to cause increased oil burning at the V.H. Braunig and O.W. Sommers plants. This proposed action would affect the distribution of the types and amounts of fuel supplies used with resultant environmental impacts on air pollutant emissions, air quality levels and water quality parameters.

Cooper, HBH, Jr Miksad, RW Fruh, EG
Texas University, Austin UT/CES-ES--5, Aug. 1978, 61 p.

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

10 196387

THE BATTLE AGAINST NOISE FROM TRANSPORT. ONE OF THE MAIN FEATURES OF ENVIRONMENTAL POLICY

The Federal Ministry of the Interior in the Federal Republic of Germany set up a Working Party to combat noise in March 1977. It has members from all related areas. The final report was submitted in October 1978 and contains details of the many steps that should be taken by the authorities, manufacturers and scientists. The harmful substances released in exhaust fumes also need to be reduced, as well as noise levels. [German]

Hartkopf, G *Glaser Annalen ZEV* Vol. 103 No. 1, Jan. 1979, pp 6-10

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

10 197007

EFFECTS OF TRACK CONSTRUCTION ON VIBRATION AND NOISE IN THE GLASGOW UNDERGROUND

The change from traditional ballast to concrete in the Glasgow Underground will give substantially increased noise levels. The article describes tests carried out on a section of slab track and makes suggestions for alleviation.

Brown, J Davidson, R *Railway Engineer International* Vol. 4 No. 2, Mar. 1979, pp 43-46, 12 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

10 197018

TEMPERATURES IN TUNNELS [Temperatura en los tunneles]

Study of the factors affecting the temperature inside tunnels. [Spanish]

Hacar Rodriguez, F *Revista de Obras Publicas* Vol. 167 No. 3, Mar. 1979, pp 217-223, 4 Tab., 7 Phot., 9 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
 ORDER FROM: Escuela de Ingenieros de Caminos Canales y Puertos, Ciudad Universitaria, Madrid 3, Spain

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

DOTL JC

10 197157

REDUCING NOISE RADIATED BY DIESEL ENGINES--1, 2

Part 1 of this 2-part article discusses 4 basic approaches to controlling noise radiated by engine surfaces: (1) Control noise generation from sources within the engine and its accessories; (2) Reduce transmission of vibration from sources to radiating surfaces; (3) Control vibration of external surfaces of the engine; (4) Enclose the engine. Ways of implementing each approach are outlined. The relative importance of combustion noise and mechanical noise is discussed, and a method of diagnosing the contribution to the overall engine noise from each surface area is covered. Part 2 describes in some detail the methods of diagnosing the vibrations from crankcase, cylinder block, valve gear covers and sump, and suggests ways of damping them to achieve an overall reduction of 5dBA or more.

Part 2 of this article appears in Volume 10, Number 1, January 1979, pp 5-7.

Russell, MF *Noise Control Vibration Isolation* Vol. 9 No. 9, Nov. 1978, pp 385-386, 4 Ref.

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

DOTL JC

10 197274

BENEFITS OF DIESEL ENGINE NOISE RESEARCH

The British government, in cooperation with the Motor Industry Research Association, the Institute of Sound and Vibration Research, the Transport and Road Research Laboratory and manufacturing industry, mounted a long term project to develop and build prototypes of two quiet, heavy vehicles-one with a 200bhp engine and the other with a 350bhp engine. The research target for the vehicles was a noise level at least 10dBA lower than the appropriate value required by the present Construction and Use Regulations. That is, they are not to exceed 82dBA in standard test conditions. This article describes the methods and equipment used by the Perkins Engines Group in their intensive research program to investigate the diesel engine noise problem. In order to assess new ideas for engine noise reduction and help test the predictive techniques using the finite element method, a research engine was built. It was based on the internal parts of a current production four cylinder 4.236 engine. Test on the first phase of the research engine project revealed that a reduction of nearly 11dBA has been achieved on cylinder block noise when compared with the production engine cylinder block.

Rogers, A *Noise Control Vibration Isolation* Vol. 9 No. 9, Nov. 1978, pp 388-390

10 197435

PREDICTION AND CONTROL OF NOISE AND VIBRATION IN RAIL TRANSIT SYSTEMS

The purpose of this report is to present a balanced introductory view of noise from rail transportation systems and its control, and to provide references to more specialized material. The emphasis is on urban transit systems. However, data on intercity passenger and freight trains are included. The noise environments treated include community noise and vibration near rail lines, vehicle interior noise of urban and intercity passenger trains, locomotive cab noise, and noise in stations and tunnels. For each environment, some or all of the following topics are addressed: measured noise and vibration levels and spectra; prediction and control of noise and vibration; measurement methods; and applicable standards, specifications, and criteria.

Kurzweil, LG Lotz, R
 Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-78-38, UMTA-MA-06-0025-78-8, Sept. 1978, 124 p.

ACKNOWLEDGMENT: NTIS
 ORDER FROM: NTIS

PB-294968/3ST

10 197522

URBAN RAIL NOISE ABATEMENT PROGRAM: A DESCRIPTION

This report presents the background, current activities, and future plans for the Urban Rail Noise Abatement Program. This program, sponsored by the Office of Technology Development and Deployment of the Urban Mass Transportation Administration (UMTA) was initiated in 1972 and has been technically managed since its inception by the Transportation Systems Center. The problem of urban rail noise and vibration is described and the rationale for the UMTA funded program is given. The body of the report presents a definition of the program objectives, a discussion of the program organization, and a description of past, current, and future program activities. Major accomplishments of the program to date are listed in the final section.

Kurzweil, LG Cobb, WN
 Transportation Systems Center, Urban Mass Transportation Administration DOT-TSC-UMTA-79-23, UMTA-MA-06-0099-79-1, Mar. 1979, 26 p.

ACKNOWLEDGMENT: NTIS
 ORDER FROM: NTIS

PB-295545/8ST, DOTL NTIS

11 186150

ASSESSMENT OF THE TUNNEL TRAIN SYSTEM AT HOUSTON INTERCONTINENTAL AIRPORT

This report describes and assesses the Tunnel Train System at Houston Intercontinental Airport; it was installed in 1972 as a replacement of an earlier battery-powered tug system. It provides a good example of the problems associated with fitting an AGT system into an existing environment. Information and data were collected by the authors through surveys of technical literature; formal site visits; interviews with operators, management, and engineering personnel; and a visit to the system manufacturer. In the proposed extension of the terminal, the airport will have to decide whether to upgrade or extend the tunnel train or to install a new system. In terms of current demand, the system serves its purpose adequately.

See also PB-281820.

Yen, AM

SRI International, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0135-77-3, Dec. 1977, 98 p.

Contract DOT-UT-70034

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-286641/6ST, DOTL NTIS

11 186162

ASSESSMENT OF THE WEDWAY PEOPLEMOVER SYSTEM AT WALT DISNEY WORLD

SRI conducted this study as part of an assessment program sponsored by UMTA. The purpose of the program is to gain an in-depth understanding of the performance, capabilities, and limitations of the AGT systems at WALT DISNEY WORLD, Seattle-Tacoma International Airport, Fairlane Town Center, Tampa International Airport, Houston Intercontinental Airport, and King's Dominion Amusement Park, as well as to provide a uniformly documented presentation of automated guideway transit (AGT) installations for UMTA's AGT program and for use by other research groups and interested parties. This final report, one of six site reports, describes and assesses the WEDway PeopleMover System, an automated guideway transit system used for passenger transport at WALT DISNEY WORLD in Lake Buena Vista, Florida. Information and data were collected by the authors through surveys of technical literature; formal site visits; interviews with operators, management, and engineering personnel; and a visit to the system manufacturer. The WEDway system represents the state-of-the-art in passive vehicles; it is completely passive except for its mechanical running gear. WEDway consists of a single 4,600-ft closed loop with only one station. Although it carries more than 4.5 million passengers/yr, there have been no serious accidents. The system design has resulted in a very reliable system. The use of a linear induction motor as the prime mover has shown efficiencies both in operation and maintenance. The authors state that although the WEDway exceeds its operational requirements, future work is necessary to explore the advantages/disadvantages of a passive system before durability of the system is determined.

See also report dated Dec 77, PB-281820.

Yen, AM

SRI International, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0135-77-5, Dec. 1977, 96 p.

Contract DOT-UT-70034

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-286935/2ST, DOTL NTIS

11 186476

SUPERCONDUCTING MAGNETS. VOLUME 2. SEPTEMBER, 1976-AUGUST, 1978 (A BIBLIOGRAPHY WITH ABSTRACTS)

The cited reports discuss research on materials studies, theory, design, and applications of superconducting magnets. Examples of applications include particle accelerators, MHD power generation, superconducting generators, nuclear fusion research devices, energy storage systems, and magnetic levitation. (This updated bibliography contains 271 abstracts, 149 of which are new entries to the previous edition.)

Reimherr, GW

National Technical Information Service Oct. 1978, 276 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

NTIS/PS-78/1063/3ST

11 186850

PROCEEDINGS-CONFERENCE ON AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY DEVELOPMENT

Twenty-eight papers were presented by experts from government and industry on system operations, passenger security, vehicle control and reliability, guideway and station structures, all-weather operation, ride comfort, deployed system assessments, automated highways, and developments in Canada, France and West Germany. The formal presentation of papers was followed by working sessions in the areas of system operations, vehicle systems and reliability, safety and security, wayside systems and all-weather operation, innovative transit, and social and economic factors. This report contains the proceedings of the conference.

Proceedings of conference, Held at Cambridge, MA. on Feb 28-Mar 2, 1978.

Transportation Systems Center, Urban Mass Transportation Administration DOT-TSC-UMTA-78-28, UMTA-MA-06-0048-78-1, Aug. 1978, 614 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-287864/3ST

11 186851

INDEPENDENT STUDY OF PERSONAL RAPID TRANSIT, AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY PROGRAM

The objectives of the Urban Mass Transportation Administration's Automated Guideway Transit (AGT) Technology Program are to: (1) develop estimates of the cost, service, reliability, safety and performance of AGT systems in representative urban deployments; (2) generate performance specifications for future AGT engineering development programs; (3) synthesize guideline standards for AGT systems to include safety and reliability; and (4) identify critical technology shortcomings that currently impede the implementation of viable AGT systems and develop the required technology. A portion of the Program consists of independent studies in specific areas by organizations that have expertise in those areas. This report summarizes the findings of an independent study in the area of Personal Rapid Transit (PRT) and was conducted by the Aerospace Corporation. This study consists of four Tasks which are presented separately. Existing hardware and software technology is reviewed for applicability to implementation of future U.S. PRT systems. The systems reviewed include Aerospace, Aramis, Cabtrack, Cabintaxi, and the Computer-Controlled Vehicle system. Environmental and energy impacts of PRT are estimated and compared with alternate forms of AGT and conventional urban transportation modes. A general methodology for establishing the feasibility of PRT in an urban area is defined and applied to the Los Angeles Basin for demonstration purposes. Areas where research and development are required to make a future PRT system deployment feasible are described, and an approach to fulfill the noted technology shortcomings is provided. The study concludes that further developments are required of the PRT full-scale systems and in most of the critical subsystem areas as well.

Olson, CL

Aerospace Corporation, Urban Mass Transportation Administration UMTA-CA-06-0090-77-1, Dec. 1977, 365 p.

Contract DOT-UT-60052T

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-287869/2ST

11 186863

DYNAMIC EXPERIMENTS OF ALTERNATIVE GUIDEWAY-VEHICLE SYSTEMS, PART I

This is an experimental investigation of vehicle-elevated guideway response dynamics. First, descriptions are given of the laboratory system components, which are: the spans (single, multiple and cable-stayed); the vehicles (tandem point loads and an Automated Guideway Transit (AGT) vehicle model); the vehicles' linear induction motor propulsion system; and the span-vehicle data retrieval system. Second, data are presented for a variety of vehicle-guideway configurations. Measured moment responses of simple spans to tandem loads show reasonable agreements with theory. Also, the six-span configuration, for a variety of transit loadings, shows less dynamic response compared to its single-span counterpart, but only up to certain vehicle speeds (or passage frequency ratios). Further, experiments on three-and six-span cable stayed guideways with a transit point load and an AGT

vehicle show the importance of designing with medium-stiff cables if both span responses and vehicle heave acceleration are to be minimized. The last study summarizes current analyses on horizontal guideways of constant radius of curvature, and the response of such guideways to transit loads. It is concluded that such model experiments are needed and preliminary tests show that they are feasible. As for the straight spans, such data can be presented in nondimensional forms, directly applicable in the full-scale dynamic design of urban transit systems.

Wilson, JF
Duke University, Department of Transportation Final Rpt. DOT/R-SPA/DPB50-77/11, June 1978, 110 p.

Contract DOT-OS-60130

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-288244/7ST

11 189812

OPERATIONS CONTROL FOR THE H-BAHN RAPID TRANSIT SYSTEM [Betriebsleittechnik des Nahverkehrssystems H-Bahn]

The fully automatic H-Bahn overhead cabin system has been developed to help solve the urban rapid transit problem. The H-Bahn will offer a frequent service on scheduled routes and will provide transport until late at night. To be able to solve the highly diversified automation problems of the H-Bahn system, the automatic control system has been structured into a three-level hierarchy comprising an operations control level, traffic control level and safety level. Siemens 300/16-Bit System process computers take charge of operations and traffic control. [German]

Birnfeld, B *Siemens Review* Vol. 52 No. 9, Sept. 1978, pp 513-516

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

11 189816

SIMULATION AND VERIFICATION OF COMPLEX SYSTEMS FOR THE EXAMPLE OF THE MAGNETICALLY SUSPENDED RAILWAY [Simulation und Verifizierung Komplexer Systeme am Beispiel der Magnetschwebbahn]

For the example of a magnetically suspended system with elastic vehicle and elastic track, the procedure of digital simulation of complex systems of high order is sketched. First, models of the components are developed and verified by experiments and measurements. The construction of the overall model in state space description is done by simple matrix operations, which are performed by the computer. Thereby the clearness of the model remains preserved and the possibility of error is reduced to a minimum amount. The calculation of step responses and frequency characteristics is done by standard routines. Analog to that, experiments are performed, where the magnetically suspended system is disturbed by stepwise and sinusoidal signals of variable frequency. By this means, a direct comparison between simulation and experimental results becomes possible. [German]

Sommerer, J *Regelungstechnik* Vol. 26 No. 6, June 1978, pp 177-188

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

11 189817

HIGH-SPEED GROUND TRANSPORT-A STOCHASTIC MODEL OF TRACK ROUGHNESS AND MISALIGNMENT

One of the significant disturbances to a tracked hovercraft or any other high-speed ground transport vehicle is the roughness of the guideway surface together with misalignment of the guideway structure itself. Existing methods of describing this roughness and misalignment are reviewed and their shortcomings noted. A description is proposed which is valid in both statistical and wave-length-amplitude domains. A method of computer generation to typical roughness profiles is discussed.

Balzer, LA *Journal of Mechanical Engineering Science* Vol. 20 No. 3, June 1978, pp 143-148, 16 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

11 190275

IEEE VEHICULAR TECHNOLOGY CONFERENCE, 28TH, 1978

This record includes 86 complete papers, 11 abstracts, and the titles only of 17 papers, 16 of which cover the Microwave Mobile Symposium. The

coverage of the conference is indicated by the following session titles: Automatic Vehicle Location; Communication at 800 MHz, Communication Testing and Techniques; Guided Radio Propagation--Mines, Subways and Buildings; Personal Radio Service Regional Communication Center Technology and Operation; Communication Interference, RF Hazards and Services; Propagation; Electric Vehicles; Electric Propulsion and Control; Automated Guideway Transit (Operations, and Reliability, Communication and Control); People Movers--Past, Present and Future; Automotive Electronics--Recent Advances; Marine Communications and Electronics.

IEEE 28th Annual Vehicle Technology Conference, Conference Record of Papers, Denver, Colorado, March 22-24, 1978.

Institute of Electrical and Electronics Engineers Conf Paper IEEE 78CH1297-1VT, 1978, 558 p.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, IEEE

11 190279

DYNAMIC ASPECTS OF PASSENGER CARRYING VEHICLES USING CONTROLLED D.C. ELECTROMAGNETS

The use of controlled dc electromagnetic suspension poses a number of special problems such as interaction through vehicle dynamics and different control loops, noncyclicality of the system and the choice of weighting matrices for high-order systems. In order to develop synthesis procedures for active feedback systems, it is necessary to take into account not only the static but the dynamic interactions between various degrees of freedom such as roll, pitch, yaw, lift and lateral displacement. Further, when controlled dc electromagnetic suspension is employed for passenger carrying vehicles a number of additional characteristics associated with vehicle dynamics must also be considered in addition to stability requirements. Some of these are suspension stiffness, acceleration levels due to guideway roughness and flexibility, damping and dynamic response.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the 5th Vehicle Systems Dynamics (VSD) Symposium and 2nd Int Union of Theoretical and Applied Mechanics (IUTAM) Symposium, Technical University of Vienna, Austria, September 19-23, 1977.

Jayawant, BV (Sussex University, England)

Swets and Zeitlinger Proceeding 1978, pp 343-356, 4 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Swets and Zeitlinger, Keizergracht 487, Amsterdam, Netherlands

11 190280

PERFORMANCE OF STEERING CONTROLLERS FOR AUTOMATED GUIDEWAY TRANSIT VEHICLES

Automated Guideway Transit (AGT) is a class of urban transportation system in which vehicles are operated under automatic longitudinal and lateral control on exclusive guideways. This paper discusses the performance of automatically steered rubber-tired vehicles on both straight and curved guideway, subject to the conflicting requirements of tracking accuracy and passenger comfort. The optimal performance for operation on straight guideway containing random lateral reference errors is presented. This performance is the best achievable with any controller of the class considered and provides a standard against which simpler suboptimal controllers can be evaluated. A simple proportional controller using a single displacement sensor is shown to produce near-optimum performance for the typical vehicle studied when operated at the design speed. By appropriate location of the position sensor, steady-state errors in curving can be made small for the practical range of curve radii. Curve entry transients are simulated for a curve having no transition spiral and a steady-state lateral acceleration of 0.223 g at 13.4 m/sec. Acceleration and tracking error overshoots are both less than 13.3% for well-chosen gains.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the 5th Vehicle Systems Dynamics (VSD) Symposium and 2nd Int Union of Theoretical and Applied Mechanics (IUTAM) Symposium, Technical University of Vienna, Austria, September 19-23, 1977.

Shladover, SE (Massachusetts Institute of Technology); Fish,

R Wormley, DN Richardson, HH

Swets and Zeitlinger Proceeding 1978, pp 127-135, 9 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

11 190281

GENERAL PURPOSE PROGRAM FOR THE SIMULATION OF VEHICLE-GUIDEWAY INTERACTION DYNAMICS

The models which can be treated are: multibody rigid or elastic vehicles, any degrees of freedom, kinematic constraints; a variety of linear and nonlinear suspension laws including active control systems; elastic guideways (or bridges) including irregularities; the nominal track can be straight and level but also curves, grades as well as variable velocity can be simulated. Special features of the resulting simulation program are: automatic generation of the linearized system equations, generation of subroutines by the program to reduce the numerical effort, modular construction of the whole program. The time-response of the overall time-varying and possibly nonlinear state-equations is obtained via numerical integration. The program is supplemented by evaluation and interpretation routines which allow one to compute vehicle stability, controllability and observability as well as the transfer function matrix. Also, the time-responses can be Fourier-transformed and vehicle ride-quality can be calculated. As a typical application, the simulation of a design of an electrodynamic repulsion system is presented for both the magnetically suspended-as well as the emergency-mode.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of the 5th Vehicle Systems Dynamics (VSD) Symposium and 2nd Int Union of Theoretical and Applied Mechanics (IUTAM) Symposium, Technical University of Vienna, Austria, September 19-23, 1977.

Duffek, W Kortuem, W Wallrapp, O Swets and Zeitlinger Proceeding 1978, pp 104-126, 7 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

11 190284

SYSTEMS APPROACH TO THE DEVELOPMENT OF AN INTERMEDIATE CAPACITY TRANSIT SYSTEM

New urban land use goals have led to a requirement for intermediate capacity transit in large and medium-sized cities. Existing modes of transit do not economically meet this requirement and so the Urban Transportation Development Corporation (UTDC), together with its development contractor Canadair Services Ltd., has embarked on a program to develop a commercially viable intermediate Capacity Transit System (ICTS).

Giles, R (Urban Transportation Development Corporation) *Engineering Journal (Canada)* Vol. 61 No. 4, Oct. 1978, pp 13-16

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

11 190286

TORONTO TO MONTREAL: 90 MINUTES BY MAGLEV

The Canadian Maglev Group, an interdisciplinary team of engineers from Queen's University, McGill University and the University of Toronto, have proposed and examined the technical feasibility of a lightweight magnetically levitated vehicle for high speed inter-urban transit. With a capacity of 100 passengers and a cruising speed of up to 480 km/h (300 mph), the system could provide ground transportation between Toronto and Montreal city centres, with an intermediate stop in Ottawa, in about 90 minutes. The system uses non-contact magnetic suspension and propulsion and does not require high speed wayside power collection. Since it is all electric there is minimal local pollution and only aerodynamic noise is generated.

Atherton, DL (Queen's University, Canada); Eastham, AR *Engineering Journal (Canada)* Vol. 61 No. 4, Oct. 1978, pp 8-10

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

11 190301

DYNAMIC ENTRAINMENT OF AUTOMATED GUIDEWAY TRANSIT VEHICLES

This paper explains the advantages when Automated Guideway Transit (AGT) vehicles are capable of operating both individually and entrained, either in mechanically-coupled trains or functionally-linked platoons. It is demonstrated that dynamic entrainment is a promising way to provide personal rapid transit service at a reasonable capacity level, and the advantages of entrainment for other, less advanced, forms of AGT operating at higher capacity are also shown. The reliability and safety implications of

entrained operation are explained, and the operational advantages of dynamic en/etrainment (vehicles entering and leaving trains at cruise speed on the mainline guideway), are discussed. The paper concludes by demonstrating why entrainment can be useful for promoting rational, timed-staged implementation of new AGT services under general conditions.

Shladover, SE (Massachusetts Institute of Technology) *High Speed Ground Transportation Journal* Vol. 12 No. 3, 1978, pp 1-27, 37 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

11 190330

MAGNETIC LEVITATION RAILWAYS AND THEIR FIELDS OF APPLICATION ON A EUROPEAN NETWORK [Magnetbahnen und ihre Einsatzfelder in einem europaischen Netz]

Survey on the present state of knowledge on the transport techniques using magnetic levitation in the Federal Republic of Germany. The technical characteristics of the systems developed, their particular aspects with regard to environment, energy requirements, safety and costs are successively dealt with. [German]

Eberlein, D Weber, PJ Bundesministerium fuer Forschung und Technologie 1978, 93 p., 2 Tab., 25 Phot., 56 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Bundesministerium fuer Forschung und Technologie, Stresemannstrasse 2, Postfach 120370, D-5300 Bonn 12, West Germany.

11 190971

AIRTRANS URBAN TECHNOLOGY PROGRAM. PHASE I. FINAL DESIGN REPORT

AIRTRANS is an Automated Guideway Transit (AGT) System which provides inter-terminal transit service for passengers at the Dallas/Ft. Worth Airport. The successful deployment of this system has prompted the investigation of the extension of AGT technology into the urban environment to relieve the congestion and pollution caused by increasing auto and bus transit. Phase I of the AIRTRANS Urban Technology Program (AUTP) covers the activities of the Vought Corporation, which tested the system for operation in an urban application. Independent assessments were made to determine what changes would be required, which were: (1) higher operating speeds; (2) better passenger acceptance; (3) reduced capital and operating costs; (4) increased reliability; (5) better all-weather capability; and (6) increased energy efficiency. The AUTP was structured into a two-phase program. Phase I was completed in 1977, and includes the development and demonstration of the subsystem improvements necessary for higher speed operations, while maintaining or improving reliability, availability, cost, and performance characteristics of the overall AIRTRANS system. This consisted of baseline tests with the test vehicle at speeds of 17 and 30 mph using the existing AIRTRANS propulsion, collector, steering, and control and communications systems. After a thorough analysis of the data from these tests, design changes were incorporated and new components were acquired or fabricated. This equipment was installed on the vehicle and guideway testing was again conducted. The overall conclusion reached in Phase I is that the existing AIRTRANS AGT system can be improved to make it a viable transit system for urban deployments. The basic design, with improvements expected from AUTP Phase II will provide for the successful deployment of urban AIRTRANS systems.

Prepared by Vought Corp., Dallas, TX. Systems Div. Errata sheets inserted.

Albach, WC Hall, VW Koonce, BL Preston, OH, III Payne, JN Dallas/Fort Worth Regional Airport Board, Vought Corporation, Urban Mass Transportation Administration, (UMTA-TX-06-0020) UMTA-TX-06-0020-78-1, Jan. 1978, 289 p.

ACKNOWLEDGMENT: NTIS

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PB-291128/7ST, DOTL NTIS

11 190993

REVIEW OF LOCAL ALTERNATIVES ANALYSES INVOLVING AUTOMATED GUIDEWAY TRANSIT (AGT)

The UMTA Office of Technology Development and Deployment is studying the attributes of Automated Guideway Transit (AGT) vis-a-vis conventional urban transportation alternatives in order to determine whether a need for

AGT systems exists within U.S. urban areas. The objectives were to define the locally perceived role of AGT, to determine the impediments to its adoption, and to identify needed improvements to current and future generations of AGT systems. This effort involved a review of 12 existing case studies; inquiries of 99 local officials and others in 46 cities, and interviews with 27 officials and others in six cities. Summaries and analysis of the responses are presented in this report. The findings of the report include: (1) Most of the critical issues in the transportation decision-making process are not AGT-specific. They include costs (capital and O and M), overhead structures, Federal and local funding, technical risk, and public and political support. (2) There is a wide variation in perceptions of the role of AGT, impediments to its adoption, and needed improvements. (3) Major problem areas are of a non-technical nature.

Lee, RB
Urbitran Associates, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-NY-06-0057-78-1, Feb. 1978, 101 p.

Contract DOT-UT-70049

ACKNOWLEDGMENT: NTIS
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PB-291334/1ST, DOTL NTIS

11 191664
TRANSPORT OF SOLID COMMODITIES VIA FREIGHT PIPELINE

No abstract available.

See also Volumes I and II, Task Reports I and II, RRS 11 191665 thru 191668 respectively; Bulletin 7902. Set includes PB-292658 thru PB-292661.

Pennsylvania University, Philadelphia, Department of Transportation 4 Volumes, Dec. 1978, 335 p.

ACKNOWLEDGMENT: NTIS
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PB-292657-SET/ST, DOTL NTIS

11 191665
TRANSPORT OF SOLID COMMODITIES VIA FREIGHT PIPELINE: VOLUME I. COST COMPARISON AMONG VARIOUS MODES OF FREIGHT TRANSPORT

The goal of this research was to evaluate the potential and limitations of freight pipeline as a viable mode of cargo transport over long distances. The purpose of this second year effort was to apply the methodology of analysis developed in the first year of study to a specific transport corridor (Philadelphia-Chicago).

See also RRS 11 191664; Bulletin 7902. Also available in set of 4 reports PC E10, PB-292657-SET.

Zandi, I Warner, JA
Pennsylvania University, Philadelphia, Department of Transportation Final Rpt. DOT/RSPA/DPB-50/7833, Dec. 1978, 98 p.

Contract DOT-OS-50119

ACKNOWLEDGMENT: NTIS
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PB-292658/2ST, DOTL NTIS

11 191666
TRANSPORT OF SOLID COMMODITIES VIA FREIGHT PIPELINE: VOLUME II. THE DEMAND FOR SOLID FREIGHT PIPELINE

The demand analysis for solid freight pipeline was pursued along two closely related lines in the second year of research. One line of demand analysis expanded the aggregate and disaggregate demand work completed during the first year. The other line of demand analysis investigated the likely pipeline originations and terminations by specific geographical subareas in both Philadelphia and Chicago to enable likely pipeline terminal location, right of way determination, and access and egress costs to be explored. The aggregate demand analysis was expanded from the three standard transportation-commodity code (STCC) commodities used during the first year to sixteen STCC commodities used during the second year. Models of modal split between truck and rail (as a function of modal rates and times) were developed for each of the sixteen commodities. This was followed by estimating pipeline penetration for each commodity by substituting pipeline cost and time for first truck and then rail following the methodology outlined in the first year report (the abstract mode approach).

See also RRS 11 191664; Bulletin 7902. Also available in set of 4 reports,

PC E10, PB-292 657-SET.
Allen, WB Kerrigan, J
Pennsylvania University, Philadelphia, Department of Transportation Final Rpt. DOT/RSPA/DPB-50/7834, Dec. 1978, 78 p.

Contract DOT-OS-50119

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292659/0ST, DOTL NTIS

11 191667
TRANSPORT OF SOLID COMMODITIES VIA FREIGHT PIPELINE: TASK REPORT I. NOISE IMPACT ASSESSMENT

The acceptance of freight pipeline as a new mode of transporting solid goods over long distances depends on its cost competitiveness with other modes of transport. However, it will also be affected by how well it compares with them on other grounds. This report compares the noise impact of various transportation modes. Since pipeline, except for compressor stations, does not generate any noise, the analysis enables estimating noise levels only for train, TOFC, and truck. The analysis considers unit train, conventional train, and truck. It assumes that for unit train the freight to be transported constitutes the total traffic, while for conventional train, and truck, it is that which is in addition to present freight traffic.

See also RRS 11 191664; Bulletin 7902. Also available in set of 4 reports, PC E10, PB-292 657-SET.

Younkin, C Thomas, K
Pennsylvania University, Philadelphia, Department of Transportation Final Rpt. DOT/RSPA/DPB-50/7835, Dec. 1978, 106 p.

Contract DOT-OS-50119

ACKNOWLEDGMENT: NTIS
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PB-292660/8ST, DOTL NTIS

11 191668
TRANSPORT OF SOLID COMMODITIES VIA FREIGHT PIPELINE: TASK REPORT II. INTERCITY TRANSPORTATION OF MANUFACTURED PRODUCTS IN UNIT TRAINS

In evaluating the future of the freight pipeline system it is important to assess possible future changes in the intercity freight systems with which it might compete. One such system is based on the unit train, now in widespread use in the transportation of coal, ore, grain, and other bulk commodities. This paper presents cost and performance (total transit time) estimating models for a general merchandise freight system, the intercity line-haul portion of which is based on conventional locomotives and general service boxcars operating as a unit in continuous service between origin and destination terminals. These terminals, which are modeled on existing highway and air cargo facilities, provide transshipment of freight between the line-haul and local access systems. Local access operations between terminals and ultimate freight origin/destination points are assumed to have cost and service characteristics similar to those of highway common carrier pickup and delivery operations. The analysis is in two parts. First, cost and performance of the line-haul unit train system are estimated as functions of train length and speed. A representative line-haul configuration (100 cars, 45 mph) is then combined with the terminal and access models to estimate total system cost as a function of shipment size and annual volume. Unit costs and equipment characteristics are best estimates of 1974 U.S. rail industry experience.

See also RRS 11 191664; Bulletin 7902. Also available in set of 4 reports, PC E10, PB-292 657-SET.

Warner, JA
Pennsylvania University, Philadelphia, Department of Transportation Final Rpt. DOT/RSPA/DPB-507836, Dec. 1978, 53 p.

Contract DOT-OS-50119

ACKNOWLEDGMENT: NTIS
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PB-292661/6ST, DOTL NTIS

11 191913

REALIZATION OF GRAVITY DRIVE IN METROPOLITAN RAILWAYS FOR LOW LOSS RECUPERATION OF KINETIC ENERGY OF VEHICLES WITHOUT LINEAR INDUCTION MOTOR

One of the advantages of the Cyclo Train gravity drive with a great slope lies in the possibility of a very flexible position of the line in the vertical plane and, additionally, in a high transport velocity (e.g., 32 km/h at 512 m distance between stops). The disadvantage lies in the large tunnel depth and in the necessity of applying the linear induction motor with variable frequency, synchronous and asynchronous, respectively. If the maximum slope is limited to 100 exp 0 /oo, it is possible to omit the linear induction motor and make the drive interact by friction between the wheel and the rail. If the distance between stops is increased from 512 m to 662 m, the mean transportation velocity of 32 km/h can be maintained. The maximum tunnel depth is reduced from 38 m to 21 m with stations provided in open hollows of 120 m length, inclusive of the open slopes, and with 2.5 m deep platforms to save space for traffic on the zero level. The maximum transportation rate is 12,000 persons per hour in one direction for platforms of 64 m length, 2.20 m width of the vehicles, and a sequence time of 90 s. If the platforms, arranged sideways of the tracks, have a width of 2.5 m, a total width of 10.0 m is needed for a station. This value would increase to 14 m for full profile trains. (ERA citation 04:013911)

U.S. Sales Only.

Jung, V

Technical University of Karlsruhe, West Germany Oct. 1977, 26 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

KFK-2531

11 191958

TRACKED AIR CUSHION VEHICLE AND MAGNETIC LEVITATION (CITATIONS FROM THE NTIS DATA BASE)

The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these Government-sponsored research reports. (This updated bibliography contains 135 abstracts, 8 of which are new entries to the previous edition.)

Habercom, GE, Jr

National Technical Information Service Apr. 1979, 143 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

NTIS/PS-79/0273/7ST

11 191959

TRACKED AIR CUSHION VEHICLES AND MAGNETIC LEVITATION. VOLUME 1. 1970-1975 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE)

The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these abstracts of reports gathered in a worldwide literature survey. (This updated bibliography contains 212 abstracts, none of which are new entries to the previous edition.)

Habercom, GE, Jr

National Technical Information Service Apr. 1979, 220 p.

ACKNOWLEDGMENT: NTIS

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NTIS/PS-79/0274/5ST

11 191960

TRACKED AIR CUSHION VEHICLES AND MAGNETIC LEVITATION. VOLUME 2. 1976-FEBRUARY, 1979 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE)

The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these abstracts of reports gathered in a worldwide literature survey. (This updated bibliography contains 81 abstracts, 17 of which are new entries to the previous edition.)

Habercom, GE, Jr

National Technical Information Service Apr. 1979, 87 p.

ACKNOWLEDGMENT: NTIS

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NTIS/PS-79/0275/2ST

11 193772

MIXED-MICRONS MAGNETIC LEVITATION FOR ADVANCED GROUND TRANSPORT SYSTEM

The possibility of applying the mixed-micron principle for magnetic levitation to ground transport systems is examined. The system is developed specifically for suspension and useful lift to passive weight ratios exceeding 8:1 have been calculated. Application to a hybrid system where conventional wheel drive is used in conjunction with magnetic levitation is explained for urban transport.

Russell, FM

Science Research Council RL-77-076/B, Dec. 1977, 24 p.

ACKNOWLEDGMENT: Energy Research Abstracts, NTIS

ORDER FROM: NTIS

RL-77-067/B

11 193898

SNOW COLLECTION BY POSSIBLE HIGH SPEED GUIDEWAY SECTIONS

A program to observe the formation of snow accumulations on possible high speed transportation tracks was initiated in 1969. The track sections tested include Pi shaped, box, inverted Tee and channel cross section beams. At extremely low wind velocities the snowfall accumulation is equal on all beams. At high cross flow velocities the beams with vertical members rising from horizontal surfaces cause severely distorted accumulations. The vertical member(s) acts as a 100% density snow fence resulting in a parallel ridge formation. With dry snow and high wind velocity the plane surface beams accumulated little or no snow. /Authors/

This Paper appeared in TRB Special Report 185, Snow Removal and Ice Control Research:

Ringer, TR Price, RD (National Research Council of Canada) *Transportation Research Board Special Report* No. 185, 1979, pp 318-327, 12 Fig., 5 Tab., 5 Ref.

ORDER FROM: TRB Publications Off

11 193899

COMBATTING ICE ON AIRTRANS AND OTHER GUIDEWAYS

The Airtrans transportation system at the Dallas/Fort Worth Airport, manufactured by the Vought Corporation, is fully automated and transports people and cargo throughout the airport complex. The Airtrans system uses 13 miles of guideway with 68 vehicles to interconnect 4 terminals, 2 remote parking lots, a hotel and the maintenance areas. The Airtrans system operates 24 hours a day, 7 days a week and has accumulated a total of 14 million vehicle miles since the opening of the airport in 1974. The system was designed specifically for the climatic environment of the Dallas/Fort Worth, Texas area. The original plan for operation during the infrequent periods of severe weather was that the constant vehicle movements throughout the system would keep the guideway and wayside system clear of ice and snow. This procedure proved completely inadequate and has resulted in system shutdown during periods of severe ice and snow. Buses and trucks are used during these periods to provide movement of people and cargo. This paper describes the approach the Vought Corporation undertook to combat the Airtrans environmental problems. The proposed improvements were considered too costly for the few days of severe weather and resulted in backup bus service at onset of icing weather. It is essential that for site specific applications, a Systems Engineering approach be utilized in order to match performance requirements with cost effective methods. Finally, a full scale demonstration is required to validate the selected approach. /Authors/

This Paper appeared in TRB Special Report 185, Snow Removal and Ice Control Research.

Patton, RJ Raven, RR (Vought Corporation) *Transportation Research Board Special Report* No. 185, 1979, pp 328-336, 7 Fig., 3 Tab.

ORDER FROM: TRB Publications Off

11 193900

ALL-WEATHER PROTECTION FOR AGT GUIDEWAYS AND STATIONS

This paper presents a synopsis of the state-of-the-art review of winter weather protection for existing AGT (automated guideway transit) systems conducted as part of the U.S. Department of Transportation UMTA sponsored AGT Guideway and Station Technology Project. The objective of this paper is to identify the problems, experiences, and techniques associated with winter weather operation of AGT systems. The information

presented was compiled through a literature search and from information provided by system and equipment operators and manufacturers. Bottom-supported, rubber-tired AGT vehicle systems are the focus of the paper as they are the only type of AGT system with significant winter operational experience. These systems include Bendix at Toronto Zoo, Boeing at Morgantown, Ford at Fairlane, Vought at Airtrans, and the Westinghouse test tracks at South Park and West Mifflin. Three AGT guideway-related areas are identified as being most susceptible to the adverse effects of winter weather—power and signal collection, maintenance of traction, and switching. The problems experienced and countermeasures currently employed in each of these areas are presented. The countermeasures include mechanical, thermal, chemical, abrasive, manual, and other approaches. The paper also identifies techniques which warrant further investigation to improve AGT all-weather operation. /Authors/

This paper appeared in TRB Special Report 185, Snow Removal and Ice Control Research.

Stevens, RD Nicarico, TJ (De Leuw, Cather and Company) *Transportation Research Board Special Report* No. 185, 1979, pp 337-342, 6 Fig., 1 Tab.

ORDER FROM: TRB Publications Off

11 193901

CONTROLLING SNOW AND ICE ON THE MORGANTOWN PEOPLE MOVER SYSTEM

This paper describes how the Morgantown People Mover has become the first automated guideway system in an urban area which is fully operational throughout winter. Unique operational methods and mechanical features of the vehicle have been developed to assure adequate tire traction, consistent steering and switching performance, and reliable power collection during their severe winter weather. Operating costs and the trends in winter operational reliability show the continuing improvement as system operating experience is accumulated. /Author/

This paper appeared in TRB Special Report 185, Snow Removal and Ice Control Research.

Morgan, PH (Department of Transportation) *Transportation Research Board Special Report* No. 185, 1979, pp 343-349, 17 Fig., 5 Ref.

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11 194146

MAGNETIC LEVITATION

West Midlands county council have reaffirmed their decision to install a magnetically levitated passenger transport system between a proposed new second terminal at Birmingham Airport, and Birmingham International railway station which serves the national exhibition centre. The system that will probably be adopted is the one developed at British Rail's technical centre at Derby. British Rail estimates that the proposed 500 M double-track link would cost 1.25M Pounds and operating over a 24 hour day should be considerably cheaper to run than a conventional bus link. The levitation system developed is based on the "attraction principle". Information provided indicates that electromagnets at each corner of the car (the prototype 3.5 M car is designed to seat 12 people) are held beneath steel rails running along the undersides of the crosspiece of the "T" shaped concrete rail. The power to each magnet is continuously adjusted to the undersides of the crosspiece of the "T" shaped concrete power is provided by two centrally located linear induction motors which react against an aluminium strip on the top of the guideway. Research at Derby at the moment is focused on vehicle speeds of about 50 km/hour over a 110 M test track containing an 8 M radius curve and a 1 in 20 gradient, with power drawn from a five wire contact alongside the track. Information is also provided on an alternative design prepared by Warwick University, which is of the "electrodynamic" or "repulsive" type based on the use of superconducting magnets. This system has not yet passed the model stage due to financial constraints.

Chartered Mechanical Engineer Vol. 25 No. 11, Dec. 1978, p 19, 1 Fig., 3 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-237952)

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DOTL JC

11 194657

SAFETY REQUIREMENTS FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS I. II.

Part I gives the arguments why it has become necessary to work out safety requirements for Automated Guideway Transit Systems. Safety terms are

defined, and systematics of all measures for the improvement of safety are given. In Part II, safety measures are treated according to the fail-safe principle and some principles of realisation are explained by example.

Zemlin, H Dauper, H Fricke, H Schild, GH *High Speed Ground Transportation Journal* Vol. 12 No. 2, 1978, pp 69-91

ACKNOWLEDGMENT: British Railways

ORDER FROM: ESL

DOTL JC

11 194658

AGT TRAVEL DEMAND ANALYSIS

A careful evaluation of the cost-effectiveness of alternative technically feasible automated guideway transit (AGT) must be done with accurate demand forecasts. However, there have been few, if any, studies of AGT patronage potential using the state of the art in behavioural travel demand analysis. As a consequence, we do not know the cost-effectiveness of alternative system design and performance options. This project applies disaggregate travel demand models to estimate the ridership of a proto-typical downtown circulation AGT. The models were exercised under alternative level of service assumptions to determine the importance of various performance characteristics. Of primary concern was wait time because it appears that transit managers have underestimated the importance of small changes in average wait time. It was concluded that, among feasible technologies, off-line stations will induce more travel than on-line stations, and, as a consequence, contribute to the success of the current downtown people mover demonstrations. It was also concluded that high speed moving walkways are a valid alternative to downtown circulator systems. Of analytical importance, it was found that demand modelling for AGT must include a destination choice component. That is, traditional mode choice analysis understates the patronage estimates because of induced changes in destinations of nonwork trips.

Dunbar, F *High Speed Ground Transportation Journal* Vol. 12 No. 2, 1978, pp 15-33

ACKNOWLEDGMENT: British Railways

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DOTL JC

11 194659

STATE-OF-THE-ART OF LONGITUDINAL CONTROL OF AUTOMATED GUIDEWAY TRANSIT VEHICLES

This paper examines the state-of-the-art of longitudinal control of Automated Guideway Transit (AGT) vehicles. The three basic longitudinal control concepts used for AGT systems—block control, point-follower, and vehicle-follower—are described and implementation of these concepts in systems currently being developed is presented. Constant-separation, constant-time-headway, and constant-safety-factor spacing policies; their implications on system operation; and their impact on the behaviour of vehicle strings are discussed. A discussion of minimum headways is presented in the Appendix.

Garrard, WL *High Speed Ground Transportation Journal* Vol. 12 No. 2, 1978, pp 35-67

ACKNOWLEDGMENT: British Railways

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DOTL JC

11 194679

PRESENT SITUATION AND PLANNED EXPERIMENTS ON MIYAZAKI LEVITATED CAR RAILWAY TEST LINE

The Miyazaki Railway Testing Centre is located at Mimitsu (Miyazaki province). Description of the track, testing centre, organisation and programme of tests.

Horiyama, A Maki, H *Permanent Way* No. 76, Dec. 1978, pp 1-13, 9 Fig., 6 Tab., 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Japan Railway Civil Engineering Association, 1-18-7 Higashi-ueno, Taito-ku, Tokyo 110, Japan

11 194680

DEVELOPMENT OF GUIDEWAY SUPERSTRUCTURE OF MIYAZAKI TEST LINE

The article gives, in diagrammatic form, background facts on the development of this testing facility and its characteristics.

Permanent Way No. 76, Dec. 1978, pp 14-22, 5 Fig., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Japan Railway Civil Engineering Association, 1-18-7 Higashiueno, Taito-ku, Tokyo 110, Japan

11 194687

PASSENGER CONVEYOR ECONOMICS

Operating and capital costs for a high speed conveyor are estimated from cost data for low speed conveyors and from estimates for high speed designs. User benefits are also considered.

Bunting, M *Transportation Planning and Technology* Vol. 5 No. 1, 1978, pp 29-40, 4 Tab., 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

11 195087

COUPLED RESPONSE OF A DYNAMIC ELEMENT RIDING ON A CONTINUOUSLY SUPPORTED BEAM

The dynamic interaction between a Linear Induction Motor primary, modeled as a spring-mass-damper element, and its secondary-rail, modeled as a prestressed, continuously supported, infinitely long beam, is studied theoretically. The existence of two transition speeds is established. At the lower transition speed, the frequency and damping ratio of the coupled system response attain their minimum and maximum values, respectively. The system is unstable at speeds higher than the second transition speed. Using a rotating annular disk to simulate the secondary rail, measured values of the frequency and damping ratio confirm the validity of the mathematical model for speeds up to nearly the lower transition speed.

Alexandridis, AA (Cornell University); Dowell, EH Moon, FC *ASME Journal of Applied Mechanics* Vol. 45 No. 4, Dec. 1978, pp 864-870, 23 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 195091

THE EVALUATION BY SIMILITUDE OF ELECTROMAGNETIC SYSTEMS OF TRACTION AND BRAKING

The evaluation of the performance of traction and braking systems by calculation is very difficult because of the complexity of the theoretical modelling of the physical phenomena involved, especially in continuous media and more particularly ferromagnetic ones. Moreover, the components of the transport system at present under consideration involve new electromagnetic devices which are not amenable to the methods of calculation used for the design of conventional electrical machines, the performance of which is most often, we have to admit, calculated inductively. Up to the present, in the absence of a particular recognised methodology, the development of these components has proceeded by way of full size construction which is very costly, principally because of the magnitude of the test facilities required. Such a procedure invites the risk, if a difficulty is encountered and such is quite normal during early testing, of premature abandonment of promising lines of investigation. For this reason the Institut de Recherche des Transports (Transport Research Institute) directed its efforts to research into the electromagnetic laws of similitude so that the scientific and technological community might be made aware of them.

Giovachini, JL *French Railway Techniques* Vol. 21 No. 4, 1978, pp 248-255

ACKNOWLEDGMENT: British Railways
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DOTL JC

11 195712

NUMERICAL SIMULATION OF LINEAR INDUCTION MOTORS FOR HIGH-SPEED TRANSPORTATION SYSTEMS

A method is expounded for the numerical simulation of the electromagnetic processes in linear induction motors (LIM) with allowance for longitudinal fringing effects. An algorithm is described for the solution of the system of differential equations obtained on the basis of the one-dimensional model of a LIM inductor, and the results of numerical simulation of a test motor prototype and a comparison of these results with experimental results are described. The possibility is revealed of analyzing the electromagnetic processes of an LIM with allowance for the actual character of the current load of the exciter.

Kopylov, IP Belyaev, EF *Power Engineering (USSR Translation)* Vol. 15 No. 3, 1977, pp 54-61

ACKNOWLEDGMENT: EI

ORDER FROM: Allerton Press, Incorporated, 150 Fifth Avenue, New York, New York, 10011

11 196366

ENGINEERING, OPERATION AND STATE OF DEVELOPMENT OF THE H-BAHN SYSTEM

The H-Bahn is a track-bound rapid transit system arranged in the form of a suspension railway with vehicles of various sizes. By selecting suitable vehicles and the appropriate type of operation this adaptable system can solve the most varied traffic problems. The H-Bahn system can be operated automatically. The instrumentation and control equipment provided for this permits various degrees of automation and modes of operation. In all operating modes, railway safety requirements are maintained.

Mueller, S *Siemens Review* Vol. 45 No. 12, Dec. 1978, pp 523-527

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

11 196390

MINIMUM HEADWAYS ON HIGH-CAPACITY HIGH-SPEED RAILWAYS USING MAGNETIC LEVITATION

[Mindestzugfolgezeiten bei Hochleistungsschnellbahnen mit beruehrungsfreier Fahrtechnik]

After reminding the reader that the capacity of a line is determined by the number of passengers transported, the author examines various other parameters, such as speed and station stops. On the basis of a given speed, the distance between stations and the stopping times, he calculates the various possible intervals between trains. [German]

Kraft, K-H *Eisenbahntechnische Rundschau* Vol. 28 No. 1-2, Jan. 1979, pp 111-114, 7 Phot., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

DOTL JC

11 196399

A COMPARISON OF LINEAR INDUCTION AND LINEAR SYNCHRONOUS MOTORS FOR HIGH-SPEED GROUND TRANSPORTATION--INTERNATIONAL MAGNETICS CONFERENCE, FLORENCE, 9-12 MAY 1978

No Abstract.

Haller, TR Mischler, WR *IEEE Transactions on Magnetics* IEEE MAG-14, Sept. 1978, pp 924-926

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

11 196456

COMPUTER MODELS FOR AGT SYSTEM OPERATIONS STUDIES

The major functions, inputs, and outputs of the seven computer models developed during the Automated Guideway Transit (AGT) System Operations Studies (SOS) project are described. The models were designed to provide tools to enable the transportation community to analyze the operation of AGT systems in the complete spectrum of deployments. Three analytic models are described: the feeder system model, which determines the cost and service characteristics of the non-AGT components of the door-to-door trip; the system cost model, which calculates annual and life cycle costs and environmental impacts; and the system availability model, which calculates the impact of failures and recovery times on passenger and vehicle delays in the network. Four simulation models are described: the discrete event simulation model, which models individual trips and vehicles on AGT networks for a wide range of management algorithms, service policies, and network configurations; the system planning model, which models vehicle and passenger flows on AGT networks; the detailed station model, which models individual vehicle and passenger movement in a station; and the detailed operational control model, which is a time step simulation that models individual or strings of vehicles on links, merges, or intersections.

Dooley, T (Transportation Systems Center); Priver, AS *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 2-10, 8 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

11 196457
MODEL-FOLLOWER LONGITUDINAL CONTROL FOR AUTOMATED GUIDEWAY TRANSIT VEHICLES

An approach for the design of longitudinal control systems for automated transit vehicles using the vehicle-follower control concept is presented. It is shown that the spacing policy selected for system operations generates a dynamic model for ideal vehicle response during station keeping. The longitudinal control system should force the actual vehicle response to be as close to this model response as possible. Two model-following controller designs are discussed. In one design the command from the controller is acceleration, and in the other design the command from the controller is jerk. The acceleration-and jerk-limited dynamic response of both controllers is examined by the use of describing functions and by computer simulations.

Olson, DE (Minnesota University, Minneapolis); Garrard, WL *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 36-45, 14 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 196458
IMPLEMENTATION TRADE-OFFS FOR A SHORT-HEADWAY VEHICLE-FOLLOWER AUTOMATED TRANSIT SYSTEM

Automated guideway transit (AGT) systems represent a new class of urban transit, where automatically controlled vehicles reside on dedicated guideway networks. To assure safe and reliable operation at high capacity, vehicle spacings and velocities must be accurately regulated. An important aspect in the design of AGT systems is the communication requirements for the longitudinal control of vehicles, that is, the requirements to measure vehicle states, transmit this information between vehicles, and subsequently control the individual vehicles. This paper examines the trade-offs in the data rates, word lengths, and allowable transmission time lags needed to maintain an acceptable level of vehicle performance, and how these requirements relate to the allocation of control computation between vehicle-and wayside-based computers. A nonlinear control law designed for short-headway vehicle-follower systems provides a baseline to examine these trade-offs. The specification of the parameters entering the problem is approached through analytically derived results, using simplified linear models with verification and expansion of these results through a detailed simulation.

Pue, AJ (Johns Hopkins University, Laurel) *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 46-55, 8 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 196459
"SAFE-APPROACH" VEHICLE-FOLLOWER CONTROL

This paper presents a vehicle-following control strategy suitable for both long-and short-headway automated guideway transit (AGT) systems. The strategy handles the vehicle overtake situation with the same basic controller as is used in steady-state string operations. A tight control loop is tied around each vehicle in the string. This control loop is isolated from large transients, such as those that occur during overtake situations, by constraining the vehicles to follow a well-behaved target trajectory, which closes on the vehicle immediately ahead, in accordance with a "safe-approach" operating policy. By this means, the controller operates on small signals at all times. The safe-approach target trajectory is determined by the states of the leading and trailing vehicles, the states of a vehicle which may become a new lead vehicle during merges, and the jerk, acceleration, and velocity constraints of the AGT system. The policy is illustrated with an example controller design and simulation evaluation.

Sklar, SJ (Draper (Charles Stark) Laboratory, Incorporated); Bevans, JP Stein, G *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 56-62, 4 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 196464

STATE-CONSTRAINED VEHICLE-FOLLOWER APPROACH TO THE STATION-EGRESS PROBLEM

Vehicle following represents one approach to the longitudinal control of vehicles in an automated guideway transit (AGT) system. Requirements for the use of such control for the merging of a vehicle from an off-line station into a mainline vehicle stream are discussed. Recently, a technique has been developed that incorporates state-variable constraints into the control law of a vehicle-follower controller. A successful application of this technique to the station-egress problem has been formulated which safely merges the egressing vehicle between two vehicles initially operating at minimum headway on the mainline. It is demonstrated that for short headway operations of approximately three seconds or less, the finite length of station ramps introduces to the developed control laws an additional constraint, which must be implemented to assure safe operations. Finally, design trade-offs are shown to exist between the egress ramp lengths and the relative disturbances to mainline traffic as a result of station-egress maneuvers.

Chiu, HK (Johns Hopkins University, Laurel) *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 70-79, 7 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 196465

SHORT STATION RAMPS FOR AGT SYSTEMS

Automated guideway transit (AGT) systems often have off-line stations, so that cars can travel directly from an origin to a destination, bypassing the intervening stations. Trip time is reduced, and a more flexible overall management policy is possible. The disadvantage of off-line stations is that additional guideway is required for the station and its associated ramps. More guideway is expensive, both to build and because of the extra space required. Conventional practice has assumed that the ramps leading into and out of off-line stations should be long enough (1) to accelerate to line speed before entering the main guideway and (2) to leave the guideway before decelerating into the station. Careful analysis using a headway safety computer program shows that ramps usually do not have to be this long. Acceleration and deceleration can safely take place on the main guideway. Possible reductions in ramp length are presented for a range of systems characteristics, assuming a constant headway control policy. It is concluded that acceleration ramps can usually be eliminated. Deceleration ramps can often be greatly shortened, particularly if main guideway headway is sufficient for successive cars to enter a station.

Whitten, RP (Alden Self-Transit Systems Corporation) *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 63-70, 2 Ref.

ACKNOWLEDGMENT: EI
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11 196466

DYNAMIC PERFORMANCE OF AUTOMATED GUIDEWAY TRANSIT VEHICLES WITH DUAL-AXLE STEERING

The lateral dynamic performance of automatically guided dual and single steered axle vehicles is determined using a three-degree-of-freedom nonlinear model. Vehicle acceleration levels and tracking errors are determined for performance during curve entry, station entry, and on straight but randomly irregular guideway references. Independent dual-axle controllers, yaw dual-axle controllers, and zero-sideslip dual-axle controllers are studied in detail. Configurations for dual-axle controllers are developed, which have reduced tracking errors and either comparable or reduced acceleration levels in comparison to single-steered axle vehicles for curve and station entry maneuvers.

Nisonger, RL (Michigan University, Ann Arbor); Wormley, DN *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 88-94, 10 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 196467

HIERARCHICAL VEHICLE MANAGEMENT CONCEPT FOR AUTOMATED GUIDEWAY TRANSPORTATION SYSTEMS

A detailed description of a hierarchical system management concept that can operate a large automated guideway transportation system while maintain-

ing achievable communication, vehicle control, and network management requirements is presented. The concept employs "smart" vehicle controllers which require minimal instructions from the network controller and can operate autonomously in case of a failure in either the network management system or the communication system. Wayside-to-vehicle communication requirements for the smart vehicle are determined and compared to those of a passive vehicle system. The economic consequences imposed by the smart vehicle's additional onboard equipment on the owners of the privately owned automated highway (AHS) vehicles are discussed. System-owned communication and control packages are recommended to make the economics of the concept favorable, even for the occasional AHS user.

Caudill, RJ (Princeton University); Kornhauser, AL Wroble, JR *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 11-21, 31 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 196468

AUTOMATED VEHICLE GUIDANCE USING DISCRETE REFERENCE MARKERS

Techniques for providing steering control for an automated vehicle using discrete reference markers fixed to the road surface are investigated analytically. Either optical or magnetic approaches can be used for the sensor, which generates a measurement of the lateral offset of the vehicle path at each marker to form the basic data for steering control. Possible mechanizations of sensor and controller are outlined. Techniques for handling certain anomalous conditions, such as a missing marker, or loss of acquisition, and special maneuvers, such as u-turns and switching, are briefly discussed. A general analysis of the vehicle dynamics and the discrete control system is presented using the state variable formulation. Noise in both the sensor measurement and in the steering servo are accounted for. An optimal controller is simulated on a general purpose computer, and the resulting plots of vehicle path are presented. Parameters representing a small multipassenger tram were selected, and the simulation runs show response to an erroneous sensor measurement and acquisition following large initial path errors.

Johnston, AR (California Institute of Technology); Assefi, T Lai, JY *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 95-106, 18 Ref.

ACKNOWLEDGMENT: EI
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11 196520

EFFECTS OF JERK LIMITING ON THE STABILITY OF AUTOMATED TRANSIT VEHICLES

In this paper a method is presented for estimating the effects of jerk limiting on the stability of the longitudinal dynamic response of automated transit vehicles.

Garrard, WL (Minnesota University, Minneapolis) *ASME Journal of Dynamic Systems, Meas and Control* Vol. 100 No. 4, Dec. 1978, pp 298-301, 10 Ref.

ACKNOWLEDGMENT: EI
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11 196532

CRYOGENIC SYSTEM FOR ONBOARD SUPERCONDUCTIVE MAGNET

This paper introduces general problems of handling cryogenic materials and describes progress of research for on-board cryogenic systems and machines for magnetically levitated vehicles having superconducting magnets. While experimental vehicles can experience a helium loss, the goal is a closed-cycle onboard refrigeration system without helium loss.

Nakashima, H *Railway Technical Research Inst, Quarterly Reports* Vol. 20 No. 1, Mar. 1979, pp 1-8, 13 Fig., 4 Tab., 4 Ref.

ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

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11 197319

DYNAMIC THEORIES AND EXPERIMENTS OF ALTERNATIVE GUIDEWAY-VEHICLE SYSTEMS, PART II

In both the companion report (Part I) and the present study, the broad purpose is to investigate theoretically and experimentally guideway-vehicle system dynamics. Four alternative systems are studied here in terms of nondimensional parameters. First, critical moment responses are predicted for simple, horizontally curved spans subjected to a variety of transit force distributions and torques. These results are validated with a series of laboratory-scale experiments. Second, measured moment responses are presented for curved, multiple spans with both even and uneven pier spacings and with several types of end constraints, all subjected to tandem vehicle loads. Results show that span dynamic responses may exceed 4 or 5 times those for vehicles at crawl speed. Third, dynamic responses are predicted for several three and six-span cable-stayed guideways subjected to a constant speed, vertical point force. These results are also validated with laboratory experiments. Finally, a statistical response analysis is presented for an AGT vehicle traversing a rigid, statistically rough, banked, curved guideway. With solutions of the covariant propagation equation, those design parameters are identified which strongly affect the lateral rms accelerations and mean suspension system strokes. The results obtained in all of these studies are directly applicable to the design of analogous intraurban and intercity transport systems.

See also Part I, RRIS 11 186863; Bulletin 7902.

Wilson, JF

Duke University, Department of Transportation Final Rpt. DOT/R-SPA/DPB/50-79/4, Mar. 1979, 189 p.

Contract DOT-OS-60130

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294247/2ST, DOTL NTIS

11 197330

SUMMARY OF CAPITAL AND OPERATIONS AND MAINTENANCE COST EXPERIENCE OF AUTOMATED GUIDEWAY TRANSIT SYSTEMS

This report presents, in summary form, the cost data developed from recent assessments of ten Automated Guideway Transit (AGT) systems conducted by the U.S. Department of Transportation, Transportation Systems Center, SRI International, and N. D. Lea and Associates, Inc. The AGT systems discussed are: (1) Morgantown People Mover, Morgantown, West Virginia; (2) AIRTRANS, Dallas-Fort Worth Airport, Texas; (3) JETRAIL, Love Field, Dallas, Texas; (4) Cabinlift, Ziegenhain Hospital, West Germany; (5) Passenger Shuttle, Tampa Airport, Florida; (6) Satellite Transit, Seattle-Tacoma Airport, Washington; (7) Tunnel Train, Houston Airport, Texas; (8) ACT, Fairlane Town Center, Dearborn, Michigan; (9) WEDway People Mover, Disney World, Florida; and (10) UMI Tourister, King's Dominion, Ashland, Virginia. Both Capital and Operations & Maintenance Costs have been examined in the context of each system's operational characteristics. Descriptive information on each system, together with a summary of performance measures, is also included. The report presents unit cost data and cost trends, and discusses the initial phase of an ongoing program to provide useful information to cities and other public agencies, as well as private organizations considering or planning AGT installations. The report also compares certain cost data for AGT systems with summary cost information for conventional transit modes. However, it is pointed out in the report, that in consideration of the limitations of the data available and the scope of this analysis, these comparisons should be treated with caution.

Cooke, FAF Elms, CP McGean, TJ Merritt, HW

Lea (ND) and Associates, Incorporated, Urban Mass Transportation Administration Summ Rpt. UMTA-IT-06-0157-78-2, June 1978, 76 p.

Contract DOT-UT-70023

ACKNOWLEDGMENT: NTIS
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PB-294306/6ST

11 197358

AIRTRANS URBAN TECHNOLOGY PROGRAM, PHASE II: IRAN PROGRAM. INSPECT, REPAIR AS NECESSARY ON THE AIRTRANS AGT VEHICLE

This is a report on the AIRTRANS Inspect Repair as Necessary (IRAN) project performed under the AIRTRANS Urban Technology Program,

Phase II. The main objective was to critically evaluate the condition of an AGT vehicle after 268,000 miles and five years of operation and to provide a guide for the establishment of IRAN plans for future AGT systems as they are deployed in an urban environment. A program plan was developed to systematically inspect, and repair as required, the structural and other subsystems of the vehicle in operation at the Dallas/Ft. Worth Airport. The approach included Non-Destructive Tests (NDT) procedures, including radiograph, and dye penetration. The use of a high-powered magnifying lens with bright lighting conditions was also employed in the inspection procedures. The detailed inspection revealed a sound frame and chassis construction with no evidence of cracking in the welded structure. The other subsystems that were inspected, such as the suspension and drivetrain, displayed the normal wear patterns. Repairs were made on the acrylic/fiberglass exterior body panels. Subsequent followup revealed these repairs generally failed, as have previous repair attempts. Repairs were made to the vehicle roof because of a temperature related problem with the acrylic/fiberglass construction. The result of the project indicates that the maintenance procedures developed for this system are excellent. With the exception of the exterior body panels, the vehicle appears capable of attaining the 20-year service life. A five-year IRAN program is recommended to assure continued high performance.

Prepared by Vought Corp., Dallas, TX. See also report on Phase 1, dated Jan 78, PB-291128.

Hawkes, DL

Dallas/Fort Worth Regional Airport Board, Vought Corporation, Urban Mass Transportation Administration, (UMTA-TX-06-0020) UMTA-TX-06-0020-79-1, Aug. 1978, 61 p.

ACKNOWLEDGMENT: NTIS

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PB-294784/4ST

11 197361

THE DEVELOPMENT OF MEASURES OF SERVICE AVAILABILITY

No abstract available.

Set includes PB-294804 thru PB-294806, Volumes I, II and III, RRIS 11 197362 thru 197364 respectively; Bulletin 7902.

Battelle Columbus Laboratories, Urban Mass Transportation Administration, Transportation Systems Center 3 Volumes, June 1978, 295 p.

ACKNOWLEDGMENT: NTIS

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PB-294803-SET/ST

11 197362

THE DEVELOPMENT OF MEASURES OF SERVICE AVAILABILITY. VOLUME I: SUMMARY REPORT

The objective of the project was to develop passenger-oriented measures of service availability which could be used to control the failure characteristics of Automated Guideway Transit (AGT) systems throughout their life cycle. A corollary and equally significant objective was to develop, as necessary, a methodology for utilizing these measures during this control process. This document, Volume I, is a summary of the research effort and results. Service availability is defined as a measure of the impingement of failures on transit system service as perceived by the passengers. The alternate technologies and applications for AGT systems require service availability measures (SAMs) to gage the impact of alternate reliability and maintainability (R/M) options and goals. The transit industry views various forms of passenger delay potential to be the appropriate parameters of service availability. The tendency of a system to induce delays is a complex function of R/M and operational characteristics. No single measure or model exists which can be uniformly applied to different technologies or applications. A methodology is presented to compute these relationships for simple loop and/or shuttle systems. More complex systems will require computer simulation procedures. This volume also summarizes the recommendations that resulted from this research.

See also RRIS 11 197361; Bulletin 7902. Also available in set of 3 reports PC E08, PB-294 803-SET.

Leis, RD

Battelle Columbus Laboratories, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0048-78-2, June 1978, 18 p.

Contract DOT-TSC-1283

ACKNOWLEDGMENT: NTIS

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PB-294804/OST

11 197363

THE DEVELOPMENT OF MEASURES OF SERVICE AVAILABILITY. VOLUME II: TASK TECHNICAL REPORTS

The study (a part of UMTA's Automatic Guideway Transit Technology program) is aimed at developing a set of measures for "service availability" which will be meaningful, readily understandable, and acceptable to transit operators, suppliers, and interested Government agencies. Service availability is defined in a generic sense as a measure of the impingement of equipment failures on the operation of a transit system as perceived by the users and operators. The first task of the study was an in-depth review of existing literature dealing directly or indirectly with the generic subject of service availability. The purpose of this document is to report the results of this task. In this task, over 100 papers, textbooks, and symposium proceedings were reviewed. The Appendix is a bibliography of material reviewed.

See also RRIS 11 197361; Bulletin 7902. Also available in set of 3 reports PC E08, PB-294 803-SET.

Leis, RD

Battelle Columbus Laboratories, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0048-78-3, June 1978, 190 p.

Contract DOT-TSC-1283

ACKNOWLEDGMENT: NTIS

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PB-294805/7ST

11 197364

THE DEVELOPMENT OF MEASURES OF SERVICE AVAILABILITY. VOLUME III: APPLICATION GUIDELINE MANUAL

The document presents guidelines for the establishment and control of service availability during the planning, procurement, and operational phases of an AGT system. It is intended to serve the following interests and functions: (1) System Buyer-To establish realistic level-of-service criteria, to evaluate supplier proposals, and to assess the impact of design changes during system design and construction; (2) System Supplier-To assess impact of equipment failure characteristics, to determine compliance with performance specification, and to assess the impact of reliability/maintainability enhancement; (3) System Operator -To establish performance monitoring information needs, to monitor system performance, to assess the effectiveness of failure management strategies.

See also RRIS 11 197361; Bulletin 7902. Also available in set of 3 reports PC E08, PB-294 803-SET.

Leis, RD

Battelle Columbus Laboratories, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0048-78-4, June 1978, 87 p.

Contract DOT-TSC-1283

ACKNOWLEDGMENT: NTIS

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PB-294806/5ST

11 197367

ASSESSMENT OF THE INCLINED ELEVATOR AND ITS USE IN STOCKHOLM

This is a study of the inclined elevators installed in the Stockholm mass transit system. The Stockholm experience, reported herein, with operation of inclined elevators in subway stations is intended to serve as a basis for judgment of the feasibility of inclined elevator applications in U.S. mass transit systems. During a two-week inspection of the Stockholm subway system, five specialists studied the inclined elevator and its setting, including planning and architectural aspects, design, construction, maintenance, costs, and actual use. An onsite investigation was conducted by a multidisciplinary team through direct observation of equipment; interviews of personnel concerned with the development, operation, and use of the elevators; and review of source material. The inclined elevators are technically similar to vertical, counterweighted, mechanical traction-type automatic elevators, except for the inclined travel. Their installation within escalatorways

integrates the travel path of elderly and handicapped elevator users with the escalator route of able-bodied passengers. Station arrangement is simplified where separate vertical elevator shafts and lateral connections to platforms can be eliminated. Inclined elevators are a possible alternative to vertical elevators in U.S. subway systems for new stations where escalator rise is greater than 40 feet, or greater than 25 feet and accompanied by a lateral displacement that prevents vertical connection.

Prepared in cooperation with General Services Administration, Washington, DC., and Massachusetts Bay Transportation Authority, Boston.

Hansen, TB Worrell, JS King, J Reinsel, RE O'Brien, TO De Leuw, Cather and Company, General Services Administration, Massachusetts Bay Transportation Authority, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0172-79-1, Sept. 1978, 73 p.

Contract DOT-UT-70097

ACKNOWLEDGMENT: NTIS
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PB-294854/5ST

11 197417

GUIDELINES FOR THE DESIGN AND EVALUATION OF HUMAN FACTORS ASPECTS OF AUTOMATED GUIDEWAY TRANSIT SYSTEMS

This document has been compiled to provide guidance in the planning, design, fabrication, and evaluation of human factors aspects of Automated Guideway Transit (AGT) Systems, including Downtown People Mover (DPM) systems. It is based on the present state of knowledge in the areas covered and as such it draws on: (1) past and ongoing research; (2) applicable national and international codes and standards; and (3) current practice in transportation construction, law enforcement, fire safety, and military operations. Design concepts such as passenger safety, security, comfort, and convenience are discussed in relation to various AGT subsystems, including the vehicle, the guideway, the command and control center, and the terminal. Potential interactions between AGT systems and the surrounding community are considered. The guidelines also address such issues as accommodation of elderly and handicapped passengers, design to facilitate emergency evacuation, determination of acceptable levels of ride quality, and the optimal assignment of command and control tasks to humans and machines. The appendix summarizes the major guidelines presented in the text in a convenient checklist format; it is intended for use

in the planning and evaluation of existing and proposed AGT systems. The bibliography provides references for the reader who needs more detailed information than that provided in the guide.

Wichansky, AM Sussman, ED
Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0081) Final Rpt. DOT-TSC-UMTA-79-12, UMTA-MA-06-0081-79-1, Mar. 1979, 197 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294817/2ST, DOTL NTIS

11 197459

AUTOMATED GUIDEWAY TRANSIT TECHNICAL DATA

The intent of this compendium is to provide background data for general, management-level discussions of Automated Guideway Transit (AGT) programs, systems, and other urban transportation modes. Data are presented on general system characteristics, cost, energy, and environmental issues for AGT, rapid rail, light rail, and transit bus systems. In addition, a summary of 19 Downtown People Mover (DPM) proposals is provided. Raw data and assumptions are supplied in an appendix to provide a base for additional study. Data are divided into four main sections: Section 1.0, AGT Overview, provides a perspective of AGT development through review of UMTA AGT programs, vehicles, guideway lane miles installed, and systems in use, proposed, or under construction; Section 2.0, Transportation System Economics, presents data on capital, operating and maintenance costs of various transportation modes (AGT, bus, rail, and light rail); Section 3.0, Energy and Environmental Issues, emphasize energy consumption and energy resource supply and production allocations; Section 4.0, Downtown People Mover Summary, presents data from the proposals of 19 cities selected by UMTA for detailed evaluation in the DPM Project. The information includes city estimates of DPM capital cost, operating and maintenance cost, ridership, and operating hours. Raw data and background information used in calculating the system economic parameters of Section 2.0 and the energy consumption of Section 3.0 are provided in the Appendix.

Chambliss, A
Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0041) UMTA-VA-06-0041-79-4, Apr. 1979, 124 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295095/4ST

12 179826

SEVERITIES OF TRANSPORTATION ACCIDENTS INVOLVING LARGE PACKAGES

The abnormal environments to which a large package--for example, a spent reactor fuel shipping cask--may be subjected during land transportation are defined quantitatively. The material presented should provide one component required in the evaluation of risks associated with the shipment of hazardous materials. In Part I the study results are summarized; in Part II the physical parameter of truck transport accidents are discussed; and in Part III the physical parameters of train transport accidents are examined.

/Author/

Prepared for U.S. Department of Energy.

Dennis, AW Foley, JT, Jr Hartman, WF Larson, DW
Sandia Laboratories SAND77-0001, May 1978, 167 p., Figs., Tabs., 69 Ref., 7 App.

Contract AT(29-1)-789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-77-0001

12 180235

LIQUEFIED ENERGY GASES SAFETY

Liquefied energy gases--liquefied natural gas, propane, and butane--could become an increasingly important part of U.S. energy supplies, but moving and storing these liquefied gases pose serious dangers. To minimize the public risk involved in meeting the country's needs for these fuels: Future facilities for storing large quantities of these gases should be built in remote areas. Facilities already in other than remote areas should not be permitted to expand in size or in use, and the safety of each should be evaluated by the Federal Government. Large quantities of liquefied energy gases should not be transported through densely populated areas unless delivery is otherwise impossible. The Congress should consider consolidating into one agency many Federal responsibilities for evaluating and controlling the adverse consequences on energy operations. The Congress should create a Federal Hazardous Materials Compensation Fund to supplement private liability insurance.

General Accounting Office 3 vols., EMD-78-28, Aug. 1978, n.p.

ACKNOWLEDGMENT: General Accounting Office
ORDER FROM: General Accounting Office, Distribution Section, Room 4522, 441 G Street, NW, Washington, D.C., 20548

12 185742

DISPERSION AND ANALYSIS OF METHANE IN THE ATMOSPHERE

As part of the project assessing the hazards involved in the transport and handling of liquefied natural gas (LNG-project) the dispersion of methane gas clouds in the atmosphere was studied. Calculations for an instantaneous, continuous, and time-dependent source were made. Starting from Pasquill's method, and taking into account the source dimensions, the amount of gas in the explosive region (5 to 15% v/v) was calculated. For an instantaneous cloud this amount shows a maximum of approximately 50% irrespective of the source length and meteorological conditions. Special attention was paid to the calculation of the safety distance for a quasiinstantaneous spill on the sea. For this case the behavior of the cloud at the source was numerically simulated. For a 25,000 cubic meter spill of LNG this leads to a distance where the average concentration is half the lower flammability limit of approx. 20 km under unfavorable meteorological conditions and a 7 km under favorable meteorological conditions. The possibilities of the continuous and discontinuous measurement of methane concentrations were investigated. A device was built to generate 0.5 to 50% concentrations of methane in air. The accuracy of the concentrations was checked with infrared spectroscopy. The performance of a commercially available combustible gas detector to measure the methane concentration continuously and the use of gas chromatography as a discontinuous method were investigated. [Dutch]

Vanbuijtenen, CJP Verweij, A Boter, HL
National Defence Research Organization TNO CL-1976-16,
TDCK-68902, Sept. 1976, 24 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

N78-26644/2ST

12 185875

COLLISION OF A LOUISIANA AND ARKANSAS RAILWAY FREIGHT TRAIN AND A L.V. RHYMES TRACTOR-SEMITRAILER AT GOLDONNA, LOUISIANA, DECEMBER 28, 1977

About 2:15 p.m. c.s.t., on December 28, 1977, Louisiana & Arkansas Railway freight train Extra 4102 North collided with a log-laden tractor-semitrailer on the Vine Street crossing in Goldonna, Louisiana. The 2 diesel locomotive units and 22 cars of the train were derailed. A jumbo tank car loaded with about 31,000 gallons of liquefied petroleum gas was ruptured and the cargo ignited. The resultant fireball enveloped an area 1,200 feet wide including parts of Goldonna's business and residential districts. Two train crewmembers were killed; the truckdriver, a train crewmember, and eight bystanders were injured. Total damage was estimated to be \$1,256,000. About 900 persons were evacuated from the Goldonna area. The National Transportation Safety Board determines that the probable cause of the accident was the excessive speed of the train, the failure of the truckdriver to approach the railroad at a speed which would allow him to stop short of the approaching train, and the obstructions which reduced the truckdriver's field of vision.

National Transportation Safety Board NTSB-RHR-78, June 1978, 29 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-283476/OST

12 186377

REALISTIC CHARACTERIZATION OF SEVERE RAILROAD ACCIDENTS. CASE STUDY: TANK CARS

The objective of the paper is not to state that one can accurately define the exact nature of all railroad accidents, nor to state that accident data can easily be translated into regulations and design criteria. History has shown this to be a difficult task for even those who have frequently been involved with railroad accidents. Rather, the intent is to show that upper limits for accident frequencies, physical forces, and fire effects, etc., can be established. These limits can be based on analysis of past accidents and the equipment involved. In simple language, no force is infinite no matter how long the train is and how fast it is going. Similarly, flame temperatures and fire durations are finite. Boundaries can be placed on the loadings imposed on a package. A direct comparison is made with the programs and regulations established by the Federal Railroad Administration and the railroad industry to make tank car movement of hazardous materials safer. These are compared with the regulations and design criteria used for radioactive material packages. (ERA citation 03:048512)

Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978.

Anderson, RT
Allied-General Nuclear Services, Department of Energy CONF-780506-15, 1978, 17 p.

Contract ET-78-C-09-1040

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AGNS-1040-13

12 186378

PUO SUB 2 TRANSPORTATION SAFEGUARD CONCEPTS

Design criteria and conceptual designs for PuO sub 2 transportation are discussed. (ERA citation 03:052123)

Symposium on Packaging and Transportation of Radioactive Materials, Las Vegas, NV, USA, 7 May 1978.

Barnes, LD
Allied-General Nuclear Services, Department of Energy CONF-780506-18, 1978, 10 p.

Contract ET-78-C-09-1040

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AGNS-1040-7

12 186463

REVIEW OF THE BASES FOR REGULATIONS GOVERNING THE TRANSPORT OF FISSIONABLE AND OTHER RADIOACTIVE MATERIAL

The outstanding record of transport of radioactive materials prompted this brief review of the history of the regulations. IAEA as well as DOT regulations are discussed, as are all classes of shipments and materials (Class I, II, III). (ERA citation 03-052128)

Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May, 1978.

Smith, DR Thomas, JT
Los Alamos Scientific Laboratory, Department of Energy
CONF-780506-36, 1978, 5 p.

Contract W-7405-ENG-36

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

LA-UR-78-1296

12 186628

TRANSCRIPT OF TESTIMONY BEFORE THE SPECIAL SUBCOMMITTEE ON THE TRANSPORTATION OF HAZARDOUS MATERIALS BY RAIL-HOUSE PROPOSAL 45 OF THE COMMITTEE ON TRANSPORTATION

Testimony was taken on House Proposal 45 from interested witnesses. This is a Proposal for a bill to require railroad companies operating in the state of Illinois to furnish informational guides to locomotive engineers, conductors and crew regarding potentially hazardous materials which may be on board a train, the location of such materials and emergency response information covering fire response, environmental protection response procedures and evacuation measures. The document contains the testimony verbatim of the witnesses.

Illinois House Committee on Transportation July 1977, 99 p.

ACKNOWLEDGMENT: NTIS

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PB-285255/6ST

12 186852

SAFETY IN URBAN MASS TRANSPORTATION: RESEARCH REPORT

The Research Report covers three major topics: (1) an analysis of the current state of safety; (2) determination of acceptable safety levels; and (3) development of the Safety Guidelines Manual. Safety performance in several modes of transportation are compared as a basis for assessing the safety situation. Methods of establishing acceptable safety levels and setting safety goals are analyzed. A safety program is formulated for the urban mass transportation industry wherein system safety principles are applied in this industry's technical and institutional environment. Conclusions are drawn that urban mass transportation, although inherently hazardous, is not troubled by immediate, severe safety problems. However, these problems will confront the industry as it moves into use of new high-performance technology. Also, problems with injuries and fatalities concern the industry today and merit remedial action. Management approaches are recommended for meeting these safety problem areas.

See also PB-245413, RRIS 12 127048; Bulletin 7601.

Cheaney, ES Hoess, JA Thompson, RE Svehla, RL
Battelle Columbus Laboratories, Urban Mass Transportation
Administration, Naval Underwater Systems Center Final Rpt.
BATT-G-2460-0001, UMTA-RI-06-0005-75-3, Mar. 1976, 199 p.

Contract N00140-73-C-A394

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-287872/6ST

12 189770

THE CONVEYANCE OF LIQUEFIED GAS BY RAIL

Discusses design considerations of the vehicles and other factors concerned with the safe transport by rail of liquefied gases.

Smith, AD Mabbitt, PT *Railway Engineer International* Vol. 3 No. 6, Nov. 1978, pp 37-40, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

12 189784

SAFETY CONTROL AT JNR

The number of accidents at work has dropped considerably since the highest figure in 1948, as a result of the JNR's perseverance and continuous efforts. This article describes the safety regulations to which JNR staff are subjected, and reviews the measure taken to prevent accidents at work.

Shimizu, Y *Japanese Railway Engineering* Vol. 18 No. 2, 1978, pp 4-5, 1 Fig., 1 Tab., 1 Phot.

ORDER FROM: ESL

DOTL JC

12 190268

PEOPLE AND SAFETY IN TRANSPORT. ACCIDENT STATISTICS AS A BASIS FOR ANALYSIS [Der Mensch und die Sicherheit im Verkehr. Unfallstatistik als Grundlage der Analyse]

In connection with a statistical documentation of the development of accident figures for the German Federal Railways from 1949 to 1976, the problem of the risk of accident involvement with personal injury is discussed using similarly recorded statistics as a basis. Every one thousand million person-kilometre the private car and collective road transport vehicle is subjected to an approximately eighty-times greater risk, and the bus to approximately ten-times greater risk, than rail traffic. With goods transport the risk of being involved in an accident with personal injury-based on one thousand million recorded kilometres-is with delivery and goods transport vehicles more than thirty-times greater than with rail transport. The main causes of road traffic accidents are offences against the road traffic regulations (80.3 per cent) and, on the railway, offences against the rail service regulations (71.2 per cent). Following a brief discussion on technology as an indispensable resource, the recommendations of the "safety in railway operation" commission are discussed. The train-track radio is of special importance. It is finally established that the human factor is the deciding factor for operational safety. As an example the requirements of applicants for the various posts are laid down with the aid of psychological examinations and consultancy tests. In addition a good education appropriate to the importance of the post is necessary. [German]

Gruss, W (German Federal Railway) *Die Bundesbahn* Vol. 53 No. 11, Nov. 1977, pp 775-780, 5 Fig., 5 Tab.

ACKNOWLEDGMENT: TRRL (IRRD-307518), Federal Institute of Road Research, West Germany

ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

12 190308

SYSTEMS SAFETY ANALYSIS SUBCOMMITTEE. PHASE I FINAL REPORT

This report presents analyses of accident and incident data designed to develop preliminary statistics that place the overall issue of hazardous materials rail transportation more clearly into perspective by comparing rail hazardous material shipments with other rail shipments. Areas that require closer attention are identified. Also included is a discussion of risk analysis and the application of Fault Tree Analysis to the problem of hazardous material releases from tank cars. In addition, countermeasures suggested by various sources, an initial screening of these countermeasures, and a preliminary analysis of the influence of train length on accidents are presented.

Prepared for the Interindustry Task Force, Rail Transportation of Hazardous Materials.

Association of American Railroads Technical Center AAR Rpt R-344, Oct. 1978, 50 p., 24 Fig., 14 Tab., 1 App.

ACKNOWLEDGMENT: AAR

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

DOTL RP

12 190321

INTERNATIONAL REGULATIONS ON THE CARRIAGE OF DANGEROUS GOODS BY RAIL

This includes amendments that came into force in October 1978 including those relating to tank cars and gases.

Department of Transport, England No Date, n.p.

ORDER FROM: Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London EC1P 1BN, England

12 190535

RAIL SAFETY/EQUIPMENT CRASHWORTHINESS

No abstract available.

Set includes PB-289147 thru PB-289150, in RRIS Bulletin 7902 as RRIS 12 190536 thru 190539, Volume I thru Volume IV respectively.

Boeing Vertol Company, Transportation Systems Center, Federal Railroad Administration 4 Volumes, July 1978, 509 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-289149-SET/ST, DOTL NTIS

12 190536

RAIL SAFETY/EQUIPMENT CRASHWORTHINESS. VOLUME I. A SYSTEMS ANALYSIS OF INJURY MINIMIZATION IN RAIL SYSTEMS

The Department of Transportation, Transportation Systems Center (TSC), is providing technical assistance to the Federal Railroad Administration (FRA) in a program to improve railroad safety and efficiency by providing a technological basis for improvement and possible regulation in rail vehicle crashworthiness, inspection and 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 towards minimizing occupant injuries. The document, the first of four volumes, reports on the collection of data for a representative accident sample, the analysis of the data to identify injury types, locations, and, when possible, injury causal factors. Vehicle interior design details are also considered in conjunction with the accident data to compile a list of potential improvements in occupant protection.

See also Volume 2, PB-289148. Also available in set of 4 reports PC E06, PB-289 146-SET.

Reilly, MJ Jines, RH Tanner, AE

Boeing Vertol Company, Transportation Systems Center, Federal Railroad Administration Intrm Rpt. FRA/ORD-77/73.I, DOT-TSC/FRA-77-15-1, July 1978, 265 p.

Contract DOT-TSC-821-1

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-289147/1ST, DOTL NTIS

12 190537

RAIL SAFETY/EQUIPMENT CRASHWORTHINESS. VOLUME II. DESIGN GUIDE

The second of four volumes, has been prepared to assist design engineers in understanding the basic problems associated with the development of crashworthy interiors of locomotives, cabooses and passenger railcars. Rail vehicle accident conditions are presented with the resulting interactions that can occur between one car and another. Types of injuries to the occupants of the cars, and the mechanism causing the injury, are discussed.

See also Volume 1, PB-289147, and Volume 3, PB-289149. Also available in set of 4 reports PC E06, PB-289 146-SET.

Reilly, MJ Shefrin, J Patrick, LM

Boeing Vertol Company, Transportation Systems Center, Federal Railroad Administration Intrm Rpt. FRA/ORD-77/73. II, DOT-TSC/FRA-77-15-2, July 1978, 99 p.

Contract DOT-TSC-821-2

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-289148/9ST, DOTL NTIS

12 190538

RAIL SAFETY/EQUIPMENT CRASHWORTHINESS. VOLUME III. PROPOSED ENGINEERING STANDARDS

The document, the third of four volumes, contains recommended Engineering Standards prepared in the format of the standards published in the Code of Federal Regulations (Title 49, Transportation, Parts 200). The standards proposed provide improved occupant protection in the secondary impact situation associated with railroad accidents.

See also Volume 2, PB-289148, and Volume 4, PB-289150. Also available in set of 4 reports PC E06, PB-289 146-SET.

Reilly, MJ

Boeing Vertol Company, Transportation Systems Center, Federal Railroad Administration Intrm Rpt. FRA/ORD-77/73. III,

DOT-TSC/FRA-77-15-3, July 1978, 70 p.

Contract DOT-TSC-821-3

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-289149/7ST, DOTL NTIS

12 190539

RAIL SAFETY/EQUIPMENT CRASHWORTHINESS. VOLUME IV. EXECUTIVE SUMMARY

The document, the fourth of four volumes, summarizes the activities and documentation conducted under this contract. The analysis of the accident data highlighted areas where improvements could be made to improve the occupant protection of passenger rail vehicles. Design criteria were determined and some suitable design changes proposed. For the proposed areas of change, typical Federal Standards documentation were prepared.

See also Volume 3, PB-289149. Also available in set of 4 reports PC E06, PB-289 146-SET.

Reilly, MJ

Boeing Vertol Company, Transportation Systems Center, Federal Railroad Administration Intrm Rpt. FRA/ORD-77/73.IV, DOT-TSC/FRA-77-15-4, July 1978, 75 p.

Contract DOT-TSC-821-4

ACKNOWLEDGMENT: NTIS

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PB-289150/5ST, DOTL NTIS

12 190583

REPORT OF THE HAZARDOUS MATERIALS TRANSPORTATION TASK FORCE

The report documents the analysis and findings of the DOT Hazardous Materials Task Force and is organized according to the following basic issues: organizational relationships; the adequacy and effectiveness of the hazardous materials regulation program; the adequacy and effectiveness of the hazardous materials compliance and enforcement programs; and Federal hazardous materials training programs and emergency response systems. The Task Force, based upon its findings and analysis, offered six recommendations for consideration.

Office of the Secretary of Transportation DOT/RSPA-78/2, Sept. 1978, 169 p.

ACKNOWLEDGMENT: NTIS

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PB-288815/4ST

12 190738

WORKBOOK FOR ESTIMATING EFFECTS OF ACCIDENTAL EXPLOSIONS IN PROPELLANT GROUND HANDLING AND TRANSPORT SYSTEMS

A workbook is presented to supplement an earlier NASA publication, which was intended to provide the designer and safety engineer with rapid methods for predicting damage and hazards from explosions of liquid propellant and compressed gas vessels used in ground storage, transport and handling. Information is presented in the form of graphs and tables to allow easy calculation, using only desk or handheld calculators. Topics covered in various chapters are: (1) estimates of explosive yield; (2) characteristics of pressure waves; (3) effects of pressure waves; (4) characteristics of fragments; and (5) effects of fragments and related topics.

Baker, WE Kulesz, JJ Ricker, RE Westine, PS Parr, VB Southwest Research Institute Final Rpt. NASA-CR-3023, REPT-02-4778, Aug. 1978, 274 p.

Contract NAS3-20497

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

N79-10226/5ST

12 190881

TRANSIT CRIME STUDY

This report presents statistic data and information which enabled a determination that the northeast region of New Jersey is the only location in the state where transit crime statistics are collected and tabulated. Security systems and techniques are evaluated and several systems are chosen as possible successful countermeasures for the high transit crime locations in

the region. Two-way radio communication is suggested for the bus and subway locations. Helicopter Track Patrols are suggested for the commuter rail locations. All these systems are examined and funding priorities are established. Activities necessary for evaluation of the recommended security systems are included. (Portions of this document are not fully legible)

Sponsored in part by New Jersey State Law Enforcement Planning Agency, Trenton.

Graf, CR Roberts, AW
New Jersey Department of Transportation, New Jersey State Law Enforcement Planning Agency Final Rpt. 77-008-7890, July 1977, 108 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289703/1ST

12 190901
TRANSPORTATION SAFETY INFORMATION REPORT. JULY, AUGUST, AND SEPTEMBER 1978 QUARTERLY HIGHLIGHTS

The quarterly publication is a compendium of selected national-level transportation safety statistics for all modes of transportation. Each report presents and compares figures for transportation fatalities, accidents, and injuries on a monthly and quarterly basis for the current and preceding years.

See also report dated Sep 78, NTISUB/D/224-002. Paper copy also available on subscription, North American Continent price \$30.00/year; all others write for quote.

Transportation Systems Center Final Rpt. DOT-TSC-P24-78-3, Dec. 1978, 36 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTISUB/D/224-003, DOTL NTIS

12 191469
NEW APPROACH FOR SAFEGUARDING ENRICHED URANIUM HEXAFLUORIDE BULK TRANSFERS

The unique concepts of American National Standard ANSI N15.18-1975 "Mass Calibration Techniques for Nuclear Material Control" are discussed in regard to the establishment and maintenance of control of mass measurement of Uranium Hexafluoride (UF sub 6) both within and between facilities. Emphasis is placed on the role of control of the measurements between facilities, and thus establish decision points for detection of measurement problems and making safeguards judgments. The unique concepts include the use of artifacts of UF sub 6 packaging cylinders, calibrated by a central authority, to introduce the mass unit into all of the industries' weighing processes. These are called Replicate Mass Standards (RMS). This feat is accomplished by comparing the RMS to each facility's In-House Standards (IHS), also artifacts, and thence the usage of these IHS to quantify the systematic and random errors of each UF sub 6 mass measurement process. A recent demonstration, which exchanged UF sub 6 cylinders between two facilities, who used ANSI N15.18-1975 concepts and procedures is discussed. The discussion includes methodology and treatment of data for use in detection of measurement and safeguards problems. The discussion incorporates the methodology for data treatment and judgments concerning (1) the common base, (2) measurement process off-sets, (3) measurement process precision, and (4) shipper-receiver bulk measurement differences. From the evidence gained in the demonstration, conclusions are reached as to the usefulness of the realistic criteria for detection of mass measurement problems upon acceptance of the concepts of ANSI N15.18-1975. (ERA citation 04:007522)

IAEA symposium on nuclear material safeguards, Vienna, Austria, 2 Oct 1978.

Doehner, LW Pontius, PE Whetstone, JR
Atomics International Division, National Engineering Laboratory,
Department of Energy IAEA-SM-231/68, CONF-781007-7, 1978, 15 p.

Contract EY-76-C-04-3533

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

RFP-2757

12 191517
RISK ANALYSIS METHODOLOGY AND DATA: STUDY OF ALTERNATIVES FOR LONG-TERM MANAGEMENT OF HANFORD DEFENSE HIGH-LEVEL RADIOACTIVE WASTE

This report provides information on the risk analysis performed in conjunction with the study of alternatives for the long-term management of the defense high-level radioactive waste at the Hanford Reservation, Richland, Washington. The risk analysis was done on a modular basis. The modules include: waste retrieval, waste preparation, waste immobilization, transportation, and storage and disposal. Based on the values obtained in this risk analysis, it is apparent that the overall risk either to an individual or to the population is extremely low. (ERA citation 04:005322)

Nuclear Services Corporation, Department of Energy Sept. 1978, 176 p.
Contract EY-77-C-06-1001

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NSC-PS-ARH-77001

12 191882
FULL SCALE IMPACT TESTING FOR ENVIRONMENTAL AND SAFETY CONTROL OF ENERGY MATERIAL SHIPPING CONTAINER SYSTEMS

Heavily-shielded energy material shipping systems, similar in size and weight to those presently employed to transport irradiated reactor fuel elements, are being destructively tested under dynamic conditions. In these tests, the outer and inner steel shells interact in a complex manner with the massive biological shielding in the system. Results obtained from these tests provide needed information for new design concepts. Containment failure (and the resulting release of radioactive material to the environment which might occur in an extremely severe accident) is most likely through the seals and other ancillary features of the shipping systems. Analyses and experiments provide engineering data on the behavior of these shipping systems under severe accident conditions and information for predicting potential survivability and environmental control with a rational margin of safety.

Environmental control symposium, Washington, DC, USA, 28 Nov 1978.

Seagren, RD
Oak Ridge National Laboratory, Department of Energy 1978, 14 p.

Contract W-7405-ENG-26

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

CONF-781109-7

12 191914
CRITICAL REVIEW AND ASSESSMENT OF PROBLEMS IN HYDROGEN ENERGY DELIVERY SYSTEMS. PROGRESS REPORT, NOVEMBER 1, 1976-SEPTEMBER 30, 1977

Potential problem areas associated with the delivery of hydrogen in large quantities and over long distances are addressed. Initial focus is on two transport modes—liquid hydrogen highway transport and gaseous hydrogen pipeline transmission. A preliminary risk analysis of tractor-trailer shipment of liquid hydrogen is documented in this initial report. Hydrogen embrittlement of metals is surveyed as applied to hydrogen delivery systems. Existing regulations and guidelines affecting hydrogen delivery are reviewed for adequacy and appropriateness to future system developments.

Edeskuty, FJ
Los Alamos Scientific Laboratory, Department of Energy Aug. 1978, 74 p.

Contract W-7405-ENG-36

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

LA-7405-PR

12 192094
RAILROAD ACCIDENT REPORT ST. LOUIS SOUTHWESTERN RAILWAY COMPANY FREIGHT TRAIN DERAILMENT AND RUPTURE OF VINYL CHLORIDE TANK CAR, LEWISVILLE, ARKANSAS, MARCH 29, 1978

About 12:10 a.m., on March 29, 1978, 4 locomotive units and 43 cars of St. Louis Southwestern Railway Company freight train SRASK derailed when they entered an 8 degree curve in the wye track at Lewisville, Arkansas. The

body of the 13th car struck and ruptured the tank head of the 12th car, releasing vinyl chloride into the atmosphere. The vinyl chloride subsequently ignited and buildings within a 1,500-foot radius of the ruptured car were damaged. About 1,700 residents of Lewisville were evacuated. The engineer and two head brakemen were injured. Property damage was estimated to be \$2,189,000. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer and other crewmembers to slow train SRASK for the 10-mph speed restriction through the wye track as required by the railroad's general orders.

National Transportation Safety Board NTSB-RAR-77-1, Dec. 1978, 26 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291758/1ST, DOTL NTIS

12 192146

FIRE SAFETY GUIDELINES FOR VEHICLES IN A DOWNTOWN PEOPLE MOVER SYSTEM

The results of a study to formulate fire safety guidelines to be required for vehicles used in Downtown People Mover (DPM) systems for the movement of people in a congested urban area are presented. Through a review of the design features of existing people mover vehicles and systems, and a review of proposed new systems, fire scenarios are developed and guidelines suggested to minimize the fire risk to passengers. Methods and criteria, based on established test procedures, are proposed for assessing the flammability and smoke generation of interior finish and furnishing materials. Fire and smoke detection and suppression equipment are recommended, along with proposed guidelines for emergency evacuation provisions and emergency communication requirements. An extensive bibliography of flammability in fixed guideway transit systems is included.

Sponsored in part by Urban Mass Transportation Administration, Washington, DC.

Peacock, RD

National Bureau of Standards, Urban Mass Transportation Administration Final Rpt. NBSIR-78-1586, Jan. 1979, 56 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292600/4ST

12 192168

ASSESSMENT OF THE RISK OF TRANSPORTING URANIUM HEXAFLUORIDE BY TRUCK AND TRAIN

This report is the fifth in a series of studies of the risk of transporting potentially hazardous energy materials. The report presents an assessment of the risk of shipping uranium hexafluoride (UF sub 6) by truck and rail. The general risk assessment methodology, summarized in Section 3, used in this study is that developed for the first study in this series. The assessment includes the risks from release of uranium hexafluoride during truck or rail transport due to transportation accidents. The contribution to the risk of deteriorated or faulty packaging during normal transport was also considered. The report is sectioned to correspond to the specific analysis steps of the risk assessment model. The transportation system and accident environment are described in Sections 4 and 5. Calculation of the response of the shipping system to forces produced in transportation accidents are presented in Section 6 and the results of a survey to determine the condition of the package during transport are presented in Section 7. Sequences of events that could lead to a release of radioactive material from the shipping cask during transportation are postulated in Section 8 using fault tree analysis. These release sequences are evaluated in Sections 9 through 11, to determine both the likelihood and the possible consequences of each release. Supportive data and analyses are given in the appendices. The results of the risk assessment have been related to the year 1985, when it is projected that 100 GW of electric power will be generated annually by nuclear power plants. It was estimated that approximately 46,000 metric tons (MT) of natural UF sub 6 and 14,600 MT of enriched UF sub 6 would be shipped in the reference year.

Geffen, CA Johnson, JF Davis, DK Friley, JR Ross, BA
Battelle Memorial Institute/Pacific Northwest Labs, Department of Energy. Aug. 1978, 188 p.

Contract EY-76-C-06-1830

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PNL-2211

12 192180

SANDIA TRANSPORTATION TECHNICAL ENVIRONMENTAL INFORMATION CENTER AND ITS APPLICATION TO TRANSPORTATION RISK ANALYSES

The purpose of this paper is to describe an applied research activity which is fundamental to the conduct of transportation analyses: the collection, analysis, storage, and retrieval of information on the intensities of technical environments. This paper describes the collection system which provides such a service to official researchers in transportation analysis and the applications of this information in the area of risk analysis.

Environmental control symposium, Washington, DC, USA, 28 Nov 1978.

Foley, JT Davidson, CA McClure, JD
Sandia Laboratories, Department of Energy CONF-781109-6, 1978, 8 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-78-1593C

12 192294

SAFETY OF HANDLING, STORING AND TRANSPORTATION OF SPENT NUCLEAR FUEL AND VITRIFIED HIGH-LEVEL WASTES

The safety of handling and transportation of spent fuel and vitrified high-level waste has been studied. Only the operations which are performed in Sweden are included. That is: -Transportation of spent fuel from the reactors to an independent spent fuel storage installation (ISFSI). - Temporary storage of spent fuel in the ISFSI. - Transportation of the spent fuel from the ISFSI to a foreign reprocessing plant. - Transportation of vitrified high-level waste to an interim storage facility. - Interim storage of vitrified high-level waste. - Handling of the vitrified high-level waste in a repository for ultimate disposal. For each stage in the handling sequence above the following items are given: - A brief technical description. - A description of precautionary measures considered in the design. - An analysis of the discharges of radioactive materials to the environment in normal operation. - An analysis of the discharges of radioactive materials due to postulated accidents. The dose to the public has been roughly and conservatively estimated for both normal and accident conditions. The expected rate of occurrence are given for the accidents. The results show that above described handling sequence gives only a minor risk contribution to the public. (Atomindex citation 09:389346)

U.S. Sales Only.

Ericsson, AM
Kaernbraenslesakerhet Nov. 1977, 70 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

KBS-TR-42

12 192347

RAILROAD ACCIDENT REPORT-DERAILMENT OF LOUISVILLE AND NASHVILLE RAILROAD COMPANY'S TRAIN NO. 584 AND SUBSEQUENT RUPTURE OF TANK CAR CONTAINING LIQUEFIED PETROLEUM GAS, WAVERLY, TENNESSEE, FEBRUARY 22, 1978

About 10:25 p.m., on February 22, 1978, 23 cars of a Louisville & Nashville Railroad Company train derailed at a facing point switch in Waverly, Tennessee. At 2:53 p.m., on February 24, 1978, a derailed tank car containing liquefied petroleum gas ruptured, releasing the product which ignited with an explosive force. As a result, 16 persons died and 43 were injured; property damage was estimated at \$1,800,000. The National Transportation Safety Board determines that the probable cause of the loss of life and substantial property damage was the release and ignition of liquefied petroleum gas from a tank car rupture. The rupture resulted from stress propagation of a crack which may have developed during movement of the car for transfer of product or from increased pressure within the tank. The original crack was caused by mechanical damage during a derailment, which resulted from a broken high-carbon wheel on the 17th car which had overheated.

National Transportation Safety Board NTSB-RAR-79-1, Feb. 1979, 24 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-292407/4ST, DOTL NTIS

12 192391

CHLORINE TRANSPORTATION RISK ASSESSMENT

An assessment was made on the toxication risk of the population due to the bulk rail transportation of liquid chlorine in Finland. Fourteen typical rail accidents were selected and their probability was estimated using the accident file of the Finnish State Railways. The probability of a chlorine leak was assessed for each type of accident separately using four leak size categories. The assessed leakage probability was dominated by station accidents, especially by collisions of a chlorine tanker and a locomotive. Toxication hazard areas were estimated for the leak categories. A simple model was constructed to describe the centering of the densely populated areas along the railway line. A comparison was made between the obtained risk and some other risks including those due to nuclear reactor accidents. (Atomindex citation 09:405005)

U.S. Sales Only.

Lautkaski, R Mankamo, T
Valtion Teknillinen Tutkimuskeskus Feb. 1977, 46 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

VTT-YDI-27

12 193741

SAFETY EFFECTIVENESS EVALUATION OF THE FEDERAL RAILROAD ADMINISTRATION'S HAZARDOUS MATERIALS AND TRACK SAFETY PROGRAMS

The Congress directed NTSB to "conduct a thorough review of hazardous materials rail shipments and the applicable Federal (track) standards as well as determine how the Federal Railroad Administration (FRA) can more effectively prevent the occurrence and reduce the severity of derailments of hazardous materials." The report is based on information obtained through interviews and reviews of technical literature and Department of Transportation organizational documents. The review was limited to the derailment of hazardous materials and the applicable track standards. The review found that FRA needs a full-time railroad safety expert at the head of the Office of Safety. The data base is inadequate to define and rate the problems. The program should be based on risks and the goals and objectives should be based on the level of risk that is acceptable. The Federal/State partnership required by the Federal Railroad Safety Act of 1970 should be improved for more effective use of State inspectors.

National Transportation Safety Board SEE-79-2, Mar. 1979, 58 p., 1 Fig., 3 Tab., 4 App.

ACKNOWLEDGMENT: National Transportation Safety Board

ORDER FROM: NTIS

PB-293500 DOTL RP

12 193746

NEED FOR IMPROVED ACTION ON RAILROAD SAFETY RECOMMENDATIONS

The National Transportation Safety Board has not been prompt in evaluating responses to its railroad safety recommendations or following up on proposed action. The Board has recognized this problem and recently took steps to correct it. In many cases the Federal Railroad Administration has not responded to recommendations within 90 days or provided timetables for carrying them out as required by law. Further, it has not adequately kept track of action promised by its operating units and does not inform the Safety Board of important changes or delays to promised actions. As a result, GAO could not determine if all Board recommendations to the Federal Railroad Administration were pending for justifiable reasons.

General Accounting Office Cong Rpt. CED-78-171, Dec. 1978, 39 p., 2 App.

ACKNOWLEDGMENT: General Accounting Office

ORDER FROM: General Accounting Office, Distribution Section, P.O. Box 1020, Washington, D.C., 20548

PB-291395/2ST, DOTL RP

12 193879

MEASURING VISIBILITY IN BLOWING SNOW

An electronic system that monitors visibility in blowing snow has been developed by the USDA Forest Service, in cooperation with the Wyoming

Highway Department. The sensor for blowing snow is a photoelectric particle counter that produces a voltage pulse for each snow particle which passes through a 3 by 25 mm area normal to the wind. The sensor's pulse train is electronically processed to give voltages proportional to five-second averages of particle frequency and diameter. These voltages are combined with the signal from an anemometer in an analog computer which stimulates visual range according to the equation, $V = 5U/\text{sq FX}$ where V is the visual range in meters, U is windspeed in meters per second, F is the particle frequency in number per second through a 1 sq cm area, and X is the particle diameter in centimeters. Field calibration was accomplished by comparison with closed circuit television recording of visual range targets during drifting. The correspondence between theory and observed visual range was very satisfactory, and two such systems are now in use for traffic control in Wyoming, having proved reliable and useful during three winters. /Author/

This Paper appeared in TRB Special Report 185, Snow Removal and Ice Control Research.

Schmidt, RA (Rocky Mountain Forest & Range Experiment Station)
Transportation Research Board Special Report No. 185, 1979, pp 200-207, 7 Fig., 1 Tab., 15 Ref.

ORDER FROM: TRB Publications Off

12 194125

REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIALS, 1973 REVISED EDITION. NATIONAL COMPETENT AUTHORITIES LIST NO. 10

National Competent Authorities responsible for approvals and authorizations in respect to the transport of radioactive material are listed by member states.

International Atomic Energy Agency NP-23438, Apr. 1978, 22 p.

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: International Atomic Energy Agency, 11 Karntnerring, P.O. Box 590, 1011 Vienna, Austria

12 194126

TRANSPORTATION OF RADIOACTIVE MATERIAL IN PENNSYLVANIA

In September 1976 a program was begun for the surveillance of radioactive material in transport throughout Pennsylvania. The program was conducted from October 1976 to September 1977. The principal objectives of the surveillance program were to observe the physical condition of packages containing radioactive material, to record radiation levels in the transportation environment, to determine radiation doses to individuals working in the transportation industry, to check compliance with packaging requirements such as labeling, assignment of transport indices, and maintenance of proper separation distances by both shippers and carriers of radioactive material, and to determine if adequate safety instructions for handling radioactive material are available to transportation workers and to ascertain compliance with such instructions. The methodology, survey procedures, and results are presented.

Pennsylvania Department of Environmental Resources NUREG/CR-0286, Apr. 1978, 189 p.

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: NTIS

12 194128

TRANSPORTATION OF IRRADIATED FUEL

The safety aspects of the transportation of irradiated fuel which has been discharged from nuclear reactors are discussed. Federal regulations and cask design requirements are considered.

From the book, "Nuclear Power Safety," edited by JH Rust and LE Weaver.

Rollins, J (Nuclear Assurance Corporation)
Pergamon Press 1976, pp 359-380

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

12 194337

CONTAINER TRANSFER BETWEEN SHIP AND RAIL WAGON AT PORTS

A properly organized interface between port and rail container operations could result in considerable savings in costs to both port operators and

railway administrations. The article examines the methods currently used for the transfer of containers between ship/stack and rail wagon at ports, and recommends that in future container berth planning, the nearer to the quay or the stack that this transfer takes place, the better for both port and rail. Order from NSFI as No. 16701.

Marsden, MB *Cargo Systems International* Vol. 5 No. 12, 1978, p 125

ACKNOWLEDGMENT: Ship Research Institute of Norway
ORDER FROM: Ship Research Institute of Norway, Technical University of Norway, 7034 Trondheim-NTH, Norway ESL

NSFI No. 16701

12 194578

LIQUEFIED NATURAL GAS SAFETY RESEARCH OVERVIEW

Liquefied Natural Gas (LNG) is a growing factor in the United States' energy supply situation, both for periods of high demand (peak shaving) and for daily supply (base load). Safety has been a major issue in its acceptance by the public, the government, and industry. Perhaps because of this, industry and government have undertaken programs of research, development, testing, and evaluation that are more extensive than those for most other new hazardous materials. This paper records the experimental and theoretical work performed with the goal of increasing LNG safety, and has been organized in fourteen divisions: land storage tank studies, rollover, dispersion from spills on land, land spill fire studies, land spill fire protection, ship studies, flameless explosion, dispersion from spills on water, underwater releases, water spill fire studies, vapor cloud deflagration, vapor cloud detonation, physical properties, and gelation. Examining the record of the LNG research effort leads inevitably to the conclusion that there is a basic understanding of the material, sufficient to design, operate, and regulate LNG transportation and storage.

Presented at the 1978 American Gas Association-Cryogenic Society of America LNG Terminal & Safety Symposium, San Diego, 12-13 October 1978. Prepared for U.S. Dept. of Transportation, U.S. Coast Guard Office of Merchant Marine Safety.

Schneider, AL
United States Coast Guard Final Rpt. CG-M-01-79, Dec. 1978, 67 p.

ACKNOWLEDGMENT: United States Coast Guard, NTIS
ORDER FROM: NTIS

AD-A063714/OST

12 194859

FORECASTING PASSENGER TRAIN CATASTROPHES

In a previous paper (Ref. 1), data on the annual number of railroad passenger fatalities per passenger mile were examined. It was found that there has been a significant improvement in railroad passenger safety in the period examined, 1890-1977, (the bulk of the improvement occurring between 1890 and 1930). It was suggested that most of the safety for railroad passengers occurred mainly because of a reduction in the number of annual accidents, but that the survivability in any one accident while also having improved, had not kept pace with the safety ensuing as a result of a reduction in the number of passenger train accidents. In this paper we examine the issue of survivability directly by examining historical data on the maximum number of railroad passenger train fatalities in any one accident in a year for the period 1902-1976. It is found, as suggested in the previous paper, that there is only a relatively small improvement in survivability in this period. Over this time frame, any one year is almost as likely as any other to have a large number of passenger fatalities. That is, unlike the dramatic decrease in the number of annual passenger fatalities over the past 3/4 century, the maximum number of people killed in passenger train accidents in a year remained relatively constant in the 3/4 of a century of data.

Kahn, D
Transportation Systems Center SS-20-U5-45, June 1978, 18 p., 6 Fig., 1 Tab., 4 Ref., 2 App.

ACKNOWLEDGMENT: TSC
ORDER FROM: TSC

DOTL RP

12 194860

HISTORY AND FORECAST OF RAILROAD PASSENGER FATALITIES

Annual railroad passenger fatality data in the period 1890 to 1977 is examined and analyzed using the method of Extremal Probability Theory. The principal findings are: 1) The annual railroad passenger fatality rate has

been, on the average, declining exponentially in this time period. 2) But major fluctuations in the fatality rate about its mean value have remained relatively constant in this same time period. 3) This suggests that it is the number of fatal accidents which have been declining but that improvements in reducing the severity of individual accidents has not kept pace; which in turn, suggests that major effort must now also be directed towards adopting crashworthiness measures in order to reduce the severity of any individual accident (as well as continuing the successful program of reducing the number of accidents.) 4) Utilizing Extremal Probability Theory, estimates have been obtained for the probability of accident severity (aggregated over the year). This is expected to be useful for FRA safety planning purpose in that it provides probability estimates for the magnitude of future railroad passenger fatalities and the time within which this magnitude will be reached.

Kahn, D

Transportation Systems Center SS-20-U5-43, May 1978, 18 p., 2 Fig., 1 App.

ACKNOWLEDGMENT: TSC
ORDER FROM: TSC

DOTL RP

12 194863

POTENTIAL SEVERITY OF ACCIDENTS INVOLVING THE TRANSPORTATION OF HAZARDOUS MATERIALS

A Cauchy-type distribution was found from analysis of data on injuries and fatalities occurring between 1971 and 1978 in transportation of hazardous materials by all modes. Based on observations of extremes in any one accident in a year, it was concluded that the potential severity of future accidents would be unacceptably high. It is recommended that accident severity be reduced, along with cutting the number of accidents.

Kahn, D

Transportation Systems Center SS-20-U1.1-50, Mar. 1979, 17 p., 7 Fig., 5 Tab., 5 Ref.

ACKNOWLEDGMENT: TSC
ORDER FROM: TSC

DOTL RP

12 195097

RISK OF SHIPPING SPENT FUEL IN THE U.S.

No Abstract.

From the Winter meeting of the American Nuclear Society; Washington, D.C., November 12, 1978.

Elder, HK (Battelle Memorial Institute/Pacific Northwest Labs) *American Nuclear Society Transactions* Vol. 30 CONF-7811109, 1978, pp 319-320

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: American Nuclear Society, Incorporated, 244 East Ogden Avenue, Hinsdale, Illinois, 60521

12 195098

RISKS OF SHIPPING URANIUM HEXAFLUORIDE BY TRUCK AND TRAIN

No Abstract.

From the Winter meeting of the American Nuclear Society; Washington, D.C., November 12, 1978.

Geffen, CA Rhoads, RE Johnson, JF (Battelle Memorial Institute/Pacific Northwest Labs) *American Nuclear Society Transactions* Vol. 30 CONF-7811109, 1978, pp 321-322

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: American Nuclear Society, Incorporated, 244 East Ogden Avenue, Hinsdale, Illinois, 60521

12 195677

FIRE BLACKENS BART IMAGE

A loose equipment cover that fell from beneath a Bay Area Rapid Transit train and damaged the third rail in the TransBay Tube stalled and damaged a subsequent train that then caught fire in the 3.6 mile tunnel. The emergency procedures of BART and city fire departments proved inadequate as the seven cars were destroyed or damaged by the fire. Recounted are the events of January 17-18, 1979, as well as subsequent investigations while the most important segment of BART was shut down for 2.5 months.

Demoro, HE *Mass Transit* Vol. 6 No. 7, July 1979, p 12, 3 Phot.

ORDER FROM: Carter (C Carroll), 538 National Press Building, Washington, D.C., 20004

12 195703

ACCIDENT/INCIDENT BULLETIN

Annual publication of FRA Office of Safety containing accident reports and statistics which must be reported by railroads under Federal legislation. First issued in 1971 as Accident Bulletin.

Federal Railroad Administration No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

12 195704

ANNUAL REPORT TO CONGRESS--NATIONAL TRANSPORTATION SAFETY BOARD

Annual publication of NTSB containing summaries of accidents and statistics for all modes subject to investigation. First issued in 1967.

National Transportation Safety Board No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

12 196110

AN INDEX TO THE HAZARDOUS MATERIALS REGULATIONS: TITLE 49, CODE OF FEDERAL REGULATIONS (JANUARY 3, 1977 REVISION) PARTS 100-199

No Abstract.

Department of Transportation 1977, 93 p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

12 196383

ENSURING SAFETY FOR HAZARDOUS FREIGHT

No Abstract.

Miller-Cranko, G *International Railway Journal* Mar. 1979, p 27, 2 Tab., 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010 DOTL JC

12 196681

STANDARDIZED MAPS FOR HAZARDOUS MATERIALS ACCIDENTS--SPECIAL INVESTIGATION REPORT

Problems reported by emergency response personnel in developing pre-emergency plans and making tactical decisions during hazardous materials transportation emergencies prompted the Safety Board to conduct this special investigation. The investigation disclosed a need to improve methods for predicting the expected behavior of hazardous materials in emergencies, for both preplanning and tactical uses. Existing information sources were found to be inadequate for these purposes. A method to improve the recording of hazardous materials behavior in accident investigations that will improve preplanning and tactical decisionmaking for

hazardous materials emergencies was identified and has been adopted as a tentative accident reporting standard by the Safety Board for accidents involving hazardous materials. Immediate and potential uses for the standardized hazardous materials behavior maps are identified and implementation problems are discussed.

National Transportation Safety Board NTSB-HZM-79-1, May 1979, 29 p., 10 App.

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12 197359

SYSTEM SAFETY PROGRAM PLAN

The report contains a recommended System Safety Program Plan for the Chicago Transit Authority (CTA) rail system. It contains a recommended policy statement, recommendations for specific actions to improve CTA system safety management practices and processes, and finally, recommendations for a process for up-dating and re-evaluating the Program Plan. The suggestions presented build upon substantial foundation established previously by the CTA in its current system safety efforts. The Plan is divided into four sections: (1) Safety Policy Statement; (2) Current CTA Safety Activities; (3) Recommendations to Strengthen Current CTA Safety Management Practices and Processes; and (4) Recommendations for Re-Evaluation and Modification of the System Safety Program. These recommendations are to a great extent tailored to the specific facilities, personnel, and philosophy of the organization of the CTA, and are not intended as a set of general guidelines for the rail transit industry.

Prepared by Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div. See also PB-295-523.

Chicago Transit Authority, Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration UMTA-IL-09-0033-79-2, Aug. 1978, 63 p.

Grant DOT-UMTA-IL-09-0033

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-294788/5ST

12 197371

SAFETY AND SYSTEM ASSURANCE STUDY

The report contains the results of a study of safety and systems assurance-related technical management practices and processes of the Chicago Transit Authority (CTA) rail system. The study involved an evaluation of technical management practices associated with system safety, equipment reliability/maintainability, system availability/dependability, and quality assurance. Special studies of human factors and train protection were also performed. While the overall scope of the project was broad, the primary objective was to develop and recommend improvements in safety and systems assurance technical management process and practices.

Prepared by Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div. See also PB-294 788.

Chicago Transit Authority, Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IL-09-0033-79-1, Sept. 1978, 72 p.

Grant DOT-UMTA-IL-09-0033

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-295523/5ST

13 053316

HIGH POWER TRACTION CURRENT COLLECTION AT HIGH SPEED

This report summarises the results already published, reports on the most recent work in more detail, and makes recommendations for the design of overhead equipment and pantographs for both high voltage a.c. and medium voltage d.c. systems.

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

International Union of Railways Final Rpt. A 129/RP 10, Oct. 1978, 30 p.

ACKNOWLEDGMENT: UIC
ORDER FROM: UIC

DOTL RP

13 053325

DISTRIBUTION OF THE OVERHEAD LINE CURRENT BETWEEN RAIL AND GROUND DEPENDING ON THE FREQUENCY AND THE DISTANCE FROM THE SUB-STATION

Tests to determine the distribution of the overhead line current between rail and ground depending on the frequency and the distance from the sub-station were made on a double track electrified line with 25 kV, 50 Hz of the Hungarian State Railways (MAV). The earth current factor and rail current factor are a function of the frequency but do not depend on the position of the train. A calculation method permits the determination of these factors in arbitrary conditions. A mathematical method makes it possible to calculate resonance phenomena or networks with different electrical parameters.

Restrictions on the use of this document are contained in the explanatory material. Written by ORE Specialists Committee A 122 "The use of Thyristors on the railway."

International Union of Railways DT 72 (A 122), Sept. 1978, 38 p., 76 Fig., 4 Tab.

ORDER FROM: UIC

DOTL RP

13 188999

MODERNIZATION OF FRENCH NATIONAL RAILWAYS 1,500 V DIRECT CURRENT SUB-STATIONS [La modernisation des sous-stations a courant continu 1 500 v de la S.N.C.F.]

Most of the sub-stations were equipped with mercury vapor rectifiers, or even rotary converters. 90% of the traction current supply installations have silicon rectifiers. New sub-stations have been built on inadequately equipped lines. At the same time remote control centers have been improved and operate over a wider area; some new centers have been built. The author explains how the technological development of rectifiers has, in older sub-stations, enabled equipment capable of coping with the higher power required to be installed, which at the same time produced a very appreciable reduction in operating and maintenance costs. He explains in this connection the policy adopted as far as voltage control and current recuperation are concerned. The article refers to the measures taken to protect the 1,500 V sectors. [French]

Laurenceau, JN *Revue Generale des Chemins de Fer* Vol. 97 June 1978, n.p.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

13 189017

MODERN SOLUTIONS FOR PANTOGRAPH DESIGN [Nowoczesne rozwiazania konstrukcyjne odbierakow pradu]

Presentation of the parameters of a pantograph with major improvement in the quality of current collection from the overhead wire at high speeds. Description of the design of standard and small gauge pantographs used throughout the world, and analysis of their static and dynamic parameters. Present trends in pantograph design. Description of work on Polish pantographs involving 200 km/h speeds, and comparison of the parameters of models used by the PKP with the prototype. Conclusion as regards modern pantograph design. [Polish]

Grajnert, J *Trakcja i Wagony* Vol. I-25 No. N5, May 1978, pp 140-146, 9 Fig., 4 Tab., 8 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Trakcja i Wagony, Warsaw, Poland

13 189021

ELECTROLYTIC CORROSION OF RAILS ON THE GIOVI LINE [Le corrosioni elettrolitiche delle rotaie sulla linea succursale dei Giovi]

It is common knowledge that d.c. electric current installations can give rise to electrolytic corrosion in sunken structures as a result of traction current dispersal in the ground. The article describes fairly simple measures for eradicating this phenomenon, or at least reducing it. [Italian]

Finzi, V Picasso, M *Ingegneria Ferroviaria* Vol. 33 No. 6, June 1978, pp 537-552, 16 Phot., 18 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

13 189022

PRESENT-DAY PROBLEMS OF LOW FREQUENCY INTERFERENCE IN ELECTRIC CIRCUITS [Aktuelle Probleme der niederfrequenten Beeinflussungen in elektrischen Netzen]

The purpose of this collection of reports is to show the present situation as regards all the different problems. The 18 articles are classified under 8 chapters: 1) formation of harmonic waves, 2) formation and propagation of harmonic waves in electrical supply networks, 3) superposition of harmonic waves, 4) repercussions of harmonic waves on transmission losses, 5) possibilities of attenuation of repercussions of harmonic waves in the networks, 6) supply through oscillation relays, 7) electric traction, 8) measuring methods and procedures. [German]

Schweizerischer Elektrotechnischer Verein 1978, 258 p., 29 Tab., 172 Phot., 62 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Schweizerischer Elektrotechnischer Verein, Seefeldstrasse 301, Postfach, 8034 Zurich, Switzerland

13 189041

TREND TOWARDS INCREASED CATENARY VOLTAGE IN ELECTRIC TRACTION [Tendenzen zur Erhoehung der Fahrdrachtspannung bei der elektrischen Zugfoerderung]

No Abstract. [German]

Meyer, E *Bulletin SEV/VSE* Vol. 69 No. 18, Sept. 1978, pp 986-989, 1 Phot., 7 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Schweizerischer Elektrotechnischer Verein, Seefeldstrasse 301, Postfach, 8034 Zurich, Switzerland

13 189068

INVESTING IN ELECTRIFICATION

With 9,360 route-km electrified at the end of 1970, it appeared SNCF had reached the economic limit for this type of propulsion. The 1973 oil crisis brought a swift change and the pace of main line electrification is again increasing. By 2000 an additional 4,000 route-km will have been added, covering most main lines. When the program is complete, 82 percent of intercity passenger, 100 percent of commuters into Paris and 88 percent of freight will be electrically hauled, yielding valuable savings in oil imports. The method of assessing such projects, energy costs, network costs and network benefits are all discussed.

DuPuy, J (French National Railways) *Railway Gazette International* Vol. 135 No. 1, Jan. 1979, pp 47-50, 5 Phot.

ORDER FROM: ESL

DOTL JC

13 189738

HIGH SPEED CURRENT COLLECTION ON BRITISH RAILWAYS

Present a.c. contact lines for speeds up to 160 km/h are considered. The railroad line London-Glasgow is taken as an example for the necessary measures on contact line and pantograph in order to increase the maximum speed up to 200 km/h on this electrified line. Trends in design of contact line and pantograph for speeds above 200 km/h are discussed.

Smith, WR (British Railways) *Elektrische Bahnen* Vol. 49 No. 6, June 1978, pp 140-143, 1 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 189739

TWO-COMPUTER SYSTEM CONTROLS THE SUPPLY OF ELECTRIC POWER FOR THE URBAN RAPID TRANSIT SYSTEM IN COPENHAGEN, DENMARK [Doppelrechnersystem Steuert die Energieversorgung der S-Bahn Kopenhagen]

The use of a duplex computer system as an aid in the operation of the Danish railroad power supply is described. The article deals with the restoration of the remote action system and the central switching station, and gives a glimpse into the operation and design of the installation and into the project realization. [German]

Hansen, JT (Danske Statsbaner, Denmark); Brodowski, E *Elektrische Bahnen* Vol. 49 No. 6, June 1978, pp 144-149, 1 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 189777

CURRENT COLLECTION BY TRAINS VIA OVERHEAD CONTACT EQUIPMENT [Stroomafname door treinen via bovenleiding]

Past, present and future technological developments in current collection via overhead contact line. Design factors in pantograph construction, suspension variations in the contact wire and technological developments in high-speed current collection are discussed in succession. [Dutch]

Kaper, HP *Polytechnisch Tijdschrift E* Vol. 33 No. 10, Oct. 1978, pp 562-576, 2 Tab., 26 Phot., 31 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Stam Tijdschriften B.V., Postbus 375, Oranjestraat 8, The Hague, Netherlands

13 189778

EFFECT OF MINING OPERATIONS ON THE CONTACT LINE [Oddziaływanie eksploatacji gorniczej na kolejowe siec trakcyjna]

Description of the mechanism giving rise to earth movements and their effect on the maintenance of surface installations. The effect of mining operations on the behaviour of catenaries. Study of distortions in the contact line and poles during the formation of a basin due to soil subsidence. Mathematical formulae to be used for the calculations required. Methods are given for rectification of the contact line on the terrain in question. [Polish]

Piatek, B *Trakcja i Wagony* Vol. I-25 No. 9, Sept. 1978, pp 253-257, 3 Fig., 1 Phot., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Trakcja i Wagony, Warsaw, Poland

13 189783

SIMULATION OF OVERHEAD CONTACT WIRE AND PANTOGRAPH AS A SYSTEM

The interaction of catenaries and pantographs and the voltages to which they are subjected must be quantified in order to be able to take accident-prevention measures. A computerised simulation method has therefore been developed, following a programme of research. In addition, full-scale apparatus has been set up to test pantograph-supplied power, with a view to confirming the values obtained as a result of theoretical analysis and simulation. Various trials are now under way. The article gives a brief survey of computerised simulation and the installation of experimental power supply equipment.

Sakaguchi, T *Japanese Railway Engineering* Vol. 18 No. 1, 1978, pp 20-21, 4 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

13 189802

OHIO'S ROBOT RAILROAD

Article marks completion of the first decade of operation of the only American automated electric railroad. Details of the line, its pair of electric locomotives, the cars and the automation system are given, along with operation experience from the first ten years.

Corns, JB *Trains* Vol. 39 No. 5, Mar. 1979, pp 22-28, 24 Phot.

ORDER FROM: Kalmbach Publishing Company, 1027 North Seventh Street, Milwaukee, Wisconsin, 53233

DOTL JC

13 190334

CRITERIA OF CHOICE IN THE ELECTRIFICATION OF SECTIONS OF THE GERMAN FEDERAL RAILWAY

The writer begins by describing the development and present situation of electrification on the DB. He then gives the criteria for deciding on electrification, discusses profitability investigations, analyses cost structures and the effects of electrification of lines on the national economy. He finally discusses the investments required for electrification and the procurement of the indispensable funds.

Binnewies, H *Rail International* Vol. 9 No. 2, Feb. 1979, pp 193-210, 1 Tab., 13 Phot., 5 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

13 190368

NATIONAL-ECONOMIC EFFECTIVENESS OF RAILROAD ELECTRIFICATION AND THE USE OF DIESEL TRACTION

[Narodnokhozyaistvennaya effektivnost' elektrifikatsii zheleznikh dorog i primeneniya teplovoznoi tyagi]

This book examines the national economic benefits to be derived from railroad electrification and diesel traction. It presents a method for calculating the foreseeable benefits arising from use of modern economic and mathematical tools. It features a comprehensive national economic approach to the electrification of railroads and the allocation of diesel traction in conjunction with other projects in railroad development, technical progress in all modes of transportation, and the introduction of innovations in science and technology. The book is intended for planning, economic, and engineering-technical personnel working the field of railroad transportation. [Russian]

Abstract only translated in English. Book available for reference purposes at the Office of R&D, FRA. Contact Technology Planning Officer.

Dmitriev, VA
Transport Publishing House 1976, 262 p., 66 Tab., 61 Ref.

ACKNOWLEDGMENT: FRA
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

13 191355

EXISTING CATENARY CONDITION AND RECOMMENDATIONS FOR IMPROVEMENT: WASHINGTON, DC. TO NEW ROCHELLE, NY

Under the Northeast Corridor Improvement Project, the spine railroad system from Washington, DC, to New Rochelle, NY, will be converted from 11 kV, 25 HZ operation to 25 kV, 60 Hz operation. The general condition of the catenary and related elements are surveyed, and recommendations for rehabilitation are made for this section of the Corridor, including all subsidiary lines and yards that will be affected by the conversion.

Prepared by Electrack, Inc., Hyattsville, MD.

De Leuw, Cather-Parsons and Associates, Electrack, Incorporated,
Federal Railroad Administration Final Rpt. F204-44A-B, FRA/
NECPO-79/5, Dec. 1978, 361 p.

Contract DOT-FR-76048

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291527/OST, DOTL NTIS

13 191730

PROCEEDINGS: SEMINAR ON THE USE OF COMPOSITE THIRD RAIL IN ELECTRIFIED TRANSIT AND COMMUTER RAIL SYSTEM

The seminar was organized at the request of UMTA to disseminate accurate information on, and experience with, composite (aluminum and steel) third, or contact rail, in wayside power distribution systems of electrified urban rail properties. The seminar provided the opportunity for the exchange of pertinent information among the suppliers, using properties, consultants and designers, potential users, and government agencies. This document contains the transcripts of the presentations made to the seminar participants, as well

as the question-and-answer sessions which followed each presentation and the round table discussion of Thursday, September 15, 1977. Information pertinent to the seminar, but not available in detail at the time of the conference, is presented in a series of four appendixes, namely: A--Third Rail-Deicing; B--Welding Composite Rail on BART; C--Maintenance of Rails on BART; and D--Relative Costs of Composite and Steel Third Rail Installations. This document also provides a list of all participants and their addresses as of September 14, 1977, as well as a list of Electrified Transit Properties.

Decker, HD
Pacific Consultants, Transportation Systems Center, Urban Mass
Transportation Administration Proceeding UMTA-MA-06-0025-7813,
Nov. 1978, 217 p.

Contract DOT-TSC-1289

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-293317/4ST

13 194505

CENTRIFUGALISED CONCRETE MASTS USED AS CATENARY SUPPORTS ON DB ELECTRIFIED LINES [Schleuderbeton-Maste als Stuetzpunkte der Fahrleitung auf elektrifizierten Strecken der Deutschen Bundesbahn]

The DB recently reverted to the use of centrifugalised concrete masts as catenary supports. The author describes how these masts are built, how they have been designed and compares the advantages of such masts over metal masts. [German]

Goepfert, E *Eisenbahningenieur* Vol. 29 No. 12, Dec. 1978, pp 555-559, 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

13 194510

ASPECTS TO BE CONSIDERED WHEN RIGGING OVERHEAD CONTACT LINES [Aspectos a considerar en el montaje de lineas de traccion electricas]

When doing fitting or repair operations, it is often necessary to connect two lengths of contact wire. The article describes various types of connection used by different Railways classifying them into two groups: wedge-shaped or tapered parts, bolted or riveted parts. For speeds of over 200 km/h, he suggests a cold welding process whereby the dynamically hard points on the contact line can be eliminated. [Spanish]

Perez Morales, G *AIT-Revista* No. 25, Dec. 1978, pp 6-10, 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

13 194635

RAILROAD ELECTRIFICATION SYSTEM DESIGN

Railroad electrification is one of our alternatives to a diesel-electric operation. The selection of the voltage has a large economic impact on capital investment, especially affecting the catenary system design and the electric supply system. Modern designs and new components such as synthetic insulators are today available to keep the initial capital cost and future operating cost of an electrified railroad as economical as possible.

Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference, held April 12-14, 1979, Colorado Springs, Colorado.

Siemens, WH (Kaiser Engineers)
Institute of Electrical and Electronics Engineers Tech Paper IEEE 79CH1454-8 IA, 1979, pp 54-59, 9 Fig., 3 Tab., 5 Ref.

ACKNOWLEDGMENT: IEEE
ORDER FROM: IEEE

DOTL RP

13 194654

AUTOMATIC INSULATOR-WASHING SYSTEM TO PREVENT FLASHOVER DUE TO POLLUTION

Atmospheric pollution can be a serious problem for the insulators of outdoor e.h.v. substations, especially when situated near the coast, as it can lead to flashovers due to wet salt deposited as a result of storms. A method of

maintaining such insulators in a condition to provide the required degree of security is the provision of automatic spray washing. Special attention to the design of insulator-washing installations is necessary to avoid creating the conditions for flashover when pollution deposits are wetted during washing, and also to keep capital and revenue costs to a reasonable minimum, to avoid creating difficulties of access for maintenance and to avoid increasing the area of the substation. This paper describes the basis of the CEGB design of automatic fixed washing installation and gives details. These include the measurement of pollution deposit, the effect of pollution and different types of insulator. The relationships between washing time, spray configuration and pressure, wash grouping, water storage, water conductivity, control facilities etc, are described. Operational experience is examined, and of particular interest is a graphical presentation of weather conditions and the automatic responses of a washing installation over a period of several days of severe storms.

Cakebread, RJ Brown, HJ Dawkins, RB *Institution of Electrical Engineers, Proceedings* Vol. 125 No. 12, Dec. 1978, p 1363

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

13 194670

CONSTRUCTION AND POSSIBILITIES OF MOBILE SWITCHING STATIONS [Konstruktion und Bewaehrung fahrbarer Schaltstellen]

Description of a mobile unit that can be used temporarily as paralleling points or sectioning points for traction current distribution. This equipment has been fitted in an adapted passenger coach. The article describes the special characteristics and functions of the equipment in this coach. [German]

Weigert, E Schmitt, B *Elektrische Bahnen* Vol. 49 No. 11, Nov. 1978, pp 295-302, 8 Phot., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

13 194672

THE NEW SERIES 704 OVERHEAD LINE INSPECTION WAGONS OF THE GERMAN FEDERAL RAILWAY [Der neue Fahrleitungsuntersuchungswagen Baureihe 704 der Deutschen Bundesbahn]

No Abstract. 771ad [German]

Kottenhahn, V *Glaser's Annalen ZEV* Vol. 102 No. 11, Nov. 1978, pp 329-335, 1 Tab., 14 Phot., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

13 194873

STANDARDIZATION OF SUBSTATIONS, SWITCHING STATIONS, AND PARALLELING POINTS FOR ELECTRIC TRACTION OF THE WEST GERMAN RAILROAD SYSTEM [Normierung von Unterwerken, Schaltposten und Kuppelstellen fuer die Elektrische Zugfoerderung der Deutschen Bundesbahn]

Guidelines for the design and appropriate standardization of electric power supply facilities for electric railroads are considered from the viewpoint of both present as well as future demands. The basic circuits of 110-kv-and 15-kv installations are normalized so that the number of units to be added can be substantially reduced. The basic design and total arrangement of a substation plant are extensively normalized and the characteristics of the main components standardized. Auxiliary attachments, control assemblies and protective gear equipment are included in this concept of normalization. [German]

Scheiber, EG *Elektrische Bahnen* Vol. 49 No. 8, Aug. 1978, pp 210-216

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 194874

NEW RAILROAD-SERVICE SELF-PROPELLED CAR OF THE WEST GERMAN RAILROAD SYSTEM FOR THE MAINTENANCE OF THE CONTACT LINE [Neuer Bahndiensttriebwagen der Deutschen Bundesbahn fuer die Fahrleitungsunterhaltung]

A new tower railcar with a high performance has been developed for the maintenance of overhead contact systems on the most important main lines and new railroad lines. Increased operating performance and a better utilization of the pauses between two blockings of tracks can be expected. The specific equipment of the tower railcar has been improved and adjusted to modern working methods. Five prototypes were assigned to West German catenary maintenance offices with the purpose of detailed trial runs. [German]

Huber, M (Messerschmitt-Boelkow-Blohm GmbH); Kottenhahn, V *Elektrische Bahnen* Vol. 49 No. 8, Aug. 1978, pp 203-209, 5 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 194876

MODERN PROTECTIVE TECHNIQUES FOR THE WEST GERMAN RAILROAD SYSTEM [Moderne Schutztechnik bei der Deutschen Bundesbahn]

The increase of the performance of electric tractive units within the last two decades has also resulted in a constant increase of the requirements on the overhead contact line protection system. The protection components resulting from this are described. The transition from the classic to the electronic protection system is outlined. The author presents arguments, from the technical and financial point of view, for this decision, which includes also advantages associated with working and medical conditions. [German]

Seiffert, K *Elektrische Bahnen* Vol. 49 No. 8, Aug. 1978, pp 192-197, 5 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 195058

ELECTRIC TRACTION ENTERS ITS SECOND CENTURY

In examining the future trends of electrification, the author discusses higher catenary voltages (ac and dc); capabilities of electronic power conditioning; thyristors; three-phase traction motors; increased adhesion; and signaling requirements.

Railway Gazette International Vol. 135 No. 4, Apr. 1979, pp 295-300, 3 Fig., 5 Phot.

ORDER FROM: ESL

DOTL JC

13 195086

TUNNEL CATENARY OF THE URBAN RAPID TRANSIT SYSTEM RHINE-MAIN (RIVERS) IN WEST GERMANY [Die Tunnelfahrleitung der S-Bahn Rhein-Main]

The catenary installations of the Rhine-Main rapid transit system have essentially been designed according to the parameters of the counterpart in Munich (West Germany). Because of different systems of tunnel construction and special structural conditions, extensive special structural measures were necessary. Therefore the supports and anchors of the catenary, switching equipment and feeding installations had to be installed by appropriate arrangements in the clear spaces between the structural elements and the normal structure gage. In general, only limited use could be made of the clear space. This required appropriate intensive and extensive job planning. The application of special working techniques during the installation of the catenary was the precondition for a rational, trouble-free realization of all catenary work. [German]

Noeding, M (AEG-Telefunken, West Germany); Zienert, S *Elektrische Bahnen* Vol. 49 No. 9, Sept. 1978, pp 239-244, 1 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 195089

THE MAINTENANCE OF ELECTRIC TRACTION OVERHEAD LINE EQUIPMENT

Since overhead line failure usually has very considerable effects on train time-keeping, the concepts of reliability and availability are of extreme importance and justify the efforts which the S.N.C.F. has been making for 30 years to define an overhead line equipment maintenance policy and to adapt its organisation to the constantly developing operating conditions. But the diversity of its components, the increasingly aggressive nature of the atmosphere (in particular pollution), the external factors (varying temperature, wind, lightning, icing) and the action of the pantographs (uplift, oscillation, contact wire wear) make it especially vulnerable to the fatigue of certain components and a degree of ageing if prompt corrective measures are not taken.

Boissonnade, P *French Railway Techniques* Vol. 21 No. 4, 1978, pp 238-247

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

13 195103

ANALYSIS OF CIRCUITS FOR DIRECT CAPACITIVE COMPENSATION ON ALTERNATING-CURRENT ELECTRICAL RAILROADS

Results are expounded of calculation of the efficiency of various circuits for direct capacitive compensation in an electrical railroad network (a three-phase configuration with the compensation in the draining conductor, in the legs of the substation) from the point of view of the voltage mode and the quality of the electrical energy delivered to converter electric locomotives. Recommendations are made concerning the fields of application of these circuits.

Mamoshin, RR Zabelova, LF Bushmin, AI *Power Engineering (USSR Translation)* Vol. 16 No. 1, 1978, pp 16-23

ACKNOWLEDGMENT: EI
ORDER FROM: Allerton Press, Incorporated, 150 Fifth Avenue, New York, New York, 10011

13 195108

PARALLEL POSITIONING OF OVERHEAD LINES ON DOUBLE TRACKS

No Abstract.

Frontczak, F *Trakcja i Wagony* -Vol. I-25 No. 11-12, Nov. 1978, pp 334-342, 10 Fig., 2 Tab., 5 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Trakcja i Wagony, Warsaw, Poland

13 195124

EFFECTIVENESS OF GRAPHITE LUBRICANTS FOR CATENARIES [Effektivnee primenjat' grafitovuju smazku]

No Abstract. [Russian]

Bel'Dej, VV *Elektricheskaya i Teplovoznaiya Tiaga* Vol. 2 No. 266, Feb. 1979, pp 31-32

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

13 195131

TESTING VEHICLES FOR ELECTRICAL AND SIGNALLING INSTALLATIONS [Les voitures de controle des installations electriques et de signalisation]

These vehicles can be used for inspecting overhead lines and checking that the fixed signal receiver contacts are working properly. The article describes the equipment and how the measuring circuits function. [French]

Ponchon, B *SNCF-Informations Techn-Direction de l'Equipement* No. 18, Dec. 1978, pp 15-26, 24 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Societe Nationale des Chemins de Fer Francais, 92 rue Bonaparte, 75 Paris 6e, France

13 195687

MEASUREMENT OF WEAR ON TROLLEY WIRES

High density service with electric multiple unit cars produces such contact wire wear on JNR that replacement as frequently as every 3 years is necessary in some places. A laser measuring system has been tested for 5 years; its success points to building a catenary inspection car for routine service.

Muto, R (Japanese National Railways) *Japanese Railway Engineering* Vol. 18 No. 4, 1979, pp 17-18, 2 Fig.

ORDER FROM: ESL

DOTL JC

13 195709

MEASUREMENT OF RAIL BOND IMPEDANCE

Many underground mines use electric rail haulage incorporating the track as the return conductor. This approach makes it essential that the rail joints have as little resistance as possible in order to properly carry the return current. Resistance is significantly reduced by bonding the joints, and is required by Federal law. Bonds can become broken or dislodged for many reasons, however. These open bonds can cause significant voltage drop in the rail at the unbonded joint. This drop can result in power loss, and can sometimes seriously affect the operation of ground-check monitors and ground-fault relays. Because most bonds are buried beneath several inches of coal, gravel, rock dust or mud, it becomes very costly for the mine operator to have these bonds checked frequently. West Virginia University has undertaken the task of developing instrumentation which will quickly and accurately assess the impedance of each bond. This paper contains an analysis of the severity of the problem, a description of the instrumentation developed to measure bond electrical characteristics, and the results of some preliminary measurements made underground.

Proceedings of the West Virginia University (WVU) Conference on Coal Mine Electrotechnology, 4th, Morgantown, West Virginia, August 2-4, 1978; Paper 6.

DeLong, CP (West Virginia University); Cooley, WL
Institute of Electrical and Electronics Engineers Conf Paper IEEE n78CH1386-2 IA, 1978, 8 p.

ACKNOWLEDGMENT: EI
ORDER FROM: IEEE

13 195711

STOCHASTIC DESIGN OF ELECTRICAL OPERATING EQUIPMENT FOR ELECTRIC RAILROADS [Stochastische Dimensionierung Elektrotechnischer Betriebsmittel Elektrischer Bahnen]

A railway load model is presented taking into account the superposition of the annual variation, daily variation and a normal random distribution. The model has been derived by computer simulation. Thermal design can be carried out via stochastic thermal modelling. [German]

Hofmann, G (Hochschule fuer Verkehrswesen Friedrich List); Schmidt, P *Elektrie* Vol. 32 No. 10, 1978, pp 545-556, 15 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

13 195718

CENTRALIZED CONTROL FOR RUHR-MITTE MINE RAILROAD AND PORT INSTALLATIONS [Zentrale Betriebsueberwachung fuer die Zechenbahn-und Hafenebetriebe Ruhr-Mitte]

The author describes the data processing equipment that is used for a more economical operation of Ruhr-Mitte mine railroad and port installations. A process computer is provided for tracking the train movements, controlling the contact line system and for traction current monitoring. [German]

Schwerdtfeger, H Sperl, H *Glaser's Annalen ZEV* Vol. 102 No. 12, Dec. 1978, pp 351-358

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 196365

NEW TRACTION LINES OF THE WEST GERMAN RAILROAD SYSTEM [Neue Bahnstromleitungen der Deutschen Bundesbahn]

In order to supply electric power to the new section between Mannheim and Stuttgart of the West German railroads, it is necessary to construct new 110-kv power supply facilities. Steps taken to implement such constructions are described. [German]

Elektrische Bahnen Vol. 49 No. 12, Dec. 1978, pp 327-328

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 196371

COMPENSATION INSTALLATIONS IN THE 15-KV, 16 2/3-HZ OVERHEAD CONTACT NETWORK OF THE WEST GERMAN RAILROAD SYSTEM [Kompensationsanlagen im 15-kV-16 2/3-Hz-Fahrleitungsnetz der Deutschen Bundesbahn]

In spite of certain advantages, tractive units with phase-angle control have the disadvantage of a worse power factor than those of conventional design. Therefore the use of the phase-angle controlled electric multiple unit series 420 of the West German Railroad System during the Olympic Games 1972 in Munich required installations for improvement of the power factor. By means of tests and computations, it is shown that the use of stationary compensation installations is the technical and economical optimum solution within the network of the West German system. Design guidelines are indicated, and installations already implemented are described. [German]

Scheiber, EG *Elektrische Bahnen* Vol. 49 No. 12, Dec. 1978, pp 320-326, 6 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

13 196372

UTILIZATION POSSIBILITY OF ELECTRIC MOTOR VEHICLES AS A FUNCTION OF THEIR OPERATIONAL PERFORMANCES AND THE CAPACITY OF THE NETWORKS

[Ausnutzungsmoeglichkeit von Elektrischen Triebfahrzeugen in Funktion ihrer Betrieblichen Leistungen und der Leistungsfahigkeit des Netzes]

Various possibilities for optimal utilization of electric tractive units are demonstrated. The article deals with the influence exerted by the electrical and mechanical service as far as the volume of the tractive stock is concerned. The special significance of the principal objectives of sales and production is pointed out. In order to assess the rate of capacity to which the electric tractive units are utilized depending on their operational performances the distance covered, the transport performance, the periods during which a locomotive is out of service and the failures are taken into account. The annual transport performance of the West German Railroad System along with the requirements the motive power service has as to network capacity are demonstrated. The effect of the locomotives with three-phase asynchronous drive on the productivity of the electric traction is dealt with. [German]

Binnewies, H *Elektrische Bahnen* Vol. 49 No. 11, Nov. 1978, pp 278-285, 15 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 196382

INTERFERENCE IN THE RAILWAY NETWORK FROM S-BAHN AND UNDERGROUND RAILWAY VEHICLES WITH CHOPPERS AND THREE-PHASE CURRENT TRANSMISSION [Beeinflussungen im Bahnsystem durch Stadt-und U-Bahn-Fahrzeuge mit Gleichstromsteller und Drehstromantrieb]

Detailed study of the interference caused by modern traction systems in cities. The values of the alternating current measured on the catenary are given in order to demonstrate the influence of various parameters. The consequences of using three-phase current tractive units are discussed and the article closes by presenting a number of proposals aimed at limiting interfering currents. [German]

See also Volume 50 No. 2, pages 48-55; February 1979 issue.

Amler, J *Elektrische Bahnen* Vol. 50 No. 1, Jan. 1979, pp 15-17, 11 Phot., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

13 196386

INCREASING RELIABILITY IN THE 3.3 KW DISTRIBUTION EQUIPMENT OF TRACTION SUBSTATIONS

No Abstract. [Russian]

Veksler, MI *Elektrifikacija i Energeticeskoe Hozjajstvo* Vol. 6 No. 110, 1978, pp 14-26, 3 Fig., 2 Tab., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

13 196392

NEW ANTI-CORROSION TECHNIQUES [Novoe v zascite ot korrozii]

New directive from the Central Research Institute of the Ministry of Communications for protecting underground Railway tunnels from corrosion by leakage currents. [Russian]

Kotel'Nikov, AV Naumov, AV *Avtomatika, Telemekhanika i Svyaz* No. 3, Mar. 1979, pp 15-17, 1 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

13 196403

PROBLEMS OF POWERING 50 HZ AND 60 HZ RAILWAY LINES [Problematik der Stromversorgung von 50 Hz-und 60 Hz-Bahnstrecken]

The article discusses powering of 50 and 60 Hz line sub-stations from the national grid. Individual or grouped supply may be chosen, according to the distance between the connecting points. A compromise solution of 3 conductors with auto-transformers has been chosen, enabling the distance between sub-stations to be increased. Joint powering of transformers and the repercussions on the network of asymmetries, load variations and current harmonics are also discussed. [German]

Schaefer, H-H *Elektrische Bahnen* Vol. 50 No. 2, Feb. 1979, pp 41-46, 9 Phot., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

13 196462

ACTIVE AND REACTIVE LOAD CONTROL FOR CONVERTERS INTERCONNECTING 50 AND 16 2/3 HZ SYSTEMS, USING A STATIC FREQUENCY CHANGER CASCADE

The article describes a converter interconnecting two power systems operating at different frequencies and with different numbers of phases, the ratio of whose frequencies may also vary within certain limits. In general such converter stations are employed in countries where the railways employ a frequency of 16 2/3 Hz and obtain some or all of their power from the industrial 50 Hz system, as they do in Switzerland, The Federal Republic of Germany, the German Democratic Republic, Austria and Norway are discussed. The basic principles of system interconnection, with a 16 2/3 Hz synchronous generator, a 50 Hz slipping motor, a static frequency changer cascade and the electric control system are discussed. The mode of operation of the drive motor, the controlling frequency changer and the main components of the control system is outlined. Special attention is paid to the characteristics of the interconnection and to means of detecting faults in the electronic equipment.

Stemmler, H *Brown Boveri Review* Vol. 65 No. 9, Sept. 1978, pp 614-618

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 196519

BRITISH RAIL ELECTRIFICATION

This article gives extracts from a policy document submitted by British Rail to the Secretary of State for Transport as the basis for a major joint study of the case for railway electrification. Electric traction working costs are

markedly lower than diesel costs, the maintenance element being less by a ratio of 1:3. The practical background to this is that electric locomotives are simpler, lighter, cheaper, and longer lasting than equivalent diesel locomotives. Electrics have a higher availability for service, since they require no time out for refuelling and substantially less for maintenance. Electric traction is demonstrably more reliable than diesel. Present operating returns show that delays to trains resulting from technical defects occur only one third as often with electric traction. The present price ratio of oil to electricity is about 1.5 for equivalent amounts of energy for rail traction, and many observers expect this to rise to between 2 and 3 by the year 2000. On an energy basis, it is stated that primary energy input for diesel traction is 25% to 30% higher than for electric traction. It is claimed that in the United Kingdom at present the railway uses some 800,000 tonnes of oil for traction in a year. Through large-scale electrification, this consumption might be reduced to 100,000 tonnes.

Energy Digest Vol. 7 No. 5, Oct. 1978, pp 18-20

ACKNOWLEDGMENT: EI
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13 196936

LARGEST ROTATING CONVERTERS FOR INTERCONNECTING THE RAILWAY POWER SUPPLY WITH THE PUBLIC ELECTRICITY SYSTEM, IN KERZERS AND SEEBACH, SWITZERLAND

Rotating frequency converter sets for interconnecting the railway power supply and the national electricity system, while allowing some flexibility in the frequency relationship, are today indispensable connecting elements in countries where the railways are supplied at a frequency of 16 2/3 Hz. In order to meet the rising demands of the railway power supply, resulting primarily from the introduction of high-power traction units, the link with the powerful national 50 Hz system has had to be strengthened. In 1974/75 two interconnecting converters rated 33 multiplied by (times) 75 Mw each came into service in the Kerzers converter station of the Swiss Federal Railways. Two more sets rated 60 Mw each are now being constructed for the SBB's converter station in Seebach (Zurich). The development of flexible system interconnecting converters are described, with reference to these latest sets, which are the world's largest.

Bruggisser, WL *Brown Boveri Review* Vol. 65 No. 11, Nov. 1978, pp 707-715

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 196937

SUBSTATIONS FOR THE POWER SUPPLY TO THE SAO PAULO METRO

Continuity of power supply is very important for an underground railway particularly during the frequent very short peak periods. For this reason, when designing substations it is essential to carry out detailed investigations concerning power requirements, trend of power requirements and the peak loads likely to occur. Planning of the power supply system and the overall protection concept has to be guided by the operational load peaks. A problem which plays only a subordinate role in surface transport is the temperature rise of the air in the tunnel, resulting from energy losses and braking energy of the traction vehicles. Thus, the question of current recovery during braking cannot be solved solely from the viewpoint of economy with the cost of energy as parameter. Here it is also necessary to settle the questions of pollution control in the tunnel and the cost of ventilating the tunnel. The power consumption and the possible peak loads were calculated on the basis of the Sao Paulo Metro's envisaged timetable. This study showed that it must be possible to feed the energy back into the ac system if economical operation is to be guaranteed. The following substations are envisaged for distribution and transformation of the energy required: 3 transformer substations 88/22 kv; 10 rectifier substations for 22 kv, 850 v dc (two of which are equipped with static braking inverters); and 20 systems supplying power to the passenger stations, 22/0.48 kv.

Spatny, W *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 840-847

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 196946

DEVELOPMENTS IN THE SUPERVISORY CONTROL OF TRACTION POWER SUPPLY SYSTEMS ON BRITISH RAILWAYS

The two main systems of electrification in use on British Railways are the 25 kv, single phase, overhead line, ac system and the 660/750 v, third rail dc system. The function of, and the information required by, the electric control operator are discussed. Examples of two recent systems with indications of how these objectives have been attained are given. The operator/equipment interface is a vital part of any system and in both systems described considerable thought was applied during the system design stage to determine accurately the functional requirements. This stage was even more important in the development of a VDU based system, since a departure from existing practices was being made.

Int Conference on Centralized Control Systems, 2nd, London, England, March 20-23, 1978.

Holmes, PF (British Railways Board)

Institution of Electrical Engineers IEE Conf Publ n 161, 1978, pp 154-158

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England

DOTL JC

13 196947

CONTROL OF LONDON TRANSPORT'S POWER SUPPLY DISTRIBUTION NETWORK

London Transport are responsible for providing power supplies for 233

route miles of the associated railroad network, these supplies being derived from their own power stations. The generated high voltage is supplied, via distribution switch-houses, to 109 substations where the incoming high voltage supplies are converted to the necessary outputs to supply the system, i.e. 630 v dc traction supplies, 125 Hz signal supplies, compressed air, lighting and escalator supplies. The plant and control facilities are discussed.

Int Conference on Centralized Control Systems, 2nd, London, England, March 20-23, 1978.

Blake, JH Taylor, DS

Institution of Electrical Engineers IEE Conf Publ n 161, 1978, pp 40-44

ACKNOWLEDGMENT: EI

ORDER FROM: ESL, Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England

DOTL JC

13 196995

100 YEARS OF ELECTRIC TRACTION: SWISS REVIEW OF THE DEVELOPMENT OF ELECTRIC RAILWAYS [Hundert Jahre elektrische Eisenbahn: Rueckblick aus schweizerischer Sicht auf die Entwicklung der elektrischen Eisenbahn]

No Abstract. [German]

Ernst, A *Bulletin de l'Association Suisse des Electriciens* Vol. 70 No. 9, May 1979, pp 423-431, 2 Tab., 14 Phot., 9 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

15 185781

A TECHNOLOGY ASSESSMENT OF TRANSPORTATION SYSTEM INVESTMENTS

An abstract technology assessment format, capable of generic evaluation over a hierarchy of city sizes, shapes and modal transportation technology characteristics, using unit cost and impact data is presented. The formal analytic model used is Markovian decision theory. The analyst is not required to know or explore the historical data characteristics of the region in depth and can, therefore, rapidly examine sensitivities and boundaries of rational or optimal transportation investments. This examination may occur over a group of similar or different regions, and may draw significant conclusions about the mix of transportation technology investments most likely needed and capable of compatible operation.

Haefner, LE

Washington University, Seattle NASA-CR-152154-2, Mar. 1978, 206 p.

Grant NSG-2170

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

N78-28989/9ST

15 186156

IMPLICATIONS OF BART'S MOBILITY AND ACCESSIBILITY IMPACTS FOR THE TRANSPORTATION DISADVANTAGED

The report examines the mobility and accessibility impacts that the 71 mile Bay Area Rapid Transit System has had to date on the transportation disadvantaged. Three special population groups are the focus of analysis--ethnic minorities, the elderly and handicapped. These groups are of special concern for transportation planning and policy because of either low-income status or mobility related impairments. Findings are reported from the investigation of five issues related to BART's impacts for the transportation disadvantaged on increased accessibility to employment, social, medical, cultural and recreational opportunities. Rapid rail patronage levels by ethnic minorities, the elderly and handicapped travelers are examined. The impact on the handicapped of BART's barrier-free design is investigated. Evaluation of these findings is made in the context of the level, nature, and degree of equity in the incidence of BART's mobility impacts. Based on the findings of the study, implications for the transportation disadvantaged of a regional rapid rail transit investment are presented in terms of policy considerations for other areas in which similar systems may be considered. (Color illustrations reproduced in black and white)

Prepared by Urban Dynamics Associates, San Francisco, CA. Prepared in cooperation with Department of Housing and Urban Development, Washington, DC.

Donnelly, R Arguelles, J

Metropolitan Transportation Commission, Urban Dynamics Associates, Department of Housing and Urban Development, Department of Transportation Tech Memo DOT-BIP-TM-35-10-78, Apr. 1978, 93 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-286760/4ST, DOTL NTIS

15 189029

THE RAILWAY IN LARGE TOWNS

The author, a consultant at the RENFE, states that a city and its transport system must be viewed as an entity. He explains that railways must continue to run passenger services into city centres and organize freight services in surrounding industrial zones. The RENFE has drawn up a national network plan based on this principle in order to examine possible solutions for improving rail services while making rational use of space available.

Carbonell Romero, A *Rail International* Vol. 9 No. 10, Oct. 1978, pp 663-667, 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

15 190263

LAND USE AND TRANSPORT IN SYDNEY AND TORONTO

Land use patterns and journey to work characteristics are compared for the Sydney and Toronto metropolitan areas using information collected in 1971. Both regions had populations of 2,780,000 as well as very similar

socio-economic characteristics. Sydney is served by a comprehensive radially-focussed commuter rail network while Toronto is served by an underground rapid transit system in the central area and a comprehensive freeway network in the outer suburbs. Gross residential densities in Sydney are about one-half those in Toronto while employment densities tend to be higher in Sydney. Employment distributions in Toronto are influenced strongly by the freeway network while commercial employment locations in Sydney are influenced by the rail network. While the majority of travel in Sydney is by private automobile the dominant orientation of home-work travel is along radial corridors focussed on the CBD. In Toronto the spatial orientation is along the subway system in the inner areas while the freeway system is the dominant influence in the outer suburbs. Daily home-based work travel in Toronto exceeds that of Sydney by 5,000,000 km. The use of public transport for the journey to work is marginally higher in Sydney.

Hutchinson, BG (Waterloo University, Canada); Black, J (New South Wales University, Australia) *Australian Road Research* Vol. 8 No. 3, Sept. 1978, pp 28-37, 13 Fig., 4 Tab., 2 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-236758), Australian Road Research Board

ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

15 190485

STUDY OF BART'S CONSTRUCTION IMPACTS. LAND USE AND URBAN DEVELOPMENT PROJECT. BART IMPACT PROGRAM

The study examines the effects that BART's construction activities had upon retail sales and services and upon real property. Key informant interviews were supplemented by longitudinal data on taxable retail sales and on permits for construction in areas near BART. Many retail merchants near the sites of BART cut-and-cover construction claimed to have suffered losses in sales during the period. The Mission District (San Francisco) and the Ashby station area (Berkeley) show the most distinct signs of losses linked to BART construction. Property owners and builders were found not to have deferred or eliminated maintenance, rehabilitation or new construction near BART construction. (Color illustrations reproduced in black and white)

Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Gussman, V Schnetlage, T Falcke, CO

Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-48-5-78, Apr. 1978, 49 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-288653/9ST

15 190486

STUDY OF THE HOUSING INDUSTRY. BART IMPACT PROGRAM

The working paper addresses BART's effects on the housing industry in nine areas: Daly City-Pacific, Mission District, Fruitvale, Walnut Creek, Hayward, Fremont-Union City, Pittsburg-Antioch, Richmond, and East Oakland. Changes in housing supply and demand during the period 1962-76 are analyzed using building permit records, bank loan disclosure statements, BART Passenger Profile Survey data, and aerial photographs, supplemented by key informant interviews with residential developers, apartment managers, planning directors, and others knowledgeable about the housing market. The relationship between these findings and other topics yet to be addressed in the Land Use and Urban Development Project also is examined. (Color illustrations reproduced in black and white)

Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Dyett, MV Castel, GH

Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-37-5-77, Apr. 1978, 70 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288676/OST

15 190487

STUDY OF EMPLOYERS' LOCATIONAL DECISIONS

The working paper examines BART's influence on employers' location decisions in the three-county BART service area. Individuals who had participated in or who were familiar with their firm's location decisions were interviewed, and relevant interviews from other studies of the BART Impact Program were reviewed. Specific issues addressed include BART's direct and indirect effects on location decisions, BART's influence on centralization or decentralization of businesses and industries, and the extent to which firms have located near BART in order to gain visual exposure. (Color illustrations reproduced in black and white)

Prepared by Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Merchant, JP

Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development
DOT-BIP-WP-46-5-78, Mar. 1978, 42 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288677/8ST

15 190522

**THE DYNAMICS OF URBAN EVOLUTION. VOLUME I:
INTER-URBAN EVOLUTION**

The concept of "order by fluctuation," that has appeared recently in physico-chemical and biological systems, is applied to the description of urban growth. It is shown that fluctuations play a vital role in the evolutionary process of urban growth. The evolution of a complex system cannot be known simply by studying deterministic equations describing the system. It is necessary, in addition, to study the effects of fluctuations, or historical accident, which can drive the system to new modes of behavior. Taking account of both the deterministic elements of urban growth and the appearance of innovations at chance locations in an economic region, a transportation-sensitive dynamic model of the evolution of the organization of urban centers was developed.

See also Volume 2, PB-288958.

Allen, PM Deneubourg, JL Sanglier, M Boon, F dePalma, A
Brussels University, Belgium, Transportation Systems Center Final Rpt.
DOT-TSC-RSPA7820VO11, Oct. 1978, 85 p.

Contract DOT-TSC-1185

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288957/4ST

15 190582

**LAND USE AND URBAN DEVELOPMENT PROJECT STUDY OF
OFFICE CONSTRUCTION INDUSTRY**

The study addresses BART's effects on the three-county BART service area office construction industry. Building permit data for new and rehabilitated offices throughout the three-county BART area were compiled for the period from 1960 through early 1977. Eighteen-year trends in regional and local office patterns were analyzed and specific office construction industry hypotheses were investigated. The hypotheses addressed specific issues of BART effects on regional office patterns, local office location shifts to BART station areas, and the timing of BART-induced changes in office location patterns. Key informants were interviewed to supplement the building permit data analysis. Information from the interviews provided insight into office location decisions and aided the interpretation of the building permit data. (Portions of this document are not fully legible) (Color illustrations reproduced in black and white)

Prepared by Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Merchant, JP Schnetlage, T

Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of

Transportation, Department of Housing and Urban Development
DOT-BIP-WP-33-5-77, Aug. 1977, 65 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288678/6ST

15 190905

**THE IMPLICATIONS OF BART'S LAND USE AND URBAN
DEVELOPMENT IMPACTS FOR THE TRANSPORTATION
DISADVANTAGED**

The report examines the land use and urban development impacts that the 71 mile Bay Area Rapid Transit System has had to date on the transportation disadvantaged. Three special population groups are the focus of analysis-- ethnic minorities, the elderly and handicapped. These groups are of special concern for transportation planning and policy because of either low-income status or mobility related impairments. Findings are reported from the investigation of six issues related to BART's impacts for the transportation disadvantaged in terms of population distribution effects, residential location decisions, and station area neighborhood level impacts. Evaluation of these findings is made in the context of the level, nature, and degree of equity in the incidence of BART's economic impacts. Based on the findings of the study, the land use implications for the transportation disadvantaged of a regional rapid rail transit investment are presented in terms of policy considerations for other areas in which similar systems may be considered.

Prepared in cooperation with Urban Dynamics Associates, San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Donnelly, R Arguelles, J

Metropolitan Transportation Commission, Urban Dynamics Associates, Department of Transportation, Department of Housing and Urban Development
DOT-BIP-WP-56-10-78, Apr. 1978, 58 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289644/7ST

15 190906

STUDY OF DEVELOPMENT PATTERNS

The working paper examines BART's effects on Bay Area, corridor, and station area land use and development patterns. BART's effects on the supply and demand for housing, commercial, and institutional uses are evaluated, using a variety of analysis techniques. These include regional regression analysis of BART's influence on population, housing, and employment; statistical analyses of survey results; and key informant interviews. Particular emphasis is placed on effects on minorities. The paper also synthesizes earlier work elements of the BART Impact Program Land Use and Urban Development Project. Study conclusions are that BART has not affected regional development patterns, but has had effects on station area (mostly commercial and institutional) and corridor development patterns. These effects, however, have been less than the anticipated level of influence. The policy implications of these findings also are addressed. (Color illustrations reproduced in black and white)

Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Fajans, MH Dyett, MV Dornbusch, DM

Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development
DOT-BIP-WP-51-5-78, Sept. 1978, 120 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289704/9ST

15 190959

**THE DYNAMICS OF URBAN EVOLUTION. VOLUME II:
INTRA-URBAN EVOLUTION**

In this report the concept of "order by fluctuation," that has appeared recently in physico-chemical and biological systems, is applied to the

description of urban growth. It is shown that fluctuations play a vital role in the evolutionary process of urban growth. The evolution of a complex system cannot be known simply by studying the deterministic equations describing the system. It is necessary, in addition, to study the effects of fluctuations or historical accident which can drive the system to new modes of behavior. Taking account of both the deterministic elements of urban growth and the occurrence of fluctuations in population in an urban region, a transportation-sensitive, dynamic model of the evolution of the spatial distribution of urban populations was developed. This is the second of two volumes. Volume I presented a model of the evolution of the organization of urban centers.

See also Volume 1, PB-288957 in RRIS 15 190522; Bulletin 7902.

Allen, PM Deneubourg, JL Sanglier, M Boon, F dePalma, A
Brussels University, Belgium, Transportation Systems Center Final Rpt.
DOT-TSC-RSPA7820VOL2, Oct. 1978, 139 p.

Contract DOT-TSC-1185

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288958/2ST, DOTL NTIS

15 190968

**STUDY OF PROPERTY ACQUISITION AND OCCUPANCY.
BART'S EFFECT ON SPECULATION, LAND USE AND URBAN
DEVELOPMENT PROJECT. BART IMPACT PROGRAM**

The working paper addresses BART's effects on speculation in real estate in the three-county BART service area. Information from interviews with key informants was combined with quantitative analyses of data assumed to be indicative of speculation at eight study sites throughout the service area. The resultant station-specific syntheses were further synthesized to deduce observations applicable to more than one station area. The study addresses specific issues of the timing and the extent as well as the character of BART-induced speculation. (Color illustrations reproduced in black and white)

Revision of report dated Apr 78. Prepared by Blayney (John) Associates/-David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Transportation, Washington, DC., and Department of Housing and Urban Development, Washington, DC.

Falcke, CO Schnetlage, T
Metropolitan Transportation Commission, Blayney (John) Associates,
Dornbusch (David M) and Company, Incorporated, Department of
Transportation, Department of Housing and Urban Development
DOT-BIP-WP-45-5-78, Oct. 1978, 96 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-290147/8ST, DOTL NTIS

15 190970

RECOMMENDATIONS FOR LONG-TERM MONITORING

Options for monitoring the impacts of the Bay Area Rapid Transit (BART) system on land use and urban development are examined and evaluated in terms of the importance for policy making, the probability of impact and the measurement feasibility. Analysis techniques are discussed, and monitoring issues in each station area summarized. A recommended long-term monitoring program is presented, including a cost estimate for the first five years.

Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Dyett, MV
Metropolitan Transportation Commission, Blayney (John) Associates,
Dornbusch (David M) and Company, Incorporated, Department of
Transportation, Department of Housing and Urban Development
DOT-BIP-WP-54-5-78, July 1978, 50 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291016/4ST, DOTL NTIS

15 191029

**PROGRAM-WIDE CASE STUDIES, LAND USE AND URBAN
DEVELOPMENT PROJECT. BART IMPACT PROGRAM**

The paper consists of in-depth, policy-oriented case studies of BART's impacts on selected communities, synthesizing all case study work in the BART Impact Program. The variety of BART impacts are described for downtown San Francisco and downtown Oakland, representing urban core areas; the Mission District of San Francisco, the Rockridge neighborhood of north Oakland, and Richmond, representing urban residential areas; and Walnut Creek and Fremont, selected as typical suburban residential communities. BART impacts on the natural environment, public policy, institutions and lifestyles, transportation service and travel behavior, as well as land use and urban development are evaluated in terms of pre-BART and no-BART alternatives. Comparative statistics on population, employment, housing, land use and travel behavior are presented, and pre-and post-BART land use and zoning are mapped for each study area. Each case study concludes with an analysis of similarities and differences, and an assessment of the policy implications of the BART experience to date. (Color illustrations reproduced in black and white)

Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Fajans, MH Dyett, MV
Metropolitan Transportation Commission, Blayney (John) Associates,
Dornbusch (David M) and Company, Incorporated, Department of
Transportation, Department of Housing and Urban Development
DOT-BIP-WP-53-5-78, July 1978, 166 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291388/7ST, DOTL NTIS

15 191033

STUDY OF RETAIL SALES AND SERVICES

The study focuses on how BART is influencing the distribution and volume of retail sales in the BART service area. Shoppers in six retail areas were surveyed to ascertain how their shopping patterns had changed since BART service began. Retailers throughout the BART service area were interviewed to determine whether BART influenced their location decisions or retail sales. Sales tax data in seventeen retail areas were analyzed to search for sales trends associated with proximity to BART. (Color illustrations reproduced in black and white)

Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Merchant, JP Gussman, V Falcke, CO
Metropolitan Transportation Commission, Blayney (John) Associates,
Dornbusch (David M) and Company, Incorporated, Department of
Transportation, Department of Housing and Urban Development
DOT-BIP-WP-50-5-78, Apr. 1978, 84 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291443/0ST, DOTL NTIS

15 191362

**THE IMPACT OF BART ON LAND USE AND DEVELOPMENT
POLICY**

The working paper assesses the relationship between the construction and operation of BART and changes in local land use policy and resulting changes in actual land use and development. This study presents findings in four areas: (1) Local government involvement in BART station location and design decisions related to land use policy; (2) BART impacts on local government planning studies, rezonings and use of special development incentives or controls; (3) BART impacts on local government policy regarding BART-related joint development, particularly public improvements, redevelopment and marketing; (4) The impact of BART-related land use policy upon actual changes in land use and development.

Prepared by Booz, Allen and Hamilton, Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Report on BART Impact Program, Public Policy Project. Color illustrations reproduced in black and white.

Jonash, RS
Metropolitan Transportation Commission, Booz-Allen and Hamilton,
Incorporated, Department of Transportation, Department of Housing
and Urban Development DOT-BIP/WP-41-8-77, Sept. 1977, 92 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291957/9ST, DOTL NTIS

15 191659
STUDY OF BART'S EFFECTS ON PROPERTY PRICES AND RENTS

The paper addresses BART's effects on residential and commercial property prices and rents. Multiple regression analyses were carried out on eight study sites throughout the service area. The separate study site analyses were synthesized to derive observations applicable to more than one station area. At most sites, the data permitted separate analyses of pre-service (anticipatory) effects, immediate, and longer term (post-service) impacts. The study addresses specific issues of the timing of BART impacts as well as joint distribution effects. Information from key informants was used in specifying study areas, determining variables to be included in the models, and in corroborating analytical results.

Prepared by Blaney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Report on BART Impact Program, Land Use and Urban Development Project.

Falcke, CO
Metropolitan Transportation Commission, Blaney (John) Associates,
Dornbusch (David M) and Company, Incorporated, Department of
Transportation, Department of Housing and Urban Development
DOT-BIP-WP-52-5-78, July 1978, 142 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292401/7ST, DOTL NTIS

15 192051
BRIDGES TO THE FUTURE: FORCES IMPACTING URBAN ECONOMIES

The report briefly discusses forces which have been singled out by the author as being potentially important factors in the future of urban economies. Chapter headings include: Urbanization and Economic Change; Technology; Personal Consumption Patterns; Private Sector Institutional Changes; Government Policy; The Impacted Cities; and Implications for Public Policy.

Schwartz, GG
Academy for Contemporary Problems, Economic Development
Administration, (EDA-OER-99-7-13387) Final Rpt. EDA/OER-
79/051, May 1978, 40 p.

Grant EDA-OER-580-G-77-27

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-290756/6ST

15 192212
THE EFFECT OF THE WASHINGTON METRO ON URBAN PROPERTY VALUES

As with other forms of urban infrastructure, public mass transit systems can alter the spatial distribution of urban property values. The magnitude of this effect is likely to be highly parcel-specific, and changes in real estate values may occur both prior to and after a transit system's construction. The report describes a series of econometric models of real estate values estimated for parcels in Washington, DC., over the period of the Metro system's development. Separate models are estimated for single family dwellings, multi-family structures and retail stores. Access to the transit system and the implementation schedule of Metro are both found to be significant determinants of parcel transaction prices. Studies of five separate transit stations are described. For each case study, results and forecasts of property value changes under different conditions are given.

Lerman, SR Damm, D Lerner-Lamm, E Young, J
Massachusetts Institute of Technology, Transportation Systems Center,
(UMTA-MA-11-0004) Final Rpt. CTS-77-18, UMTA-MA-11-

0004-79-1, July 1978, 135 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-293730/8ST

15 193618
FUTURE DIRECTIONS FOR PUBLIC TRANSPORTATION: A BASIS FOR DECISION

This report is a long range planning study that was prepared to assist the Urban Mass Transportation Administration (UMTA) in its planning to meet the mobility needs of the American population in the coming decades. The authors have identified a number of important societal forces and considered reasonable scenarios based upon those forces, with particular attention to the implications for the mobility of people in the public sector. Based upon considerations of (1) population growth and dispersion, (2) energy costs and availability, (3) technological advances, and (4) economic conditions, the report concludes that urban decentralization is likely to continue through the year 2000. Therefore, UMTA must accept and support to a greater extent than presently innovative uses of the automobile and paratransit modes as the most efficient mode for most urban area trips. At the same time, existing conventional transit systems in dense areas must continue to be supported. But a major opportunity exists for UMTA to support a total efficient transportation system in a low-density environment. This report provides conclusions and recommendations for future UMTA policy decisions as well as a list of references. /UMTA/

Sponsored by the Urban Mass Transportation Administration.

Wiener, AJ Pignataro, LJ Bloch, AJ Crowell, WH McShane, WR
Polytechnic Institute of New York, (UMTA-NY-11-0017) Final Rpt.
UMTA-NY-11-0017-79-1, Dec. 1978, 87 p.

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB-292781

15 194862
MEASURES OF THE SPATIAL DISTRIBUTION OF U.S. POPULATIONS 1790-1970 AND THEIR CORRELATION WITH TRANSPORT, ENERGY CONSUMPTION, AND GNP

This study is one of a series examining the historical growth of transportation in the United States and its correlation with the national and urban economy, hoping to show some of the basic relationships quantitatively. The fundamental speculation presented here and supported by evidence from several diverse sources, is that population potential and its related variables are useful macro variables for characterizing the spatial order of populations, and that the spatial order can be related to the economic order of such a population at equivalent macro levels of analysis through the variables of physical transport systems.

Hassler, FL
Transportation Systems Center SS-200-U9-33, Nov. 1976, 24 p., Figs., 1 Tab.

ACKNOWLEDGMENT: TSC
ORDER FROM: TSC

DOTL RP

15 195139
TRANSPORT PLANNING AND REGIONAL PLANNING. CONFLICTS IN TWO MAJOR PROJECTS FOR MODERN LONG-DISTANCE RAILWAY TRANSPORT [Verkehrsplanung und Raumordnung-Konflikte bei zwei Grossprojekten des modernen Schienenfernverkehrs]

No Abstract. [German]

Also covered in Vol. 30 N2, February 1979 issue, pages 49-53.

Westphal, J *Eisenbahningenieur* Vol. 30 No. 1, Jan. 1979, pp 20-23, 2 Tab., 15 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

15 197283
THE IMPACT OF TRANSIT INVESTMENT ON HOUSING VALUES: A SIMULATION EXPERIMENT

This paper uses a joint-choice logit model of travel demand and residential location to simulate the impact of urban rapid-transit investment on housing

values within a radial corridor. The model developed is a clean break with the traditional urban economic theory. Instead the heterogeneous nature of travel and location decisions is recognized and the logit model, consistent with stochastic utility maximization, is employed. Simulation experiments reveal that the aggregate increase in property values caused by transit's impact on work trips is highly sensitive to the aggregate number of vacancies within the corridor. Under reasonable assumptions, transit investment tends to lower central-city property values, to increase central-city vacancies, and to raise suburban property values. It tends to help the poor move further away from the center and penetrate the inner suburbs. Depending on several influences, aggregate property values can increase or decrease and the change can often be statistically insignificant. Calculations show that an equitable taxation (and compensation) of property-value changes may raise a small to modest proportion of a transit system's construction cost. Several considerations suggest that even these modest estimates might be optimistic. These results help develop an improved perspective on "value-capture policy" which has not, up to now, benefited from quantitative analysis. Major extensions of the model are briefly considered.(a)

Anas, A. *Environment and Planning A* Vol. 11 No. 3, 1979, pp 239-255, 3 Fig., 4 Tab., 24 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-241042)

ORDER FROM: Pion Limited, 207 Brondesbury Park, London NW2 5JN, England

DOTL JC

15 197340

BART IMPACTS ON TRAVEL BY ETHNIC MINORITIES

BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impacts of BART on transportation and travel in the Bay Area. This report assesses BART's impacts on travel by ethnic minorities by analyzing data from (1) conventional large-scale travel surveys and (2) special "field station" data collection efforts conducted by participant observers in ethnic minority communities. The latter were conducted in the predominantly Spanish-heritage Mission District of San Francisco and the predominantly Black city of Richmond. Minorities use BART rather less than suggested by their representation in the total population of the area served. Most minority BART riders are young, well-educated and have relatively high incomes, and like the white majority ridership, travel largely to central city destinations. Low-income disadvantaged minorities use the system little.

Prepared by Jefferson Associates, Inc., San Francisco, CA. and Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Program. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Frye, HT Gelb, PM Minkus, D
Metropolitan Transportation Commission, Jefferson Associates,
Incorporated, Peat, Marwick, Mitchell and Company, Department of
Transportation, Department of Housing and Urban Development DOT/
BIP/WP-57-3-78, Nov. 1977, 77 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

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PB-294672/1ST, DOTL NTIS

15 197485

EXPLORATORY NETWORK ANALYSES OF BART'S IMPACTS UPON ACCESSIBILITY

BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, and other cities and communities, is the first regional-scale rapid transit system to open in the United States in over 50 years. Service began in 1972. This report is one of a series assessing the impact of BART on transportation and travel in Bay Area. Accessibility measures were based on estimates of zone-to-zone travel times and transit fares derived from computer network representations of the Bay Area transportation system. Comparisons are made for the 1971 pre-BART, 1976 with-BART, and 1976 hypothetical 'no-BART' transit networks and the 1976 highway network. Peak period travel times were compared for selected zones representing typical home-to-work trips, while off-peak comparisons were made for selected shopping destinations. Weighted travel times were also computed based on the estimated volume of trips between zones. As it was designed to, BART provides the most significant travel time improvements for long-distance, downtown-oriented trips by public transit, especially from out-lying areas that would have relatively poor transit service without BART. However, for most trips, door-to-door times by BART are still much longer than times for the same trips by automobile, even at periods of peak highway congestion.

See also report dated Jul 75, PB-244 088. Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Report on BART Impact Program, Public Policy Project. Color illustrations reproduced in black and white.

Fan, HSL Sherret, A

Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Department of Transportation, Department of Housing and Urban Development, (UMTA-CA-09-0025) DOT-BIP-WP-15-3-75, Oct. 1977, 151 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

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PB-295416/2ST, DOTL NTIS

16 185618

REDUCING THE SPECIFIC ENERGY DEMAND BY MEANS OF TRANSPORT SYSTEMS, TAKING THESE INTO ACCOUNT IN TRANSPORT AND AREA PLANNING AND THEIR INFLUENCE ON THE ENVIRONMENT

Using data on the average energy consumption values for selected transport systems, an attempt is made to determine which transportation systems should be considered in transport planning. Possibilities for reducing the energy demand for passenger services while maintaining customer convenience, earnings, and purposeful development of transportation systems are discussed.

U.S. Sales Only.

Baron, P
Kongress Rationelle Energienutzung in Ballungsgeb CONF-7609113-6,
1976, 12 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AED-Conf-76-407-010

16 185817

END USE ENERGY CONSUMPTION DATA BASE: SERIES 1 TABLES

This report presents a series of tables which categorize national energy consumption in 1974 by economic sector, by major industries within certain sectors, by end use, by fuel, and by geographic area. For the transportation sector, there is a breakout by mode of transportation. For the residential sector, there are breakouts by type of housing structure and by the income level of the residents.

Prepared in cooperation with Faucett (Jack) Associates, Inc., Chevy Chase, Md. Contract DOE-CO-03-50346-00 and Ultrasystems, Inc., McLean, Va. Contract DOE-CO-03-60410.

Energy and Environmental Analysis, Incorporated, Faucett (Jack) Associates, Ultrasystems, Incorporated, Department of Energy DO-
E/CRN-780106-00003, June 1978, 219 p.

Contract DOE-CO-03-60412-00

ACKNOWLEDGMENT: NTIS
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PB-281817/7ST

16 186430

POTENTIAL FOR TRANSIT AS AN ENERGY SAVING OPTION

This study was instigated in response to the growing national concern over the rapidly expanding rate of energy use in the face of possible fuel shortages. It is primarily concerned with the potential impacts and energy efficiencies of short-term policies designed to induce auto drivers to shift to public transit. The energy efficiencies of various urban passenger transportation modes are analyzed, including automobile, bus, rapid rail, commuter rail, and Dial-a-Ride transit. Policies to induce mode shifts to public transit are structured into alternative scenarios for evaluation. Possible urbanized area transportation energy savings as well as reductions in vehicle miles of travel are estimated first for individual representative cities and then expanded to a national level. Representative cost evaluations of policy actions are included as well. Finally, note is made of projected secondary or indirect impacts of policy design and implementation. Four scenarios were constructed for evaluation. Scenario I consists of modest transit enhancements. Scenario II major transit enhancements, Scenario III the same major transit enhancements combined with auto disincentives, and Scenario IV automobile disincentives alone. The analytical procedures used to estimate the travel mode shifts and energy savings that could be achieved with alternative strategies were applied in the context of actual urban conditions. As it was clearly impractical to prepare separate analyses for all urbanized areas, one representative city was chosen from each of four groupings. Collectively, these four groups covered all urbanized areas in the country. The groupings were made on the basis of transit utilization for journey-to-work purposes and the presence or lack of an extensive rail system. Four representative cities chosen for this study were Albuquerque, San Diego, Chicago, and Baltimore. (ERA citation 03-048237)

Federal Energy Administration, Department of Energy Mar. 1976, 107 p.

ACKNOWLEDGMENT: NTIS
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FEA/D-76/224

16 186471

ENERGY IN TRANSPORT. VOLUME 2. POLICIES. REPORT NO. 27

The study identifies and evaluates realistic and practical transport policy changes in New Zealand related to fuel saving. Covered briefly in a background chapter are: transport fuel users; fuel conservation in rail, sea, and air transport; social aspects of saving fuel; policy definition and summary of results; and cost-effectiveness of short-term conservation policies. Then the report addresses in detail road-transport policies that might save fuel since, in New Zealand, 89 percent of domestic fuel consumption is for road transport; 3 percent for rail, 3 percent for sea; and 5 percent for air transport. The road-transport policies are divided into five groups, with each successive group involving measures with greater restraints on personal mobility and lifestyle. Group I merely involves increased vehicle efficiency; Group II transfers to a different vehicle type or mode of travel; Group III increases vehicle loading; Group IV suppresses trip making, such as by substitution of personal travel with remote forms of communication; and Group V changes to urban and regional land use and transport structure to reduce transport volumes. (ERA citation 03:048189)

U.S. Sales Only.

Beca, Carter, Hollings and Ferner Limited Nov. 1977, 159 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NP-23226

16 189011

TRANSPORTATION AND ENERGY: SOME CURRENT MYTHS

Some widespread ideas about public transportation are criticized. It is disagreed that good public transportation can attract people out of cars; that public transit saves energy; that transit is more economical than cars; that the decline in the railroads is due to federal subsidies of the trucking industry; and that railroads can provide economical passenger service.

Energy Use Management, Proceedings of the International conference, held in Tucson, Arizona, October 24-28, 1977.

Lave, CA (California University, Irvine)
Pergamon Press Vol. 2 1977, pp 597-603, 11 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL, Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

16 189014

LUBRICANT DEVELOPMENTS ON BRITISH RAIL

Reviews work on lubricants with emphasis on dispersant and multigrade crankcase oil developments designed to produce savings in costs. Outlines improvements which have been effected in lubricants for specific purposes.

Haines, AF Morley, GR *Institution of Mechanical Engineers Proceedings*
Vol. 192 No. 32, 1978, pp 333-342, Tabs., 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

16 189040

ENERGY CONSERVATION AND INTERCITY FREIGHT TRANSPORT

In this paper, the characteristics of intercity freight modal operations are investigated to evaluate the potential for achieving energy savings. It is determined that the greatest opportunities for conserving energy appear to rest with achieving modal shifts and operational improvements in truck and rail transport.

Bevilacqua, OM *Transportation Planning and Technology* Vol. 4 No. 4,
1978, pp 227-240, 4 Tab., 30 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

16 189049

ENERGY CONSUMPTION OF THE DIFFERENT MODES OF TRANSPORT: A SYSTEMATIC STUDY [Spezifischer Energieverbrauch der Verkehrsträger: eine systematische Betrachtung]

There are a large number of methods in existence for the study of energy consumption and much of the data obtained is contradictory. The author describes a method of classifying these studies into three categories according to the degree of detail obtained from each analysis. [German]

Bauermeister, K *Elektrische Bahnen* Vol. 48 No. 9, Sept. 1978, pp 220-224, 2 Tab., 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

16 189768

MAJOR ELECTRICITY SAVINGS FROM REDUCING TRAIN SPEEDS [Bol'saja ekonomija pri men'sej skorosti]
No Abstract. [Russian]

Judov, AZ *Elektricheskaya i Teplovoznaya Tiaga* No. 10, Oct. 1978, pp 17-18, 2 Fig., 2 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

16 189774

COMPARISON OF SPECIFIC ENERGY CONSUMPTION FIGURES IN TRANSPORT [Vergleich der spezifischen energieverbrauche im Verkehr]

Comparisons between specific energy consumption figures for competing transport modes often given rise to unrealistic expectations where energy-saving is concerned. Specific energy consumption comprises the component parts of what is known as indirect consumption in addition to traction energy. Giving two examples, the author demonstrates the need for continuing studies based on objectivity and the interpretation of energy consumption comparisons. [German]

Wurm, A *Internationales Verkehrswesen* Vol. 30 No. 4, July 1978, pp 244-248, 3 Tab., 13 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

16 189811

ENERGY EVALUATION OF URBAN MODES AND SYSTEMS: IT ALL DEPENDS ON HOW YOU MEASURE IT

Pitfalls encountered in energy analysis are identified in this introductory overview to a conference session on Urban Transport Modes and Systems. Examples are presented both for the comparison of modes or systems, and for divergent results from different analyses. Some working definitions of urban modes and systems are suggested, along with several different criteria of comparison with caveats for what is or is not included. Requirements for the energy assessment of an urban area's transportation system--present--are summarized.

Energy Use Management, Proceedings of the International Conference, Tucson, Arizona, October 24-28, 1977.

Fels, MF (Princeton University)
Pergamon Press Proceeding 1977, pp 625-632, 17 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

16 190303

INFLUENCE OF SYSTEMS OF OPERATIONS ON RAPID RAIL ENERGY UTILIZATION

The objective of this paper is to collectively quantify and assess the potential of new rapid rail hardware and operational techniques to reduce rail energy utilization. With regard to the desire to apply these concepts to urban rail as a generic mode, it is recognized that in certain cases the impact of the application will be site dependent. However, the approach taken is one of bounding the overall energy improvements in order to assess exactly what can be expected in terms of future rapid rail energy utilization. Further, this assessment has been constrained to consider only operating energy plus those systems and operational techniques which have been proven as feasible candidates for reducing energy utilization.

Tucker, HL (Department of Transportation) *High Speed Ground Transportation Journal* Vol. 12 No. 3, 1978, pp 29-43, 11 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

16 190353

RELATION BETWEEN FOAMING AND SURFACE PROPERTIES OF DETERGENT-CONTAINING LUBRICATING OIL

The effect of water concentration on the foaming tendency of lubricating oil containing the detergent additives calcium phenate and amide was investigated from a surface chemical standpoint. Foam volume, dynamic surface tension and surface viscosity were measured at various water concentrations. It was proved that the increase of surface viscosity with water content was the main factor affecting foaming in the case of calcium phenate but, in contrast, the Marangoni effect played an essential role in the case of amide.

Tamai, Y (Tohoku University, Japan); Koyama, S Takano, N *American Society of Lubricating Eng-Transactions* Vol. 21 No. 4, Oct. 1978, pp 351-355, 5 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

16 190354

LUBE AND FUEL OIL FILTRATION ON LOCOMOTIVES

It costs 136 pounds Sterling a year to maintain adequate filtration of lubricating oil on one of British Railway's major classes of locomotives and filtration generally accounts for a large part of railway maintenance costs. Topics covered include lubricating oil quality, effect of dirt, the lubricating system, filters and media, oil consumption and filter life, dirt-holding capacities and element failure. Fuel oil filtration is also considered.

Jackson, EA (Railway Technical Center, England) *Filtration and Separation* Vol. 15 No. 6, Nov. 1978, p 578

ACKNOWLEDGMENT: EI
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16 191164

HYDROGEN ENERGY ASSESSMENT

The purpose of this assessment is to define the near term and long term prospects for the use of hydrogen as an energy delivery medium. Possible applications of hydrogen are defined along with the associated technologies required for implementation. A major focus in the near term is on industrial uses of hydrogen for special applications. The major source of hydrogen in the near term is expected to be from coal, with hydrogen from electric sources supplying a smaller fraction. A number of potential applications for hydrogen in the long term are identified, and the level of demand is estimated. The results of a cost benefit study for R and D work on coal gasification to hydrogen and electrolytic production of hydrogen are presented in order to aid in defining approximate levels of R and D funding. A considerable amount of data is presented on the cost of producing hydrogen from various energy resources. A key conclusion of the study is that in time hydrogen is likely to play a role in the energy system; however, hydrogen is not yet competitive for most applications when compared to the cost of energy from petroleum and natural gas. (ERA citation 04:002672)

Salzano, FJ Braun, C
Brookhaven National Laboratory, Department of Energy Sept. 1977, 101 p.

Contract EY-76-C-02-0016

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

BNL-50807

16 191921

ENERGY IN TRANSPORT. VOLUME I. DATA. REPORT NO. 27

Detailed information is presented on energy use in New Zealand transport together with international comparisons and historical trends. The term transport energy as used here refers to direct energy use, that is the energy supplied for vehicle propulsion, being the energy content of the fuel or electricity consumed. The data tabulations are for the whole transport system, broken down into various subdivisions. Such "system-wide" data, unless they are disaggregated to a very fine level, do not generally show up the attributes of particular transport vehicles, and for this reason have been criticized overseas. To avoid this error of omission data are also presented on particular transport vehicles apart from the main data sets. Wherever possible, to eliminate cumulative errors, global data have been used as control totals and a process adopted of successive breakdown into subdivisions of the transport system. Only in a few cases, where New Zealand data are lacking and could not be inferred, have overseas data been

introduced and then only when these were judged to be reasonably applicable to the New Zealand situation.

U.S. Sales Only.

Beca, Carter, Hollings and Ferner Limited, New Zealand Energy Research & Development Comm Nov. 1977, 58 p.

ACKNOWLEDGMENT: NTIS
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NP-23411

16 192123

DEMAND FOR ELECTRICITY BY THE TRANSPORTATION SECTOR OF THE NEW YORK REGION: ANALYSIS AND PROJECTIONS TO 1985

The possible impact of areawide residential location policy on future residential electricity usage in the Tri-State Metropolitan Region centering on New York City is investigated. This report describes electricity consumption by the transportation sector of the New York Region in terms of level, trends and geographical distribution, and compares this information with national trends. A projection methodology is developed whose basic assumption is that the percent of workers using an electric mode in the journey to work will increase if real fuel prices increase. The projections of region-wide electricity consumption by the transportation sector in 1985 are shown for the three cases (high, middle, and low) and also by core, inner ring, and outer ring counties.

Drennan, M

New York Regional Energy Study, National Science Foundation WP/C-8, NSF/RA/N-75/141, Feb. 1975, 42 p.

ACKNOWLEDGMENT: NTIS
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PB-292187/2ST

16 193758

ENERGY EFFICIENCY IN THE TRANSPORTATION SECTOR

The distribution of energy use in the transport sector in the United States of America is presented and analyzed in terms of the efficient use of energy in various applications. Comparisons are drawn with other modelling efforts. Statistical results of this study based on over-all traffic patterns suggest that in terms of energy, railroads are most efficient for freight traffic, whereas buses are most efficient for passenger traffic. Accordingly, from a strict energy efficiency point of view, the national transportation policy should encourage rechanneling freight traffic from truck and airplane to rail. Strictly speaking one should say that the freight traffic should be rechannelled to rail and water transport. According to the Department of Transportation water transport uses 462 Btu of energy per ton mile of traffic. As regards passenger traffic, public policy should encourage rechanneling passenger traffic from automobiles and airplanes to buses. This is especially important, since 88 percent of the energy in this sector is consumed by automobiles and trucks. However, for policy purposes, one must also consider the service characteristics of each mode, such as speed, door-to-door service and frequency of service of various modes of transportation.

Koshal, RK (Ohio University, Athens); Kool, KL *International Journal of Energy Research* Vol. 2 No. 4, Oct. 1978, pp 337-341, 10 Ref.

ACKNOWLEDGMENT: EI
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16 194123

TRANSPORTATION ENERGY SCENARIO ANALYSIS TECHNICAL REPORT-NO. 1: EXAMINATION OF FOUR EXISTING SCENARIOS

This project aims to provide the DOE Division of Transportation Energy Conservation (TEC) with a long-range forecasting framework in which to evaluate potential changes to the U.S. Transportation system. This initial report examines four existing, but diverse, 50-year scenarios of the future. It describes the scenarios and summarizes the changes in the major transportation system variables that would occur through the year 2025 in each scenario. Projections of variables of interest to TEC are explored, including passenger or ton miles and energy consumption. Each is reported for 1985, 1995, 2010, and 2025 under four scenarios: success, moderate economic growth, energy crisis, and transformation. The philosophy of this project is that the transportation system must support future lifestyles; by examining potential future lifestyles the required transportation system

changes can be deduced. The project: (a) develops a set of scenarios that span likely futures; (b) describes the lifestyles in each scenario in order; (c) determines the characteristics of the transportation system supporting those lifestyles; (d) indicates transportation technologies and policies necessary in that system; and (e) derives the energy characteristics of that system. The implications of the four existing scenarios are examined with emphasis on current TEC electric-vehicle development. This preliminary investigation will be followed by detailed-scenario building (modifying existing scenarios or developing new ones) and generation of lifestyles and transportation system demands under each of the scenarios. This work will be reported in October 1978.

Bernard, MJ, III LaBelle, SJ Millar, M Walbridge, EW Argonne National Laboratories, Department of Energy ANL/EES-TM-1, Mar. 1978, 79 p.

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: Energy Research Abstracts, NTIS
ORDER FROM: NTIS

ANL/EES-TM-1

16 194498

TECHNICAL, TECHNOLOGICAL AND ORGANISATIONAL MEASURES FOR SAVING FUEL AND ELECTRIC ENERGY IN THE RAILWAYS [Tehniceskie, tehnologiceskie i organizacionnye mery po ekonomii topliva i elektroenergii na zeleznizh]

No Abstract. [Russian]

Fertel', AI *Lokomotivy i Lokomotivnoe Hozjajstvo* Vol. 6 No. 107, 1978, 26 p., 8 Fig., 7 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

16 194504

THE UK SURFACE PASSENGER TRANSPORT SECTOR: ENERGY CONSUMPTION AND POLICY OPTIONS FOR CONSERVATION

Describes a study of the UK surface passenger transport sector whose main objectives were to investigate the pattern of present and future energy consumption and to provide a preliminary evaluation of policy options to reduce energy use.

Maltby, D Monteath, IG Lawler, KA *Energy Policy* Vol. 6 No. 4, Dec. 1978, pp 294-313, 20 Tab., 3 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

16 194506

SECOND REPORT ON THE PROGRAMME FOR RATIONAL USE OF ENERGY. PROPOSED GUIDELINES AND RECOMMENDATIONS FROM THE COUNCIL [Second rapport sur le programme de l'utilisation rationnelle de l'energie. Proposition de directive et recommandations du Conseil]

After recalling the need to build up the EEC community programme on energy savings, this volume describes a 2nd series of legislative proposals. It gives tables comparing the measures specifically adopted by Member States since October 1973 in connection with a programme for rational use of energy and those measures planned or likely to be introduced in the near future. The 2nd part is devoted to the interim reports from 8 specialist sub-groups including those for road vehicles and transport structures. [French]

European Economic Community UIC Cat 30 28, 1977, 143 p., Tabs.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: European Communities Official Publications Office, Luxembourg, Belgium

16 194690

ROLE OF HYDROGEN IN OUR FUTURE FUEL SUPPLY

Review the technical and economic conditions which have to be fulfilled before a hydrogen economy can be realised.

Braun, MJ *Electronics and Power* Vol. 25 No. 2, Feb. 1979, pp 110-113, 5 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
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16 194819

DEVELOPMENT OF LONG DRAIN MULTIGRADE DIESEL ENGINE OILS FOR THE CANADIAN MARKET

A line of high quality multigrade diesel engine oils suitable for long drain applications has been developed using hydrotreated basestock. The process differs from those more commonly found in North America since fractionation occurs after the major refining step and the severe hydrogenation (hydrotreating) replaces the more common solvent extraction with furfural or phenol. Laboratory and engine dynamometer tests indicated that lubricating oils using hydrotreated basestock have superior control of diesel piston deposits and oxidative viscosity increase. Excellent performance of multigrade diesel engine oils using both hydrotreated and solvent refined basestock over extended oil change intervals has been demonstrated in extensive field trials. Cold weather benefits for multigrade diesel engine oils were defined by cold room studies and outdoor trials.

Prepared for SAE Meeting Nov. 13-16 1978.

Swinney, B (Gulf Canada Limited, Ontario); Coulter, JS Hanson, RE Hunter, L *Society of Automotive Engineers Preprints* SAE 780957, 1978, 18 p., 19 Ref.

ACKNOWLEDGMENT: EI
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16 194868

THE ENERGY EFFICIENCY OF THE SWEDISH TRANSPORTATION SYSTEM- AN INTERNAL COMPARISON

When discussing energy efficiency of the various modes of transportation one has to be very cautious about what to compare. It is obvious that there exist differences with respect to energy efficiencies, but differences also occur in the general patterns of utilization. This paper focuses on intercity transportation, of goods and passengers respectively. It contains a general discussion of what comparisons on energy efficiency ought to comprise. In short, any comparisons of the energy efficiencies of the various modes of transportation have to apply to transportation services that usually are, or at least could be, carried out by all the modes. It is also important that the energy forms used for propulsion are measured at compatible points in the applicable chains of transformations and transmissions. Further, any analyses are incomplete unless one includes energy requirements for manufacturing and maintaining carriers. Also energy requirements for constructing and maintaining infrastructures have to be considered. The results of some calculations are demonstrated, which include all the aspects mentioned. Data that are used apply to the Swedish transportation system. The comparisons involve for freight transportation: truck, railway, and coastal shipping; and for passenger transportation: passenger cars, bus, railway, and airplane. It is difficult to draw some simple conclusions of the results obtained. The results indicate, however, that variations within each mode, under certain circumstances that are related to existing background data, are even greater than the differences between the modal averages with respect to energy efficiencies. (a) /TRRL/

Kordi, I (Royal Institute of Technology, Sweden) *Rail International* Vol. 9 No. 12, Dec. 1978, pp 951-956, 4 Fig.

ACKNOWLEDGMENT: TRRL (IRRD 239104)
ORDER FROM: ESL

DOTL JC

16 195135

RATIONAL USE OF FUEL AND ELECTRICAL ENERGY [Racional'noe ispol'zovanie toplivno-energeticeskih resursov]

To increase efficiency and the quality of the transport service, the author describes the practical bases for saving fuel and electrical energy for all users of rail transport. [Russian]

Kolotij, AI *Zheleznodorozhnyi Transport* No. 11, 1978, pp 49-52

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

120

16 196123

VISCOSITY AND FLOW PROPERTIES OF MULTIGRADE ENGINE OILS--A REVIEW OF AN INTERNATIONAL COLLOQUIUM

An International Colloquium, "Viscosity-Flow Properties of Multigrade Engine Oils," was held at the Technische Akademie Esslingen, December 7-9, 1977, at Ostfildern, Germany. The program of the colloquium, which is the subject of this review, provided an almost complete review of the present state of technology in the field of multigrade engine oils and their development. Besides the requirements of engines for engine oils and the fundamentals of rheology, the following main subjects were discussed: Viscosity classification of engine oils development in the USA and in Europe; Chemical and physical properties of viscosity index (VI) improvers; Cold flow behavior and high temperature viscosity of VI-improver containing oils; Influence of mechanical, thermal, and oxidative stresses; Engine performance of multigrade engine oils; Startability and pumpability of engine oils. Some of the most important results and conclusions especially related to the subject of the relationship of engine oil viscosity to engine performance are reported and discussed. Paper No. 780979.

SAE Special Publication 434, Relationship Between Engine Oil Viscosity and Engine Performance--Part 4: Paper presented at SAE International Fuels and Lubricants Meeting, Toronto, Ontario, November 13-16, 1978.

Bartz, WJ
Society of Automotive Engineers SAE Special Pub 434, 1978, pp 11-32, 21 Ref.

ACKNOWLEDGMENT: EI
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16 196516

DIESEL ENGINE LUBE FILTER LIFE RELATED TO OIL CHEMISTRY

Today's diesel engine lubricating oils are highly dispersant and typically carry several pounds of solid combustion contaminant in suspension--little of which is filterable. Since the average full flow filter is capable of holding less than a pound of solids, filter life and capacity are no longer directly related. Field experience has demonstrated at least six distinct methods by which filters plug. This indicates that filter life is simply a function of the type and amount of contaminant present in the crankcase and the oil's ability to handle or tolerate the contamination. However, oils differ greatly in their ability to do this. Field experience also suggests that the current API Classification tests may be inadequate in some areas to determine lubricating oils' suitability for diesel engine service. Finally, filter plugging should be looked at as a symptom of engine or oil problems, but not as a problem itself.

For Meeting held November 13-16, 1978.

Hudgens, RD (Fleetguard, Incorporated); Feldhaus, LB
Society of Automotive Engineers Preprint SAE 780974, 1978, 24 p., 20 Ref.

ACKNOWLEDGMENT: EI
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16 196979

IRCA/UIC CONGRESS. SECTION 1: INVESTMENT POLICY FOR TRANSPORT, RAILWAYS AND ENERGY

The opportunity for the Swedish State Railways to conserve energy is discussed. Involved are both internal railway management and national transportation policy decisions which would divert traffic from less efficient modes to rail haulage.

Presented at the Twenty-second Session of the IRCA, IRCA/UIC Congress, Stockholm, 7-12 May 1979.

Lundberg, AS *Rail International* No. 1, Jan. 1979, pp 17-25, 2 Fig.

ORDER FROM: ESL

DOTL JC

16 197013

DETECTION OF WATER IN DIESEL FUEL

The presence of water in diesel fuel is detected by analyzing the component elements of water, the commonest of which is sodium, which is identified by spectrum analysis of the fuel using a FPL-1 photometer, for example. However, this is an extremely expensive method, hence the design of a new type of equipment. The article describes, by means of tables and diagrams, the results obtained with the new method. [Russian]

Pahomov, EA *Elektricheskaya i Teplovoznaya Tiaga* Vol. 4 No. 268, Apr. 1979, pp 31-32, 4 Fig., 2 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

16 197272
METROPOLITAN WORK-TRIP ENERGY CONSUMPTION PATTERNS

This study examines the patterns of energy consumption for journeys-to-work in a metropolitan area and demonstrates the relationship between these patterns and urban structure. The study also identifies population and geographic variables that affect energy use. Cartographic and statistical analyses are performed on census data relating to distances of work trips and choice of mode in the Chicago, Illinois, area. A review of the literature on the related studies is given. Explanations of the mapping and regression techniques are provided, along with an analysis of the study results.

Soot, S (Illinois University, Chicago); Sen, A *Traffic Quarterly* Vol. 33 No. 2, Apr. 1979, pp 275-295, 14 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

16 197342
FREIGHT TRANSPORTATION PETROLEUM CONSERVATION OPPORTUNITIES--VIABILITY EVALUATION

This report develops a comprehensive perspective of current and near-term future energy demand in U.S. freight transportation. Synthesis of studies of many agencies indicate that the annual petroleum fuel demand for freight transportation in 1985 will be 5 billion gallons greater than that in 1975, even with a 7 billion gallon a year savings from conservation measures. This represents an increase in freight's share of the U.S. total transportation fuel demand from 23% to 29%, because of continued freight traffic growth and the greater savings potential in passenger systems. Freight transport by rail, by highway and by rail/highway intermodal services receives the most attention in this report because these modes offer the greatest promise for significant fuel savings. Fuel consumption and conservation estimates include both intercity and local truck operations, but intercity operations of the competitive, heavy-duty trucks and general merchandise trains are the primary focus because about 60% of the potential truck fuel savings and virtually all of the rail savings in 1985 are projected to come from intercity operations. Attention is focused on considerations of the transport market place supply and demand interactions in the evaluation of alternative government policies for fuel conservation in freight systems. An overall evaluation approach is presented, analytical tools appraised and several government policy alternatives are given a preliminary assessment. The

results suggest that the most productive conservation strategies are those that focus on technological and operational improvements within the rail and highway modes having estimated savings of 28% and 18% respectively. Shifts of traffic to intermodal rail services although economically viable may prove counterproductive in certain markets in terms of energy consumption.

Maio, DJ
Transportation Systems Center Final Rpt. DOT-TSC-RSPA-79-6, Mar. 1979, 125 p.

ACKNOWLEDGMENT: NTIS
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PB-294676/2ST, DOTL NTIS

16 197420
BART'S OPERATING ENERGY CONSUMPTION

BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, and other cities and communities, is the first regional-scale rapid transit system to open in the United States in over 50 years. Service began in 1972. This report is one of a series assessing the impact of BART on transportation and travel in the Bay Area. The report gives information on BART's operating energy consumption and incorporates an earlier BART Impact Program Report ('Analysis of BART's Energy Consumption for Interim System Operations', June 1975). The updated report was presented as a paper to the January 1977 annual meeting of the Transportation Research Board. It gives a historic analysis of BART's operating energy consumption per passenger-mile and per car-mile. BART's traction energy consumption is compared with that of (1) other rail transit systems, and (2) bus and automobile, in terms of equivalent gallons of petroleum fuel. BART's impacts on total energy consumed by BART, bus and automobile for transbay travel between San Francisco and Oakland is analyzed using data on travel patterns with and without BART. Although BART carries 20% of all passenger-trips in the transbay corridor, it has reduced overall energy consumption by only 5%. This saving is relatively small because, although BART consumes less energy per passenger-mile than automobile, it consumes more than bus. BART's ridership is drawn about equally from automobile and bus. BART has also had the effect of inducing new trips by automobile.

Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Impact Program. Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Color illustrations reproduced in black and white.

Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-14-3-75, Jan. 1977, 58 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
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PB-294839/6ST, DOTL NTIS

17 183740

DEVELOPMENT OF A COMPUTERISED BRIDGE INVENTORY FOR A STATE ROAD AUTHORITY

The Highways Department of South Australia is currently developing a computerised bridge inventory system which will be used by the Bridge Inspection Section to rationalise the approach to the inspection of bridges. It will also be used by the Planning Branch to provide a basis for economic comparison of alternatives in the replacement and strengthening of bridges, by the Construction Branch for the rational allocation of maintenance funds and to provide information to the National Association of Australian State Road Authorities (NAASRA) proposed data bank. One of the most important functions of a bridge inventory is to provide a complete and accurate record of each bridge on a highway system. Maintenance of bridges requires complete records in usable form including history of the structure, all repairs, widening, strengthening or reconstruction, or other actions which have been taken, subsequent to inspections. Information should be easily accessible and readily updated; factors which today are made possible by computerisation. However, conflicting requirements must be dealt with. On the one hand data handling facilities should be large enough to provide sufficient information for managing inspection maintenance, but flexible enough to be used for planning functions both at the regional and national level; yet the system developed should not become cumbersome and difficult to use. /Author/

This paper appeared in Transportation Research Record No. 664, Bridge Engineering, Volume 1. Proceedings of a conference conducted by the Transportation Research Board, September 25-27, 1978.

Richards, BL (South Australia Highways Department, Australia) *Transportation Research Record* No. 664, 1978, pp 1-6, 4 Fig., 5 Ref.

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DOTL JC

17 185591

NETGEN REVISITED: A PROGRAM FOR GENERATING LARGE SCALE (UN)CAPACITATED ASSIGNMENT, TRANSPORTATION, AND MINIMUM COST FLOW NETWORK PROBLEMS

The purpose of this note is to describe a modified version of the computer program NETGEN, which can be used to generate network flow problems for testing and validation purposes. The paper also presents solutions for a set of 35 benchmark problems. (Author)

Karney, D Klingman, D
Texas University, Austin Res Rpt. CCS-320, June 1978, 17 p.

Contract N00014-78-C-0222

ACKNOWLEDGMENT: NTIS
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AD-A058109/OST

17 189027

AUTOMATIC TRANSPORT AND DISTRIBUTING SYSTEM FOR LARGE CONTAINERS [Avtomatizirovannaja sistema slezenija za proizvodzeniem i razmescheniem krupnotonnaznyh tranzitnyh kontejnerov]
No Abstract. [Russian]

Skul'tin, IV *Vycislitel'naja Tehnika* Vol. 3 No. 47, 1978, pp 1-13, 1 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

17 189818

MULTICOMMODITY NETWORK FLOWS--A SURVEY

This report aims at a comprehensive survey of the literature dealing with the multicommodity flow problem. This problem arises naturally in network modelling wherever commodities, vehicles, or messages are to be shipped or transmitted from certain nodes of an underlying network to some others. Recent applications of mathematical programming techniques to traffic equilibrium problems in transportation studies as well as computer networks analysis has renewed considerable interest in this problem. This report discusses solution techniques for both linear and nonlinear flow problems. The former includes decomposition, partitioning, compact inverse methods, and primal-dual algorithms. Described is a variety of feasible direction methods for the latter. The report concludes by giving applications and computational experience for both types of problems.

Assad, AA (Massachusetts Institute of Technology) *Networks* Vol. 8 No. 1, 1978, pp 37-91, 119 Ref.

ACKNOWLEDGMENT: EI
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17 190272

FAULT-TOLERANT COMPUTER SYSTEM WITH THREE SYMMETRIC COMPUTERS

The increasing complexity and consequent increased requirement for reliability of computer control systems are discussed. Circumventing partial failures by partial shutdown and the manual intervention of an operator is described. It is noted that many fault-tolerant computer systems already developed were developed as special computer systems with complicated architecture, or as the combination of computer resources coupled with bus features instead of using the ordinary computer systems. However, the fault-tolerant computer system that is the subject of this paper consists essentially of three symmetrically connected "off-the-shelf" computers. Two of the computers are connected by a dual system controller for on-line dual processing. The third computer is for standby. To protect the on-line system, a status register is used for the configuration control hardware. Degradation techniques in software and hardware are introduced to prevent the system from stoppage. The actual running record shows 99.99 percent operating availability for three years in the command and control system for Shinkansen (Japanese National Railway's bullet train). The system, call COMTRAC, Computer-aided TRAFFIC Control system, is described in detail.

Ihara, H (Hitachi Limited); Fukuoka, K Kubo, Y Yokota, S *Institute of Electrical and Electronics Engrs Proc* Vol. 66 No. 10, Oct. 1978, p 1160

ACKNOWLEDGMENT: EI
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DOTL JC

17 193722

MOPAC TCS NEARS REAL-TIME OPERATIONS CONTROL

The 20,000-km Missouri Pacific Railroad has a Transportation Control System (TCS) based on a pair of IBM 370 computers, an extensive telecommunications system and dispersed peripheral equipment used to control individual car movements, provide switching instructions, accept orders from shippers for cars to load and assure they are filled, generate waybills and bills of lading, computer freight bills, and produce current status reports for trains as well as cars. About 200,000 such transactions are handled daily. Car scheduling, the latest phase of TCS, has been installed initially on the 879-km heavy-traffic segment of the system between Memphis, TN, and Fort Worth, TX. /Author/

This paper appeared in TRB News No. 81, March-April 1979.

Houser, FN Ward, EJ *Transportation Research News* No. 81, Mar. 1979, pp 2-4, 2 Phot.

ORDER FROM: TRB Publications Off

17 193759

MONITORING SYSTEM FOR ELECTRIC TRAINS

A microcomputer-based monitoring system is described developed for the purpose of providing suitable information regarding the running of the train; simplifying emergency repairs; rationalizing train inspection, and recording running conditions and troubles. The hardware, software and structural configuration of the system are outlined.

Yamaguchi, T (Toshiba Corporation, Japan); Nishimura, M Kurosawa, H Yamaya, T *Toshiba Review* No. 116, July 1978, pp 11-16

ACKNOWLEDGMENT: EI
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17 193773

LOCOMOTIVE DATA ACQUISITION PACKAGE. PHASE I, FINAL REPORT, OCTOBER 1977-JULY 1978

A preliminary examination of the problems associated with railroad locomotive data acquisition is presented. An approach toward the design of a microprocessor-based locomotive data recorder is also presented. Special attention is placed on determining the functional characteristics and environmental specifications required for the system. The system described consists of a magnetic tape digital data recorder, an ensemble of transducers, and analysis software. The system described is to be used as a research tool.

Kirsten, FA Abbott, RK Mullen, DR Turner, DB

California University, Berkeley, Department of Energy Sept. 1978; 122 p.

Contract W-7405-ENG-48

ACKNOWLEDGMENT: Energy Research Abstracts, NTIS
ORDER FROM: NTIS

17 194689

THE MANAGEMENT OF CHANGE

The author, who is responsible for Union Pacific's management information services, gives some details of the changes that have occurred over the last 20 years as regards information requirements, the role of the computer, and the repercussions of these developments for the organisation. He goes on to describe the stages envisaged by Union Pacific for introducing the most up-to-date techniques in coming years.

Jorgensen, J.L. *Progressive Railroading* Vol. 21 No. 12, Dec. 1978, pp 29-32, 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

17 196534

NETWORK PROCESSING LANGUAGE PLANET

A new network processing language PLANET (Processing Language for Network) based on a variation of hypergraph and suitable for structured programming is described. The language processor of PLANET has also been developed as a pre-processor of FORTRAN.

Seki, E. *Railway Technical Research Inst. Quarterly Reports* Vol. 20 No. 1, Mar. 1979, pp 22-25, 4 Fig., 1 Tab., 5 Ref.

ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

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17 196928

MISSOURI PACIFIC'S COMPUTERIZED FREIGHT CAR SCHEDULING SYSTEM. SYSTEM PERFORMANCE MEASUREMENT

As part of the development of the Freight Car Scheduling System, the Missouri Pacific Railroad (MP) will collect and analyze railroad performance data during a period beginning in January 1978 and continuing into 1979. These data will be used in assessing the effectiveness of the scheduling system. The purpose of the document is to describe MP's plan for conducting the measurement task. The document identifies the expected changes, the pilot implementation area, the performance measures to be taken, and how the data will be collected and presented.

See also report dated July 1977, PB-275439.

Missouri Pacific Railroad Company, Federal Railroad Administration
Final Rpt. FRA-OPPD-78/9, Feb. 1978, 41 p., 13 Fig.

Contract DOT-FR-65139

ACKNOWLEDGMENT: NTIS
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PB-279861/9SL, DOTL NTIS

17 197289

FREIGHT DISTRIBUTION MODEL PREDICTIONS COMPARED: A COMMENT

A recent paper by Pitfield (1978) concluded from an analysis of freight flows, employing a range of tests, that there was no means of predicting whether a linear-programming solution or a gravity model provided the better approximation to an actual flow matrix. However, it can be shown theoretically that the gravity model should always be at least as good as the linear-programming solution. The source of Pitfield's inconsistent results is traced and it is argued that plural tests should be used to identify specification errors rather than to promote agnosticism.

Gordon, I.R. *Environment and Planning A* Vol. 11 No. 2, 1979, pp 219-221, 8 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-241040)

ORDER FROM: Pion Limited, 207 Brondesbury Park, London NW2 5JN, England

DOTL JC

17 197510

SINGLE-COMMODITY AND MULTI-COMMODITY NETWORK IMPROVEMENT PROCEDURES

In this report a multi-modal freight transport improvement problem is formulated, and a heuristic solution procedure is developed for large scale problems. Arcs on a multi-modal network are modified to minimize the sum of investment and shipper disutility. The model includes a mode abstract multinomial logit model and convex arc transport characteristic improvement functions. The procedure is based on the general Continuous Optimal Adjustment heuristic suggested by Steenbrink; a major component is a concave transportation assignment problem, for which two methods are developed: a Dantzig-Wolfe decomposition to solve an arc-path form of the general multi-commodity fixed charge network flow problem, and a heuristic based on the local optimum seeking procedure of Yaged. The latter was programmed and thirty test runs were made on a problem derived from the Multi-State Transportation Corridor research program. Conclusions reached are: the solution procedure is viable; although times are long, this is not unusual for problems of this size or design construction projects of this scale; solution times may be shortened considerably by proper selection of parameters. As a final step, the procedure is extended to include multiple transport commodity classes.

Mullens, MA Sharp, GP

Georgia Institute of Technology, Office of the Secretary of Transportation
Spec Rpt. DOT-OST-80050-1C, Mar. 1979, 289 p.

Contract DOT-OST-80050

ACKNOWLEDGMENT: NTIS
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PB-295482/4ST, DOTL NTIS

18 185783

PHASE 1: DEFINITION OF INTERCITY TRANSPORTATION COMPARISON FRAMEWORK. VOLUME 1: SUMMARY

A unified framework for comparing intercity passenger and freight transportation systems is presented. Composite measures for cost, service/demand, energy, and environmental impact were determined. A set of 14 basic measures were articulated to form the foundation for computing the composite measures. A parameter dependency diagram, constructed to explicitly interrelate the composite and basic measures is discussed. Ground rules and methodology for developing the values of the basic measures are provided and the use of the framework with existing cost and service data is illustrated for various freight systems.

Operations Research, Incorporated Final Rpt. NASA-CR-152152-V-1, ORI-TR-1298-V-2, July 1978, 42 p.

Contract NAS2-9815

ACKNOWLEDGMENT: NTIS
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N78-28993/1ST

18 185784

PHASE 1: DEFINITION OF INTERCITY TRANSPORTATION COMPARISON FRAMEWORK. VOLUME 2: METHODOLOGY

Categories of cost and service measures that will appropriately define the characteristics of all intercity transportation systems were established. Previous methods of comparing transportation systems were reviewed. Specific comparison variables, applicable to all modes were defined, and the functional relationships by which these variables are interdependent were explored. A framework by which the set of variables may be employed for comparison of data from the individual systems was constructed.

Operations Research, Incorporated Final Rpt. NASA-CR-152152-V-2, July 1978, 251 p.

Contract NAS2-9815

ACKNOWLEDGMENT: NTIS
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N78-28994/9ST

18 185810

A STUDY OF CHARACTERISTICS OF INTERCITY TRANSPORTATION SYSTEMS. PHASE 1: DEFINITION OF TRANSPORTATION COMPARISON METHODOLOGY

Decision making in early transportation planning must be responsive to complex value systems representing various policies and objectives. The assessment of alternative transportation concepts during the early initial phases of the system life cycle, when supportive research and technology development activities are defined, requires estimates of transportation, environmental, and socio-economic impacts throughout the system life cycle, which is a period of some 40 or 50 years. A unified methodological framework for comparing intercity passenger and freight transportation systems is described and is extended to include the comparison of long term transportation trends arising from implementation of the various R & D programs. The attributes of existing and future transportation systems are reviewed in order to establish measures for comparison, define value functions, and attribute weightings needed for comparing alternative policy actions for furthering transportation goals. Comparison criteria definitions and an illustrative example are included.

Subm-Sponsored in Part by DOT.

English, JM Smith, JL Lifson, MW
Econergy Incorporated NASA-CR-152153-1, Aug. 1978, 202 p.

Contract NAS2-9814

ACKNOWLEDGMENT: NTIS
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N78-29995/5ST

18 185811

A STUDY OF CHARACTERISTICS OF INTERCITY TRANSPORTATION SYSTEMS. PHASE 1: DEFINITION OF TRANSPORTATION COMPARISON METHODOLOGY--EXECUTIVE SUMMARY

The objectives of this study are: (1) to determine a unified methodological framework for the comparison of intercity passenger and freight transportation systems; (2) to review the attributes of existing and future transportation

systems for the purpose of establishing measures of comparison. These objectives were made more specific to include: (1) development of a methodology for comparing long term transportation trends arising from implementation of various R&D programs; (2) definition of value functions and attribute weightings needed for further transportation goals.

Subm-Sponsored in Part by DOT.

English, JM Smith, JL Lifson, MW
Econergy Incorporated NASA-CR-152153-2, Aug. 1978, 42 p.

Contract NAS2-9814

ACKNOWLEDGMENT: NTIS
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N78-29996/3ST

18 186406

MODELS FOR FREIGHT TARIFF ESTIMATION

Models of freight tariffs may be useful both for analysis of tariff structures and for the generation of tariff rate estimates for use in research. Such models may be developed on an origin-destination and commodity abstract basis by using the attributes of the shipment and the commodity as independent variables. Examples of such models are calibrated using data from waybill samples and a commodity attribute file. The results demonstrate the feasibility of producing useful freight-tariff estimation models. (ERA citation 03:048055)

Samuelson, RD Lerman, SR Roberts, PO Kneafsey, JT
Massachusetts Institute of Technology, Department of Energy Apr. 1976, 39 p.

Contract EM-75-C-01-8400

ACKNOWLEDGMENT: NTIS
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CTS-76-7

18 186641

THE ECONOMIC SIGNIFICANCE OF TRANSPORTATION IN TEXAS

The economic significance of transportation in Texas is highlighted by the relationship between total private expenditures for transportation and economic activity in the state. The report contains estimates of the Texas transportation expenditures from 1959 through 1976 by mode. These estimates show the growth in total transportation expenditures and the shifts in the relative magnitudes of expenditures for the various passenger and freight transportation modes. A comparison between the Texas transportation bill and Gross Texas Product is presented to illustrate the trends in transportation expenditure shares of the state's total output. Additionally, a comparison between the U.S. transportation bill and the Texas transportation bill reveals the relative intensity of transportation expenditures in the U.S. and Texas. The effects of population growth are removed by presenting the Texas and U.S. transportation bills in per capita terms. These per capita transportation expenditures show the relative magnitude of micro-level expenditures for each transportation mode. The Texas per capita bill, along with gasoline price, per capita Gross Texas Product, and a price index are variables in functional relationships which are used to forecast future transportation bills. The forecasting equations specify the relationships between the state's transportation bill and other economic variables.

Prepared in cooperation with Texas State Dept. of Highways and Public Transportation, Austin.

Holmes, SR McFarland, WF
Texas Transportation Institute, Texas State Department of Highways & Public Transp Intrm Rpt. TTI-2-1-77-227, Sept. 1977, 110 p.

ACKNOWLEDGMENT: NTIS
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PB-285443/8ST

18 189789

IRCA/UIC CONGRESS, STOCKHOLM, 7-12 MAY 1979. REFLECTIONS ON THE NEED, FROM THE COMMERCIAL POINT OF VIEW, OF AN INVESTMENT STRATEGY FOR FREIGHT ROLLING STOCK

No Abstract.

Bagnai, C *Rail International* Vol. 9 No. 12, Dec. 1978, pp 919-929, 2 Fig., 9 Tab., 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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18 189796

RAILWAY AND ITS INCREASING ROLE IN ECONOMIC DEVELOPMENT

Issues involved in economic choice of transport mode are analyzed, particularly with respect to developing nations. It is concluded that both rail and road modes have their place with railroads particularly adapted to high density freight traffic taking into consideration economy of land, manpower and energy. Pricing policy and traffic allocation should reflect short-run and long-term marginal social costs of necessary inputs.

Proceedings of the Seminar on Transport Planning in Developing Countries held from 11 to 13, July 1978, during the PTRC Summer Annual Meeting at the University of Warwick, England. Co-sponsored by the Transportation Research Board.

Majumdar, J *Planning & Transport Res & Comp, Sum Ann Mtg, Proc* Proceeding Seminar F, July 1978, pp 107-120, 2 Tab., 22 Ref.

ACKNOWLEDGMENT: Planning and Transport Res and Computation Co Ltd
ORDER FROM: Planning and Transport Res and Computation Co Ltd, 109 Bedford Chambers, King Street, London WC2, England

18 189804

COST-BENEFIT TRIPS UP THE CORPS

The administration has questioned the use of cost-benefit analysis by the U.S. Army Corps of Engineers in justifying waterway improvement projects. Certain economists have agreed in this appraisal. Among flagrant abuses are unrealistically high traffic volumes on proposed waterways, understatement of barge traffic which can be moved on existing waterways; and interest rates which are far too low. Environmental and railroad interests are mounting an attack on current projects justified in these ways.

Business Week No. 2573, Feb. 1979, pp 96-97, 1 Phot.

ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020

DOTL JC

18 189806

IRCA/UIC CONGRESS, STOCKHOLM, 7-12 MAY 1979. ECONOMIC DEVELOPMENT OF THE UNDERDEVELOPED REGIONS. INTERDEPENDENCE BETWEEN INDUSTRIAL INVESTMENTS AND INVESTMENTS IN RAIL TRANSPORT
No Abstract.

Chiello, V *Rail International* Vol. 9 No. 11, Nov. 1978, pp 823-833, 10 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

18 190909

JOINT COST, PRODUCTION TECHNOLOGY AND OUTPUT DISAGGREGATION IN REGULATED MOTOR CARRIERS

The study uses a sample of 252 Class I Instruction 27 Motor Carriers (Instruction 27 carriers earned at least 75 percent of their revenues from intercity transportation of general commodities over a three year period) of general freight that existed continuously during the period 1965-1974 to estimate a long run cost function for the regular route, general freight section of the motor carrier industry. The functional form of the estimated equation belongs to the class of flexible, second order approximations to any cost function that are referred to as transcendental logarithmic or 'translog' functions. This class of functions does not make any prejudgments about the proper functional form, or the nature of the economic technology that motor carriers use to produce output; the functions may be derived from a Taylor's series expansion. The outputs are: (1) truck load ton-miles; (2) less-than-truck load ton miles; (3) pick up and delivery tons per hour and (4) terminal-platform tons. The inputs for which prices were included in the cost function are: (1) labor-salaried, clerical and other; (2) labor-linehaul; (3) labor-pickup and delivery and terminal platform; (4) other inputs not elsewhere classified; (5) purchased transportation; (6) owner-operators; (7) materials; (8) fuel, and (9) capital. The estimated cost function shows that there are no economies of scale in the domains for which the function was estimated, and that the usual representation of cost, using a Cobb-Douglas or CES function, is a serious misspecification because the true underlying

function is non-separable and therefore the composition of output is a function of the level of factor prices.

Cherry, RC

Transportation Systems Center Intrm Rpt. DOT-TSC-OST-78-19, Nov. 1978, 138 p.

ACKNOWLEDGMENT: NTIS

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PB-289884/9ST, DOTL NTIS

18 192228

ANALYSIS OF BART CAPITAL COSTS

BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impact of BART on transportation and travel in the Bay Area. The report documents the capital costs of BART and its components and analyzes the difference between the actual capital cost of the System (\$1,636 million) and the cost predicted by the 1962 planning report (\$994 million). The apparent 65% cost overrun is shown to be explained almost entirely by (1) increases in scope, (2) inflation at higher rates than anticipated, and (3) inflation associated with delays to the construction schedule.

Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Color illustrations reproduced in black and white.

Davidson, N Merrick, F Sherret, A

Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-40-3-77, Mar. 1978, 40 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

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PB-293855/3ST

18 193742

RAIL SYSTEM INVESTMENT ANALYSIS: SAMPLE EVALUATION OF A TRACK REHABILITATION PROJECT

This report is a hypothetical case study developed to show how a railroad applying for Federal assistance under Title V of the Railroad Revitalization and Regulatory Reform Act of 1976 might calculate an internal rate-of-return for a major track rehabilitation project. The analysis consists of five main parts. The first part is a detailed description of the project--the rehabilitation of 110 miles of track (including extensive rail and tie replacement) at a cost of \$9.4 million. The second part is a detailed description of the base case; i.e., the most favourable alternative action the applicant railroad could take without a major investment. This particular base case envisions steadily increasing expenditures for emergency or spot maintenance which nevertheless are insufficient to halt further track deterioration, more frequent derailments, and the imposition of new slow orders. The third part discusses key assumptions and traffic forecasts. The fourth part identifies and explains the project's cash flow components and shows how each was calculated. Finally, the fifth discusses principal areas of uncertainty. The hypothetical project yields an internal rate-of-return of approximately 38 percent. However, this finding does not necessarily imply that actual rehabilitation projects will yield similar rates-of-return. Nor should the case study, as a whole, be taken as an indication of the types of projects likely to receive Federal assistance.

Sponsored by U.S. DOT, Office of the Secretary, Office of Transportation Systems Analysis and Information and Federal Railroad Administration, Office of Federal Assistance, Washington, D.C.

Ernst and Ernst DOT-TPI-77-10-01, Jan. 1977, 103 p., Tabs., 1 App.

Contract DOT-OS-60097

ACKNOWLEDGMENT: OST, FRA

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18 194666

22ND SESSION OF THE IRCA/UIC CONGRESS, STOCKHOLM, 7-12 MAY 1979. SECTION III: ECONOMIC ASPECTS OF INVESTMENTS ON THE RAILWAYS

Papers presented at the Congress by: Campbell, I.M.: Investment in high speed Inter-City rail transport. A case study. Kolaric, V.: The significance and the assessment of the economic and social criteria in the development of individual traffic carriers in the transport system of the future. Dodgson, J.S.: Problems in using social cost-benefit analysis to determine the level and allocation of railway investment. Taillanter, F.: Economic criteria for the choice of investments. Heimerl, G.: Should the various procedures of benefit-cost-investigations as aids to decision for infrastructure investments be combined with one another.

See also Volume 10 No. 1, 2 and 3 for January, February, and March 1979 pages 39-48, 133-148, 149-166 and 255-262, respectively.

Campbell, IM: *Rail International* Vol. 9 No. 12, Dec. 1978, pp 887-904, Refs.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

18 194675

A METHOD FOR DETERMINING THE NORMAL SERVICE LIFE OF PASSENGER COACHES [Eine Methode zum Ermitteln der normativen Nutzungsdauer von Reisezugwagen]

It is essential to have all necessary information to judge the actual use of current and future stock. The economic factors taken into account are depreciation, the cost of maintenance and upkeep, and administrative costs. By reducing such expenditure to a minimum the optimum service life of vehicles can be established. Examples are given to illustrate the case of passenger coaches.

Dreissel, E *DET Eisenbahntechnik* Vol. 26 No. 12, Dec. 1978, pp 499-503, 6 Fig., 1 Tab., 13 Ref.

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

18 194676

RAILWAY INVESTMENT: THE PARTS AND THE WHOLE

This additional paper for the IRCA/UIC Congress to be held in Stockholm from 7-12 May 1979 suggests a method of selecting railway investment projects taking account of the latest official thinking in the UK public sector, particularly of the White Paper on the Nationalised Industries of March 1978. In Part One, the writer refers to the traditional framework; in Part Two, he discusses risk and uncertainty and lastly, he deals with programme control and the relationship between the Railway's financial target and the discount rate.

Posner, M *Rail International* Vol. 9, No. 12, Dec. 1978, pp 913-917

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

18 195133

22ND SESSION OF THE IRCA/UIC CONGRESS, STOCKHOLM, 7-12 MAY 1979. SECTION III: ECONOMIC ASPECTS OF INVESTMENTS ON THE RAILWAYS

Paper delivered at the Congress entitled: Fundamental principles for planning and determining the profitability of capital investments on the USSR Railways.

Barkov, NN *Rail International* Vol. 10 No. 3, Mar. 1979, pp 263-269, 1 Tab., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

18 195140

WORK TO BE DONE IN THE CORPORATE ECONOMIC CONTEXT IN CONNECTION WITH TECHNICAL DEVELOPMENTS ON THE DB [Betriebswirtschaftliche Aufgaben im Rahmen der technischen Entwicklung bei der Deutschen Bundesbahn]
Research and development should be carried out taking account of the cost factors as in other sectors of the undertaking. The amount of capital tied up

and the risks inherent in developing new inventions should be weighed up when making a decision. In this article, the author gives an account of the resulting tasks for those responsible for corporate economics. He describes all the means available and gives details of methods to ensure that economic requirements are made when developing technical ideas. [German]

Mirsching, G *Eisenbahningenieur* Vol. 30 No. 1, Jan. 1979, pp 7-14, 4 Phot., 7 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

18 195552

WHO WILL SUPPLY TOMORROW'S CARS?

Car ownership costs, incentive per diem and rate regulation are combining in an inflationary period to change ownership of the U.S. freight car fleet and affect maintenance and operating policies of Class I railroads. There is an incentive to keep cars off-line, a policy which runs counter to the requirements of a railroad's own shippers.

Kreyling, EG, Jr (Southern Railway System) *Railway Age* Vol. 180 No. 10, May 1979, p 58

ORDER FROM: ESL

DOTL JC

18 195698

FINANCIAL AND OPERATING STATISTICS. CLASS I RAILROADS

Semiannual publication of the ICC Bureau of Accounts with second issue cumulative for the year. Contains following information on Class I railroads; Operating revenues and expenses; selected income and balance sheet items; operating statistics; train and yard service statistics; traffic statistics; motive power and car equipment ownership.

Interstate Commerce Commission No. 100, No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: Interstate Commerce Commission, Bureau of Accounts, Washington, D.C., 20423

18 195699

WAGE STATISTICS OF CLASS I RAILROADS IN THE UNITED STATES

Semiannual publication of the ICC Bureau of Accounts. First issued in 1921 as monthly Wage statistics of Class I steam railroads in the U.S. and continued as monthly until 1971.

Interstate Commerce Commission No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: Interstate Commerce Commission, Bureau of Accounts, Washington, D.C., 20423

18 195700

RAILROAD CARLOAD COST SCALES

Annual publication of ICC Bureau of Accounts. Costs are indicated by territories. For years 1962 through 1965 the statements contained only unit costs and were published under title, Railroad carload unit costs by territories. No issue published in 1971.

Interstate Commerce Commission No. 1c1-75, No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: Interstate Commerce Commission, Bureau of Accounts, Washington, D.C., 20423

18 195706

TRANSPORT ECONOMICS

Monthly comment on transportation statistics and transport economics for all transport modes prepared by ICC Bureau of Economics. First issued in May-June 1955 and continues Monthly comment on transportation statistics issued first in August 1941.

Interstate Commerce Commission No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: Interstate Commerce Commission, Bureau of Economics, Washington, D.C., 20423

18 195722

PATH ANALYSIS: ITS USE IN TRANSPORTATION RESEARCH

This paper describes the basic method of path analysis and its use as a tool to aid airline carriers in capital equipment acquisition decisions. In addition to this application of path analysis, some other uses of this methodology in other transportation-related areas are discussed.

Gilmour, P (Harvard University) *Transportation Research* Vol. 12 No. 6, Dec. 1978, pp 377-384, 30 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

18 196101

MANAGERIAL PERSPECTIVES ON THE TRANSPORTATION EQUIPMENT LEASING DECISION

Leasing as a viable alternative to purchase of assets is no longer used solely by organizations with credit ratings which preclude direct access to debt capital. This paper discusses ownership tax benefits, lease types, lease provision analysis, and a model by which a lease-versus-purchase decision may be made. Economic aspects of the purchase decision are reduced to an "annuity equivalent" figure that may be compared with the yearly lease fee.

Langley, CJ, Jr Wood, WR *Transportation Journal* Vol. 18 No. 3, 1979, pp 36-48, 1 Fig., 4 Tab.

ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606

DOTL JC

18 196102

UPGRADING TRANSPORT COSTING METHODOLOGY

This paper discusses two aspects of statistical transportation cost estimation which can be upgraded: (1) Modeling resource usage rather than monetary costs can produce parameters relatively insensitive to inflation; (2) A regression technique in lieu of least-squares can eliminate the possibility of masking independent variables.

Wilson, HG *Transportation Journal* Vol. 18 No. 3, 1979, pp 49-55, 2 Tab.

ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606

DOTL JC

18 196109

THE ECONOMICS OF FREIGHT CAR SUPPLY

The historical and legal, as well as the economic aspects of freight car supply, are examined. The chapters: Measurement of the adequacy and efficiency of the freight car fleet; Interline car movement and owner compensation; Private and public controls on the size and allocation of the freight car fleet; Proposed solutions to the problem of freight car supply; An optimum fleet and its optimum utilization; A system of freight car rental markets; Measurement of the potential gains from the institution of freight car rental markets.

Felton, JR
Nebraska University Press No Date, 116 p.

ORDER FROM: Nebraska University Press, 901 North 17th Street, Lincoln, Nebraska, 68588

18 196374

TARIFF RATE DETERMINATION UNDER COMMON COST: THE CROSS-SUBSIDIZATION CRITERION IN PRACTICE

This paper presents an analytical and graphical methodology, developed as part of a detailed feasibility study of railway transport of two products (crude oil and liquid natural gas) from two Arctic locations (Prudhoe Bay, Alaska, and the Mackenzie Delta, Northwest Territories) to a single southern destination, for determining the range of product and origin tariff levels under conditions of joint and common costs. Sample tariff ranges, computed to preclude cross-subsidization and to permit a realistic comparison of the railway with other transport modes are presented. The applicability of the methodology to more general circumstances is discussed.

Lake, RW (Queen's University, Canada); MacDonald, JA *American Institute of Indust Engrs Transactions* Vol. 10 No. 4, Dec. 1978, pp 416-422, 5 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

18 196455

ADVANCED COUPLING CONCEPTS PROJECT-PHASE I 1/2 REPORT INCLUDING GENERAL ECONOMIC MODEL

This report describes the General Economic Model for evaluation of Advanced Coupling Concepts/Systems. Procedures for data collection and summaries of the pilot data on hand are described, for each of the benefit areas. The data is used for sensitivity analysis to test data requirements and to rank the potential for benefits from each area. Selected systems are tested for economic benefits and potential implementation and preliminary conclusions are described.

Punwani, SK Eshelman, L (Kearney (AT) and Company, Incorporated)

Association of American Railroads Technical Center Final Rpt. AAR R-285, Nov. 1977, 350 p., Figs., Tabs., 7 App.

Contract S-401

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

DOTL RP

18 196526

INVESTMENT PLANNING IN LONDON TRANSPORT USING NON-FINANCIAL DECISION CRITERIA PART 1 AND PART 2

This article is in two parts: Part I deals first with the requirements of the investment planning process in a corporate context, and then introduces the background and framework for London Transport's investment planning. Particular attention is given to the derivation of an appropriate corporate objective and decision criterion, the formal adoption of "maximising passenger miles subject to budget constraint" is explained and justified. Part II deals specifically with the preparation of investment plans in London Transport, and illustrates the use of the "programme approach" by the case of station modernisation. Finally the presentation of the 10 year investment plan is described.

Quarby, DA (London Transport Executive) *Journal of Enterprise Management* Vol. 1 No. 1-2, 1978, p 31, 5 Fig., 3 Tab., 10 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-240888)

ORDER FROM: Pergamon Press, Incorporated, Headington Hill Hall, Oxford OX3 0BW, England

18 196530

SIXTH REPORT ON THE RESULTS OBTAINED USING THE ACCOUNTING SYSTEM FOR EXPENDITURE ON, AND FROM THE SURVEY OF UTILIZATION OF, RAIL, ROAD AND INLAND WATERWAY TRANSPORT INFRASTRUCTURES. REGULATION (EEC) 1108/70 OF THE COUNCIL OF 4 JUNE 1970, YEAR 1976

This sixth report broadly follows the lines of previous reports and in particular that for 1975. As far as possible the effects of trends and of progress made in calculating the marginal cost of use of the infrastructures have been taken into account. The commission has also started a formal revision of the basic texts to take account of changes in these calculations. The information presented in this report gives the figures received by the commission before 15 December 1978. The first part of the report relates to expenditures (tables 1 to 19) and loans (table 20), the second part presents figures on utilization (tables 21 to 45). A few summary tables (tables 46-52) have been added to the report, which also contains corrections to previous years' figures. Tables 48 to 51 in particular give figures on trends in expenditure on and the utilization of infrastructures between 1973 and 1976; they are analysed at the beginning of the report.

Commission of the European Communities Final Rpt. COM (79) 95, Mar. 1979, 77 p., Tabs.

ACKNOWLEDGMENT: TRRL (IRRD-240630)

ORDER FROM: Commission of the European Communities, 200 rue de la Loi, B-1040 Brussels, Belgium

P7904031

18 196585

FINANCIAL ANALYSIS METHODOLOGY FOR REGIONAL RAPID TRANSIT SYSTEM DEVELOPMENT, ABRIDGMENT

In planning large-scale transportation improvement projects, local, state, and federal governments all insist that a major consideration be the establishment of the financial workability of the proposed project. The financial commitments involved in such projects extend over long periods of time and can potentially impose untenable financial burdens on a community. It is therefore imperative that the financial requirements be identified early in the planning process. This requires an analysis over time of capital costs, operating and maintenance costs, revenues, and funds from local, state, and federal sources. Through such an analysis, the financial impact of various design parameters and policies, such as fare structures and levels, can be identified and evaluated. The computerized financial model described in this paper was developed for the metropolitan Dade County transportation improvement program—stage 1: rapid transit system. The costs presented here are for stage 1 (alternative), a 34.5-km (21.5-mile) conventional rail system. The financial model is being used in planning for the Dade County combined bus-rail transit system. This financial (or cash-flow) model was developed and is being used to assist in the financial analysis of various design parameters and alternatives and in the evaluation of policy decisions. The model provides a yearly analysis of capital-cost and operating-cost expenditures, capital-funding and operating-funding sources, operating revenues, and other funding sources. It also calculates the annual net cash flow and determines the extent of additional funding required.

/Author/

This paper appeared in TRB Research Record No. 680, Transportation Finance and Charges, Programming, and Costs.

Fuller, RV Rutherford, GS Schimpeler, CC (Schimpeler-Corradino, Associates); Unger, VE (Georgia Institute of Technology) *Transportation Research Record* No. 680, 1978, pp 16-18, 1 Fig.

ORDER FROM: TRB Publications Off

18 196872

CLASS 2 RAILROAD OPERATING COSTS

Multiple regression analysis was used to develop predictive equations for the estimation of operating costs associated with the provision of class 2 railroad service. Annual report data for 102 carriers was the basis for the construction of five equations, each of which pertained to estimation of a specific type of operating cost. Categories included were maintenance of way, maintenance of equipment, traffic, transportation, and general. Five specific predictor variables were included in the analyses; carrier geographic location, ownership, main trackage, traffic volume, and one other depending on the particular type of cost being estimated. In addition, an equation was developed for the prediction of the sum in dollars of the individual costs. All equations appeared to be correctly specified, and each exhibited an acceptable explanatory ability. The research findings from this study should provide significant insight into the expected magnitudes of the costs of operating a light-density line independent of class 1 ownership. The results will be of specific interest to states involved in developing and updating their state rail plans. Areas of primary application include branch-line economic viability analyses and efforts to rank branch lines in order to determine the best candidates for federal or state assistance or both.

This paper appeared in Transportation Research Record No. 687, Surface Transport Regulation and Railroad Planning.

Langley, CJ, Jr Patton, EP (Tennessee University, Knoxville) *Transportation Research Record* No. 687, 1978, pp 11-18, 1 Fig., 3 Tab., 1 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

18 196873

SIMPLE ANALYTICS OF RAIL COSTS AND DISINVESTMENT CRITERIA

Recent estimates have indicated that a significant amount of excess capacity exists in the rail freight industry. The techniques used to estimate branch-line viability have varied widely, however, and in many cases there is no economic basis for the viability analysis. This paper develops the microeconomic concept of plant indivisibilities and demonstrates the effects of minimum efficient scale on the costs of providing branch-line service. Using this characterization of rail costs, it is shown that the demand curve can lie entirely beneath the declining average cost curve, making it impossible for total revenue to equal total cost with a single price. The concepts of consumer and producer surplus are introduced, and a social welfare criterion of optimum disinvestment is developed. That criterion is compared to the private profitability criterion. The two are shown to be equivalent with perfect price discrimination and to depend implicitly on the pricing of alternative modes, as illustrated by a model including both rail and motor freight service. Certain simplifying conditions are then relaxed in order to take account of rail network interdependencies: parallel rail lines and the "feeder effect" or the movement of branch-line originations over the main-line network. No empirical estimate of rail costs or demand is included. Rather, the paper develops heuristic models of branch-line disinvestment that may serve to inform empirical investigations.

This paper appeared in Transportation Research Record No. 687, Surface Transport Regulation and Railroad Planning.

Harris, RG (California University, Berkeley) *Transportation Research Record* No. 687, 1978, pp 19-25, 8 Fig., 11 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

18 196927

THE ECONOMIC JUSTIFICATION FOR DEMAND LEVELING PRICING IN THE RAIL INDUSTRY

The paper provides a non-technical discussion of peak-load pricing principles and their application to accomplish demand leveling in the rail industry. The economic justification for demand-responsive rail rates is explained and the improvements which would result from their implementation is discussed. The economic impact of existing regulatory pricing policies on freight car utilization is examined and evaluated. Results of the paper show that poor pricing principles have generated substantial inefficiencies for the rail industry and that freight car utilization would be greatly improved by flexible, demand-responsive rail rates.

Berglund, MF

Federal Railroad Administration Final Rpt. FRA-OPPD-78/5, Dec. 1977, 20 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-279851/OSL, DOTL NTIS

19 194130**TRANSPORTATION ENERGY SCENARIO ANALYSIS
TECHNICAL MEMORANDUM NO. 2: HISTORICAL RATES OF
CHANGE IN THE TRANSPORTATION STOCK**

This report examines historical rates of change in the transportation stock as a result of the introduction of new or improved technologies. Organized by mode, it highlights selected technological changes in motor vehicles (including automobiles, trucks, and buses), light and heavy rail transit, rail passenger and freight systems, commercial and general aviation, merchant shipping, and pipeline systems. As appropriate, these improvements are related to salient features of the technology under examination, the transportation system into which it was introduced, and general social or economic conditions. As a tool for long-range planning in the area of technology commercialization, the document is intended to provide background material against which to gauge maximum and likely rates of change (or acceptance) that may be anticipated following the introduction of new or greatly improved transportation technologies.

Millar, M Bernard, MJ, III
Argonne National Laboratories, Department of Energy ANL/
EES-TM-6, Sept. 1978, 42 p.

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: Energy Research Abstracts, NTIS
ORDER FROM: NTIS

ANL/EES-TM-6

19 195697**THE AMERICAN RAILROAD PASSENGER CAR**

An engineering history of American passenger cars from the inception of railroads to the present. The development of wheels, trucks, couplers and other components is outlined. The evolution from wood to metal cars is described. The fully annotated, well-illustrated work, in addition to all its mechanical details, discusses the business and social aspects of rail travel and their impact on passenger accommodations from the first cars based on stage-coach design to contemporary lightweight equipment.

White, JH, Jr
Smithsonian Institution No Date, n.p.

ORDER FROM: Johns Hopkins University Press, Homewood Campus,
Baltimore, Maryland, 21218

20 180409

DOMESTIC AND INTERNATIONAL TRANSPORTATION OF U.S. FOREIGN TRADE: 1976. PART A-EXPORTS. PART B-IMPORTS (ANALYSIS)

This report contains results of the 1976 Survey of Domestic and International Transportation of U.S. Foreign Trade, an origin/destination study of the movement of foreign trade within the United States. The results are available on a public-use tape, and appear also in this 2-volume final report. The purpose of this survey was to collect data for 1976 similar to, but more comprehensive than, those collected during the 1970 survey on movements of exports and imports within the United States. The information collected includes the U.S. interior origin of exports and destination of imports; the domestic mode of transportation between significant points; the commodity weight, value, and volume; the international and domestic shipping costs; the use of containerization and other handling characteristics; and terms of sale (c.i.f., etc.). The new data were linked to data already available on the international movement of commodities through ports within the 48 contiguous states as collected from documents filed with the U.S. Customs Service. This information will be useful to shippers, carriers, port authorities, researchers, and government agencies at all levels in areas such as cargo forecasting, market analysis, and facilities planning; in analysis of trade patterns, port hinterlands, modal distribution, and modal interface at ports; and in studying the impact of foreign trade on the domestic transportation system and state and local economics. The scope of the 1976 survey was expanded over the 1970 survey to include previously excluded bulk commodities and to collect information on U.S. foreign trade commodities transhipped to and from third countries by rail and truck via Canada and Mexico.

The study is sponsored by the Department of Transportation, the U.S. Army Corps of Engineers, and the Maritime Administration.

Bureau of the Census July 1978; 55 pp

ACKNOWLEDGMENT: Bureau of the Census

ORDER FROM: Bureau of the Census Subscriber Services, Department of Commerce, Washington, D.C., 20233

20 185629

STUDY OF POTENTIAL COAL UTILIZATION, 1985--2000

Growing energy requirements beyond 1985 will require continued expansion of coal use and will impose a considerable strain on the mining and transportation industries. National projections tend to obscure the reality that the impacts of this expansion will not be borne equally throughout the nation, but will fall heavily on the coal-producing regions, particularly on those in the west. The Federal government's policy to develop a commercial synthetic fuels industry may result in a new and growing coal market during this period, as well. To examine these factors, regional supplies and demands for coal, oil, and natural gas were estimated for 1985 and 2000. National coal supplies of 1018 million tons in 1985 (consistent with FEA's 1976 National Energy Outlook) and 1836 million tons in 2000 were employed in this analysis. In order to estimate transportation and consumption patterns for these supplies, a substantial data base was assembled estimating interregional energy-transportation costs. Delivered energy costs were then estimated regionally by combining the wellhead or mine-mouth costs of the fuel resource with these transportation charges. Coal transportation and use patterns for electric utilities, industrial steam, and synthetic-fuel producers were determined by linking the supply, demand, and cost estimates and solving the resulting network through a cost-minimizing linear program formulation. The coal-use patterns generated through this formulation constituted the basis of an investigation of constraints that might preclude this development. Major findings are summarized. (ERA citation 03:040668)

Gunwaldsen, D Bhagat, N Beller, M
Brookhaven National Laboratory, Department of Energy Dec. 1977, 194 p.

Contract EY-76-C-02-0016

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

BNL-50771

20 185651

DEMAND 77: EPRI ANNUAL ENERGY FORECASTS AND CONSUMPTION MODEL. VOLUME 1. FORECASTS AND GENERAL DESCRIPTION OF THE MODEL

This report presents forecasts of end-use consumption of electricity, petroleum, natural gas, and coal for the years 1980 to 2000. The forecasts are based on an econometric model whose equations represent energy consumption of each form of energy in each end-use sector. The forecasts are based on a forecast of long-run economic growth coupled with three scenarios concerning energy prices and conservation policy. Each of the scenarios was coupled with two scenarios concerning natural gas availability, one in which natural gas supplies are restricted at the assumed price and the second in which natural gas is freely available at the assumed price. The scenarios were: (1) a baseline scenario, which assumed that the most likely energy prices would prevail and that no significant new conservation policies would be adopted; (2) a high-electricity-consumption scenario, with low oil prices and minimal obstacles to the use of coal and nuclear energy for electricity generation; and (3) an energy-conservation scenario, which embodied the proposals in President Carter's National Energy Plan. Forecasts are presented for each of the sectors and for each of the forms of energy by five-year periods. The structure of the econometric model is described along with plans for further development. (ERA citation 03:037540)

Williams, LJ Boyd, JW Crow, RT
Electric Power Research Institute 18, Mar. 1978, 77 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

EPRI-EA-621-SR(V.1)

20 185655

UTILITY ANALYSIS OF COAL TRANSPORTATION AVAILABILITY. FINAL REPORT

Under the Energy Supply and Environmental Coordination Act of 1974, the Federal Energy Administration was directed to serve, to certain electric utility and industrial power plants, prohibition orders restricting them from burning petroleum products and/or natural gas as their primary energy sources and, thus, necessitating conversion to coal. This study seeks to determine if the transportation systems and facilities servicing first-round ESECA-candidate electric utility power plants are adequate to support a finding of transportation availability for those plants. The study identifies, characterizes, and documents transportation systems availability for each ESECA plant with respect to the following areas: (1) trunk lines from coal-supply region to demand region, including mode, ownership, and capacity; (2) spur lines from trunk lines to plants, including mode, ownership, capacity, and structural integrity; (3) mine-site loading and plant-unloading facilities, including ownership, capacity, and needed construction or refurbishment; and (4) economically feasible alternative systems for purposes of fallback routes if the primary route should become inadequate. The modes of transport considered included railroad rolling stock (general, unit, and integral trains), barges, and trucks. A time frame of 1976 to 1985 (inclusive) was used. (ERA citation 03:037550)

Energy Resources Company, Incorporated, Department of Energy Sept. 1976, 160 p.

ACKNOWLEDGMENT: NTIS

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HCP/B60573-01

20 185866

INACCURATE ESTIMATES OF WESTERN COAL RESERVES SHOULD BE CORRECTED

An accurate estimate of coal under Federal lease, and information on lessee development plans is essential for supporting coal leasing policy decisions. Better estimates are needed to relate Interior leasing with the administration's goal of increasing domestic coal production. Interior's recoverable reserve estimates are based on general recovery factors--not detailed, current economic analysis; using unreliable estimates in enforcing laws would produce inadequate production controls, increase the chances for speculative holdings, and be against the public interest. Wide variations existed between Interior and leaseholder estimates; leaseholder estimates were generally supported better. But many leaseholder estimates were incomplete because they did not consider all underground coal. GAO considers neither Interior nor leaseholders estimates accurate or reliable. No coal was produced before

1977 on most Federal leases; about 212 million tons may be produced annually by 1985.

General Accounting Office Cong Rpt. EMD-78-32, July 1978, 63 p.

ACKNOWLEDGMENT: NTIS
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PB-283305/1ST

20 185890

STIMULATING THE ECONOMY OF THE GREAT LAKES STATES. A SURVEY FOR THE COMMITTEE FOR GREAT LAKES ECONOMIC ACTION. APPENDIX B. GREAT LAKES BIBLIOGRAPHY AND CURRENT RESEARCH

The bibliography is a product of a six-month survey of business, labor, government, civic and academic leaders concerned with future economic development in the Great Lakes. The bibliography also includes a Current Research section listing research in progress or recently completed which is not presently in the published literature. The bibliography is divided into twelve major sections--Institutional capacity, Capital investment, Labor, Land use, Natural resources, Non-metropolitan development, Population, Regional economy, Regional development, Transportation, and Urban economic development, and References.

Findley, LB
Academy for Contemporary Problems, Economic Development Administration Dec. 1977, 119 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-283711/OST

20 185916

THE PENNSYLVANIA COAL MODEL-EXECUTIVE SUMMARY PHASE I

In the model formulation, data banks on coal supply, transportation, and demand are used in a linear optimization procedure which derives potential coal supply systems under alternative future demand scenarios. Insights into such policy areas as coal production, cash flows, employment, land use, and environmental quality may also be gained.

Sponsored in part by Pennsylvania Science and Engineering Foundation, Harrisburg.

Knight, CG Manula, CB
Pennsylvania State University, University Park, Pennsylvania Science and Engineering Foundation, Appalachian Regional Commission
ARC-75-164/PA-4374ES, June 1977, 69 p.

Grant ARC-75-164/PA-4374

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-283966/OST

20 185917

THE PENNSYLVANIA COAL MODEL-PHASE I

In the model formulation, data banks on coal supply, transportation, and demand are used in a linear optimization procedure which derives potential coal supply systems under alternative future demand scenarios. Insights into such policy areas as coal production, cash flows, employment, land use, and environmental quality may also be gained.

Sponsored in part by Pennsylvania Science and Engineering Foundation, Harrisburg.

Knight, CG Manula, CB
Pennsylvania State University, University Park, Pennsylvania Science and Engineering Foundation, Appalachian Regional Commission
ARC-75-164/PA-4374, June 1977, 311 p.

Grant ARC-75-164/PA-4374

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-283967/8ST

20 185960

THE TRANSPORTATION OF ENERGY COMMODITIES FOR THE APPALACHIAN REGION

No abstract available.

Ernst and Ernst, Appalachian Regional Commission 3 Volumes, Apr. 1978, 686 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-284440-SET/ST

20 185961

THE TRANSPORTATION OF ENERGY COMMODITIES FOR THE APPALACHIAN REGION. VOLUME I

The research focused on the need to expand the capacity of fixed facilities, such as locks and dams along the inland waterway system; new crude, petroleum product and natural gas pipelines and new rail lines. Requirements for barge and railroad equipment and for maintenance of right-of-way of rail lines to support the transportation of energy commodities were also estimated. The study examined the capacity of energy transportation system for states east of the Mississippi to meet National energy needs in 1985 and 2000. Potential levels of capital investment to maintain and expand capacity of the energy transportation system were also made.

Also available in set of 3 reports PC E12, PB-284 440-SET.

Ernst and Ernst, Appalachian Regional Commission Final Rpt.
ARC-76-86/CO-4533-V1, Apr. 1978, 436 p.

Contract ARC-76-86/CO-4533

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-284441/3ST

20 185962

THE TRANSPORTATION OF ENERGY COMMODITIES FOR THE APPALACHIAN REGION. VOLUME II. APPENDIX

Contents: Analysis zones used in the Appalachian Regional Commission (ARC) energy transportation study; Review of the ARC regional energy model; Determination of link costs; Computing link capacities; Determining resource requirements; Summary of transportation regulatory authority by state for all study area states; Program documentation; Coal slurry pipelines; Railroad system capacities; Mine mouth generation facilities. (Portions of this document are not fully legible)

Also available in set of 3 reports PC E12, PB-284 440-SET.

Ernst and Ernst, Appalachian Regional Commission Final Rpt.
ARC-76-86/CO4533-V2, Apr. 1978, 230 p.

Contract ARC-76-86/CO-4533

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-284442/1ST

20 185963

THE TRANSPORTATION OF ENERGY COMMODITIES FOR THE APPALACHIAN REGION. EXECUTIVE SUMMARY

The research focused on the need to expand the capacity of fixed facilities, such as locks and dams along the inland waterway system; new crude, petroleum product and natural gas pipelines and in new rail lines. Requirements for barge and railroad equipment and for maintenance of right-of-way of rail lines to support the transportation of energy commodities were also estimated. The study examined the capacity of energy transportation system for states east of the Mississippi to meet national energy needs in 1985 and 2000. Potential levels of capital investment to maintain and expand capacity of the energy transportation system were also made.

Also available in set of 3 reports PC E12, PB-284 440-SET.

Ernst and Ernst, Appalachian Regional Commission Final Rpt.
ARC-76-86/CO-4533, Apr. 1978, 21 p.

Contract ARC-76-86/CO-4533

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-284443/9ST

20 186380

NATIONAL COAL UTILIZATION ASSESSMENT. AN INTEGRATED ASSESSMENT OF INCREASED COAL USE IN THE MIDWEST: IMPACTS AND CONSTRAINTS

The objectives of the National Coal Utilization Assessment (NCUA) are to: (1) provide the Department of Energy (DOE) with the impact and impact-management information needed to ensure that environmental and social concerns receive appropriate emphasis in DOE coal R and D

programs; (2) identify and analyze strategies to alleviate potential problems or constraints associated with increased coal use; and (3) work closely with state and regional agencies and DOE to present the NCUA findings in a useful manner. This report documents Argonne's examination of: Technology characteristics; Energy supply and demand trends; Siting constraints on coal-related facilities; Impacts of increased coal use on water availability, land use, and coal reserves; Impacts on air and water quality and ecosystem; effects of trace-element emissions from coal combustion/conversion; Social and economic impacts; and Health risks. The assessment, which covered 14 northern midwestern states, placed significant emphasis on identifying the coal-related problems and risks that are of particular concern to state and regional agencies and commissions. (ERA citation 03:044093)

Argonne National Laboratories, Department of Energy Oct. 1977, 107 p.

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

ANL/AA-11(V.1)(Dr)

20 186383

SOME MEASURES OF REGIONAL-INDUSTRIAL INTERFUEL SUBSTITUTION POTENTIALS

One of the more important issues in the current energy dilemma concerns the potential for the substitution of coal for oil and gas in the manufacturing sector. Among the parameters required for such an assessment are the degrees to which various energy forms (oil, coal, gas, and electricity) substitute for one another in response to changes in their relative prices. The partial and preliminary results are presented of a research effort designed to comparatively examine substitution and demand elasticities within the manufacturing sectors of several important regions of the United States. Demand functions for the alternative energy inputs are derived from a more general model of producer behavior. Data for the manufacturing sectors of thirty-three states for the years 1971, 1974, 1975 are pooled into three regional groupings. Two statistical specifications are then estimated. The first is predicated on the assumption that the response parameters are completely heterogeneous across the three regions. The second has regional equality imposed on the parameter estimates and is identical to the complete pooling of the observations. From the above, the regional interfuel substitution and demand elasticities are determined and comparatively examined. Several notes of caution are introduced regarding the use of these (or other representative) elasticities as an aid in the policy formulation and evaluation process. The extreme care which must be taken in both interpreting and comparing alternative elasticity estimates from energy-only models is emphasized. In addition, potentially serious misinformation is shown to occur when completely pooled cross-regional and time series data are used to estimate national (or sub-national) average response parameters. (ERA citation 03:052891)

Fifty-third Conference of the Western Economic Association, Honolulu and Kona, HI, USA, 20 Jun 1978.

Goettle, EJ, IV

Brookhaven National Laboratory, Department of Energy CONF-780651-1, May 1978, 43 p.

Contract EY-76-C-02-0016

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

BNL-24368

20 186407

REPRESENTING INDUSTRY AND POPULATION STRUCTURE FOR ESTIMATING FREIGHT FLOWS

This paper presents and demonstrates a method for representing the urban industrial structure and predicting the annual usage rate of commodities by industry and by firm size. It also describes a scheme for grouping industries in sectors and treating the interindustry linkages between these sectors logically. Predictions are made in such a way that they will be consistent between commodities and between industries. Computations are simple and feasible using data that exist for any area in the U.S. The approach should be a powerful tool in attacking the problems of urban and regional structure, industry interaction, and various other areas as well as serving as a basic input to freight-demand forecasting. (ERA citation 03:048235)

Chiang, YS Roberts, PO

Massachusetts Institute of Technology, Department of Energy Aug. 1976, 29 p.

Contract EM-75-C-01-8400

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

CTS-76-8

20 186409

GENERAL INDUSTRIAL PRODUCTS (MEXICO)

The market research was undertaken to study the present and potential US share of the market in Mexico for general industrial products; to examine growth trends in Mexican end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques were also reviewed.

U.S. sales only for 8 months. Available to foreign addresses in Jul 79.

Quick (CR) y Asociados, Domestic & International Business Administration July 1978, 93 p.

Contract S-128-1870 (COMM)

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

DIB-78-12-500

20 186423

COAL PREPARATION FOR COMBUSTION AND CONVERSION. FINAL REPORT

This report stresses topics of particular interest to the electric utility industry. It covers the full scope of coal processing, from mine face to post-combustion stack gas clean-up, and provides essential information for assessing the potential contribution of physical (as opposed to chemical) coal beneficiation to a utility's fuel procurement and utilization strategy. A methodology is presented for quantifying direct costs corresponding to six different levels of preparation, ranging from mere rubbish removal from ROM coals to intensive beneficiation of crushed and sized coals in prepared media. Fixed and variable costs, including those representing Btu's lost with washing plant rejects, are tabulated for six preparation levels. Major factors influencing preparation costs are examined and the point made that such costs cannot be forecast without a detailed study of each potential application. This applies equally to estimates of quality improvements achievable and economically justifiable with a particular coal. The blending of low and medium sulfur coals is shown to be an alternative for meeting SO₂ standards in some cases, but the reader is cautioned that coals after blending may exhibit disproportionately lower ash fusion temperatures. The effects on power plant operation from burning beneficiated coals are discussed, particularly as they bear on a coal's grindability, its combustion characteristics such as fouling and slagging, and on flue gas treatment systems. Coal transportation costs are investigated on a nationwide basis and impacts of financial and environmental constraints on the coal preparation industry discussed. The report leads to the conclusion that the moderate costs of coal beneficiation are often more than offset by the benefits and savings generated by this practical and proven technology. (ERA citation 03:046489)

Phillips, PJ

Gibbs and Hill, Incorporated May 1978, 295 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

EPRI-AF-791

20 186574

REMOTE SENSING OF STRIPPABLE COAL RESERVES AND MINE INVENTORY IN PART OF THE WARRIOR COAL FIELD IN ALABAMA

Methods by which estimates of the remaining reserves of strippable coal in Alabama could be made were developed. Information acquired from NASA's Earth Resources Office was used to analyze and map existing surface mines in a four-quadrangle area in west central Alabama. Using this information and traditional methods for mapping coal reserves, an estimate of remaining strippable reserves was derived. Techniques for the computer analysis of remotely sensed data and other types of available coal data were developed to produce an estimate of strippable coal reserves for a second four-quadrangle area. Both areas lie in the Warrior coal field, the most prolific and active of Alabama's coal fields. They were chosen because of the amount and type of coal mining in the area, their location relative to urban

areas, and the amount and availability of base data necessary for this type of study.

Joiner, TJ Copeland, CW, Jr Russell, DD Evans, FE, Jr Sapp, CD
Geological Survey Final Rpt. NASA-CR-150781, July 1978, 128 p.
Contract NAS8-31573

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

N78-32520/6ST

20 186684

COAL DEVELOPMENT AND GOVERNMENT REGULATION IN THE NORTHERN GREAT PLAINS: A PRELIMINARY REPORT
Characteristics and development status of 91 known deposits in Montana, North Dakota, and Wyoming are described by deposit and in the aggregate. The report discusses socioeconomic and environmental impacts of the extraction, transportation, and conversion phases of the coal fuel cycle, as they would occur in the absence of state or federal regulation of these activities. Existing state and federal laws and regulations applicable to each of these phases of the cycle are described.

Nehring, R Zycher, B Wharton, J
Rand Corporation, National Science Foundation Final Rpt. R-1981-NSF/RC, NSF/PRA-7407918/1/7, Aug. 1976, 218 p.

Grant NSF-OEP74-07918

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-285918/9ST

20 186689

MARKETING PROSPECTS FOR WESTERN COAL, WITH A SUPPLEMENTARY REPORT ON THE ECONOMICS OF SYNTHETIC FUELS FROM COAL

Data on western coal availability indicate that low cost resources of such coal are in ample supply to meet demand levels implied by recent energy forecasts. An extensive review of the cost engineering literature on electric power plants leads to the conclusion that while nuclear power appears to have a strong long-run position, the data are subject to considerable uncertainty. A regionally disaggregated simulation of electric utility fuel use shows the wide range of possible coal use patterns that could emerge. Lead times are such that a substantial increase of coal use will occur between now and the middle 1980s but the split of markets between eastern and western coal is unclear. Intensified nuclear competition may restrain subsequent growth in the period 1990-2000, but this is not certain. A method for placing different estimates of synthetic fuel costs on a consistent basis and for testing the sensitivity of such costs to coal prices is presented in the Supplement. This method suggests that earlier studies were overly optimistic about the prospects for synthetic fuels.

Gordon, RL Julian, EL Julian, LC
Pennsylvania State University, University Park, National Science Foundation Final Rpt. NSF/PRA-7520827/1/7, Dec. 1976, 346 p.

Grant NSF-OEP75-20827

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-285944/5ST

20 188332

THE OUTLOOK FOR AUSTRALIAN FREIGHT TRANSPORT TO 1983

The aim of this freight transport outlook paper is to identify existing and future changes and try to predict their impact on the industry. The outlook for freight in transport industry is dependent upon changes in demand for services, changes in the ability of industry to supply the required services and the interaction between supply and demand. Possible changes in supply and demand likely to occur during the next five years are detailed. The most significant of the anticipated changes in demand are 1) total freight transport task is expected to grow at approximately the same rate as general economic activity as measured by GDP, 2) most spectacular area of growth in demand will be in the transport of coal for export, 3) growth in international air freight. Other pressures will result in changes to the industry. For the road transport sector the most significant changes will be an increase in the real price of fuel, increasing domination by the major road haulers, and less

regulated environment. The mode which will probably be most affected by change will be the railways. The number of the covering abstract of the conference is IRRD no. 235123.

Australian Government Publishing Service Conf Paper 1978, 47 p., 6 Tab.

ACKNOWLEDGMENT: TRRL (IRRD 235128), Australian Road Research Board
ORDER FROM: Australian Government Publishing Service, 109 Canberra Avenue, Griffith, A.C.T., Australia

20 188532

CRITICAL ISSUES IN COAL TRANSPORTATION SYSTEMS--PROCEEDINGS OF SYMPOSIUM

The Symposium addressing Critical Issues in Coal Transportation Systems, held June 14-15, 1978, consisted of sixteen papers addressing economic, security, labor, circuitry, regulatory, and technological issues affecting the transportation of coal. The modes addressed by the papers included rail, pipeline, inland waterways, Great Lakes, and ocean. Extensive question and answer sessions followed each delivered paper.

This is a report of work supported by the Departments of Commerce, Defense, and Transportation under provisions of Contract N0014-75-C-0711 between the National Academy of Sciences and the Office of Naval Research.

Draffin, C Desai, SA Hettner, R Greene, R Boone, JW Tauber, H Fuller, D Sullivan, P Souder, P Eastman, S Roseman, D Rieber, M Lippek, HE Miles, C DeSteele, JG Shore, M Maritime Transportation Research Board Nov. 1978, 358 p., Refs.

Contract N00014-75-C-0711

ACKNOWLEDGMENT: Maritime Transportation Research Board
ORDER FROM: National Academy of Sciences, 2101 Constitution Avenue, NW, Office of Publications, Washington, D.C., 20418

20 189052

CONTRACT RATES: INCREASING RAIL PROFITABILITY

The Railroad Revitalization and Regulatory Reform Act contains two sections which allow imposition of contract rates which were not allowed under the Interstate Commerce Act. The 4R Act restricts application of contract rates to all situations, but fresh fruit and vegetable traffic is suggested as a case where such a rate making procedure might be applied. Contracts for rates and service are seen as a useful marketing tool; for produce traffic contract rates offer a means to halt decline of rail market share and to yield an acceptable rate of return on investment in new intermodal equipment. Successful demonstration of this could stimulate application of contract rates to other commodities.

Hill, SG (Manalytics, Incorporated) *ICC Practitioners' Journal* Vol. 46 No. 2, Jan. 1979, pp 222-232

ORDER FROM: Hein (William S) and Company, Incorporated, 1285 Main Street, Buffalo, New York, 14209

DOTL JC

20 189053

PIGGYBACK'S POTENTIAL FOR PERISHABLES

Railroad share of the fresh fruit and vegetable traffic has decreased to the present 10 percent level in the wake of growth of the owner-operator, agricultural-exemption truckers. Santa Fe is teaming with a shipper association, Co-operative Shippers, Inc., in an intermodal operation which will use special reefer trailers for produce eastbound from the West Coast and dry freight westbound--achieving balanced moves at competitive rates.

Welty, G *Railway Age* Vol. 180 No. 1, Jan. 1979, pp 30-32, 6 Phot.

ORDER FROM: ESL

DOTL JC

20 189072

THE LIMITS OF PIGGYBACK: LIGHT AT THE END OF THE TUNNEL

A survey of firms originating piggyback-competitive freight was made to rate the significance of ten possible disadvantages of TOFC service. They were also asked what level of savings would have to be achieved with TOFC to overcome disadvantages and if improved TOFC service would reduce the required savings. Primary disadvantages are the length and variability of transit time. While piggyback rates favor long-haul traffic, this market

represented less than 30 percent of the total volume which is divertible from trucks under the best of circumstances.

Beier, FJ (Minnesota University, Minneapolis); Frick, SW *Transportation Journal* Vol. 18 No. 2, 1978, pp 12-18, 1 Fig., 4 Tab.

ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606

DOTL JC

20 189073

PROBLEMS IN ESTIMATING THE SOCIAL COST OF MINIMUM RATE REGULATION

Two methods of determining the benefits of a cost-based railroad rate structure are appraised; a blending of the two is seen as yielding better estimates of traffic diversion from motor carriers. Combining the flexibility of the stochastic choice approach with the base of the inventory theoretic approach appear to produce reliable estimates of benefits.

Harmatuck, DJ (Wisconsin University, Madison) *Transportation Journal* Vol. 18 No. 2, 1978, pp 19-28, 1 Fig., 2 Tab.

ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606

DOTL JC

20 189781

DEVELOPMENT TRENDS IN THE TRANSPORT DEMAND IN THE GERMAN FEDERAL REPUBLIC UP TO THE YEAR 2000 [Entwicklungstendenzen der Verkehrsnachfrage in der Bundesrepublik Deutschland bis zum Jahre 2 000]

Account of a study undertaken to correct forecasts made in 1975 up to 1985, in the light of recent structural changes. The forecasts now extend to the year 2000. On the basis of socio-economic and socio-demographic variables, an attempt is made to determine the future transport demand, using 7 travel objectives for passenger traffic and 12 freight classifications in freight traffic. [German]

Hope, R *Internationales Verkehrswesen* Vol. 30 No. 4, July 1978, pp 215-217

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

20 189803

PIGGYBACK NEEDS THE 45-FOOT TRAILER

With the popularity of the 45-ft trailer growing for over-the-road services, the author urges that railroads look to modifications in piggyback cars and equipment to assure long-term viability of TOFC service. While the standard piggyback car could be fitted with pedestals for handling two 45-ft trailers, none have been built this way and the question of safety will have to be examined. The traffic potential and productivity of the 45-ft trailer are explored.

Newbourne, MJ (Detroit, Toledo & Ironton Railroad Company) *Traffic World* Vol. 177 No. 8, Feb. 1979, pp 111-112

ORDER FROM: Traffic Service Corporation, 815 Washington Building, Washington, D.C., 20005

DOTL JC

20 189805

CEMENT

Cement is a word derived from the Latin caementum, which meant stone chips such as were found in Roman mortar. Although the word cement can be used to describe any adhesive substance used to make objects adhere to each other, in the primary dictionary definition and in common usage, it refers to hydraulic cement, especially portland cement. Hydraulic cements are those that have the property of hardening under water and are the chief binding agents for concrete and masonry. The vast majority of hydraulic cements are used for construction purposes. It is anticipated that concrete will continue to be one of the principal materials of construction, and cement usage will grow at a modest 2.0 percent per year through the end of the century. This Bureau of Mines report presents comprehensive data on cement including industry structure, uses, reserves-resources, technology, supply-demand relationships, byproducts and coproducts, economic factors and problems, and outlook to 2000.

Hall, WB Ela, RE
Bureau of Mines 1978, 21 p., 2 Fig.

134

ACKNOWLEDGMENT: Bureau of Mines

ORDER FROM: Bureau of Mines Publications Distribution Branch, 4800 Forbes Avenue, Pittsburgh, Pennsylvania, 15213

20 189860

DETERMINANTS OF FREIGHT MODAL CHOICE. ABRIDGMENT

Briefly described is a freight transportation modal choice model that, because it is felt that any broad study of freight must deal with more than two modes, does assume existence of more than two possible modes. This research implies that, in order to forecast freight commodity flows accurately, it is necessary to take individual commodity characteristics such as shipment size and value into account. The type of mode chosen by a shipper will depend greatly on the commodity to be transported; in turn, this will help determine modal choice. Input-output models provide commodity-group output forecasts that can be used as a starting point to forecast demand for transportation by mode at a commodity level; an appropriate modal split algorithm can--after converting value of output to tons--estimate the tonnage carried by each mode. This methodology is preferable to more macro-related methodologies when research is focusing, for example, on the effects of energy or regulatory policies; it may be that in many cases government actions will not alter shipper choice because of a shipper's perception of transport.

This paper appeared in TRB Research Record No. 668, Freight Movement and Demand.

Jelavich, MS (Peat, Marwick, Mitchell and Company) *Transportation Research Record* Vol. N No. 68, 1978, pp 14-17, 3 Tab., 5 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

20 189863

ESTIMATING SERVICE-DIFFERENTIATED TRANSPORT DEMAND FUNCTIONS

This paper develops a methodology for estimating the demand for freight transport based on a model of the shipper's decision-making process. Conditions of optimality are used to specify a choice model--subject to some assumptions about the shipper's response to the risks incurred by using the transport system. This model is expanded to allow for testing for imperfection in the goods markets. If such imperfection exists, a technique is proposed that involves generating a posterior on shipment size and the estimated choice model. The resulting expectation of the posterior, when used in combination with industry supply functions, produces demand equations. Finally, market equilibria--where demand equals supply--are computed. /Author/

This paper appeared in TRB Research Record No. 668, Freight Movement and Demand.

Daughety, AF (Northwestern University, Evanston); Inaba, FS (Washington State University) *Transportation Research Record* Vol. N No. 68, 1978, pp 23-30, 3 Fig., 3 Tab., 20 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

20 189864

EFFECT OF INCREASED MOTOR-CARRIER SIZES AND WEIGHTS ON RAILROAD REVENUES

Railroad net revenue is directly related to motor-carrier rates and costs on all traffic for which motor carriage can be substituted easily for rail service. Increases in maximum lawful truck sizes and weights will lead to lower motor-carrier costs. Competition and regulatory pressure will translate these lower costs into lower rates. Railroads will have to either match the lower rates or lose traffic to the competing mode. In either instance, railroad revenue will decline as a result of the increased truck sizes and weights. The amount of loss depends on the reduction in motor-carrier costs and rates brought about by the increase in capacity, and by the proportion of existing rail traffic that will move by motor carrier if the relative rates of the two modes change. If motor-carrier capacity increases from 33 249 kg to 40 834 kg (from 73 280 lb to 90 000 lb), costs of operation and rates are estimated to decline by 16.8 percent. Potential for diversion from rail to truck was estimated by examining market shares of each commodity in each distance grouping. Available market share data suggest that railroads compete with motor carriers for traffic accounting for approximately 75 percent of rail revenue. Thus, a 16.8 percent decline in motor-carrier costs and rates would

force railroads to make competitive adjustments that would cost the industry up to \$2 billion. /Author/

This paper appeared in TRB Research Record No. 668, Freight Movement and Demand.

Hymson, EB (Department of Transportation) *Transportation Research Record* No. 668, 1978, pp 30-35, 1 Tab., 5 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

20 189865

ESTIMATING EFFECTS OF RAILROAD ABANDONMENT

Estimates were developed of the potential for rail-service termination and of the probable transport-related effects that such loss of rail service would have on the freight-transport system, transport costs of affected rail users, resulting public and private-sector investment requirements and energy consumption. All estimates were developed for lines on which service either had been recently terminated or might be terminated in the future. A survey was conducted of a sample of users of these lines. Estimates of the overall effects of abandonment were developed by a computer program from an analysis of survey responses and from waybill data for shipments originating or terminating on the lines under study. About 80 percent of present rail shipments to or from facilities that lose rail service would continue to be made to or from these facilities by another mode, with most of these made entirely by truck or by a combination of truck and rail. About half of the remaining shipments would continue to be made to or from other locations in the general area. The average increase in transport-related expenditures of affected rail users would be about 17 percent of present railroad charges. It was also estimated that abandonment of the lightest density lines under study would generally result in a small reduction in fuel consumption, while abandonment of uneconomic lines with more moderate traffic densities would result in increased fuel consumption. /Author/

This paper appeared in TRB Research Record No. 668, Freight Movement and Demand.

Weinblatt, H (Faucett (Jack) Associates); Matzkie, DE (CONSAID Research Corporation); Harman, JE (Department of Transportation) *Transportation Research Record* No. 668, 1978, pp 17-21, 2 Tab., 23 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

20 190164

TRANSPORTING THE NATION'S COAL--A PRELIMINARY ASSESSMENT, REPORT TO THE SECRETARY OF TRANSPORTATION FROM THE COAL TRANSPORTATION TASK FORCE

For the next decade and beyond, moving the nation's coal will present a stern challenge to the U.S. Transportation system. The Coal Transportation Task Force report concentrates on three main objectives: (1) to undertake an assessment of the U.S. transportation system's ability to move the greatly increased coal volumes projected for the mid-1980's, (2) to identify any potential bottlenecks or problems in transporting coal between now and 1985, and (3) to make a preliminary evaluation of the post-1985 demands for coal movement and identify the problems likely to be encountered.

Department of Transportation Jan. 1978, n.p.

ACKNOWLEDGMENT: General Motors Research Laboratories (GMRL 78-46)

ORDER FROM: DOT

20 190208

CURRENT AND FUTURE TECHNOLOGY IN FREIGHT TRANSPORT

Technology utilised in Australia is on a par with that used elsewhere. The major difference occurs in the efficiency with which the technology is used. Factors which must be present before any technical change are 1) demand, 2) capability for change 3) institutional influences must not prevent the new technology 4) social acceptance. Any technology developments in air transport in Australia will follow those of the USA, possibly with the manufacture of a dedicated freight transport aircraft, resulting in cost reductions for freight. Only moderate changes are anticipated in rail-ways-their biggest opportunities being in improvements in operation procedures. Trucking operations will continue to undergo minor changes, with the trend for larger trucks with greater power to weight ratios, and quieter engines. A number of changes in freight technology will involve the

development of systems that will facilitate a more efficient use of that technology, including improved scheduling techniques and planned inter-relationships for intermodal movements /TRRL/

This paper was presented at the Workshop on the Future of Domestic Freight in Australia, Canberra, 1977.

Heacock, RH

Bureau of Transport Economics, Australia 1978, 15 p., 3 Fig., 4 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 236807), Australian Road Research Board

ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

20 190261

THE CURRENT DOMESTIC FREIGHT SITUATION

This paper focuses on the tasks that are being undertaken by the various modes (i.e. Physical movements) and makes estimates of what the user charges are likely to be in a current year. It is estimated that 1200M tonnes of freight were consigned in 1975-76. Two-thirds of the interstate total of 56M tonnes is carried by sea, with road and rail sharing the remainder in about equal amounts. Of the total intra-state non-urban transport total of over 300M tonnes, nearly all is carried by road and rail. Air transport is most expensive, followed by road, rail and sea. The total user cost in 1975-76, \$6400M is equal to 9% of the gdp. User payments to road transport are estimated to be three quarters of the total. In the interstate trade, sea carries most of the bulk liquids and solids, while road and government rail share most of the non-bulk freight task. Pipelines carry two-thirds of the non-urban bulk liquid movements within state borders and rail handles about 60% of total intrastate non-urban freight movements. The number of the covering abstract of the workshop is IRRD no. 236802.

Papers from the Workshop on the Future of Domestic Freight in Australia, Canberra, 1977.

Quinlan, HG

Bureau of Transport Economics, Australia 1978, 14 p., 3 Fig., 4 Tab.

ACKNOWLEDGMENT: TRRL (IRRD-236804), Australian Road Research Board

ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

20 190362

PHOSPHATE

The primary soil nutrients that are needed to assure high yields per acre from arable lands are nitrogen, phosphorus, and potassium. These elements are applied to the soil as they are depleted by crops. There is no substitute for the unique nutritive element phosphorus in agriculture, and the only source of phosphorus is phosphate rock. Phosphorus cannot be recycled or recovered from secondary sources. This Bureau of Mines report presents comprehensive data on phosphate including industry structure, reserves-resources, technology, supply-demand relationships, byproducts and coproducts, economic factors and problems, government programs and legislation, strategic considerations, operating factors and problems, and outlook to 2000.

Stowasser, WF

Bureau of Mines 1979, 19 p., 6 Fig.

ACKNOWLEDGMENT: Bureau of Mines

ORDER FROM: Bureau of Mines Publications Distribution Branch, 4800 Forbes Avenue, Pittsburgh, Pennsylvania, 15213

20 190768

TRANSPORTATION AND DEVELOPMENT OF ALASKA NATURAL RESOURCES. COMMISSION STUDY

One of the central issues that has emerged in the analysis of the (d)(2) lands has been the relationship between access, transportation development, and land use. The importance of access to both Federal and non-Federal lands, particularly for major natural resource development, is clear. Two comprehensive questions delineate the principal concerns that have been addressed. Firstly, the question of future demand for transportation has been considered. This, in turn involves treating the potential for future resource development and the corollary issue of the role of transportation in determining the feasibility of resource development. The demands of settlement development and a growing population must also be considered. The second dimension of the overall analysis addresses the relationship of the (d)(2) lands and future transportation development. The paper is divided

as follows: In Chapter 2, some general relationships between transportation and resource development are considered. In Chapter 3, renewable resources are analyzed. Chapter 4 focuses on hardrock minerals. Chapter 5 treats Alaska's energy resources. Chapter 6 discusses the issue of corridor designations on (d)(2) lands. In Chapter 7, general policy implications, conclusions, and recommendations are presented. These findings provide part of the basis for a forthcoming Commission document in which specific recommendations for a future corridor designation process are developed and presented.

Engelmen, P Tuck, B Kreitner, JD Dooley, DM
Federal-State Land Use Planning Comm for Alaska FSLUPCA-32, Mar. 1978, 92 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-287193/7ST

20 190790

ROLE OF TRANSPORTATION OF ENERGY IN THE DEVELOPMENT OF THE SOUTHWEST

The total cost of an energy transportation project consists of hard costs which are directly measurable in traditional ways, and soft costs which reflect social impacts, political conflict, environmental damage, and other less readily quantifiable impacts. Soft costs and benefits are playing an increasingly important role in decision making for western energy projects. General models for estimating the hard costs of unit train and coal slurry pipeline transportation of coal were developed and run. It was found that soft costs such as the political difficulty of obtaining water for slurry pipelines may outweigh the hard costs.

Prepared by California Univ., Los Angeles. Inst. of Geophysics and Planetary Physics.

Anderson, OL Rogozen, MB
Lake Powell Research Project, California University, Los Angeles,
National Science Foundation BULL-50, NSF/RA-770587, Aug. 1977, 47 p.

Grant NSF-ENV72-03470

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-287369/3ST

20 191159

HIGH-BTU GAS SUPPLY SYSTEMS: THE CHARACTERIZATION AND SOCIAL COST OF SELECTED OPTIONS FOR PROVIDING GAS TO A MIDWESTERN TERMINUS

This study identifies and compares the social costs of alternative methods of supplying incremental quantities of pipeline-quality gas to the Chicago-Northern Indiana area in the 1985 to 1990 time period: increased offshore production of nonassociated natural gas, imported liquefied natural gas, and first-generation Lurgi gasification of North Dakota lignite and southern Illinois bituminous coal. Reference systems, each supplying 250 million cubic feet of gas per day, are defined and characterized to allow comparison of the four options on an equivalent basis. The social costs emphasized are resource use, environmental residuals, conventional construction and operating costs, socio-economic impacts, and human health and safety impacts. Where possible, the social costs are quantified and presented side by side for the four reference systems. (ERA citation 04:000023)

Samsa, ME Hub, KA Evans, AR
Argonne National Laboratories, Department of Energy Oct. 1977, 272 p.
Contract W-31-109-ENG-38

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

ANL/IAPE/TM-78-1

20 191160

AGENDA FOR ANALYSIS, ASSESSMENT AND RESEARCH

The goals of the NCUA program are to identify the health, socioeconomic and environmental impacts of possible levels of future national and regional coal development, define where those impacts may cause problems or constraints to increased coal use, and identify and evaluate alternative strategies for alleviating the problems or constraints. In conjunction with this first year assessment, an extensive effort was undertaken to contact state and regional organizations to identify the major coal-related issues of

concern to them. This report summarizes the results of those contacts and describes NCUA studies responding to the issues. (ERA citation 04:000126)

Hilton, ML
Argonne National Laboratories, Department of Energy Dec. 1977, 70 p.

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

ANL/IAPE/TM-78-6

20 191181

ENERGY UTILIZATION AND ENVIRONMENTAL CONTROL TECHNOLOGIES IN THE COAL-ELECTRIC CYCLE

This report presents an overview and assessment of the currently commercial and possible future technologies in the United States that are a part of the coal-electric cycle. From coal production to residual emissions control at the power plant stack, this report includes a brief history, current status and future assessment of each technology. It also includes a discussion, helpful for policy making decisions, of the process operation, environmental emission characteristics, market constraints and detailed cost estimates for each of these technologies, with primary emphasis on coal preparation, coal-electric generation and emissions control systems. (ERA citation 03:056411)

Ferrell, GC
California University, Berkeley, Department of Energy Oct. 1977, 201 p.

Contract W-7405-ENG-48

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

LBL-6334

20 191275

POWER PLANT UTILIZATION OF COAL

This report is directed to the use of coal and coal-derived fuels for the generation of electric power at central-station utility plants and for industrial applications, especially the generation of steam in industrial boiler plants. The scope of this report is limited to that technology expected to have commercial impact by 1995. Included were various aspects of fossil-fuel-fired steam-electric plants, gas-turbine plants, and combined-cycle plants, as they relate to electric-power generation systems. Primary emphasis is placed on the utilization of coal and coal-derived fuels, including gasified and liquefied fuels resulting from coal-conversion processes. The state of the art of fuel utilization is reviewed, anticipated problems are identified, and R and D needs are defined.

Locklin, DW Hazard, HR Bloom, SG Neck, H
Battelle Columbus Laboratories Sept. 1974, 107 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289475/6ST

20 191278

THE FEASIBILITY OF RETAINING STEEL OPERATIONS IN THE BUFFALO AREA: AN ASSESSMENT OF BETHLEHEM AND REPUBLIC STEEL COMPANY OPERATIONS

The study is part of the economic adjustment strategy developed for government planners and private industry to create new jobs and stimulate economic growth in Buffalo and Erie County. It was concluded that only significant capital investment, to develop new finishing facilities, would assure the continuance of current production levels at Bethlehem's Lackawanna plant. Conversely, the preliminary assessment of Republic's Buffalo plant indicates a favorable long term outlook for maintaining current production levels.

Sponsored in part by Economic Development Administration, Washington, DC.

Szekely, J Clark, J
Erie County Industrial Development Agency, Economic Development Administration Report No. 3, Apr. 1978, 99 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289635/5ST

20 191279

A BUSINESS ANALYSIS OF THE BUFFALO MILLING INDUSTRY

The study is part of the economic adjustment strategy developed for government planners and private industry to create new jobs and stimulate economic growth in Buffalo and Erie County. Buffalo is currently the largest flour milling center in the United States. However, flow production costs in Buffalo show a competitive disadvantage due to the area's shipping problems and above average labor costs for the industry. Selling millfeed (bran removed during grinding) as a second product of milling could improve the narrow profit margin for flour. Other possible ways recommended in the report to increase profits are: improve rail service, lower flour shipping and terminal costs. Erie lake transportation improvements, promotion of better labor relations, financial assistance in OSHA compliance, millfeed market alternatives expansion, modernization assistance, and promotion of packaged food industry for Buffalo to benefit from proximity to mills.

Sponsored in part by Economic Development Administration, Washington, DC.

Hamilton, JS

Erie County Industrial Development Agency, Economic Development Administration Report No. 5, Sept. 1978, 50 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-289637/1ST

20 191286

RESEARCH AND DEVELOPMENT FOR IMPROVING COAL EXTRACTION: CONSTRAINTS AND INCENTIVES TO COMMERCIALIZATION

Barriers to commercializing new technology resulting from R and D application for improved coal extraction systems and the incentives required on both the federal and state levels which would allow these new technologies to be commercialized are discussed. Numerous constraints were identified, leading the authors to conclude that the government should consider incentives that will: (1) stabilize markets for coal; (2) stabilize the price of coal competitive with oil and gas; (3) assure adequate transportation systems; (4) stabilize regulations that will allow growth of U.S. coal industry; (5) establish manpower recruiting and training facilities to support expanding industry; and (6) establish a climate where capital availability will not be a problem for an expanding coal industry.

Prepared in cooperation with USC, Inc., Pittsburgh, PA.

Little (Arthur D), Incorporated, USC, Incorporated, National Science Foundation NSF/OEP-74-19795/1/4, 1974, 63 p.

Contract NSF-C952

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-289852/6ST

20 191474

ORBES PHASE I: INTERIM FINDINGS

This report is an integrated summary of various elements of Phase I of the Ohio River Basin Energy Study (ORBES) which includes three parallel but independent preliminary technology assessments and a number of in-depth topical studies. ORBES Phase I was conducted by research faculty from six state universities in the state comprising the Phase I study region: all of Kentucky, and substantial portions of Illinois, Indiana and Ohio. The results reported are preliminary in nature and reflect limitations in data availability and analysis which were found. Four alternative scenarios for energy development in the region through the year 2000 were employed to conduct the analysis. Some of the major preliminary findings of this first year assessment are: (1) air quality limitations in the region are becoming increasingly important considerations; (2) water availability limitations may become important before the year 2000; and (3) a high rate of growth may be associated with an insufficiency of skilled labor to construct conversion facilities. The implications of these and other selected findings for public policy development are discussed.

Stukel, JJ Keenan, B

Illinois University, Urbana, Environmental Protection Agency Summ Rpt. EPA/600/7-77/120, Nov. 1977, 172 p.

Grant EPA-R-804848-01

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-291331/7ST

20 191589

EMERGING FOOD MARKETING TECHNOLOGIES: A PRELIMINARY ANALYSIS

The objective of this preliminary analysis was to identify new or emerging food marketing technologies that will have significant long-range impacts on society and the U.S. food system. Food marketing is defined as the activities that take place within the food system from the farm gate to the consumer: processing, wholesaling, retailing, transportation, and food service. The availability and cost of energy, supply of and demand for food (domestically and worldwide), environmental concerns, food safety, nutrition and health, and consumer attitudes are major socioeconomic factors identified and discussed in the report. These socioeconomic and marketing components are outlined and analyzed using two different scenarios: the first scenario assumes only minor changes in the socioeconomic climate through the year 2000, and the second (felt to be more realistic) assumes changes from the current situation that will effect concomitant changes in the food marketing system.

Library of Congress Catalog Card no. 77-600131.

Office of Technology Assessment OTA-F-79, Oct. 1978, 92 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-291039/6ST, DOTL NTIS

20 191737

PRIVATE CARRIAGE MOTIVATION AND IMPACT OF RURAL LOCATION

The study deals with 26 selected firms who developed private motor carriage operations for one or more of the following reasons: (1) to improve service, even though the result was more costly (15 examples), (2) to reduce transportation cost, even though the resulting service was lower (10 examples), and (3) to serve a plant in an unfavorable rural location (21 examples). The report contains a brief case description of each firm and its reason(s) for going into private carriage. The firms were very diverse in terms of size, industry classification (particularly represented were industrial products, forest products, and food companies), and specific motivations. Under the first type of motivation, seven specific service improvements were noted (varying from firm to firm): (1) faster transit for normal orders, (2) better control and faster transit for expedited orders, (3) need for specialized equipment, and better, (4) scheduled deliveries, (5) overall consistency of service, (6) handling and claims experience, and (7) direct off-highway deliveries. In nearly every case where reducing cost was the motivation, reduction in service entailed an increased cycle time for orders or deliveries, by virtue of delays in consolidating shipments for transport by private truck. Unfavorable rural plant locations were widespread across the country, and all lacked sufficiently reliable common carrier truck service.

Sutton, RM Potter, RS Weitz, DW

Drake Sheahan/Stewart Dougall, Incorporated, Department of Transportation Final Rpt. 2273, DOT/P/50-78/1, Mar. 1975, 64 p.

Contract DOT-OST-PS-50367

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-293495/8ST

20 191867

NATIONAL COAL UTILIZATION ASSESSMENT. AN INTEGRATED ASSESSMENT OF INCREASED COAL USE IN THE MIDWEST: IMPACTS AND CONSTRAINTS

Energy supplies and energy demand are projected for the nation and the region. Siting constraints for fossil-fuel power plants and coal conversion plants are discussed. Resources of coal and water are evaluated. The environmental impacts of increased usage of coal are discussed (effects on air and water quality, effects on aquatic and terrestrial ecosystems, possible hazards of trace elements). Finally, social and economic impacts and health hazards are considered. (ERA citation 04:005082)

See also Volume 1, RRIS 20 186380. Microfiche copies only.

Argonne National Laboratories, Department of Energy Oct. 1977, 463 p.

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: NTIS

ORDER FROM: Defense Documentation Center, Cameron Station, Alexandria, Virginia, 22314

ANL/AA-11(V.2)Dr

20 191870

IMPLEMENTING ENERGY CONSERVATION STRATEGIES IN ENERGY MATERIALS TRANSPORT: U.S. DEPARTMENT OF ENERGY AND OTHER GOVERNMENT AGENCY POLICY-MAKING MECHANISMS

This report defines policy-making channels within Federal agencies for the strategy implementation efforts of a U.S. Department of Energy (DOE) project entitled "Development and Implementation of Strategies to Conserve Energy in Energy Materials Transport and Through Modal Shifts." The report's research involved review and analysis of government-agency policy-making mechanisms. Research methods included interviews with 36 regulatory officials, and review of pertinent legislative, organizational and other technical materials. Emphasis was placed upon relevant Federal agencies and summary treatment given other federal, state, and local agencies. In addition to DOE, the ICC, DOT, DOI, EPA, and Council on Environmental Quality were found to be highly important to the implementation of strategies developed during this project. Brief case studies were also made of states and localities which have had significant effects upon energy materials transport systems. The main findings of the report are that two primary channels exist for effecting this project's policy-oriented strategies: inputs to legislation and inducement of regulatory involvements. In addition, interviews with Federal agency officials during the research produced two significant suggestions for implementing strategies--to hold internal DOE and inter-agency briefings.

Bertram, KM

Argonne National Laboratories, Department of Energy Nov. 1978, 62 p.

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: NTIS

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ANL/EES-TM-32

20 191872

COAL RELATED ISSUES IDENTIFIED BY STATE AND REGIONAL GROUPS IN THE MIDWEST

Coal-related problems of general concern include increased air pollution; effects of Prevention of Significant Deterioration and other Federal air quality regulations; potential water use conflicts; acid mine drainage and other problems related to reclamation of "orphan" lands; price and availability of alternative energy sources; transportation constraints; and lack of information on new coal technologies. Perhaps the most important problem stressed was the increase in air pollution that will result from increased coal use unless advanced emission-control technologies are used. This issue is of particular importance to states in the eastern half of the region. Here the increased use of local high-sulfur coals could aid the economy of coal-producing states such as Ohio and Illinois, but would also result in higher sulfur dioxide emissions. While there is a general concern over the impacts of increased air pollution, a related problem is that of meeting Federal standards designed to control pollution. Many states are having difficulty meeting National Ambient Air Quality Standards. Conflicts over water use related to coal development are expected to increase. While both coal-fired generating plants and the gasification plants require much water, demands for municipal and industrial supply, agriculture, and recreation are also increasing. Adequate disposal of solid and liquid wastes from emission-control systems is of concern to many Midwestern state governments. Transportation problems may also slow development of coal in the Midwest. Existing rail networks, cars and engines may not be adequate to haul the amount of low sulfur coal required in the next 20 years. Several other coal-related problems were mentioned at several meetings but were not as common as those discussed above. (ERA citation 04:005083)

Hilton, ML

Argonne National Laboratories, Department of Energy Nov. 1977, 110 p.

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

ANL/IAPE/TM-78-2

20 191877

COAL IN TRANSITION 1980--2000 DEMAND CONSIDERATIONS

The usefulness of the Brookhaven model, TESOM, lies in its exploration of the demand side of the energy system. Sectors where coal may be substituted for other energy forms are identified, and attractive technologies are highlighted. The results of the runs accord well with intuitive expectations. The increasing prices of oil and natural gas usually imply that (a) coal synthetics become increasingly attractive technologies, except in the High Demand and CRUNCH Cases (b) nuclear and hydro-electric generation are preferred technologies, (c) coal steam electric, even with expensive scrubbers, becomes more attractive than oil or gas steam electric by year 1990, (d) fluidized bed combustion for electricity generation is cost effective (with relatively small environmental impacts) when compared to oil, gas and coal steam electric. FBC process steam exhibits similar behavior. In the High Demand and CRUNCH scenarios, technologies such as solar electric, which are usually not chosen on the basis of cost, enter the solution because meeting demands has become extremely difficult. As the allowed coal expansion rate becomes a limiting factor, coal synthetics manufacturing becomes an unattractive alternative. This is due both to the need for coal electric generation to meet high electricity demand levels, and to the inefficiencies in the manufacturing process. Due to preferred allocation of coal to electricity generation or synthetics, direct coal use is reduced, although this is normally a preferred option. (ERA citation 04:012268)

Kydes, AS Cherniavsky, EA

Brookhaven National Laboratory, Department of Energy Dec. 1977, 92 p.

Contract EY-76-C-02-0016

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

BNL-50844

20 191901

ANTHRACITE TASK FORCE REPORT

On April 29, 1977, President Carter enunciated a National Energy Plan which called for an increased reliance on abundant domestic coal, and established a goal of approximately 1.3 billion tons to be produced by 1985. In keeping with this Energy Plan and in an attempt to reverse the declining contribution of anthracite to meeting the nation's critical energy needs, on May 11, 1977, Mr. John F. O'Leary, FEA Administrator, announced the formation of the Anthracite Task Force. This Task Force was charged with the responsibility of setting forth recommendations to improve the production and utilization of anthracite within acceptable environmental parameters. The Task Force feels that the impetus behind the implementation of the recommendations contained in this Report is based upon the importance of recognizing anthracite as an abundant domestic energy resource possessing distinct attributes which allow it to play a potentially major role in meeting the coal utilization objectives of the National Energy Plan. On the other hand, anthracite is a resource faced with distinct problems that limit the realization of its energy producing capabilities. The geological circumstances under which this high grade energy source was created, also produced difficult and expensive mining conditions far different from those encountered in the extraction of other coal resources. As a result, anthracite incurs an initial cost disadvantage relative to many alternative fuels. (ERA citation 04:012269)

Department of Energy Nov. 1978, 292 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

DOE/RA-0007

20 192118

MINNESOTA COAL STUDY

This study of coal use in Minnesota involves an analysis of several interrelated factors relative to consumption, transportation and handling, economic implications, and environmental impacts.

Prepared in cooperation with Minnesota Dept. of Natural Resources, St. Paul, Minnesota Dept. of Transportation, St. Paul, Minnesota Pollution Control Agency, Roseville, and Minnesota State Planning Agency, St. Paul. See also RRIS 20 188168; Bulletin 7901.

Minnesota Energy Agency, Minnesota Department of Natural Resources, Minnesota Department of Transportation, Minnesota Pollution Control Agency, Minnesota State Planning Agency MEA/MCS-78, Sept. 1978, 137 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

BP-292106/2ST

20 192189

ASSESSMENT OF THE POTENTIAL FOR USING ALASKAN COAL IN CALIFORNIA

This study is a brief assessment of the potential for using Alaskan coal in California. Adequate coal resources to support California markets exist in the Beluga coal fields near Cook Inlet. New mines, transportation, and ship-loading facilities would be required to exploit these resources. Alaskan coal could be delivered to California at costs competitive with coal delivered by rail from other western states. Tentative locations were identified along the California coast for power plants, coal conversion plants and coal transshipment terminals. California ports typically cannot handle ships with drafts greater than about 30 ft, which implies either using ships smaller than the most economical sizes or other, novel unloading methods. The technical and economic issues concerning six alternatives to conventional coal use are discussed: solvent-refined coal, synthetic fuel oils, coal-oil mixtures, methanol, fluidized bed combustion, and low-Btu/combined-cycle combustion. Air pollutant emission limitations were compiled for the California Air Pollution Control Districts in the Coastal Zone; these were compared with the emissions to be expected from the use of coal and the alternative technologies in electric power plants. All of these technologies—with the possible exception of solvent-refined coal—probably could meet current emission standards. However, none will be able to meet the extremely low levels implicit in the New Source Review Standards. Even with the use of best available control technology, such plants probably will be unable to qualify for construction permits without the use of emission tradeoffs. Further studies are recommended on the detailed identification of power plant sites along the coast, on the availability of pollutant emission trade offs, and on the economics of producing Alaskan coal and transporting it to California. (ERA citation 04:012270)

Rubin, B Borg, IY Ramsey, WJ
California University, Livermore, Department of Energy July 1978, 41 p.

Contract W-7405-ENG-48

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

UCRL-52511

20 193765

OVERVIEW OF SOLID FUEL TRANSPORTATION

Rapid growth in domestic coal use during the next 25 years may be expected to increase coal transportation demands, especially on western railroads. Similarly, the rapid flux in environmental regulations has resulted in considerable uncertainty among utilities concerning the ground rules for coal use. The course that environmental policy ultimately takes will be a major determinant in regional coal use and transportation patterns. To capture this effect, utility coal use patterns were estimated for 1985 and 2000 under two widely different environmental scenarios. The transportation impacts of these scenarios were estimated and formed the basis of a discussion of current coal transportation issues.

Proceedings of the 13th Intersociety Energy Convers Eng Conference held August 20-25, 1978, San Diego, California. Also available from IEEE Cat n 78-CH1372-2 ENERGY, New York, New York.

Gunwaldsen, D (Booz-Allen and Hamilton, Incorporated)
Society of Automotive Engineers Vol. 2 SAE Cat n P-75, 1978, p 1010

ACKNOWLEDGMENT: EI
ORDER FROM: SAE, IEEE

20 194124

ENERGY MATERIAL TRANSPORT, NOW THROUGH 2000, SYSTEM CHARACTERISTICS AND POTENTIAL PROBLEMS. TASK 2 FINAL REPORT: COAL TRANSPORTATION

This report contains a summary characterization of the existing domestic coal transportation system and an assessment of some potential problems which may impact coal transportation in the United States during the balance of the century. A primary purpose of this task is to provide information and perspective that contributes to the evaluation of research and development needs and priorities in future programs. Specific concerns are identified which warrant additional programmatic effort to fill apparent gaps in the coverage of other relevant programs. Recommendations are

made for new programs to address these concerns according to their apparent importance under conditions known or anticipated in early 1978. These recommendations are intended to encourage new research initiatives by the coal transportation industry, the Department of Energy (DOE) and other cognizant agencies. Concerns were identified by the analysis of problem issues associated with currently-projected growth scenarios for domestic coal consumption. The assessment of potential problem effects on the adequacy of future coal transportation assumes domestic coal production levels of approximately one billion tons in 1985 and two billion tons by the year 2000. The relative priorities of potential problems were judged on the basis of their overall impact on the system and the immediacy of this potential impact.

DeSteele, JG Bamberger, JA Franklin, AL Hendrickson,
PL Lippek, HE Loscutoff, WV Wilson, CL
Battelle Memorial Institute/Pacific Northwest Labs, Department of Energy PNL-2420, June 1978, 106 p.

Contract EY-76-C-06-1830

ACKNOWLEDGMENT: Energy Research Abstracts, NTIS
ORDER FROM: NTIS

PNL-2420

20 194127

IMPACT OF COAL TRANSPORTATION ON GILLETTE, WYOMING, AND COMMUNITIES SOUTH AND EAST

The selected study area, a coal production region that transports coal through Gillette, Wyoming, and communities southeast of Gillette, will be heavily affected by increasing numbers of unit-trains carrying coal. Unit-trains will face little competition from other transportation modes through 1985. Depending on the study area's 1985 coal production level, it is estimated that 18 to 31 trains per day will pass through Gillette. This will result in separation of community services, and increased safety hazards, noise, and vibration. Without new grade separations within Gillette, traffic blockages are estimated to range from 5 to 9 h per day. Slow moving trains preparing to stop for crew changes will contribute to part of this traffic blockage. Only 20% of the study area's coal production will affect Gillette. The rest will either bypass the city via a newly-completed rail spur or be mined southeast of the city and marketed in the Midwest and the South. Again, depending on the study area's 1985 coal production level, 62 to 125 trains per day will be required to move through the communities southeast of Gillette. The railside communities southeast and downline of Gillette could be even more heavily affected with problems similar to those that Gillette faces. Before the year 2000, unit-trains probably will see competition from other transportation modes, such as slurry pipelines, combined gasification and pipeline, combined electricity production and transmission by wire, and other modes, which will take a portion of the study area's coal transport from unit-trains.

Morris, DW
Los Alamos Scientific Laboratory, Department of Energy LA-7495-MS,
Sept. 1978, 31 p.

Contract W-7405-ENG-36

ACKNOWLEDGMENT: Energy Research Abstracts, NTIS
ORDER FROM: NTIS

LA-7495-MS

20 194597

CENSUS OF TRANSPORTATION

The Census of Transportation is performed every five years in years ending with 2 and 7. The latest available data are from the 1972 Census; statistics for 1977 will be published in 1979. The Census is made up of a number of different surveys, each of which is published separately: National Travel Survey; Commodity Transportation Survey, Area Statistics (Northeast and North Central Regions; and South and West Regions and United States Summary); Commodity Transportation Survey, Commodity Groups (including individual reports for selected commodity groupings and a report on the traffic patterns of small manufacturing plants); Commodity Transportation Survey, Shipper Groups (14 reports in the series, including transportation equipment, textile mill products and apparel, primary metal products, food and kindred products, chemical and allied products, petroleum and coal products, machinery, etc.); and Truck Inventory and Use Survey (individual reports produced for each of the 50 states, the District of Columbia, and a United States summary.) A bibliography of the reports produced for the 1972 Census is available at no charge from the Government Printing Office as Subject Bibliography-149.

Bureau of the Census No Date, n.p.

ACKNOWLEDGMENT: GPO

ORDER FROM: GPO

20 194598

CENSUS OF MANUFACTURES

The Census of Manufactures is conducted every five years in years ending with 2 and 7. 1972 Census statistics are the latest currently available; 1977 data will be published in 1979. The Census is presented in 3 volumes: Volume I, Subject and Special Statistics (covering such topics as manufacturing activity in government establishments, fuels and electric energy consumed, water use in manufacturing, etc.); Volume II, Parts 1, 2, and 3, Industry Statistics, SIC Major Groups 20-26, 27-34, and 35-39 (including, in Part 3, Ship and Boat Building, Railroad and Miscellaneous Transportation Equipment, Report Number 37C); and Volume III, Parts 1 and 2, Area Statistics, Alabama-Montana and Nebraska-Wyoming (with a report for each of the 50 states and the District of Columbia.) The reports are available separately, i.e., interested persons can purchase copies of reports on single SIC groups, such as Ship and Boat Building, and on individual states. A subject bibliography, SB-1436, of the various publications of the Census of Manufactures is available free from the Government Printing Office.

Bureau of the Census No Date, n.p.

ACKNOWLEDGMENT: GPO

ORDER FROM: GPO

20 194602

TSC INTERCITY FREIGHT FLOWS FILE

This ongoing research project is being performed by the TSC to give present and projected modal traffic flows by mode and community class. The file being developed includes traffic by 2-digit STCC commodities from BEAR origin to BEAR destination.

Transportation Systems Center Data base No Date, n.p.

ACKNOWLEDGMENT: DOT

ORDER FROM: TSC

20 194631

RAIL TRANSPORTATION SYSTEMS-THAT HELP US MEET OUR ENERGY REQUIREMENTS

In direct relation with Economics of Energy, Energy and Power Systems, and Energy Management is transportation of potential energy. Within the scope of the United States energy movement, the railroads play and will continue to play a vital role, since coal is our major energy source for the present as well as for the future. The only way these huge amounts of coal can be moved over our railroad network is through the establishment of a "System's Approach" to transportation and handling of bulk material. This paper will discuss these existing systems as well as expected improvements.

Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference held April 12-14, 1979, Colorado Springs, Colorado.

Roberts, W (Ortner Freight Car Company)

Institute of Electrical and Electronics Engineers Tech Paper IEEE 79CH1454-8 IA, 1979, pp 24-29, 7 Fig.

ACKNOWLEDGMENT: IEEE

ORDER FROM: IEEE

DOTL RP

20 194663

PROVIDING NEW SOURCES OF MINERAL SUPPLY

This Bureau of Mines study outlines the history of 11 major metal ore deposits or districts that are relatively new discoveries. The oldest operation is the White Pine mine, where major exploration was initiated in 1929. Discovery (delineation of ore bodies) dates range from 1948 to 1976. All but two of the deposits, Quartz Hill in Alaska and Flambeau in Wisconsin, are or shortly will be in major production.

Gries, JP

Bureau of Mines 1979, 42 p., 18 Fig.

ACKNOWLEDGMENT: Bureau of Mines

ORDER FROM: GPO

20 194664

STATUS OF THE MINERAL INDUSTRIES

"Status of the Mineral Industries 1978" provides a written and graphic view of the Nation's mineral position and its mineral industries. It describes

recent activities in mineral position, consumption, imports, exports, and uses of significant minerals and mineral raw materials. Charts profile trends for the past 25 years in supplies and uses of iron, steel, major nonferrous metals, primary nonmetallic construction raw materials, fertilizers, and plastics. Also included are current and historical financial data on the mineral industries, such as debt-to-equity ratios, asset-to-liability ratios, and plant and equipment expenditures.

Bureau of Mines 1979, 39 p., 20 Fig.

ACKNOWLEDGMENT: Bureau of Mines

ORDER FROM: GPO

20 194665

MINERAL TRENDS AND FORECASTS

This report contains trend and forecast tables for the United States and the world that are based on data terminating in 1976, the last year for which reliable and complete data were available for the world at the time the data sheets for the report were compiled by the commodity specialists--January and February 1978. Since the inception of the trends and forecasts in present form by the Bureau, the published information has been useful to mineral economists, research organizations, government agencies, students and academia, industry, and others as a source of U.S. and world supply-demand and reserve-resource information. The tables serve as a guide to government policy-planning agencies and commissions in deliberations where the adequacy of mineral supplies with respect to future demand is of critical importance.

Bureau of Mines 1979, 25 p., 4 Fig.

ACKNOWLEDGMENT: Bureau of Mines

ORDER FROM: Bureau of Mines Publications Distribution Branch, 4800 Forbes Avenue, Pittsburgh, Pennsylvania, 15213

20 194857

ANALYSIS OF 1976 RAIL HAZARDOUS MATERIAL FLOWS

The 1976 Railroad Waybill data base has been analyzed on a state by state basis to provide an overview of Hazardous Material (HAZMAT) production, consumption and the patterns of flow connecting producer and consumer. The results show that production is primarily concentrated in the Texas-Gulf Coast region in the middle of the petroleum refined and related product and industrial chemical-production complexes. The flow of HAZMAT is in three major corridors connecting the production complex with a California-West Coast Consumption concentration, with a South-East/-Florida Consumption concentration, and (more diffusely) with the main industrial production complex of the U.S. lying along the Mississippi-Ohio River Basin serving the large population concentrations there and along the North East Coast. Maps of several indices of production, consumption and rail transport are developed and discussed, and a brief discussion of long range trends that may affect the patterns of transport is presented. In summary, to understand Rail Hazmat flows better, work should be done to explain the apparent consumption anomalies in Idaho, North Dakota, Maine, and Florida along with the better understood sites in Indiana etc. Radio active material movement forecasting is worth a special long range analysis due to its sensitive nature. A study of categorization of HAZMAT flows should be done to see if other similar special categories of HAZMAT may become increasingly important. Finally a forecasting study using some of the trend analysis presented herein should be developed and unified with HAZMAT accident potential analysis documented separately.

Hassler, FL

Transportation Systems Center SS-20-U1-40, Apr. 1978, 34 p., Figs., 4 Ref., 2 App.

ACKNOWLEDGMENT: TSC

ORDER FROM: TSC

DOTL RP

20 194858

TRANSPORTATION PATTERNS OF PRODUCTION AND CONSUMPTION-1967 CENSUS OF TRANSPORTATION-SIC 20-39

This work presents a macroscopic picture of production and consumption of manufactured commodities (SIC 20-39) from a transportation point of view. The picture that emerges is in qualitative agreement with intuitive understandings of the spatial character of the U.S. economy in 1967, the year of collection of the census of transportation data on which this study is based. (The work is preliminary and requires detailed refinement to remove source data problems). Forecasts of potential changes in the spatial patterns

are made. Research issues in energy commodity movement that impact the transportation planning of rail investments and deepwater ports and pipelines are outlined. Finally, research in four directions to expand the approach presented herein is described and related to the long range planning problem for freight movement in the U.S.

Hassler, FL
 Transportation Systems Center SS-200 U1-21, Mar. 1976, 20 p., Figs., 2 App.

ACKNOWLEDGMENT: TSC
 ORDER FROM: TSC

DOTL RP

20 194871
THE FUTURE OF FREIGHT TRANSPORT-A REVIEW OF THE 1977 ANNUAL CONVENTION OF THE DVWG IN STUTTGART
[Zukunft des Gueterverkehrs--ein Rueckblick auf die Jahrestagung 1977 der DVWG in Stuttgart]

The 1977 annual convention of the DVWG in Stuttgart was concerned with the future perspective for freight transport. In the course of papers and discussion meetings, an intensive examination took place of all aspects of freight transport. The first paper dealt with target setting in traffic policy. The main point of the scientific section was formed by three working groups, the results of their research being reported in an address and subsequently discussed. The first group was concerned with problems in the economic field, particularly themes of supply and demand, investment and competition. The second technical group dealt with technical and operational development possibilities for transport modes, transport chains and infrastructure. The third working party discussed policy questions such as pricing policy, market access regulations and administration policy. In the closing contribution of the convention, the requirements of the economy were illustrated. [German]

Heimerl, G Arnold, W (Stuttgart University, West Germany) *Internationales Verkehrswesen* Vol. 29 No. 6, Nov. 1977, pp 359-362

ACKNOWLEDGMENT: TRRL (IRRD 307639), Federal Institute of Road Research, West Germany
 ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

20 195068
RENT AND REGULATION IN UNIT-TRAIN RATE DETERMINATION

Railroads and utilities bargain over rates for hauling coal. In the past, the price of alternative fuels has served to limit those rates. Recently, these limits have been raised by regulation-induced shortages in natural gas, cartel-induced price rises of oil, and environmental opposition to nuclear power. This article estimates a model of the rate making process and examines how the process has responded to increased prices of alternative fuels. The results indicate that railroads have been moderately successful in taking advantage of these higher prices. However, their success is increasingly leading to challenges before the Interstate Commerce Commission.

Zimmerman, MB (Massachusetts Institute of Technology) *Bell Journal of Economics* Vol. 10 No. 1, 1979, pp 271-281, 2 Tab., Refs.

ACKNOWLEDGMENT: Bell Journal of Economics
 ORDER FROM: ESL

20 195069
ECONOMETRIC FORECASTING OF RAILWAY FREIGHT DEMAND

This study is concerned with the demand for rail freight transportation in Canada for the period 1958-73. The primary objective is to quantify the impact of macro-economic activity on rail freight demand. Input-output analysis has been used to provide a link between the macro-economic variables and the transportation sector. The coefficients in the input-output tables have been used to translate information on the expenditure components of Gross National Expenditure into commodity outputs. These commodity outputs are in turn related to freight movements by commodity, in the framework of a rail model. The rail model attempts to characterize the determinants and interrelations of rail freight demand and supply by commodity in a simultaneous equation framework. The results on both the commodity forecasting and rail model are quite encouraging. The major findings of the study are: (1) Given accurate forecasts of final demand variables, we can predict both the industry and commodity outputs with a

small margin of error. (2) Commodity outputs are the major determinants of rail freight demand in volume terms, and in the short run there is a proportional relationship between output and transportation demand. (3) Rail freight demand is price inelastic and the effect of price differs among commodities. (4) For the sample period 1958-73, the complete model was used to measure the combined effect of structural changes as measured by changes in the input-output coefficients, and the compositional changes in final demand over time. The results were a reduction in the growth rate of railway tons and ton-miles by 3 per cent and 6 per cent respectively, and increased revenue growth in real terms by 5 per cent as compared with a hypothetical base under which the structure and composition remain constant.

Sparks, GR
 Canadian Institute of Guided Ground Transport Final Rpt. CIGGT Rpt 78-4, Dec. 1978, 62 p., 1 Fig., Tabs., Refs.

ACKNOWLEDGMENT: CIGGT
 ORDER FROM: CIGGT

DOTL RP

20 195104
STATUS OF THE IRON ORE INDUSTRY-1978

The most striking production changes since 1952 are the growth in mine production of agglomerates and the decline in production of direct-shipping ore. In 1952, less than 6 percent of usable ore was agglomerated before shipment, mostly in the form of sinter. Pellets were still in the pilot plant stage. In 1978, more than 80 percent of usable ore will be agglomerated before shipment, practically all in the form of pellets. These changes have resulted from depletion of direct-shipping ores and increasing reliance on taconite.

Klinger, FL (Bureau of Mines) *Mining Congress Journal* Vol. 64 No. 12, Dec. 1978, pp 19-22

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

20 195553
COAL PRODUCTION & TRANSPORTATION: THE NEXT FIVE YEARS

This is the first (1975) of a series of annual proceedings of conferences and is divided into three main sections: Factors affecting investment and development; Mining and moving coal; and Purchasing and Operating Coal Cars. Fifteen presentations are included.

Transcript of Conference sponsored by Professional Lease Management held February 26-28, 1975, San Francisco, California.

Professional Lease Management Proceeding 1975, 131 p.

ACKNOWLEDGMENT: Professional Lease Management
 ORDER FROM: Professional Lease Management, One Embarcadero Center, San Francisco, California, 94111

DOTL RP

20 195554
COAL PRODUCTION & TRANSPORTATION: SECOND ANNUAL CONFERENCE-1976

This is the second (1976) of a series of annual proceedings of conferences and is divided into three main sections: Resource development of coal; Using and moving coal; and Coal car design and maintenance. Twenty presentations and a panel discussion are included.

Transcript of a Conference sponsored by Professional Lease Management.

Professional Lease Management Proceeding 1976, 232 p., 2 Tab.

ACKNOWLEDGMENT: Professional Lease Management
 ORDER FROM: Professional Lease Management, One Embarcadero Center, San Francisco, California, 94111

DOTL RP

20 195555
COAL PRODUCTION & TRANSPORTATION: THIRD ANNUAL CONFERENCE-1977

This is the third (1977) of a series of annual proceedings of conferences and includes 15 presentations and a panel discussion. Production, transportation and uses of coal were discussed.

Transcript of a Conference sponsored by Professional Lease Management held April 13-14, 1977 at the Brown Palace, Denver, Colorado.

Professional Lease Management Proceeding 1977, 236 p., 24 Fig., 1 Tab.

ACKNOWLEDGMENT: Professional Lease Management
ORDER FROM: Professional Lease Management, One Embarcadero Center,
San Francisco, California, 94111

DOTL RP

20 195556

COAL PRODUCTION & TRANSPORTATION: FOURTH ANNUAL CONFERENCE-1978

This is the fourth (1978) of a series of annual proceedings of conferences. Eighteen presentations are included on production and transportation of coal.

Transcript of a Conference sponsored by Professional Lease Management held April 12-13, 1978 at the Galleria Plaza Hotel, Houston, Texas.

Professional Lease Management Proceeding 1978, 195 p., Figs., Tabs.,
Photos., Refs.

ACKNOWLEDGMENT: Professional Lease Management
ORDER FROM: Professional Lease Management, One Embarcadero Center,
San Francisco, California, 94111

20 195705

FREIGHT COMMODITY STATISTICS CLASS I RAILROADS

Annual publication in Statement series of the ICC Bureau of Accounts compiled from quarterly Freight Commodity Statistics of the Class I Railroads in the United States. First issued in 1956.

Interstate Commerce Commission No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications,
GPO
ORDER FROM: GPO

20 195708

POTENTIAL UTILIZATION OF CANADIAN THERMAL COAL IN JAPAN

All indications point to a growing market for thermal coal in Japan as part of the country's current energy policy formulation process. Canada, with large resources of all types of coal, could fill a portion of this market. Thermal coal could come from specific thermal coal developments or from metallurgical coal mines, which usually produce a certain amount of coal not amenable to coking, but suitable for power purposes. However, penetration of this Japanese market by Canadian thermal coal will depend on the resolution of a number of problems. On the demand side, siting, environmental aspects, the need for a coal unloading and trans-shipment center, and the added cost of installing coal-fired stations could be major constraints.

LaFleur, P *CIM Bulletin* Vol. 72 No. 802, Feb. 1979, pp 61-68

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

20 195710

KEYSTONE PREDICTS RAPID EXPANSION

An industry-wide survey by The Keystone Coal Industry Manual is discussed and accompanied by tables showing new coal mines, as well as their development and expansion through 1987. The survey shows that new coal production from planned mines, will total about 644 million tpy by late 1987. Although the majority of the new mines will be underground, surface mining will account for the larger share of the production.

Nielsen, G *Coal Age* Vol. 84 No. 2, Feb. 1978, 12 p.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

20 195728

COAL DATA: A REFERENCE

No Abstract.

Department of Energy 1978, 21 p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications,
GPO
ORDER FROM: GPO

20 195729

REPLACING OIL AND NATURAL GAS WITH COAL: PROSPECTS IN THE MANUFACTURING INDUSTRIES-THE CONGRESS OF THE UNITED STATES

No Abstract.

United States Congress 1978, 83 p., Refs.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications,
GPO
ORDER FROM: GPO

20 195730

IRON AND STEEL FOUNDRIES AND STEEL INGOT PRODUCERS

No Abstract.

Bureau of the Census 1977, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications,
GPO
ORDER FROM: Bureau of the Census, Subscriber Services Section, Suitland,
Maryland, 20233

20 196108

ASSESSMENT OF SYN FUEL TRANSPORTATION TO YEAR 2000

This report identifies and discusses potential problems in transportation of synthetic fuels (synfuels) which could hamper large-scale development of these energy materials up to the year 2000. Synfuels considered are shale oil, synthetic gas from coal, coal syncrude, methanol from coal and hydrogen. Forecasts of production, existing and potential transportation systems and hazards associated with movement of each of these fuels are discussed.

Prepared for U.S. Department of Energy.

Wakamiya, W Sebelien, KB Parkhurst, MA
Battelle Memorial Institute/Pacific Northwest Labs PNL-2768, UC-71,
Mar. 1979, 69 p., 9 Fig., 9 Tab., Refs., 6 App.

Contract EY-76-C-06-1830

ACKNOWLEDGMENT: Battelle Memorial Institute/Pacific Northwest Labs
ORDER FROM: NTIS

DOTL RP

20 196114

IMPACT OF TRANSPORTATION FACTORS AND AIR QUALITY LAWS ON THE MOVEMENT OF COAL TO THE MIDWEST

The principal consumer of coal in the Midwest is the electric utility industry. Two major factors that have a significant impact on the movement of coal to Midwestern utilities are transportation costs and requirements to install flue gas desulfurization systems on all electric power plants. A review of several transportation studies reveals significant variations in assumed future transportation costs. The study uses the highest and lowest of these estimates. A requirement to install gas desulfurization systems on all power plants may enhance the development of new systems that are less costly than the lime/limestone system if low-sulfur coal is utilized. Costs of limestone and ammonia absorption flue gas desulfurization systems are compared for various levels of sulfur in coal. Using the Argonne Coal Market Model, eight scenarios that incorporate different assumptions about the level of transportation rates and sulfur emission requirements were analyzed. It was concluded that shipments of Western coal to the Midwest will be most affected by the regulations adopted regarding flue gas desulfurization. High transportation costs, while important, will not be decisive. If stringent desulfurization is mandated, then the potential Midwestern market for Western coal will be seriously eroded. On the other hand, if more moderate desulfurization levels like those proposed by the Department of Energy are accepted, then the relative share of Western coal in the Midwestern market will increase.

Treat, N Allen, E
Oak Ridge Associated Universities, Incorporated Tech Rpt. ORAU-
/IEA--79-4(R), Feb. 1979, 116 p.

Contract EY-76-C-05-0033

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

20 196115

COAL TRANSPORTATION AND USE IN THE GREAT LAKES REGION

The purpose of the seminar was to examine the implications of future coal use and transportation in the Great Lakes region. The seminar was divided into three sessions, which examined current and projected coal use in the region, coal transportation alternatives and federal and state policy implications.

From Coal Transportation and Use in the Great Lakes region; Duluth, Minnesota, June 7, 1978.

Perkinson, D

Great Lakes Basin Commission CONF-7806133-Summ, 1978, 132 p.

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: Great Lakes Basin Commission, 3475 Plymouth Road, P.O. Box 999, Ann Arbor, Michigan, 48105

20 196116

TRANSPORTATION TASK FORCE REPORT

Coal policy and transportation policy are closely interdependent. Transportation costs typically account for 40 to 50 percent of the price of coal, while coal provides the transportation sector with an important share of traffic and revenue. The prominence of coal shipments with transportation modes strongly suggests that policies which bear on coal uses, such as air quality standards or the mandated use of coal as a boiler fuel, will have significant impacts on the transportation sector as a whole. Similarly, transportation policy will be an important determinant of the price and distribution of coal. Coal does not present a unique case calling for special treatment, so coal transportation recommendations should be formulated within the broader context of a general transportation policy. The national transportation system currently suffers significant inefficiencies, in large part because of inappropriate and often conflicting policies. Prices for transportation services do not necessarily reflect the full environmental and economic costs of providing those services. The result is waste of financial and physical resources. The growing reliance on coal energy presents the transportation system with the challenge of moving substantially increased amounts of coal. Some physical bottlenecks in the system's capacity are already evident. Correct policies should guide the choice of additional investments to wherever market demand warrants the expansion of capacity. The task force concluded that the primary goal of transportation policy should be to promote economic efficiency, with particular attention to internalizing environmental costs to ensure that they are properly weighed in transportation decisions.

From Where We Agree: Report of the National Coal Policy Project, Volume 1.

Murray, FX

Westview Press, Incorporated 1978, pp 5-99

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: Westview Press, Incorporated, 1898 Flatiron Court, Boulder, Colorado, 80301

20 196363

MINERALS YEARBOOK, 1976. VOLUME 1. METALS, MINERALS, AND FUELS

Contains chapters on virtually all metallic, nonmetallic, and mineral fuel commodities important to the domestic economy. In addition, it includes a general review chapter on the mineral industries, a statistical summary, and a chapter on mining and quarrying trends.

Bureau of Mines 1979, 1484 p.

ORDER FROM: GPO

20 196424

EFFICIENCY DRIVE COMES TO CHEMICAL TRANSPORT

In the highly regulated field of chemical transportation cost-conscious producers, uncertain of the effects of deregulation, will attempt to streamline operations to optimize use of all carriers. The most obvious changes will be in the railroad, trucking and barge lines that carry most chemicals to market. Chemical companies will pay more attention to safety and will optimize their use of various types of transportation. The aim will be to emphasize regular bulk shipment and reduce small-volume, irregular shipments. This will mean more barging and unit trains and less trucking. This article discusses the cost of distribution of chemicals and the targets among carrier modes for cost savings. A survey showed that highway modes account for 47% of the total

chemical transportation, railroads just under 47% and barges only 6%. Chemical companies which feel that the best potential break on increasing transportation costs is competition among carriers, are backing deregulation or proposals for less regulation. The possible effects of deregulation of railroads and of lesser regulation of inland waterway carriers are discussed.

Greek, BF *Chemical and Engineering News* Vol. 57 No. 28, CE-NEAR57(28) 1-68, July 1979, pp 12-14

ORDER FROM: American Chemical Society, 1155 16th Street, NW, Washington, D.C., 20036

20 196922

RAIL ALTERNATIVES AND EFFECTS IN COAL TRANSPORTATION

The history of coal traffic in the northern states is reviewed. Originally, eastern coal was taken west; then after World War II, and with the use of diesel engines on railways, coal traffic was negligible; now, there are plans to move large quantities of low-sulfur western coal to the east (in combination with large ships on the Great Lakes). Between 1973 and 1977, Burlington Northern Railway invested \$201 million on roadway improvements and \$239 million on rolling stock for this purpose. They contemplate spending more than 1 1/4 billion dollars in addition between now and 1982. The threat of slurry pipelines skimming the cream of this coal traffic is discussed briefly with respect to eminent domain, regulations of common carriers, and effects on financing.

From Coal Transportation and Use in the Great Lakes region, Duluth, Minnesota, June 7, 1978.

Davies, GK Perkinson, D

Great Lakes Basin Commission 1978, pp 38-46

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: Great Lakes Basin Commission, 3475 Plymouth Road, P.O. Box 999, Ann Arbor, Michigan, 48105

20 196923

ASSESSMENT OF FUTURE COAL MOVEMENT AND TRANSPORTATION: A JOINT NTPSC-DOE EFFORT

The National Transportation Policy Study Commission and the US DOE are conducting a study to assess transportation needs to 2000. A major factor in the study is the predicted movement of coal and the ability of the transportation system to handle it. We are conducting a modal comparison of coal movement which addresses the ability of truck, railroad, slurry pipeline, transmission line and waterborne movement of coal. Included in the study will be a consideration of the environmental regulations and impacts of the various transport modes, economic regulations of transport modes, and the relative costs of different modes in providing transport services. We are also taking a close look at the impacts of regulations on coal movement. Preliminary results show that as much as \$800 billion may be needed by 1993 to pay for the required transportation system. Possible methods of financing are discussed.

From Coal Transportation and Use in the Great Lakes region, Duluth, Minnesota, June 7, 1978.

Wild, J Perkinson, D

Great Lakes Basin Commission 1978, pp 78-83

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: Great Lakes Basin Commission, 3475 Plymouth Road, P.O. Box 999, Ann Arbor, Michigan, 48105

20 196926

THE COAL INDUSTRY: PROBLEMS AND PROSPECTS: A BACKGROUND STUDY

No Abstract.

Library of Congress, United States Senate 1978, 152 p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

21 186994

JANE'S FREIGHT CONTAINERS: PORTS, OPERATIONS, MANUFACTURERS (FORECAST). ANNUAL DIRECTORY

There are 9 sections included in this annual directory: Sect. 1: Ports and Inland Transports. Organized by country, Section 1 gives data on management, container facilities and container traffic for each port. Sect. 2: Ship Operators. Included here are the names of ship operating companies involved in containerized shipping, their phone numbers, officials' names, services, fleet, number of containers in service, and overseas branches. Sect. 3: Leasing. The name, address, phone number, and services of each container leasing firm is listed by country. Sect. 4: Container Manufacturers. Listed here are the addresses, phone numbers, and names of company officials of container manufacturing firms and particulars of the containers they produce. Sect. 5: Container Handling Equipment. This section lists the names, addresses and phone numbers of the equipment companies and the products they manufacture. Sect. 6: International Rail and International Road. Data in this section include information about the companies involved in international rail and road container transport, the scope of their operations, their rail container services, traffic data, refrigerated traffic data, and names of their overseas representatives. Sect. 7: Air Freight. Sect. 8: International Container Standards. Sect. 9: Future Trends.

Finlay, P

Macdonald and Jane's Publishers Limited No Date, n.p.

ACKNOWLEDGMENT: Jane's USA

ORDER FROM: Jane's USA, Franklin Watts Incorporated, 730 5th Avenue, New York, New York, 10019

21 188757

RAILWAYS AND THEIR INTERACTION WITH PORTS

The author outlines some of the changes in ports and handling methods that have taken place in recent years. In considering whether railways still have a role to play in port activities he puts forward a list of relevant questions to be answered. Port size and the volume of traffic are factors which are examined in relation to those principal commodities that are most suitably transported by rail. Cargo handling facilities are considered with special reference to bulk materials. The author comments on the creation of a basic railway network with regard to capacity and expenditure and considers such aspects as length of haul, speed, and reliability of the journey, terrain, gradients and radius of line curvature. The last two sections cover transport policy and customs facilities.

Paper presented to Arab Ports Conference, London July 27-29, 1978, 8 p. Copies of original material available to members at a cost of 0.15 pounds per page, and to non-members at 0.30 pounds per page to include postage. There will be a minimum charge of 0.50 pounds to members and 2.00 pounds to non-members for this service.

Alexander, NJB *Cargo Handling Abstracts* No. 3, 1978, p 5

ACKNOWLEDGMENT: International Cargo Handling Coordination Assn (ICHCA 3063)

ORDER FROM: International Cargo Handling Coordination Assn, Trade News Ltd, Abford House, 15 Wilton Road, London SW1V 1LX, England ICHCA 3063

21 189752

COMPUTERISED STUDY OF RAILWAY LAYOUT [Les etudes de traces ferroviaires par le calcul automatique]

After general remarks on the first data processing applications for this purpose in the SNCF, the article describes the new program chains: AFGHA for open line studies, and TVA for the layout of stations and marshalling yards. [French]

Flauw, J *Revue Generale des Chemins de Fer* Nov. 1978, pp 726-740, 11 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

21 189766

DEVELOPMENT OF METHODS AND EQUIPMENT FOR INTEGRATED TRANSPORT ROAD-RAILWAY [Utveckling av metoder och utrustningar foer kombinationstransport landsvaeg-jaernvaeg]

The report deals with an integrated system based on handling of load-carrying units between road and railway trucks on an equalized level. Based on

this system technical developments are recommended. Possibilities for existing load carriers (containers or the like) and the demands for new types of load carriers are discussed. Design and performance of current rail and road trucks are described. A concept of new rail trucks is also presented. Possible new methods and equipment for direct transfer of load-carrying units between vehicles are discussed. A system for transfer of 3,4 x 2,5-M load carriers which are located across the railway waggon during transportation is described. This system is in operation today. A new system is then introduced including all load carriers which are locked to vehicles with ISO-corner fittings corresponding to 20' and 40' units. The system is founded upon a particular transfer-equipment. A third system is founded upon a 12.7 integrated body for a semi-trailer as a load carrier. With this system it will be straightforward to develop equipment for transfer between rail waggons and road trucks. For the Swedish domestic integrated road-railway transport system it will probably be sufficient to use the two 3,4 x 2,5 M and 12,7 x 2,5 load-carrying units. Three possible methods are presented for one-man-operated transfer of load carriers between train and terminal. The first is a truck connected to the train. The second is a remote control system for transfer between railway waggon and quay. The third is a remote control system which makes it possible for the engineer to change waggons without any other help. In this system the railway waggons are equipped with automatic couplings. [Swedish]

Grinnal, L

Luleaa Hoegskola Monograph Teknisk Rpt 1978:36T, 1978, 133 p., Figs., 2 Tab., 8 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-237657), National Swedish Road & Traffic Research Institute

ORDER FROM: Luleaa Hoegskola, Avdelningen foer Transportteknik, Luleaa, Sweden

P2580

21 190826

INCREASING COAL CAR UTILIZATION ON THE DETROIT, TOLEDO AND IRONTON RAILROAD: A STUDY OF OPEN TOP HOPPER CAR UTILIZATION AND THE COAL SUPPLY-TRANSPORTATION-DEMAND SYSTEM OF WHICH IT IS A PART

The report describes a study of the utilization of railroad freight cars and the coal traffic that could move in these cars. It examines utilization of railroads for moving coal and tries to determine its potential as an originating coal carrier. It examines the supply and demand characteristics of this specific coal market. Coal supply or producers in close proximity to the Detroit, Toledo & Ironton Railroad are analyzed. The transportation section considers both trucking and railroad aspects. The coal market demand analysis is determined by first quantifying where and how much is consumed and then finding out if DTI-originated coal is closer than the present sources of supply. In summary, the demand potential exceeds the supply by 8.3 million tons. However, the DTI failed to originate any coal from 1970-73. Subsequently, the railroad has begun to originate coal since late 1974 due to the proddings of coal producers, and is thus finally beginning to realize its latent potential as a coal originating carrier.

Potratz, JT

National Center for Product & Qual Working Life Sept. 1975, 235 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-287950/OST

21 192031

STUDY OF A STEEL INGOT DELIVERY SYSTEM USING SIMULATION TECHNIQUES

A simulation model was developed for ingot delivery process to provide an analytical tool for the investigation of different dispatching policies. As the first step, the simulation model was successfully validated against the given actual production area. A simulation experiment was designed as the next step and all the necessary statistical tests were conducted. Even though the results of the experiment showed that the single area discipline and priority rule were superior to others in terms of the measured variables, the economic dispatching rule should not be neglected. The effect of the economic rule is the reduction of engine trips, which means that the rule minimizes the engine costs, whereas the priority rule minimizes the delay costs. Therefore, the optimum policy may be a combination of these two rules if one's objective is to minimize the total operating cost. Sensitivity tests were performed on

the percent delivered within 10 percent over bogey track times, and the results showed that the system was indeed very sensitive to changes in number of strippers, number of drags of buggies, and mean track times. Finally the information that the engine dispatcher needs to perform his function was described and analyzed using the PSL/PSA language. (Portions of this document are not fully legible)

Surh, DS Talavage, JJ
Purdue University, National Science Foundation NSF/RA-761658, Mar. 1976, 200 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289845/OST

21 192213
SYSTEMS ENGINEERING FOR INTERMODAL FREIGHT SYSTEMS, PHASE I, EXPLORATORY PLANNING, VOLUME II, TASK RESULTS

Volume II is a documentation of current intermodal system and equipment characteristics; identification of institutional, regulatory, and operational constraints to intermodal freight service; discussion of problems and opportunities; and identification of appropriate goals and objectives for an improved intermodal system; development of an evaluation methodology to compare alternative systems; selection of appropriate evaluation factors and criteria; identification of improved and innovative technological components for intermodal freight movement, technological assessment of each component, synthesis of components into subsystems (pick-up and delivery, terminal, and line-haul), analysis at the subsystems level, and development of technologically compatible systems; and final evaluation of alternative technological systems with respect to economics, service, operational impact, technological considerations and social implications.

See also Volume I, PB-282 370. Prepared in cooperation with Whitten (Herbert O.) and Associates, Washington, DC., and General Motors Technical Center, Warren, MI. GM Transportation Systems Div.

Best
Kearney (AT) and Company, Incorporated, Whitten (Herbert O) and Associates, General Motors Technical Center, Federal Railroad Administration Final Rpt. FRA/ORD-78/24.II, Aug. 1978, 822 p.

Contract DOT-FR-748-4336

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-293757/1ST, DOTL NTIS

21 193755
PLUNGERS SLOW OR PUSH CARS

Dowty hydraulic retarders, widely used in Europe, are now finding application in the U.S. The small individual units, requiring no supplementary power, can be used to slow, stop or accelerate cars in flat or hump yards. A series of American test installations for specific purposes are described.

Progressive Railroading Vol. 22 No. 3, Mar. 1979, p 81, 2 Phot.

ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

21 193771
CONTAINER HANDLING-IS THERE A KEY TO SELECTION?

The development of equipment designed for use in landside container handling applications has steadily followed both the growth and spread of containerisation. In effect, this means that there is equipment available designed for use in high through-put ports such as those on the developed country trade routes and also equipment available suitable for use in low throughput ports like those of the developing countries. But how, when confronted with this vast range of equipment, does a terminal operator arrive at a purchasing decision?

Cargo Systems International Vol. 5 No. 11, Nov. 1978, p 84

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

21 194133
IN-CAB COMPUTER IS ON THE WAY

As part of the AAR's Track/Train Dynamics Program, Phase III, attention is being given to development of a minicomputer for locomotive cab

application. Locomotive engineers are to be given information on the function of units under multiple-unit control, train operating conditions, and on-board processing of operational factors. The overall concept is known as the Advanced Locomotive Cab Instrumentation System and will consist of sensors, signal conditioners, multiplexers and de-multiplexers, transmitters, receivers, controls, displays and recorders all based on the minicomputer. Present status of the various elements is discussed.

Malone, F *Railway Age* Vol. 180 No. 7, Apr. 1979, pp 34-35

ORDER FROM: ESL

DOTL JC

21 194313
STRADDLE V. SIDELIFT--ROOM FOR ALL IN TERMINAL OPERATIONS

The choice of the correct type of equipment for a particular operation depends on the ability to segregate those types of specialist equipment which are in direct competition and then to assess the pros and cons of each competitor. Modern container handlers fall conveniently into three basic divisions. Straddle carriers and sidelifts, rail mounted and wheeled gantry cranes, and frontlift trucks. These are discussed and compared. Order from NSFI as No. 16700.

Balderstone, RJ *Cargo Systems International* Vol. 5 No. 12, 1978, p 129

ACKNOWLEDGMENT: Ship Research Institute of Norway
ORDER FROM: Ship Research Institute of Norway, Technical University of Norway, 7034 Trondheim-NTH, Norway

NSFI No. 16700

21 194662
TRAINLOAD TRAFFIC

The railway is highly suited for the transport of heavy bulk traffic. On the SNCF trainload traffic accounts for more than 50% of the tonnage conveyed and more than 35% of the tonne-kilometres invoiced, despite the crisis. The article refers to the main traffic flows and their evolution. It explains the tariff conditions offered by the SNCF for full trainload traffic, for groups of wagons, for certain sets of wagons carrying liquid fuels and petroleum products or road construction and building materials. It then deals with the technical aspects of transport installations required for the dispatch and reception of trains, forwarding, programming train paths, as well as the return of empty wagons. Reference is also made to certain techniques derived from trainload working: Rapilege and TARC (transport par association de rames convergentes or forming trains with sets of wagons for the same destination). [French]

Daumas, J Garandel, F *Revue Generale des Chemins de Fer* Vol. 97 Nov. 1978, pp 711-725

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

21 194682
DETERMINATION OF THE CAPACITY OF LARGE RAILWAY JUNCTIONS AND SECTIONS OF THE RAIL NETWORK [Die Ermittlung der Leistungsfähigkeit von grossen Fahrstrassenknoten und von Teilen des Eisenbahnnetzes]

Details of a method of analysis for establishing the interaction that exists between parts of installations: junctions and line sections. The network examined is defined as an extended system of junctions. Using simple rules, junctions in one area can be grouped together with those in others to form a complete network. This process needs no special EDP equipment when the areas covered are small. It is explained using a diagram. [German]

Schwanhaeuser, W *Archiv fuer Eisenbahntechnik* No. 33, 1978, pp 7-18, 4 Tab., 5 Phot., 15 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

21 194683
ECONOMICAL LIGHTING OF TRACK ZONES ON DB [Wirtschaftliche Beleuchtung von Gleefeldern bei der Deutschen Bundesbahn]

After examining the cost-effectiveness of the pressured sodium-vapor lamp, the author describes the lighting levels required by the DB, explains the

arrangement and maintenance of color-light signals equipped with HNa lamps and discusses the problem of "lighting mix". He goes on to present a new lamp for zones in the vicinity of tracks, for factory yards, etc. Lastly, he describes development work on another, less powerful HNa lamp. [German]

Obersoler, T. *Eisenbahningenieur* Vol. 29 No. 12, Dec. 1978, pp 546-550, 9 Phot., 1 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

21 194686

DEFINITION AND CALCULATION OF "REGULATION DIFFICULTIES" IN A RAILWAY NODE [Definizione e computo della "difficolta di regolazione" di un nodo ferroviario]

Difficulties in regulating traffic in a railway node depend on the intensity and distribution of the traffic, the configuration of the node as a whole and of its elements, i.e., the characteristics that can be expressed as precise factors of a kinetic and probabilistic nature. The writer suggests using a suitable "index" for these difficulties and describes the procedure for the determination of this index. [Italian]

Mazzone, R. *Ingegneria Ferroviaria* Vol. 33 No. 10, Oct. 1978, pp 894-902, 11 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

21 194851

THE GRAIN TRAINS: FOOD FOR THE WORLD

A growing and more stable export market, acceptance of the covered hopper and unit train as the rail transport tools, and changes in various government regulations and industry requirements have given and could give greater effectiveness to rail-hauled grain traffic which has been growing.

Welty, G. *Railway Age* Vol. 180 No. 9, May 1979, pp 20-23, 3 Phot.

ORDER FROM: ESL

DOTL JC

21 195071

AUTOMATION OF FLAT CLASSIFICATION YARDS

Systems in use in Europe and Japan are described wherein the cars are propelled along classification tracks by means of propulsion and braking units which are so controlled that impact between cars is minimized. In one instance the propulsion is by means of continuous wire rope and in the other by linear induction motor. In both cases the cars themselves are propelled by rollers which engage on the flanges of car wheels. While the main objective is the reduction of damage to freight in transit, the system of car propulsion by linear motor offers promise of application to yards which have hitherto been considered insufficiently large or important to warrant automation on the hump system. A study was made of the Belleville Yard of the Canadian National Railways and a computer program devised to simulate the operation of this yard using a system of linear induction motors. The result of the study showed that the proposed system was capable of dealing in an expeditious manner with traffic likely to be offered. Detailed design would be necessary in order to provide an accurate estimate of cost but preliminary figures relating to a yard capable of classifying cuts of 60 cars into 16 classification tracks, each capable of holding 60 cars, indicate that cost would be about \$400,000. An alternative switching system has been considered wherein cars are attached to the end of the train being made up at a given point, the train being moved forward by an amount corresponding to the length of each car as it is attached. Because of the great mass of the train as it nears completion, together with the slow speed of progression throughout the classification process, the linear motor is considered to be unsuitable and rope haulage is recommended for this system. It is concluded that it is feasible to provide an automated classification yard without the expense associated with the provision of a conventional hump yard by using a linear motor for the propulsion of cars within the yard. The investment required would be comparatively modest and should result in less damage to freight and better manning arrangements within the yard. It is recommended that a prototype system be commissioned for application to a yard for which economic justification for re-equipment exists.

Barwell, FT Leech, DJ Symeonides, XP

Canadian Institute of Guided Ground Transport Final Rpt. CIGGT Rpt 78-12, July 1978, 58 p., 28 Fig., 2 Tab.

ACKNOWLEDGMENT: CIGGT
ORDER FROM: CIGGT

DOTL RP

21 195073

EASTERN CANADA RAILWAY LINE CAPACITY STUDY

This study provides a preliminary assessment of railway line capacity in Eastern Canada with a view towards identifying links which may become "congested" in the near future. The study area includes mainlines east of Thunder Bay/Armstrong Station, extending to Canadian Atlantic ports and to interchange points with the United States railway network. The basis of the capacity analysis is the CIGGT over-the-road transit time model. Extensive model revisions have been made to incorporate block spacing, siding occupancy probabilities and other important variables into the delay equations. For links where the CIGGT model was difficult to adopt, a simulation model provided by the Australian Bureau of Transport Economics was used. Five physical capacity-related measures are provided. No attempt to tie capacity to costs and revenues has been made.

English, GW Schwier, C

Canadian Institute of Guided Ground Transport Final Rpt. CIGGT Rpt 77-16, Nov. 1977, 81 p., Figs., 9 Tab., 3 Ref., 5 App.

T.C. B1027 TOTAL FUNDS:

ORDER FROM: CIGGT

DOTL RP

21 195113

TOGSIM: A SIMULATION MODEL FOR SINGLE TRACK RAILWAY OPERATION

TOGSIM is a tool used by NSB to compute the consequences of alternative ways of increasing the capacity of the railway lines. TOGSIM provides a method for operating several train performance calculations at one time. The model calculates the delays of each train running according to fixed schedules. The main parameters are schedules, train sizes, power unit sizes, safety and signalling system, length and position of passing sidings, and the power feed system. The model includes a statistical part for the analysis of train delays. This program can also be used to analyse real operational results as well as simulation results: [Norwegian]

Moen, R. *NSB-Teknikk* Vol. 4 No. 6, 1978, pp 14-20, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Norwegian State Railways, Storgaten 33, Oslo 1, Norway

21 195550

FREIGHT-CAR UTILIZATION: TWO INNOVATIVE APPROACHES ON FAMILY LINES

Two operations--one involving a trainload movement of aggregate over weekends in Florida and the other involving a combination of phosphate and grain in unit trains between the Southeast and Indiana/Ohio--have provided a low-capital approach to increasing Seaboard Coast Line's freight traffic. Service reliability, effective car supply and innovative pricing are all components of these new service packages.

Armstrong, JH *Railway Age* Vol. 180 No. 10, May 1979, pp 38-42, 5 Phot.

ORDER FROM: ESL

DOTL JC

21 195743

BULK IN ISO CONTAINERS--A GUIDELINE BRIEFING

Bulk commodities may be carried in ISO containers in the interests of superior cargo protection, savings on packing costs or to allow the transport of material direct from producer to end user without intermediate handling or storage. It is with these factors in mind that "Bulk in ISO containers"--a guideline briefing pamphlet for the International Cargo Handling Co-ordination Association--has been prepared. The article discusses the guidelines, which cover tank containers, dry and liquid bulk, gravity loading, unloading, fumigation and safety.

Agnew, J Askham, G *Cargo Systems International* Vol. 5 No. 12, Dec. 1978, p 91

ACKNOWLEDGMENT: EI

ORDER FROM: Engineering Societies Library, 345 East 47th Street, New York, New York, 10017

21 196364

COST MODELS FOR COAL TRANSPORTATION BY COMMON CARRIER

Cost and capacity analyses have determined that certain railroad networks can satisfy the increased coal demand projected by utilities only with increased investment or at a cost for rerouting. Need for investment underscores the need for adequate coal revenues. Three computerized coal transportation cost models were developed: One for all-rail; one for inland waterway, Great Lakes and coastal transportation; and one for combined rail/barge transport with intermediate transfer. A "worst case" situation with coal traffic by 1985 up over 150 percent over 1973 and a 30 percent growth of other traffic would overload many network links.

White, SJ Hynes, JP

Manalytics, Incorporated Final Rpt. EPRI-EA-675 Proj 866, Mar. 1979, 130 p.

ORDER FROM: Electric Power Research Institute, P.O. Box 10090, Palo Alto, California, 94303

21 196373

AUTOMATIC WAGON HAULING FOR RATIONAL AND ECONOMIC HANDLING OF GOODS

A description of ASEA's automatic wagon hauling system, which meets present-day demands on efficiency, flexibility and safety is presented. An account is given of the various application areas. This automatic wagon hauling system is a permanently installed system, comprising a coupling carriage, a rope driving system with deflection sheaves, a patented double-barrel capstan and rope tensioning equipment with counterweight. The purpose of the latter is to maintain the friction of the steelrope against the capstan barrels.

Huldt, A Larsson, U *ASEA Journal* Vol. 51 No. 4, 1978, pp 99-100

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

21 196381

BASIC DIMENSIONING OF TRANSPORT INSTALLATIONS [Sul dimensionamento di massima degli impianti di trasporto]

A method for the general optimal sizing of transport installations is presented. The method consists of a double procedure: analytical research of possible solutions through a deterministic formulation of the problem and its verification for the identification of the optimal solution, based on the application of simulation techniques. First, the general aspects of installations, conceived as systems, are considered, passing then to description and analysis. After having applied these criteria to the case of a marshalling yard, a definition is given of the analytical structure of the problem and the conditions for solving them. Finally, a resolving algorithm is separately presented for the case of an independent service unit and for two or more dependent units. [Italian]

Gori, S Pavese, O *Ingegneria Ferroviaria* Vol. 33 No. 11, Nov. 1978, pp 974-984

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

21 196391

FROM MECHANICAL TO ELECTROMECHANICAL ROLLING STOCK WEIGHING APPARATUS [Von der mechanischen zur elektromechanischen Gleisfahrzeugwaage]

Description of the first DB electromechanical weighing apparatus, installed in the new marshalling yard at Maschen in 1977. [German]

Zoder, E *Eisenbahningenieur* Vol. 30 N2, 7902, pp 54-62, 13 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

21 196523

ENERGY TRANSPORTATION IN APPALACHIA

Results of two recent studies which examined the transport modes for coal and coal-based energy commodities in the Appalachian Region of the U.S. are discussed. The first study focused on the line-haul portion of the trip, examined three modes--rail, water, and pipeline--and three energy resources--coal, oil (refined or crude), and natural gas. The second study was

more limited. First it dealt only with roads and highways, and secondly it only considered the transport of coal within the eight producing states of the Region.

Fourth Kentucky Coal Refuse Disposal and Util Seminar, Proceedings, Pineville, Kentucky, June 6-7, 1978.

Pixton, CE

Kentucky University Res Rpt. IMMR 40-RRR5-78; Dec. 1978, pp 31-36, 2 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: Kentucky University, Office of Research and Engineering Services, Lexington, Kentucky, 40506

21 196529

MINING TRANSPORT-SHORT AND LONG TERM CONSIDERATIONS

The paper considers the scale of the underground transport activity within the collieries of the National Coal Board. Particular characteristics of currently operating systems for the transport of mineral, men and materials are discussed along with the historical trends which have contributed to the present stage of underground transport. Criteria of safety and efficiency are examined and restraints discussed. Current developments in transport technology within the UK are reviewed along with comparable work in Europe.

Watt, RG (National Coal Board, England) *Mining Engineer* Vol. 138 No. 211, Apr. 1979, pp 729-741, 1 Fig., 6 Phot., 5 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-240684)

ORDER FROM: ESL

21 196982

SYSTEMS ENGINEERING FOR INTERMODAL FREIGHT SYSTEMS. PHASE I-EXPLORATORY PLANNING--VOLUME III-TASK RESULTS; APPENDICES

One of five reports documenting the results of a study entitled "Systems Engineering for Intermodal Freight Systems-Phase I, Exploratory Planning" sponsored by the Federal Railroad Administration. Volume III is comprised of three sections which constitute a statistical appendix to the Study Team's Phase I analysis report. The sections contain the detailed computer listings for all computer simulations of alternatives to the present intermodal system which were carried out as a part of the task entitled: Evaluation, Selection, and Recommendation of Alternatives. Part 1 contains those listings which deal with the analysis of trailer terminal alternatives, Part 2 with container terminal alternatives and Part 3 with line-haul and pickup/delivery alternatives. Each part is indexed on the rear cover of this volume.

Nyquist Heuer Kluk Markham Kloss DeClaire Hood Britt Lipman

Kearney (AT) and Company, Incorporated, Federal Railroad Administration, Whitten (Herbert O) and Associates, General Motors Corporation Final Rpt. FRA/ORD-78.24. III, Aug. 1978, 1510 p., Figs., Tabs.

Contract DOT-FR-748-4336

ORDER FROM: NTIS

PB-297395/AS, DOTL NTIS

21 197000

NEW MINING RAILWAY WILL HELP EXPLOIT VAST LIGNITE DEPOSITS

Plans are being made to construct a new 22km double-track line to transport lignite between Dusseldorf, Cologne and Aachen, to complete the 238.5 km Rheinsche Brown Coal Works (RBW) network.

Holzinger, R *International Railway Journal* Apr. 1979, p 58, 1 Fig., 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010

DOTL JC

21 197014

EXPERIMENTS COVERING THE MECHANIZATION AND AUTOMATION OF MARSHALLING YARD OPERATIONS ON USSR RAILWAYS [Erfahrungen bei der Mechanisierung und Automatisierung der Prozesse auf Rangierbahnoefen]

No Abstract. [German]

Bujanov, W *Zeitschrift der OSShD* Vol. 22 No. 1(123), 1979, pp 4-9, 1 Fig., 2 Tab., 2 Phot., 1 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Warsaw, Poland

21 197275

SURFACE TRANSPORT EQUIPMENT. HAULAGE EQUIPMENT [Le materiel de transport terrestre. Le materiel de manutention]

This article gives the complete tabulated list of manufacturers of container chassis used in France, a list of French manufacturers of trailers, (the engines of which ought not to leave the boundary of the terminals), and a list of manufacturers of tankers. The second part of the article devoted to haulage equipment confirms that there are no problems in the terminals themselves (railway, maritime or highway), but on the other hand, problems do arise as soon as the container arrives at the firms. At this stage there is a bottleneck which is prejudicial to the development of containerisation. An evolution worth noting is: the fact that the operations of loading and unloading are being carried out more and more with equipment adapted to container work. [French]

Containers Transport International No. 70, Aug. 1977, pp 15-28, 2 Tab.

ACKNOWLEDGMENT: TRRL (IRRD-105359), Central Laboratory of Bridges & Highways, France, Institute of Transport Research
ORDER FROM: Containers Transport International, rue Saint Saens 6, Paris, France

21 197288

VEHICLE BOOKING AT COMMON-USER DEEP-SEA CONTAINER TERMINALS

Vehicles arrive to collect and deliver containers at common-user port container terminals without appointments and generally have to queue for service. Vehicle booking schemes offer a means of controlling the arrival times of vehicles to smooth the demand on container handling resources, and could enable improved service standards to be achieved. Surveys of vehicle arrivals and service have been carried out at two UK common-user terminals and the effects of booking on service standards have been estimated, using a computer model to relate the turn-round times of vehicles to their arrival patterns, terminal throughput and the deployment of handling resources. The consequences for terminal users of the need to make appointments at the terminals have also been examined. Although practical booking systems would enable improved service standards to be achieved at the throughputs found in the surveys, they would lead to only small reductions in the total resource cost of container handling at the terminals because of the additional staffing costs incurred in running the systems. Booking would have greater benefits at higher throughputs than those found in the surveys or at terminals with more irregular vehicle arrival patterns.

Bailey, AC Prudhoe, J

Transport and Road Research Laboratory, (0305-1293) Monograph
TRRL Lab Rpt. LR873, 1979, 26 p., 10 Fig., 3 Tab., 1 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-241108)
ORDER FROM: TRRL

22 053313

STANDARDISATION OF LARGE CONTAINERS AND LARGE CONTAINER WAGONS. LOADING CONDITIONS FOR LARGE CONTAINER WAGONS ACCORDING TO UIC LEAFLET 571-4--SECTION I

This report gives some simple loading rules for container wagons, these rules being intended for railway staff and users. In addition, the appendix gives the bases taken for the establishment of these rules and also the approximations made: this information can be used for determining, in limit cases, the optimum loading of the wagon considered.

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

International Union of Railways B 112/RP 18, Oct. 1977, 39 p., 21 Fig.

ACKNOWLEDGMENT: UIC

ORDER FROM: UIC

DOTL RP

22 174305

WESTERN COAL SHIPMENT ON THE GREAT LAKES: BACKGROUND AND RESEARCH NEEDS

The purpose of this study is to examine existing and future patterns of western coal movement on the Great Lakes, and to identify the potential economic and environmental impacts of significantly increased levels of western coal shipment to the lower Great Lakes region. Research needed to determine probable levels of impacts and to provide background data and guidelines for governmental and management decision-making are outlined. A total of 21 million tons per year of western coal is expected to be moved from Duluth-Superior to the lower lakes by 1985, requiring the construction of 8-10 new 1000-ft, specialized coal carriers and additional lakeside coal handling facilities. The most significant impacts are anticipated to be related to noise, vessel traffic, employment, coal-storage-pile runoff, and airborne dust from coal unloading.

Lewis, LR Stupka, RC

Argonne National Laboratories Oct. 1977, 42 pp

ACKNOWLEDGMENT: Department of Energy

ORDER FROM: Department of Energy, 20 Massachusetts Avenue, NW, Washington, D.C., 20545

22 185508

A NETWORK AUGMENTING PATH BASIS ALGORITHM FOR TRANSSHIPMENT PROBLEMS

The purpose of this paper is to present a new simplex algorithm for solving capacitated transshipment network problems which both circumvents and exploits the pervasive degeneracy in such problems. This generalized alternating path algorithm is based on the characterization of a special subset of the bases that are capable of leading to an optimal solution. With consideration restricted to these bases, fewer alternative representations of a given extreme point are inspected. The impact on the number of degenerate pivots and problem solution times is demonstrated by computational testing and comparison with other approaches. (Author)

Revision of report dated Aug 77. Prepared in cooperation with Decision Analysis and Research Inst., Austin, TX, Contract no. N00014-76-C-0383.

Barr, R Elam, J Glover, F Klingman, D

Texas University, Austin Res Rpt. CCS-272, Mar. 1978, 35 p.

Contract N00014-75-C-0569

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

AD-A056761/OST

22 185665

FAST REACTOR SPENT FUELS TRANSPORTATION PROBLEMS

In this paper transportation problems of spent fuels from fast reactors BN-350, BN-600 and BN-1500 to reprocessing plant are discussed. It was calculated that 6-10 fuel assemblies can be inserted in one transport cask, the weight of which is 50-60t. Noble gas or water can be used for the BN-350 fuel cask; sodium, lead and special alloys for the BN-1500. Transportation problems of angermetized fuel are also considered in this paper. (Atomindex citation 09:363498)

U.S. Sales Only.

Burlakov, VA Kosarev, YA Markovin, AP

International Atomic Energy Agency CONF-760576-33, May 1976, 6 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

IAEA-AG-63-15

22 185690

SOLID WASTE DISPOSAL ECONOMICS. VOLUME 1. 1964-1976 (A BIBLIOGRAPHY WITH ABSTRACTS)

This bibliography includes the economics of solid waste disposal and abatement. The citations cover studies concerning industries, transportation, urban planning, and recycling. They include topics such as profitability of waste recovery, the economics of using new solid waste processing and disposal techniques, and their impact on handling costs. (This updated bibliography contains 179 abstracts, none of which are new entries to the previous edition.)

Cavagnaro, DM

National Technical Information Service Aug. 1978, 185 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

NTIS/PS-78/0894/2ST

22 185691

SOLID WASTE DISPOSAL ECONOMICS. VOLUME 2. 1977-JULY, 1978 (A BIBLIOGRAPHY WITH ABSTRACTS)

The topics cited in the bibliography include various aspects of the economics of solid waste disposal and abatement, covering studies concerning industries, transportation, urban planning, and recycling. Topics such as profitability of waste recovery, the economics of using new solid waste processing and disposal techniques, and their impact on handling costs are included. (This updated bibliography contains 134 abstracts, 86 of which are new entries to the previous edition.)

Cavagnaro, DM

National Technical Information Service Final Rpt. Aug. 1978, 140 p.

ACKNOWLEDGMENT: NTIS

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NTIS/PS-78/0895/9ST

22 185838

SUMMARY OF ACTIONS TAKEN TO IMPLEMENT THE RECOMMENDATIONS OF THE JOINT AGENCY TRANSPORTATION STUDY

The General Accounting Office and other agencies have substantially completed actions to implement the recommendations of the Joint Agency Transportation Study. These actions have resulted in annual savings estimated at over \$8 million and have provided many other benefits for the Government and for commercial carriers from whom transportation services are procured.

General Accounting Office LCD-78-218, June 1978, 37 p.

ACKNOWLEDGMENT: NTIS

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PB-283063/6ST

22 185883

REFUSE DERIVED FUEL TRANSPORTATION ANALYSIS: A STUDY BY THE COUNTY OF MONROE-CITY OF ROCHESTER TECHNOLOGY TRANSFER PROGRAM

The Technology Transfer Program was requested to compare the two modes of transportation (truck or rail) available to Monroe County for delivering the Refuse Derived Fuel (RDF) to the RG&E Russell Station; and based on a thorough inspection of the impacts of each mode, conclude its investigation by submitting a recommendation. This was to be for the Resource Recovery Facility's full capacity of 2,000 tons per day of input. The study showed that fixed charges for rail transport would be about \$7.83 per ton. Costs to the county for truck transport would be approximately \$3.00 per ton. After a thorough study which encompassed technical data, environmental data, and economic data, the Transportational Analysis Committee unanimously recommended the truck transit mode. The overwhelming factor in drawing this conclusion was the difference in costs (truck vs. rail) to be borne by the citizens of the county of Monroe.

Rochester Engineering Society, Incorporated, National Science Foundation NSF/RA-770552, Dec. 1977, 25 p.

Grant NSF-ISP76-24661-A-01

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-283603/9ST

22 185948

GSA CAN IMPROVE TRAFFIC MANAGEMENT PRACTICES

The General Services Administration needs to give civil agencies more assistance in traffic management matters. The potential for improvements and savings is great. Large savings also can be realized in moving goods from vendors' plants to General Services Administration depots. Cost analyses are needed to identify the lowest overall transportation cost.

General Accounting Office LCD-77-240, July 1978, 19 p.

ACKNOWLEDGMENT: NTIS
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PB-284305/OST

22 186020

NATIONAL WASTE TERMINAL STORAGE PROGRAM: LOW LEVEL TRANSURANIC WASTE TRANSPORTATION STUDIES

This study was performed to identify transportation related problems and concerns for low-level transuranic (LLT) wastes. Recommended actions for these problems and concerns are included. (ERA citation 03:042328)

Merlini, RJ Rushton, RJ Briggs, WR
Atomics International Division, Department of Energy Apr. 1978, 37 p.
Contract EY-76-C-04-3533

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

RFP-2728

22 186025

DEVELOPMENT OF A TRANSPORT NETWORK MODEL FOR THE NRC PHYSICAL PROTECTION PROJECT

The assessment of the requirements for a transportation system to transport special nuclear materials, due to the complexities deriving from schedule size and flexibility, convoy components and maintenance requirements, requires a well-formulated model and an associated computer package not presently available. This report details the problem of sizing the transportation system, presents several approaches to modeling this system, and provides recommendations for development of a computerized model. (ERA citation 03:039366)

Anderson, GM Payne, HJ
ORINCON Corporation, Department of Energy OC-R-77-9964-1, Aug. 1977, 119 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-78-8178

22 186235

STUDY OF FORCE EFFECTS ON SELECTED MATERIALS USED IN CARGO TO VEHICLE RESTRAINT SYSTEMS FOR RAIL TRANSPORT. VOLUME 1. SUMMARY REPORT

Movement of cargo by any of the various modes of transportation-ship, railroad, or truck-requires the employment of some type of restraining device. The present methods of restraining cargo were developed by using the "Trial and Error" approach. The amount of dunnage was determined, more or less by the experience of the packaging personnel or by using static test results along with a good margin of safety. This method of designing cargo restraints suggested the need for developing a technological base for selecting various materials to be used in cargo to vehicle restraint systems. Therefore, in April 1973, the US Army Materiel Development and Readiness Command (DARCOM) Ammunition Center and the Military Traffic Management Command (MTMC) Transportation Engineering Agency (TEA) decided to participate in a joint project to conduct a series of tests to develop such a technological base. Because of the limited amount of information available of the reaction of dunnage material to dynamic forces, major emphasis was conducted primarily to evaluate the strength of wood-nail assemblies and the effect of wheel chocks in chain and wire rope restraint systems designed for rail transport. Because rail impact tests are difficult to control and are costly, a major portion of the tests were conducted using laboratory facilities. /Author/

See also Volumes 2 through Volume 6, RRIS 22 186333 through 186337

respectively; Bulletin 7902.

Jackson, E Kenna, J
Military Traffic Management Command MTMC-TR-73-14-1,
SARAC-DEV-4-73-3, Apr. 1978, 58 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A057985/4SL

22 186247

DREDGED MATERIAL TRANSPORT SYSTEMS FOR INLAND DISPOSAL AND/OR PRODUCTIVE USE CONCEPTS

The purpose of this study is to identify and evaluate transportation systems applicable for the movement of dredged material inland. This report is intended to provide generalized data which can be utilized in evaluating the economic potential of inland disposal alternatives for specific applications across the country. Considerable detail from both a technical and economic point of view is provided to allow the users of this report to apply the information presented to their particular situations. Where a given application requires modification in a specific transportation concept and/or an alteration in specific cost elements, the level of detail in this report should facilitate any such required changes.

Report on Dredged Material Research Program.

Souder, PS, Jr Tobias, L Imperial, JF Mushal, FC
General Research Corporation Final Rpt. WES-TR-D-78-28, June 1978,
319 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A058432/6ST

22 186333

STUDY OF FORCE EFFECTS ON SELECTED MATERIALS USED IN CARGO TO VEHICLE RESTRAINT SYSTEMS FOR RAIL TRANSPORT. VOLUME 2. LABORATORY DYNAMIC TESTS ON WOOD-NAIL ASSEMBLIES

This report presents the results from laboratory tests that simulated field dynamic conditions of forces on wood-nail assemblies. Between April 1973 and May 1977, 336 laboratory test specimens, three samples per specimen, were tested on a modified conbur type inclined ramp.

See also Volume 1, RRIS 22 186235; Bulletin 7902.

Jackson, E Kenna, J
Military Traffic Management Command MTMC-TR-73-14-2,
SARAC-DEV-4-73-4, Apr. 1978, 346 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A059331/9ST

22 186334

STUDY OF FORCE EFFECTS ON SELECTED MATERIALS USED IN CARGO TO VEHICLE RESTRAINT SYSTEMS FOR RAIL TRANSPORT. VOLUME 3. RAIL IMPACT TESTS ON WOOD-NAIL ASSEMBLIES

This report is Volume 3 of six volumes that document a series of tests that were conducted by the US Army Materiel Development and Readiness Command (DARCOM) Ammunition Center and the Military Traffic Management Command (MTMC) Transportation Engineering Agency (TEA). The tests were performed in order to develop a technological base for selecting various materials to be used in cargo to vehicle restraint systems. This report presents results of rail impact tests that were performed on thirteen wood-nail combinations of full-scale blocking. These tests were conducted between July and October 1977, inclusive, to determine if the laboratory data could be applied to full-scale blocking and bracing design. (Author)

See also Volume 1, RRIS 22 186235; Bulletin 7902.

Jackson, E Kenna, J
Military Traffic Management Command MTMC-TR-73-14-3,
SARAC-DEV-4-73-5, Jan. 1978, 49 p.

ACKNOWLEDGMENT: NTIS
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AD-A059332/7ST

22 186335

STUDY OF FORCE EFFECTS ON SELECTED MATERIALS USED IN CARGO TO VEHICLE RESTRAINT SYSTEMS FOR RAIL TRANSPORT. VOLUME 4. STUDY OF THE EFFECTS OF NAIL COATING

A number of laboratory tests were conducted in the past four years to establish physical criteria for and characteristics of cargo restraint systems. Those tests indicated that nail coating is effective only for high-carbon-steel (AISI 1040), cement-coated nails used in oak wood. The effectiveness is shown by a significant increase in the lateral resistance of a wood-nail assembly to dynamic forces. This report presents results of further tests, which sought to explain some of the results of the previous laboratory tests.

See also Volume 1, RRIS 22 186235; Bulletin 7902.

Jackson, E Kenna, J
Military Traffic Management Command MTMC-TR-73-14-4,
SARAC-DEV-4-73-6, May 1977, 41 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A059333/5ST

22 186336

STUDY OF FORCE EFFECTS ON SELECTED MATERIALS USED IN CARGO TO VEHICLE RESTRAINT SYSTEMS FOR RAIL TRANSPORT. VOLUME 5. EFFECTIVENESS OF WHEEL CHOCKS IN THE CHAIN RESTRAINT SYSTEM ON DODX 80 TON FLATCAR

This report presents results of tests that were conducted during September 1977 to measure the effectiveness of wheel chocks when a vehicle is secured to a flatcar equipped with a chain restraint system.

See also Volume 1, RRIS 22 186235; Bulletin 7902.

Jackson, E Kenna, J
Military Traffic Management Command MTMC-TR-73-14-5,
SARAC-DEV-4-73-7, Nov. 1977, 37 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A059334/3ST

22 186337

STUDY OF FORCE EFFECTS ON SELECTED MATERIALS USED IN CARGO TO VEHICLE RESTRAINT SYSTEMS FOR RAIL TRANSPORT. VOLUME 6. EFFECTIVENESS OF WHEEL CHOCKS IN A RESTRAINT SYSTEM USING 3/8-INCH, 1/2-INCH, OR 5/8-INCH WIRE ROPE

This report presents results of tests that were conducted during October and November 1977 to measure the effectiveness of wheel chocks when a wire rope restraint system is used to secure a vehicle to a flatcar.

See also Volume 1, RRIS 22 186235; Bulletin 7902

Jackson, E Kenna, J
Military Traffic Management Command MTMC-TR-73-14-6,
SARAC-DEV-4-73-8, Feb. 1978, 66 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A059335/0ST

22 186389

OWI TRANSPORTATION/LOGISTICS PROGRAM

In development of a comprehensive plan to assure the availability of a transport system by 1985 capable of moving commercial radioactive wastes to federal waste repositories, a series of concerns were identified as having the potential to interfere seriously with the overall objective. These are tabulated and briefly reviewed. Activities to counteract these concerns were formulated. Logistics models were then developed. The spent fuel logistics model is described. (ERA citation 03:046890)

Symposium on Packaging and Transportation of Radioactive Materials, Las Vegas, NV, USA, 7 May 1978.

Shappert, LB Joy, DS Heiskell, MM Turner, DW
Oak Ridge National Laboratory, Union Carbide Corporation,
Department of Energy 1978, 10 p.

Contract W-7405-ENG-26
ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

CONF-780506-17

22 186392

ANALYSIS OF ALTERNATIVE TRANSPORTATION METHODS FOR RADIOACTIVE MATERIALS SHIPMENTS INCLUDING THE USE OF SPECIAL TRAINS FOR SPENT FUEL AND WASTES

Two studies were completed which evaluate the environmental impact of radioactive material transport. The first was a generic study which evaluated all radioactive materials and all transportation modes; the second addressed spent fuel and fuel-cycle wastes shipped by truck, rail and barge. A portion of each of those studies dealing with the change in impact resulting from alternative shipping methods is presented in this paper. Alternatives evaluated in each study were mode shifts, operational constraints, and, in generic case, changes in material properties and package capabilities. Data for the analyses were obtained from a shipper survey and from projections of shipments that would occur in an equilibrium fuel cycle supporting one hundred 1000-MW(e) reactors. Population exposures were deduced from point source radiation formulae using separation distances derived for scenarios appropriate to each shipping mode and to each exposed population group. Fourteen alternatives were investigated for the generic impact case. All showed relatively minor changes in the overall radiological impact. Since the radioactive material transport is estimated to be fewer than 3 latent cancer fatalities (LCF) for each shipment year (compared to some 300,000 yearly cancer fatalities or 5000 LCF's calculated for background radiation using the same radiological effects model), a 15% decrease caused by shifting from passenger air to cargo air is a relatively small effect. Eleven alternatives were considered for the fuel cycle/special train study, but only one produced a reduction in total special train baseline LCF's (.047) that was larger than 5%. (ERA citation 03:044272)

Symposium of Packaging and Transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978.

Smith, DR Luna, RE Taylor, JM
Sandia Laboratories, Department of Energy 1978, 17 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

CONF-780506-9

22 186402

TRANSPORT IN INTERCITY MARKETS: AN OVERVIEW OF THE PHYSICAL DISTRIBUTION SYSTEM

One view of the transportation system of the nation is that it consists of a large number of individual city-pair markets. The markets are different sizes, are located different distances from each other, and are served by a variety of transportation services. By summing the transportation activities found in each of these city-pair markets, the overall transportation system of the nation can be described. This approach ignores the complexity of the transport network and alternate paths through it on purpose. A major reason for focusing on city-pair markets rather than on the multi-modal network which makes up the overall system is that individual markets, with their hinterlands are easier to understand and to work with. Obviously, identifying those links which function as the connecting tissue, and disentangling them from the larger network poses problems but it is relatively straight forward. The result is an abstract representation of the city-pair markets connected by single links of the various modes. This approach does not completely ignore the complexity of travel over the networks. It merely focuses attention in the first instance on those attributes of travel between the cities which are important to the carriers which offer service in the market and to those shippers and receivers who seek it. (ERA citation 03:048234)

Roberts, PO
Massachusetts Institute of Technology, Department of Energy Oct. 1975,
33 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

CTS-75-17

22 186405

MODELS OF FREIGHT LOSS AND DAMAGE

This paper reports on the development of models useful in estimating the extent of freight loss and damage (L/D) on a mode-specific, commodity abstract basis. National level claims data from ICC and carrier-organization reports are used to derive tonnage L/D estimates, using value/ton

information. These amounts are then converted to percentages, using national commodity flow estimates from the U.S. Census of Transportation, Commodity Transportation Survey. Using regression analysis, models are estimated which relate these L/D percentages to commodity attributes, such as value/pound, density, special handling requirements, shelf life, and state (solid, liquid, gas, particulate). The resulting models can be used to provide L/D estimates for a given commodity and transport mode. L/D elasticities with respect to commodity attributes are provided, and intermodal comparisons on this basis are presented. (ERA citation 03:048054)

Wilson, LB Roberts, PO Kneafsey, JT
Massachusetts Institute of Technology, Department of Energy Apr. 1976,
30 p.

Contract EM-75-C-01-8400

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

CTS-76-6

22 186466

TRU WASTE TRANSPORT ECONOMICS: AN OVERVIEW

There are currently three predominant methods used to transport transuranium contaminated waste. These are: (1) ATMX Railcars--500 and 600 series, (2) Super Tigers, and (3) Poly Panthers. Both the ATMX-500 and 600 series railcars are massive doubly walled steel railcars which provide the equivalent protection of a Type B package. In ATMX-600 the rapid loading and unloading of the 9 x 9 x 50 feet cargo space is achieved by prepackaging the TRU waste into standard 20-foot steel cargo containers. The ATMX-500 railcars are divided into three inside bays, having dimensions of 16 (l) x 9.25 (w) x 6.25 (h) feet. A typical load consists of 128 55-gallon drums (however, space can accommodate 192 drums), 12 fiberglass boxes (4 x 4 x 7), or a combination of palletized drums and boxes. A Super Tiger is an overpack authorized for Type A, Type B, and large quantities of radioactive materials having outside dimensions of 8 x 8 x 20 feet. Maximum payload is approximately 28,700 lb with a gross weight of 45,000 lb. The primary factors influencing transport costs are examined including freight rates of transport mode, effective cargo (weight and volume) management, effective utilization of available space (package design), transport mileage, and rental fees or initial capital outlay. Miscellaneous factors are also examined. (ERA citation 03:052129)

Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978, Microfiche copies only.

Edling, DA Hopkins, DR Walls, HC
Mound Facility, Department of Energy CONF-780506-34, 1978, 8 p.

Contract EY-76-C-4-0053

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

MLM-2524

22 186800

BASELINE DESCRIPTIONS FOR LWR SPENT FUEL STORAGE, HANDLING, AND TRANSPORTATION

Baseline descriptions for the storage, handling, and transportation of reactor spent fuel are provided. The storage modes described include light water reactor (LWR) pools, away-from-reactor basins, dry surface storage, reprocessing-facility interim storage pools, and deep geologic storage. Land and water transportation are also discussed. This work was sponsored by the Department of Energy/Office of Safeguards and Security as part of the Sandia Laboratories Fixed Facility Physical Protection Program. 45 figs, 4 tables. (ERA citation 03:049654)

Moyer, JW Sonnier, CS
Sandia Laboratories, Department of Energy Apr. 1978, 142 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-77-1953

22 186826

CARGO-RESTRAINT-TRANSPORTER (CRT): A NOVEL APPROACH TO THE HANDLING OF CARGO ON DOE'S SAFE-SECURE TRAILERS (SST)

Safe-Secure Trailers (SST) loading and tie-down techniques, initial design conception, basic design criteria, and cargo-restraint-transporter (CRT)

loading operation are discussed. The CRT is a multi-container double-tiered cargo transport system that consolidates cargo items of various configurations into a single unit. (ERA citation 03:044274)

Symposium on packaging and transportation of radioactive materials, Las Vegas, NV, USA, 7 May 1978.

Ramsey, WE Burger, TN
Oak Ridge National Laboratory, Department of Energy CONF-780506-24, May 1978, 10 p.

Contract W-7405-ENG-26

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

Y/OA-2034

22 186827

CURRENT STATUS AND FUTURE CONSIDERATIONS FOR A TRANSPORTATION SYSTEM FOR SPENT FUEL AND RADIOACTIVE WASTE

This report is part of the OWI Transportation/Logistics systems analysis of problems associated with shipping these wastes to waste terminal storage facilities. It covers governmental regulations and functional responsibilities, highway and rail transportation status and economic considerations, assessment of present industry capabilities and business-related considerations, important receiving facility considerations, necessary engineering and licensing-related aspects of packaging systems, and essential elements of reprocessing plant waste activities including packaging and transportation. (ERA citation 03:044275)

Anderson, RT Darr, DG Godfrey, WL Keely, RB Lusk, EC
Allied-General Nuclear Services, Department of Energy Feb. 1978, 481 p.

Contract W-7405-ENG-26

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

Y/OWI/SUB-77/42513

22 189002

GENERAL PORTLAND USES "PD" RAILCARS TO KEEP AIR CLEAN, CUT SHIPPING COSTS

General Portland Incorporated eliminated the need for a new unloading terminal, maximized labor use, and met strict Federal and State environmental standards--all in one move--by choosing PD (pressure differential) railcars over traditional hopper cars to ship its regular type #1 cement.

Rock Products Vol. 81 No. 8, Aug. 1978, p 71

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 189038

RESEARCH INTO NEW METHODS OF THAWING AND PREVENTING FREEZING OF BULK GOODS ON THE PKP

[Untersuchung neuer Methoden des Auftauens und der Verhinderung des Gefrierens von Schuetttguetern bei den PKP]

The author discusses the results of research work carried out at the Warsaw Railway Research Institute into ways of improving the transport conditions of frozen freight in winter. He deals with methods of protecting coal from frost by means of a non-stick layer of asphalt-latex, polymeric oil and a layer of polyethylene, and iron ore by means of hydrophilous substances. The article also describes the thawing process of freight using a supersonic steam jet and high-frequency current. [German]

Jalocha-Koch, H *Zeitschrift der OSSHd* Vol. 21 No. 4, 1978, pp 7-10, 3 Fig., 1 Tab., 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Warsaw, Poland

22 189054

STUDY OF THE ADEQUACY OF THE NATIONAL TRANSPORTATION SYSTEM FOR AGRICULTURE AND RURAL DEVELOPMENT: REPORT TO ACCOMPANY S. 1835

No Abstract.

Senate report-95th Congress, 2nd Session, No. 95-923.

United States Congress May 1978, 14 p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO
ORDER FROM: GPO

22 189055
FINAL ENVIRONMENTAL STATEMENT: RAIL-TO-BARGE COAL TRANSFER FACILITY, ST. LOUIS, MISSOURI
No Abstract.

Department of Defense July 1976, 5 p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO
ORDER FROM: Department of Defense, Army Corps of Engineers, St Louis, Missouri, 63101

22 189814
BULK WEIGHING--INCREASING DEMAND FOR CONTINUOUS FLOW

With the ever-increasing economic requirement to throughput bulk cargoes more rapidly, trends in measurement have moved progressively toward continuous weighing. In the trade, handling and transportation of bulk materials accurately is recognized as a vital function. The article examines the design and regulatory parameters affecting the continuous weighing of bulk materials. At the same time, it stresses that the choice of weighing equipment, its function and location, should receive more attention in the early stages of facility design.

Colijn, H (Colijn (H) Consulting Engineers) *Cargo Systems International* Vol. 5 No. 6, June 1978, p 126

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 190262
A REVIEW OF THE SURFACE TRANSPORT SECTOR

The paper gives a general review of the transport industry in Australia currently, and of the legislative, regulatory and industrial environment in which the industry functions. It traverses the administrative and institutional arrangements through and by which the industry is administered at government, at a sectional and at a trade association level, and is confined to surface transportation operations. Full economic benefit of new technology is not being obtained by the user of transport services and so the energies of all the operators should be directed towards higher productivity. Industry research should be directed in a very specific way towards identifying costs of and correcting causes of lost productivity. Users could contribute to higher productivity by greater spread of delivery and receiving hours, greater use of palletised and unitised commodity packaging oriented to iso container dimensions, greater use of shrink-wrap packaging/securing, improved warehouse design, simplified and uniform documentary systems and procedures, improved material handling methods in warehouses and stores, and by making better use of container depot services as aids to deconsolidation and distribution of imports and for the consolidation of exports. The number of the covering abstract of the workshop is IRRD no. 236802.

Papers from the Workshop on the Future of Domestic Freight in Australia, Canberra, 1977.

O'Regan, HJ (Associated Container Transportation (Australia)) Bureau of Transport Economics, Australia 1978, 13 p.

ACKNOWLEDGMENT: TRRL (IRRD-236803), Australian Road Research Board

ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

22 190270
STUDY ON THE OPTIMIZATION OF MATERIAL HANDLING SYSTEM IN BULK STORAGE YARDS

This article describes a method and a concept for determining the optimum specifications for the entire materials handling system in the design stage of a port's yard. An example of the application of this method is given. This simulation system can be very useful in determining the following items: storage capacity of a yard; layout of a yard; capacity of the materials handling machinery; set-up of the materials handling machinery; method of system management; and planning of storage.

Kohama, Y (Hiroshima Shipyard and Eng Works; Japan); Nonoue, T Nagamori, N Murata, I Miyamoto, K *Mitsubishi Heavy Industries Technical Review* Vol. 15 No. 2, June 1978, pp 130-139, 3 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 190322
COAL HANDLING AND STORAGE SYSTEMS

Equipment and facilities for coal handling are described. Information is included on facilities for unit trains, barge loading systems, handling systems for coal users, and coal storage.

From Energy Technology Handbook.

Smardo, P (McNally Pittsburgh Manufacturing Corporation)
McGraw-Hill, Incorporated 1977, p 1.137

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020

22 190323
RAILROAD TRANSPORTATION OF COAL

Types of rail service for coal transportation are described including single carload, multiple carloads, trainload volume service, and unit trains. Railroad cars for coal service are also described including open-top hopper cars, gondola cars, and rapid-discharge cars. Information is included on loading systems, unloading systems, terminals, and geographical aspects of coal transportation.

From Energy Technology Handbook.

Sward, JD (Atchison, Topeka and Santa Fe Railway)
McGraw-Hill, Incorporated 1977, p 1.153

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020

22 190324
BARGE MOVEMENT OF COAL

Barge movement of coal on inland waterways and intercoastal waterways is discussed. Information is included on economic factors, Gulf intercoastal waterways, Great Lakes movement of coal, loading and unloading of barges on inland waterways, and barge design.

From Energy Technology Handbook.

Price, WL (Dravco Corporation)
McGraw-Hill, Incorporated 1977, p 1.170

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020

22 190325
COAL TRANSPORTATION BY SLURRY PIPELINE

Coal transport by slurry pipeline is discussed. An early Ohio installation is described along with the Black Mesa Arizona, system for coal slurry transport. The outlook for coal slurry pipelines is evaluated.

From Energy Technology Handbook.

Jacques, RB Montfort, JG (Black Mesa Pipeline, Incorporated)
McGraw-Hill, Incorporated 1977, p 1.178

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020

22 190326
RAILROAD TRANSPORTATION OF LIQUID AND GASEOUS FUELS

Fuel transportation in the US by rail is reviewed. Evolution of the tank car is discussed and information is given on gaseous and liquid fuel movements, specifications for tankcars, loading and unloading tankcars, and tankcar procurement. A brief discussion of the rail situation in Europe is included.

From Energy Technology Handbook.

McGraw-Hill, Incorporated 1977, p 3.176

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020

22 190352

COAL BUNKER DISCHARGE

The Coal Research Association began a research project to investigate the performance of a variety of devices claimed to induce a continuous flow of slack coal from bunkers. The most effective arrangement, was a nest of vertical rods (1/4 in steel) where the outer contour of the rods matched the discharge opening, and where the bottom of the rods was just above the opening. The effect was increased when the vibration was a vertical, oscillating motion.

Toynbee, PA (New Zealand Coal Research Association) *Australian Mining* Vol. 70 No. 7, July 1978, p 14

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 190371

RAIL-TO-BARGE TRANSPORTATION OF COAL

The future of coal transportation systems in the United States will depend upon which of our abundant coal sources are developed and on where the coal is eventually consumed. A combined rail and waterway system offers a proven and existing method for much of the coal transported between mines and consumers. Potential mine areas and locations for future coal consumption are evaluated and the types of transportation that can be expected to handle this coal in the future are assessed. Rail to barge transfer terminals are highlighted specifically with one of the newest transfer terminals discussed in detail. The paper clarifies the complex rail/barge transportation network involving coal movement in the United States and offers details on typical coal transfer facilities.

Paper presented at ASME Meeting, December 10-15, 1978.

Edwards, EF (Dravo Corporation); Zachariason, RA
American Society of Mechanical Engineers 79-WA/MH-6, 1978, 7 p., 7 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 190372

COAL TRANSPORTATION: BELT CONVEYORS, COMBINED RAIL-BARGE, AND SLURRY PIPELINES

The capacity of the nation's transport system to move increasingly large tonnages of coal from mines to markets is a major energy problem. Coal accounts for more ton-miles of freight on the railroads and the waterways than does any other commodity. This work deals with belt conveyors, rail-barge combinations, and slurry pipelines as innovative additions to transport systems. In the past, both production and consumption have taken place within the same geographic regions. As late as 1969, the average length of coal hauls was only 225 miles. With the opening of the western mines along with increased emphasis on having new power plants designed to use coal, the market is becoming national in scope. Average hauls are much greater, with some being as long as 1200 miles. Each of the modes is considered, including its level of energy efficiency, its advantages and constraints, and how it can contribute to the overall capacity to transport this vital source of energy.

Paper presented at ASME Meeting, December 10-15, 1978.

Campbell, TC (West Virginia University)
American Society of Mechanical Engineers 78-WA/MH-1, 1978, 9 p., 28 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 190429

IRON ORE--TRADE STRUCTURE CHANGING

This fourth of a series of articles analyzing bulk trade development and the implications for cargo handling techniques examines the past development and future potential for seaborne trade in iron ore, concluding that with trade volumes likely to reach a level of 360m/390m tons in 1985, investment in new and improved handling equipment is becoming increasingly necessary if iron ore ports and terminals are to provide the faster handling rates which sustained ore vessel size growth will require in the future.

Cargo Systems International Vol. 5 No. 7, July 1978, p 70

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 190884

NATIONAL WASTE TERMINAL STORAGE PROGRAM: POTENTIAL PROBLEMS IN THE WASTE TRANSPORTATION SYSTEM

Potential problems are identified which may impact the planning, organization, and operation of nuclear waste transportation systems serving federal repositories. These system-level problems have the potential of seriously interfering with the overall OWI Transportation/Logistics Study objective of having a viable nuclear waste transportation system in 1985. This report includes recommended action and priority judgments to address these problems and minimize their impact. The potential problems identified as most important have consequences which may impact the overall state of future preparedness for transporting nuclear waste. Other important concerns relate to the imposition of unnecessarily severe and costly restrictions on nuclear waste transportation, public and carrier acceptance, and the involvement of interested parties in planning and decision-making. The major recommendation of this report is that the planning and development of the waste transportation system should be controlled by a central planning activity which anticipates the impact of uncertainties and undesirable events. (ERA citation 03:054708)

DeSteele, JG Rhoads, RE
Battelle Memorial Institute/Pacific Northwest Labs, Department of Energy Dec. 1977, 30 p.

Contract EY-76-C-06-1830

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PNL-2444

22 190887

MANAGEMENT PLAN FOR THE PROCUREMENT OF SHIPPING CASKS REQUIRED TO SERVICE PROPOSED FEDERAL WASTE REPOSITORIES

Development of transportation systems to move radioactive waste and unprocessed spent fuel to proposed federal waste repositories is an integral part of the National Waste Terminal Storage Program. To meet this requirement, shipping casks must be designed, licensed, and fabricated. To assist the manager charged with this responsibility, a Cask Procurement Plan has been formulated. This plan is presented as a logic diagram that is suitable for computer analysis. In addition to the diagram, narrative material that describes various activities in the plan is also included. A preliminary computer analysis of the logic diagram indicates that, depending on the result of several decisions which must be made during the course of the work, the latest start dates which will allow prototype delivery of all types of casks by December 1985, range from November 1977 to March 1982. (ERA citation 03:057311)

Renken, JH Dupree, SA Allen, GC Freedman, JM
Sandia Laboratories, Department of Energy Aug. 1978, 104 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-77-2053

22 190888

WASTE TRANSPORTATION SYSTEM PLAN FOR GEOLOGIC NUCLEAR-FUEL-CYCLE WASTE REPOSITORIES

The Office of Waste Isolation, Union Carbide Corporation sponsored a program for the purpose of developing a waste transportation system plan for the procurement of shipping casks to service federal commercial nuclear waste repositories. The study has been performed by Sandia Laboratories, Albuquerque, New Mexico. Geologic waste repositories will begin cold testing in the mid 1980's and will require prototype shipping casks. Implementation of the plan developed from the cask scoping study will provide licensed prototype truck and/or rail casks with subsequent production units on a schedule that is consistent with repository objectives. Additional activities of the program were: (1) To provide information on the details of how casks affect and are affected by interfacing systems, (2) To prepare conceptual designs for casks to be used in the shipment of high level waste and cladding waste, and (3) To describe operational characteristics, maintenance requirements, and interfaces associated with cask use. The program has resulted in the development of a program plan which can be utilized to procure prototype shipping casks needed to service a geologic waste repository in the mid 1980's. Implementation of the plan should begin

now due to the limited manufacturing capacity in the United States. Design, licensing, and fabrication of prototype shipping systems should be completed in a timely manner so as not to eliminate options which are consistent with national policy strictly on the basis of hardware unavailability. (ERA citation 03:054692)

Symposium on Packaging and Transportation of Radioactive Materials, Las Vegas, NV, USA, 7 May 1978.

Allen, GC Dupree, SA Freedman, JM Sutherland, SH
Sandia Laboratories, Department of Energy CONF-780506-38, 1978, 17 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-78-0246C

22 190912 WATER TRANSPORTATION REQUIREMENTS FOR COAL MOVEMENT IN 1985

This study of transportation requirements for coal movements through 1985 is one of a series conducted for the U.S. Department of Transportation to identify and quantify future transportation requirements for energy materials. The primary objectives of the study were to develop a scenario for 1985 coal production and consumption and to project water coal traffic equipment and facilities requirements consistent with the scenario. A second objective was to identify the planning processes used by the water carriers to identify and prepare for future traffic. The third objective of the study was to identify potential constraints to and institutional issues impacting increases in water coal traffic and the ability of the water carriers to handle it profitably.

See also report dated Dec 76, PB-263 368.

Witten, JM Desai, SA
Input Output Computer Services, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-OST-78-21, Dec. 1978, 114 p.

Contract DOT-TSC-1282

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289937/5ST, DOTL NTIS

22 191106 TRANSPORTABILITY TEST OF NAVY IRSKIT AMMUNITION RESTRAINT SYSTEM IN 20-FOOT COMMERCIAL CONTAINERS

The DARCOM Project Manager for Container Systems requested that the DARCOM Ammunition Center conduct a series of transportability tests on 20-foot commercial containers employing a system which provides ammunition restraint. This system is called IRSKIT and was developed by the Naval Weapons Handling Center, which had previously conducted the container-on-flatcar (COFC) rail impact test of this system. Three containers of varying materials of construction were each subjected to three modal tests. These tests include the trailer-on-flatcar impact test, the road test, and the tilt test. Each container was loaded with a different inert ammunition item. The IRSKIT system was successful in restraining the ammunition lading in all configurations which were tested. This report describes the test program and analyzes the results that were generated. (Author)

Darcom Ammunition Center EVT-10-77, Sept. 1977, 77 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A061356/2ST

22 191465 SOLID NEUTRON SHIELD DEVELOPMENT

Solid neutron shields for use on Breeder Reactor Spent-Fuel Shipping Casks (SFSC) are being developed by Sandia Laboratories, Albuquerque, New Mexico. A number of different solid neutron shield materials are being evaluated which could be used to attenuate neutrons in various nuclear material transportation systems. A SFSC must be capable of surviving a series of design basis accidents (of which a fire would likely have the most severe effect on a neutron shield) with a degradation of shielding ability less than a factor of about one hundred. One basis of determining a preferable solid neutron shield material is to compare the neutron attenuation of the materials after being subjected to fire. Other bases include shielding

efficiencies, costs, and mechanical properties. The materials currently being assessed as solid neutron shields for shipping casks are listed. The list includes one material that will remain undamaged and others that will degrade in a fire accident environment. The data base for the comparison of the materials is being compiled. (ERA citation 04:008699)

ANS meeting, Washington, DC, USA, 12 Nov 1978.

Allen, GC Curl, ML Freedman, JM Pope, RB Sutherland, SH
Sandia Laboratories, Department of Energy CONF-781105-35, 1978, 5 p.
Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-78-1288C

22 192170 PRELIMINARY ENGINEERING STUDIES OF SHIPPING CASKS FOR TRANSPORTING CANISTERS OF SOLIDIFIED HIGH-LEVEL RADIOACTIVE WASTE, FINAL REPORT, REVISION 1

The possible physical constraints that transportation could impose on the design of canisters include limits on thermal content, weight, radioactive source terms, materials of construction, canister configurations, and space envelopes. In addition, a major design objective for the transportation of solidified high-level waste is the maximization of the contents of each cask load in order to minimize the total number of waste shipments. This tends to decrease both public and occupational dose commitments, and maximize safety considerations by minimizing the number of shipments. The major conclusion of this study is that the transportation phase of high-level waste does not impose more restrictive design constraints on the high-level canister than do the other portions of the high-level waste canister life cycle such as filling, interim storage, and final storage. But the canister configuration and space envelope can significantly influence the amount of high-level waste that can be shipped per cask load.

Bray, GR Ridihalgh, JL
Science Applications, Incorporated, Ridihalgh, Eggers and Associates,
Department of Energy Oct. 1977, 92 p.

Contract EY-77-C-06-1030

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

RHO-C-6

22 192174 WASTE TRANSPORTATION SYSTEMS

Shipping systems are being developed for three nuclear waste types: PWR and BWR spent fuel (SF), high-level waste (HLW), and clad waste (CW). Preliminary work on conceptual cask designs is discussed. Shielding of the cask is considered. Work shows that special attention must be given to the impact of recycle economies on shipping systems.

ANS annual meeting, San Diego, CA, USA, 18 Jun 1978, Microfiche copies only. Microfiche copies only.

Sutherland, SH Freedman, JM Allen, GC Renken, JH Dupree, SA
Sandia Laboratories, Department of Energy CONF-780622-49, 1978, 6 p.

Contract EY-76-C-04-0789

ACKNOWLEDGMENT: NTIS
ORDER FROM: Defense Documentation Center, Cameron Station, Alexandria, Virginia, 22314

SAND-78-0225C

22 193760 GRAVITY DISCHARGE RATE OF FINE PARTICLES FROM HOPPERS

An experimental and theoretical study was made of the rate with which fine particles undergo gravity discharge in air from a hopper. The particles studied were small enough for their motion to be significantly retarded by air resistance but large enough to be substantially free from cohesion. A simple flow system was chosen so that particle and air properties varied in one dimension only and could be measured easily. The theoretical analysis yields inter-related equations for particle flow rate and for the spatial distributions of particle stress, bed voidage and interstitial air pressure. Particle flow rates predicted from basic material properties and hopper geometry are about twice as large as measured values but show the correct dependency on particle size.

Spink, CD (Cambridge University, England); Nedderman, RM *Powder Technology* Vol. 21.No. 2, Nov. 1978, pp 245-261, 20 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 193766

LICKING RIVER TERMINAL: A SHOWCASE IN COAL HANDLING

This article describes a new transportation gateway opened by Oglebay Norton Co. to link the coalfields of southern Kentucky with the riverports of the Midwest. Operating at a 2600-tph minimum capacity, the Licking River rail-to-barge terminal near Cincinnati, Ohio, features a floating dock system that simplifies barge loading regardless of the Ohio river water levels. Low-sulfur Kentucky coal is delivered by barge fleets to electric power generating stations that lie along the river.

Yewell, J (Oglebay Norton Company) *Coal Mining and Processing* Vol. 15 No. 10, Oct. 1978, p 74

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 193774

FACTORS AFFECTING FUTURE EXPANSION OF THE COAL TRANSPORTATION NETWORK: LEGAL AND INSTITUTIONAL CONSTRAINTS ON ACCELERATED COAL FREIGHT

This Department of Energy publication considers those factors which will determine the ability of the railroads, water carriers, coal slurry pipelines, high voltage electrical transmission lines, and truck movements to meet increasing demands for coal hauling capacity. The aim of this publication is to identify the major legal and institutional constraints confronting the coal haulers such that their resolution will result in expedient and economic transportation of coal to market.

Stacy, DM (West Virginia University)
West Virginia Governor's Office METC/SP-78/7, July 1978, 93 p.

ACKNOWLEDGMENT: Energy Research Abstracts, NTIS
ORDER FROM: NTIS

METC/SP-78/7

22 194678

NEW EQUIPMENT GIVES A NEW DIMENSION TO CONTAINER TRANSHIPMENT [Container-Umschlaggeraet setzt neue Massstaebe]

Description of new equipment for horizontal transshipment of containers, which can therefore take place beneath the overhead contact lines. [German]

Fracht-Management Vol. 10 No. 11, 1978, 28 p., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Fracht-Management, Utrecht, Netherlands

22 194856

PACKAGING: SHAKE IT TILL IT BREAKS

Packaging is emerging as an engineering science, equipped with effective analytical tools and now an area of specialization for some colleges and universities. Product strength and package performance must be balanced against overall costs to produce a package that is both protective and economical. The effects of shock and vibration can be determined in advance. Procedures currently used for developing effective packaging are described.

Young, DE (Lansmont Corporation) *Traffic World* Vol. 178 No. 2, Apr. 1979, p 73.

ORDER FROM: Traffic Service Corporation, 815 Washington Building, Washington, D.C., 20005

DOTL JC

22 195062

AS CONSUMERS POWER GROWS, SO DOES ITS NEED FOR RAIL TRANSPORT

A Michigan utility looks at the transportation and coal handling problems associated with expansion of its electric generating capacity. It has its own car fleet but operation of unit trains involves service, rate routing problems with carriers that handle them. New generating plants involve high-capacity thawing and dumping installations.

Malone, F *Railway Age* Vol. 180 No. 8, Apr. 1979, p 27, 2 Phot.

ORDER FROM: ESL

DOTL JC

22 195072

DEVELOPMENT OF COMPUTER MODEL AND LABORATORY SCALE EXPERIMENTAL STUDY OF THE FREEZING OF BULK MATERIALS AND FULL SCALE TEST OF COAL FREEZING DURING RAIL TRANSPORTATION

When bulk materials are transported by rail during winter, freezing of the material can occur. This makes the material difficult to discharge from the cars. The mathematical basis of a finite difference computer simulation model of the freezing process is presented. The model can simulate freezing or thawing in three-dimensional rectangular and cylindrical shapes as well as several other miscellaneous container shapes. An insulating material at the inside surface of the container walls may also be specified in the model. Experimental results were also generated with which numerically predicted results could be compared. A copper concentrate and coal were frozen by placing them in a container whose surface was kept at about minus 30 degrees C (minus 20 degrees F). During the test, the surface temperature and the temperature at various points in the material were measured. The measured surface temperature was then used as an input to the computer model and the measured and predicted temperature variations in the material were compared. A test was also undertaken in which the temperature variation in railcars containing coal was measured during a winter journey. A 100-ton Gondola car and Bathtub Gondola car were loaded with coal from a mine in the Crow's Nest Pass area. Thermocouple probes were inserted into the cars and connected to a measuring instrument contained in a caboose between the two cars. The cars were then transported from the mine to Thunder Bay, the journey taking approximately 80 hours. During the journey the temperature in the coal was measured at regular intervals as was the ambient air temperature. Because of the relatively mild temperatures experienced during the journey, the cars were allowed to stand at Thunder Bay for about another week and the coal temperature again was measured. The basic purpose of the test was to provide results that would be used to validate the computer model of the freezing process. Accurate comparison between measured results and those predicted by this model was rendered difficult by the relatively small temperature changes that occurred during the test. However, the general conclusion is that the agreement between the measured and predicted results is satisfactory, which indicates that none of the basic assumptions on which the model is based is radically in error.

Oosthuizen, PH
Canadian Institute of Guided Ground Transport Final Rpt. CIGGT Rpt 78-10, Jan. 1978, 150 p., Figs., Tabs., 9 Ref., Apps.

ACKNOWLEDGMENT: CIGGT
ORDER FROM: CIGGT

DOTL RP

22 195076

TRANSPORTATION VIBRATION EFFECTS ON UNITIZED CORRUGATED CONTAINERS

This report presents the theoretical analysis of the analog that represents a stack of containers and an example that carries the mathematics through a package design problem. To supplement the manual computations which are too time-consuming for practical packaging design, a computer program is discussed. This program plots the transmissibility in each container over a range in frequencies, including the damaging resonants. An example using the program shows employment of the generated plot for unitized package designing.

Urbanik, TJ *Forest Service Research Paper* FPL No. 322, 1978, 24 p., 8 Ref.

ACKNOWLEDGMENT: EI, NTIS
ORDER FROM: ESL, NTIS

AD-A063135/8ST

22 195096

TRANSPORTATION LOGISTICS FOR SPENT-FUEL STORAGE AND DISPOSAL

No Abstract.

From the 1978 Winter meeting of the American Nuclear Society; Washington, D.C., November 12, 1978.

Andrews, WB Burnett, RA Engel, RL (Battelle Memorial Institute/Pacific Northwest Labs) *American Nuclear Society Transactions*

Vol. 30 CONF-7811109, 1978, pp 292-293
 ACKNOWLEDGMENT: Energy Research Abstracts
 ORDER FROM: American Nuclear Society, Incorporated, 244 East Ogden Avenue, Hinsdale, Illinois, 60521

22 195102

P & M USES PREWEIGH LOADOUT UNIT

On Aug. 23, 1978, Pittsburg & Midway Coal Mining Co.'s McKinley mine, near Gallup, NM, became the only coal operation in the U.S. to have a certified operable preweighing system for unit-train loading. Coal is automatically bulk preweighed in batches of about 100 tons in a special weigh hopper before it is loaded. High accuracy of preweighing is particularly advantageous in situations where the bulk density of the coal varies from seam to seam.

Jackson, D *Coal Age* Vol. 83 No. 12, Dec. 1978, pp 57-59

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

22 195689

ECONOMIC IMPACT OF FREIGHT CAR SHORTAGES

This study estimates the economic impact of freight car shortages on the lumber, plywood, and grain industries in 1968. It defines the nature and cost/benefits per incident of different shortage conditions for affected parties (shippers, consignees, and carriers) and the net economic effect. The latter was defined as the net sum of costs and benefits affecting the total national economy. Information was obtained by in-depth interviews, analyses of existing data, and an extensive survey of shippers and receivers. The results were then combined to estimate the total economic impact of these events. In addition, methodologies were developed to forecast weekly lumber and plywood shipments.

Prepared for the Department of Transportation, Federal Railroad Administration, Washington, D.C.

Little (Arthur D), Incorporated Final Rpt. FRA-RP-71-1, May 1971, 117 p., 11 Fig., 35 Tab.

Contract DOT-FR-00013

ACKNOWLEDGMENT: FRA
 ORDER FROM: NTIS

DOTL HE2333.L58

22 195690

ECONOMIC IMPACT OF FREIGHT CAR SHORTAGES. EXECUTIVE SUMMARY

No Abstract.

Prepared for the Department of Transportation, Federal Railroad Administration, Washington, D.C.

Little (Arthur D), Incorporated FRA-RP-71-1, Oct. 1971, 8 p., 5 Tab.

ACKNOWLEDGMENT: FRA
 ORDER FROM: NTIS

DOTL HE2333.L582

22 195691

ECONOMIC IMPACT OF FREIGHT CAR SHORTAGES. APPENDICES

No Abstract.

Little (Arthur D), Incorporated May 1971, v.p., Figs., Tabs.

ACKNOWLEDGMENT: FRA
 ORDER FROM: NTIS

DOTL HE2333.L583

22 195714

DETERMINATION OF THE FLOW-DOWN TIME OF A HIGHLY VISCOUS PETROLEUM PRODUCT FROM INNER SURFACES OF TANK-CAR DRUMS [Opredelenie vremeni stekaniya plenki vysokovyazkogo nefteprodukta s vnutrennei poverkhnosti kotlov zheleznodorozhnykh tsistern]

The problem of flow, under the effect of the force of gravity, of a non-Newtonian liquid obeying an exponential rheological law, in a film, down a curved surface, is considered. A formula is situated on the inner surface of the tank-car drum at any moment of time after the beginning of the discharge. [Russian]

Lur'e, MV Mikhailov, VM *Izvestia Vysshikh Uchebnykh Zavedenii, Neft i Gaz* No. N8, 1978, pp 69-72

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

22 195716

BULK HANDLING & TRANSPORTATION IN THE 21ST CENTURY

The paper discusses new developments in bulk handling, particularly as applied to mining, metal processing and energy. It also relates to the trends in minerals processing such as crushing and grinding, classification, concentration, agglomeration, and chemical processing. In addition, the latest developments in storage, transfer and blending are reviewed in terms of systems and components. An extensive survey of advances in minerals transportation and haulage, which constitute a major cost component, is also included. Socioeconomic and environmental problems, as well as the solutions by innovations and new concepts for the future, are discussed.

Conv Union Panam de Asoc de Ing (UPADI), 15th, Santiago, Chile, October 1-7, 1978.

Yu, AT (ORBA Corporation)
 Instituto de Ingenieros de Chile Vol. 2 1978, pp 315-333, 10 Ref.

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

22 195744

SUB-OPTIMALITY IN FREIGHT DISTRIBUTION

A method of implementing the modification to the transportation problem that takes account of sub-optimality by iteration is outlined that minimizes an appropriate goodness-of-fit statistic. The model is then applied, using this method, to freight flow data in Great Britain. A freight flow matrix is predicted that is superior to a transportation problem prediction and behavioral and economic implications are derived to demonstrate the insights that the technique can yield.

Pitfield, DE (Loughborough University of Technology, England) *Transportation Research* Vol. 12 No. 6, Dec. 1978, pp 403-409, 16 Ref.

ACKNOWLEDGMENT: engineering Index
 ORDER FROM: engineering Societies Library, 345 East 47th Street, New York, New York, 10017.

DOTL JC

22 196395

AUTOMATIC UNLOADING OF FADS LARGE-CAPACITY SELF-DISCHARGING WAGONS AT THE STEAG POWER PLANT [Automatische Entladung der Grossraum-Selbstentladewagen Fads--im STEAG-Kraftwerk Moellen]

No Abstract. [German]

Lueder, H *Rangiertechnik und Gleisanschlusstechnik* No. 38, 1978, pp 37-38

ACKNOWLEDGMENT: International Union of Railways, BD
 ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

22 196473

EFFICIENT SOLUTIONS IN MULTIOBJECTIVE TREE NETWORK LOCATION PROBLEMS

The problem of locating a single facility on a tree network where there is more than one objective function to be minimized is considered. A constructive method is given for finding the efficient set of solutions when the objective functions are convex and the constraints define a convex set. Partial results are given for the case where the feasible region is not a convex set.

Lowe, TJ (Purdue University) *Transportation Science* Vol. 12 No. 4, Nov. 1978, pp 298-316, 23 Ref.

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

DOTL JC

22 196528

MATERIALS HANDLING: AN INTRODUCTION

This book is the first of a series on materials handling scheduled for publication by the Department of Industry's Committee for Materials Handling. It provides a basic grounding in the subject, and will be of value to managers in industry, distribution, transport and allied areas who need

to know about the handling of materials. The book is divided into three broad sections, the order and content of which ensure that the reader is introduced to the various aspects of the subject in context. The first (chapter 1) deals with the analysis of materials handling and associated plant-layout problems, and with the definition of solutions to these problems. Some, but certainly not all, of the solutions will involve the use of equipment. This aspect of materials handling—the uses and limitations of the major categories of handling equipment—is covered in the second section of the book (chapters 2-8). The third section (chapters 9-11) is concerned with the relevance of four important industrial functions associated with materials handling: transport, warehousing, maintenance and safety. Selected bibliography refers the reader to sources of detailed information on the various topics dealt with.

Mundy, JR Harris, ND Dovey, RF Pemberton, AW Webb,
JS Whitley, RL
Her Majesty's Stationery Office Monograph 1978, 163 p., Figs., Refs.

ACKNOWLEDGMENT: TRRL (IRRD-240839)
ORDER FROM: Pendragon House, Incorporated, P.O. Box 255, Old Mystic,
Connecticut, 06372

P7904088

22 197016

INSTALLATION FOR THAWING FRIABLE SUBSTANCES

[Urządzenia do rozmrażania materiałów sypkich na wagonach]

Description of the state of progress reached in studies being carried out by

the Institute for Railway Research on the thawing of friable substances loaded on cars. [Polish]

Wierzbick, W *Przegląd Komunikacyjny* Vol. 28 No. 2, Feb. 1979, pp 59-62, 2 Fig., 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Ars Polona-Ruch, Krakowskie Przedmieście 7, Warsaw, Poland

22 197276

THE TRANSPORT OF ROAD CONSTRUCTION MATERIALS BY RAIL [Le transport par fer des matériaux de viabilité]

A study is made of the different aspects of the transport of road construction materials by rail: over the last ten years it has doubled. Various solutions are envisaged: (1) adaptation of technical means of transport; (2) development of loading and unloading techniques; (3) fixation of a level of tariff which takes into account the low value of the products carried; (4) active commercial policy. [French]

Eveilleau, R (Société Nationale des Chemins de Fer Français) *Revue Generale des Routes et des Aerodromes* No. 541, Apr. 1978, pp 47-50, 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-108047), Central Laboratory of Bridges & Highways, France

ORDER FROM: Revue Generale des Routes, 9 rue Magellan, Paris 8e, France

23 186458

PEOPLE'S REPUBLIC OF CHINA RAILROAD PASSENGER TIMETABLES, JUNE 1977

The report contains latest information on railroad passenger timetables, ticket information and regulations on baggage.

Joint Publications Research Service Aug. 1978, 358 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

JPRS-71690

23 186869

METRORAIL ALTERNATIVES ANALYSIS

Since 1968 cost estimates for completing the 100-mile Metrorail system within the Washington Metropolitan Area have escalated, and concern has been expressed about financing the full system and whether the full 100-mile system provided the best solution to the transportation problems of the area. The study reviewed a full range of rail and non-rail alternatives for the 'E' Route to Greenbelt, the 'F' Route to Branch Avenue, the 'J-H' Route to Franconia, and the 'K' Route to Vienna. The study was designed to analyze the relative costs and effectiveness of each alternative. Criteria used to evaluate each alternative included patronage, costs, deficits, funding requirements, automobile use, energy consumption and economic measures. Of the 1700 possible regional combinations, 72 were analyzed in detail; five regional candidates were chosen for final study. After eighteen months of study, the JPSC reaffirmed a complete system for the area.

Metropolitan Washington Council of Governments, Urban Mass Transportation Administration Final Rpt. UMTA-IT-09-0077-78-1, June 1978, 37 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288579/6ST

23 186870

METRORAIL ALTERNATIVES ANALYSIS

The Metrorail Alternatives Analysis project has been completed with the selection of a preferred regional system by the Joint Policy Steering Committee (JPSC) charged with that responsibility in the Washington region. This report summarizes many of the issues addressed during the project, and focuses on the final regional alternatives that were developed as a prelude to the selection of the preferred regional system.

Prepared in cooperation with Peat, Marwick, Mitchell and Co., Washington, DC., JHK and Associates, Alexandria, VA., and Dames and Moore, Washington, DC.

Metropolitan Washington Council of Governments, Peat, Marwick, Mitchell and Company, JHK and Associates, Dames and Moore, Urban Mass Transportation Administration, (UMTA-IT-09-0077) Final Rpt. UMTA-IT-09-0077-78-2, Aug. 1978, 207 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288580/4ST

23 186871

SAN FRANCISCO MUNI TRANSPORTATION PLANNING OPERATIONS AND MARKETING STUDY

The report provides an overview of extensive inventories and evaluations of Municipal Railway (MUNI) services, and principal features of a recommended short-term improvement plan and program. The main thrust of the recommendations is aimed at more efficient use of existing public transportation resources. Recommendations include comprehensive modifications of MUNI routes and headways; a transit priority street program to facilitate transit vehicle movement on congested streets; an extension of the J streetcar line to improve operating efficiency; site plans and design criteria for a new bus maintenance facility needed to reduce operating costs; a set of basic goals, standards and criteria for MUNI service; and various management actions which would improve the quality of service. The work described represents only the first of several phases of a complete planning, operations and marketing program. (Color illustrations reproduced in black and white)

Also available in 35 mm.

Smith (Wilbur) and Associates, Urban Mass Transportation Administration Summ Rpt. UMTA-CA-09-0025-78-1, Mar. 1978, 35 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-288582/OST

23 188992

VALIDATION TEST OF DISAGGREGATE MODE CHOICE MODEL

A model of work trip mode choice was developed on a sample of workers taken before Bay Area Rapid Transit (BART) opened for service. Validation tests of the model were performed on a sample of workers taken after BART service began. Two validation methods were used: the actual mode shares in the post-BART sample were compared to the mode shares predicted by the models estimated on the pre-BART sample, and the parameters of models estimated on the post-BART sample were compared with the parameters of the models estimated pre-BART. Three possible reasons were explored for the differences in actual and predicted shares and in the pre- and post-BART model parameters.

Train, K (Cambridge Systematics, Incorporated) *Transportation Research* Vol. 12 No. 3, June 1978, pp 167-174, 8 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

23 189057

EVALUATION REPORT OF THE SECRETARY OF TRANSPORTATION'S PRELIMINARY RECOMMENDATIONS ON AMTRAK'S ROUTE STRUCTURE: REPORT OF THE RAIL SERVICES PLANNING OFFICE TO THE SECRETARY OF TRANSPORTATION

No Abstract.

Ex Parte No. 351, review of Amtrak route structure, submitted in accordance with section 4(d) of the Amtrak improvement act of 1978.

Interstate Commerce Commission Sept. 1978, 127 p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: Interstate Commerce Commission, Rail Services Planning Office, Washington, D.C., 20423

23 189785

OPTIMAL ARRANGEMENT OF DISTURBED TRAIN TRAFFIC ON THE SHINKANSEN

275 trains travelling in both directions cover an average of 160,000 kilometres daily on the Shinkansen. Traffic processing is simulated with a view to devising a method of rapidly rectifying timetable disruptions; traffic diagrams are drawn up to assist in dealing with disruptions smoothly.

Ebihara, K *Japanese Railway Engineering* Vol. 18 No. 1, 1978, pp 18-19, 3 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

23 190265

SOME ASPECTS OF THE OUTLOOK FOR URBAN TRANSPORT

This paper was presented to the workshop on the future of urban passenger transport in Australia, Canberra, 1978. A major problem confronting transport planning authorities is the continuing low density urban expansion and the accompanying dispersion of travel movements throughout urban areas. Major factors influencing the growth pattern for urban transport demand in Australia are identified to be population, real incomes, real fares, service levels and car ownership, and the implications of these factors are discussed. Demand levels for private motor car transport are expected to increase and patronage levels on public transport are expected to decline less rapidly than indicated by simple extrapolation. In order to better understand the nature of the urban passenger transport task and the problems associated with it, it is important to know the distribution of urban transport demand by mode, time of day and trip purpose. For abstract of a summary report of the workshop see IRRD no. 236740.

Hutton, TM Smith, AB
Bureau of Transport Economics, Australia Monograph 1978, 22 p., 11 Tab., 1 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-236739), Australian Road Research Board

ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

23 190540

FARE POLICY AND STRUCTURE

The overall objective of this research effort is to relate fare policies and fare structures to passenger demand characteristics as well as to operating expenses and to determine appropriate methods of addressing fare in transit financing. This report presents the findings of a three year research effort. It includes a survey of literature on fare policies and structures throughout the nation. In addition, the report presents the findings of a nation-wide survey of transit properties and deals with fares, ridership, financing, and policy making. Analysis of acquired information show that fare revenues are producing an ever decreasing percentage of operating expenses and, by 1980 will account for less than 40 percent of operating expenses for transit properties nation-wide. The report puts forth arguments for the study of time-varied fares as the most beneficial policy for reducing the financial problems of transit properties while still increasing ridership and also shows that using fare policy/structures to reduce peak vehicles can result in operating cost savings.

Habib, P Linzer, E Jones, C Nason, R Ablamsky, R
Polytechnic Institute of New York, Urban Mass Transportation
Administration, (UMTA-NY-11-0014) Final Rpt. UMTA-NY-11-
0014-78-1, Sept. 1978, 70 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289194/3ST

23 191660

THE IMPACT OF BART ON LOCAL TRANSIT SERVICE AND FINANCIAL POLICY

The paper assesses the public policy impacts of BART on existing and planned local transit service and its financing in the three BART counties in the San Francisco Bay Area. Three specific policy areas were considered: (1) The impact of BART on changes in service, routes, fare, transfer and personnel policies of existing local transit operators; (2) the impact of BART on the creation of new local transit systems to provide feeder service to BART as well as local transit service; (3) the impact of BART on changes in State, regional or local policies for financing local transit service.

Prepared by Booz, Allen and Hamilton, Inc., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Graebner, LS Higgins, T Curtis, E
Metropolitan Transportation Commission, Booz-Allen and Hamilton,
Incorporated, Department of Transportation, Department of Housing
and Urban Development DOT-BIP-WP-42-8-77, Sept. 1977, 119 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-292402/5ST, DOTL NTIS

23 191758

EXPLANATORY MODELING OF TRANSBAY TRAVEL CHOICE

The 71-mile Bay Area Rapid Transit (BART) System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. The report analyzes the reasons underlying BART-bus and BART-automobile travel choices in the key transbay travel corridor linking San Francisco and Oakland. Travel modes are defined in terms of 14 service attributes including quantifiable attributes such as travel time and cost, and more difficult-to-quantify attributes such as dependability and safety. Disaggregate models which relate mode-choice probability to perceived satisfaction with the alternative modes are estimated using data for the 14 attributes collected by semantic differential scales. Several different models are estimated and compared for BART-bus and BART-auto choices, for work and nonwork trip purposes, for geographic stratifications of the data, and using linear and logit functional forms. The models provide convincing explanations of mode choice behavior and show that travel time and travel time-related attributes such as dependability and flexibility are the dominant determinants of choice.

Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Fan, H Sherret, A
Metropolitan Transportation Commission, Peat, Marwick, Mitchell and
Company, Department of Transportation, Department of Housing and
Urban Development DOT-BIP-WP-34-3-77, Nov. 1977, 130 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294011/2ST

23 191936

TRAVEL HABITS AND PATTERNS. VOLUME 2. 1974-JANUARY, 1979 (A BIBLIOGRAPHY WITH ABSTRACTS)

This two-volume work is devoted to U.S. travel patterns and habits primarily in urban areas. Presented are discussions on mass transit, modal choices and split, parking, park and ride, and commuting. Disadvantaged, disabled, student, and various age groups are studied along with recreational data. References are made to dial-a-ride, dual mode, car pooling, taxicab, railroad, rapid transit railways, and aircraft.

Kenton, E
National Technical Information Service Mar. 1979, 210 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NTIS/PS-79/0169/7ST

23 192058

THE IMPACT OF TELECOMMUNICATION ON TRANSPORTATION DEMAND THROUGH THE YEAR 2000

This report analyzes the interactions of transportation and telecommunication as they exist today and in the future, especially as regards the effects of telecommunication on transportation demand. It analyzes the development of four major telecommunication services--voice, video, data, and interactive cable television--and reports estimates of their substitutability for transportation service. It reports present and possible future impacts of government investment and regulation.

Mitre Corporation, National Transportation Study Commission Spec
Rpt. NTPSC/SR-78/03, Nov. 1978, 163 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-290833/3ST

23 192230

WORK TRAVEL SURVEY METHODS AND FINDINGS (1977)

BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impacts of BART on transportation and travel in the Bay Area. It describes the methods and results of a survey of 8,400 persons employed in the areas most accessible by BART. The sample represents 506,000 daily work trips to the survey area. A novel sampling design was used in which self-completion questionnaires were distributed to workers at their workplaces. Detailed information was obtained on the travel mode choices available to workers, the characteristics of their journey-to-work alternatives, and the reasons for their mode choices. BART's share of journey-to-work trips into the survey area from residences in the primary BART service areas is 18%; bus, 16%; and automobile, 66%. The BART share varies greatly for specific origin-to-destination corridors and trip lengths; BART's highest share is for long-distance commute trips to downtown areas. Of all trips from residences in the primary service area, respondents considered 40% to be possible by BART; BART presently carries about 40% of these possible trips, which suggests a high potential for increased patronage. Typically, relative travel times and reliability of service are among the most important determinants of travelers' mode choices.

Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Color illustrations reproduced in black and white.

Sherret, A
Metropolitan Transportation Commission, Peat, Marwick, Mitchell and
Company, Department of Transportation, Department of Housing and
Urban Development DOT-BIP-WP-58-3-78, Dec. 1978, 140 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-293885/OST

23 193770

SHOULD AMTRAK'S HIGHLY UNPROFITABLE ROUTES BE DISCONTINUED

Despite new equipment, improved stations and tracks, changes to schedules, and additional intermediate stops, some routes operated by the National Railroad Passenger Corporation--Amtrak--continue to be highly unprofitable and to waste energy. Procedures developed for deciding which routes, if any, should be discontinued.

General Accounting Office CED-79-3, No Date, 21 p.

ORDER FROM: General Accounting Office, Distribution Section, Room 1518, 441 G Street, NW, Washington, D.C., 20548 NTIS

PB-288759/4ST

23 194129

STUDY OF A NEW LAYOUT OF THE ROME RAILROAD HUB IN THE PRESENT URBAN CONTEXT

After a short history on the evolution of the Rome rail center, indications are given of the present problems which limit the smoothness of the service, above all in Rome Termini station, and thus, to a lower degree, in the other Rome stations. Suppositions are made for the rearrangement of the rail center, both by means of a south-north line underpassing Rome Termini, and by the construction of a tangential line, on the surface, which would make operative appropriate interchanges with urban traffic. [Italian]

Scardia, U *Ingegneria Ferroviaria* Vol. 33 No. 2, Feb. 1978, pp 158-173

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: ESL

DOTL JC

23 194131

SNCF ATTACKS PARIS AREA REVENUE COLLECTION PROBLEMS

Heavy suburban passenger flows in greater Paris present difficult ticket control problems, with complex ticketing rendering effective manual inspection impossible. With the Interconnexion project with the Paris Regional Transit (RATP) to become operational in 1981-82, the French National Railways has been faced with introduction of a compatible automatic fare collection system. Starting in 1979 a full-scale experiment has been under way on Montparnasse suburban lines with the goal of extending it or a similar system to most of the Paris suburban area by the late 1980s.

Railway Gazette International Mar. 1979, pp 217-219, 2 Phot.

ORDER FROM: ESL

DOTL JC

23 194139

END OF THE TUNNEL FOR TYNESIDE METRO

The Tyne and Wear metro is considered to represent the most significant urban transport development in the UK this century. As such it will form the backbone of the country's integrated public transport system, and its passenger potential is said to be both in its ability to be linked with bus services and parking and in being able to attract short distance passengers. The ultimate aim of this integrated transport system is that every resident in Tyne and Wear should be within 400 M of a public transport facility whether it be bus or rail. Factors associated with the success of the present network are described and discussed. The route of the metro is illustrated, and provides information on Metro tracks, BR passenger and freight lines, sections for joint use and on the position of all the stations and interchanges. A feature of the system is an increase in the number of suburban stations to 42, only about half of which exist now. The first phase of the system from Haymarket to the Regent Centre and West Monkseaton opens in autumn 1979, and progress to date on the construction and equipment programme is discussed. Photographs illustrate the sixth bridge over the Tyne, Jesmond and Haymarket stations and the rolling stock for the metro.

Acton, P *Surveyor - Public Authority Technology* Vol. 152 No. 4506, Oct. 1978, pp 8-10, 1 Fig., 4 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-238386)

ORDER FROM: IPC Building and Contract Journals, Limited, Surrey House, 1 Throwley Way, Sutton, Surrey SM1 4QQ, England

23 194140

COMPARISON OF INTER-CITY BI-MODAL SPLIT MODELS

Using data collected from rail and air passengers on two inter-city routes in the UK, seven different model formulations were set up and tested in order to ascertain the most appropriate model format. As a result of the work carried out, it is concluded that a simple entropy-type model based on the theoretical work of A.G. Wilson and utilising a linear generalised cost function is the most suitable. Other useful parameters emerging from the work are perceived values of travel time, and a weighting factor for night travel.

Leake, GR (Leeds University, England); Underwood, JR (West Indies University, Trinidad) *Transportation Planning and Technology* Vol. 5 No. 1, 1978, pp 55-69, 9 Fig., 12 Tab., 19 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-238396)

ORDER FROM: ESL

23 194143

TYNE AND WEAR METRO

Tyne and Wear is described as the major conurbation of the north-east of England with a population of approximately 1.2 M, industrial in nature centred on the banks of the rivers Tyne and Wear, and the regional capital of a large mainly rural hinterland serving a population of about 2.5 M. Transportation problems within the region are reviewed, which led to the establishment of the metro concept and the introduction of the Tyneside Metropolitan Railway Act in 1973. The metro as described will form the backbone of Tyne and Wear's integrated public transport system. It will be 54 route kilometres long, comprising 41 kilometres of converted British rail suburban routes and 13 kilometres of new construction, about half of which is underground to provide accessibility to central Newcastle and Gateshead and to improve the cross-river link. Other new sections described include the byker alignment where metro will run through a major area of inner-urban revitalisation along what was to have been an urban motorway alignment. A new route through the centre of South Shields will replace the existing route which is no longer suitably located to serve a major residential area and link with a focus of the local bus network. In the north-east of Newcastle a freight line will be doubled to provide passenger service as far as Kenton Bank through a rapidly developing area. Reference is made to transport integration, pattern and frequency of service, engineering and engineering equipment-with a system voltage of 1500 volts DC from overhead equipment- and future plans. The first section of metro from Regent's Centre and West Monkseaton to Haymarket will open in the summer of 1979.

Howard, D *Transport Management* Vol. 11 No. 2, Dec. 1978, pp 9-12, 2 Fig., 1 Phot., 8 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-237972)

ORDER FROM: FPL Transport Publications Limited, Green Lane, Balsall Common, Coventry, England

23 194867

THE POTENTIAL OF FEEDER BUS SYSTEMS SERVING COMMUTER RAIL STATIONS

The authors conclude that feeder bus services to railway stations are capable of making a useful contribution to the efficiency of the transport system in travel corridors such as Crosby-Central Liverpool. Most of the benefits to travellers can be achieved at low cost, and thus the results suggest that feeder bus services may be expected to provide an effective short-term measure for reducing congestion on the major arteries into large conurbations and improving the efficiency of public transport operations, particularly when supplemented by increased restraint on car usage through higher parking charges.(a) /TRRL/

Leake, GR (Leeds University, England); Read, M (West Yorkshire Metropolitan County Council, Engl) *Traffic Engineering and Control* Vol. 20 No. 2, Feb. 1979, pp 52-58, 3 Fig., 6 Tab., 7 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 239101)

ORDER FROM: ESL

DOTL JC

23 194870

THE FUTURE OF LONG DISTANCE PASSENGER TRANSPORT IN EUROPE. FINAL REPORT OF THE OECD STUDY OF THE REQUIREMENTS OF EUROPEAN (INTERCITY) PASSENGER TRANSPORT (COST 33) [Die Zukunft des Europäeischen Personenfernverkehrs. Schlussbericht der OECD-Studie fuer die Anforderungen des Europäeischen (Intercity) Personenverkehrs--COST 33]

Research has been carried out for west and south Europe in order to develop a transportation/political decision model for the requirements of long distance passenger transport up to 2000 ad. The inter-zonal transport of persons was estimated for 109 zones, differentiated according to business-, holiday-, and domestic short journey traffic. Transportation means included were rail, car, bus and air. Four transportation/political strategies are investigated: a status quo strategy, a strategy of the affected alternatives offered (qualitative improvement especially of the rail network, if necessary by introducing high performance rapid rail systems), the strategy of the affected requirements and of the planned requirements (changes to land area usage). The positive and negative effects arising for the user, for those managing transport establishments, and for the general public, are calculated for each strategy. As a conclusion it is shown that the four strategies do not show significant differences with respect to the total number of journeys. In particular the modal split varies. Also no clear differences between strategies with respect to use-cost-relation can be established. In addition to the internal system effects, the investigation takes into account the effects on energy, attainment of objective and environmental impact. External effects are however considered exclusively in physical terms. [German]

Internationales Verkehrswesen Vol. 29 No. 6, Nov. 1977, pp 354-357

ACKNOWLEDGMENT: TRRL (IRRD 307638), Federal Institute of Road Research, West Germany

ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

23 195077

ANALYSIS OF INTERNAL TRANSIT SYSTEMS REQUIREMENTS FOR CENTRAL CITIES

This paper has two principal objectives. First, it describes an approach entitled Performance Requirements Analysis for developing a set of requirements or standards that a downtown transit system should satisfy and structuring these requirements so as to generate a small set of alternative generic systems for detailed evaluation. Second, it provides a preliminary assessment of performance requirements for distribution systems in 19 of the largest cities in the United States.

Chan, Y (Pennsylvania State University, University Park); Ellis, RH *Transportation Planning and Technology* Vol. 5 No. 1, 1978, pp 1-11, 5 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

23 195545

DECLINE AND DECAY OF REA

Railway Express Agency came into existence as a railroad-owned organization in 1929, succeeding American Railway Express which had consolidated most of the nation's several express operations in 1918. The standard operating agreement between individual railroads and REA presented accounting and efficiency problems which were never overcome. REA volume peaked in 1944 and began a decline. As revenues dropped, railroads were unable to identify costs but assumed express represented a deficit operation leading to a new basis for operation in 1959 which expanded highway operation, piggyback, containerization and palletization. Railroad ownership ended in 1969 but new management was unable to stem decline of small-shipment traffic, REA entered bankruptcy in 1975 and liquidation followed.

Shaw, RB *Trains* Vol. 39 No. 6, Apr. 1979, pp 22-25, 7 Phot.

ORDER FROM: Kalmbach Publishing Company, 1027 North Seventh Street, Milwaukee, Wisconsin, 53233

DOTL JC

23 195546

AUTOMATIC REVENUE COLLECTION-THE BR WAY

Automatic fare collection, or automatic revenue collection (ARC) as British Rail identifies it, is being developed for a major portion of London's

suburban network, as well as for coordinated services operated by London Transport. LT already has some AFC, as does BR in the Glasgow suburban area. Differences between BR concept and others used in Europe and the U.S. are discussed.

Modern Railways Vol. 36 No. 367, Apr. 1979, p 144, 4 Phot.

ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

DOTL JC

23 195678

INTER-CITY MARKET IS A MOVING TARGET

As 200 km/h trains give rail a further competitive boost, the nature of inter-city travel is undergoing important changes. After 2-1/2 years of HST operation between London and Bristol/South Wales, BR is now convinced that traffic can after all be abstracted from private cars on a parallel motorway. This has led to a major rethink of marketing strategy as HST and APT are introduced, with greater emphasis on optional and leisure travel. Hence the fourth major route on which HST will appear next year avoids London, with first-class accommodation reduced, while efforts are being made to upgrade other cross-country services with minimal investment.

Keen, PA (British Railways Board) *Railway Gazette International* Vol. 135 No. 5, May 1979, pp 407-411, 4 Fig., 4 Phot.

ORDER FROM: ESL

DOTL JC

23 195685

INCREASE OF TRAIN SPEED AND CONTROL OF RIDING QUALITY

Speedup of passenger services on narrow-gauge main lines of Japanese National Railways is complicated by curvature, stopping distance requirements and light axle loads. Instead of track changes, JNR has adopted new rolling stock technology with electric cars of low center of gravity and pendulum suspensions which can negotiate fairly sharp curves at good speed. Without new equipment, JNR has an analytical method for appraising speedup--identifying the factors involved, confirming the safety and comfort of the projected schedules, and assuring against excessive expenditures that may be involved.

Mukasa, Y *Japanese Railway Engineering* Vol. 18 No. 4, 1979, pp 9-12, 6 Fig.

ORDER FROM: ESL

DOTL JC

23 195701

AMTRAK-EFFECTIVENESS OF THE ACT. REPORT TO THE PRESIDENT AND THE CONGRESS

Annual publication of ICC in compliance with Rail passenger service act of 1970. First issued in 1972.

Interstate Commerce Commission No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

23 196463

TRIP AVAILABILITY FOR RAPID TRANSIT SYSTEMS

Passenger acceptance of mass transit system depends on predictable travel times. The major sources of travel time uncertainty are passenger wait delays due to system loading and travel time delays due to failures. The second of these effects is treated analytically. Travel time distributions are developed for a typical automated group rapid transit network with a passenger load of 14,000 passengers per hour. In addition, an approximate availability solution is presented and compared to the analytic solution.

Sacks, IJ (California University, Livermore) *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 106-113, 5 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

23 196469

DEVELOPMENT OF THE ITALIAN AIRPORT NETWORK IN RELATION TO THE RAILROAD SYSTEM [Lo sviluppo della rete aeroportuale italiana in relazione al sistema ferroviario]

The passenger traffic in Italy for distances between 200 and 1000 km is reviewed from the point of view of optimal development of the air and railroad transportation systems. An analysis of the areas of airport and railroad influence is carried out and illustrated with many diagrams. It is concluded that the Italian air transport must provide connections between the North and the South, and with islands, and at medium distances where the traffic is not heavy. The airport network of Italy is overabundant and has to be redimensioned in relation to the development of rapid railroad networks. New railroad routes must start from airports. [Italian]

Lanzara, G *Ingegneria Ferroviaria* Vol. 33 No. 9, Sept. 1978, pp 767-779, 21 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

23 196533

PERFORMANCE ANALYSES OF PASSING TRACK AND PLANNING PRINCIPLES FOR ITS LAYOUT ON DOUBLE-TRACK LINES

The correlation between scheduled and actual performance with respect to passing tracks where higher speed trains may overtake slower ones is discussed. Plans for such passing sidings on double track lines with frequent passenger services are developed.

Yokota, H *Railway Technical Research Inst, Quarterly Reports* Vol. 20 No. 1, Mar. 1979, pp 9-14, 11 Fig., 2 Tab.

ORDER FROM: Ken-yusha, Incorporated, Hikaricho 1-45-6, Kokubunji, Tokyo, Japan

DOTL JC

23 196543

A NATIONAL PARK-AND-RIDE PLAN FOR THE NETHERLANDS [Een national park-and-ride plan voor Nederland]

In September 1977 the ANWB presented a draft for a national park and ride plan to the then minister of transport. This resulted in a discussion in which Netherlands railways play a major role. The scope of the park-and-ride concept is likely to be widened to include other means of public and private transport. [Dutch]

Verkeerskunde Vol. 30 No. 3, Mar. 1979, pp 106-107, 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-240844), Institute for Road Safety Research

ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands

PB14490

23 196945

HIGH SPEED TRAIN-FLEET OPERATION

In October 1976 British Rail introduced its first 200 km/h service on the London-Bristol and London-South Wales services. This followed several years of design work and extensive testing of a prototype train. The increase in passenger traffic on these routes, during the first two years of high speed operation, clearly indicates that there is a demand for such a service and that the train itself fully meets the need from the passenger viewpoint. Unlike some railway administrations, who have built separate lines dedicated to high speed services, it is British Rail policy to operate these units on the existing network, sharing it with passenger and freight trains running at conventional speeds. The paper starts with a brief description of the train and the facilities provided to ensure adequate maintenance resources both within regional depots and railway workshops. This is followed by a review of experience to date and the paper concludes with a forecast about future trends in high speed operation.

Power, SRD (British Rail) *Institution of Mechanical Engineers Proceedings* Vol. 192 Dec. 1978, n.p., 1 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

23 197003

AUTOMATIC REVENUE COLLECTION IN SUBURBAN TRAFFIC: THE PARIS-MONTPARNASSE EXPERIMENT [Le controle automatique banlieue: l'experimentation de Paris-Montparnasse]

The high proportion of fraud in suburban traffic, together with the decision made to link the RATP (Paris transport) network up with the SNCF, have persuaded the latter to conduct an experiment with ARC. The system used is compatible with that of the RATP: three types of apparatus are being used at present. [French]

Boutanquoi, J *Revue Generale des Chemins de Fer* Apr. 1979, pp 187-192, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

23 197011

TRAM TO SUPERTRAM

"Light rapid transport" is essentially an upgraded tramway: in the popular idiom it is a "supertram". Its role is between the ordinary street-running transport mode (the bus) and the fully-equipped rapid transit system (the underground).

Joyce, J Prigmore, BJ *Electronics and Power* Vol. 25 No. 3, Mar. 1979, pp 207-211, 12 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

23 197282

A PARAMETRIC MODEL OF INTER-CITY PASSENGER TRANSPORT

This report describes a model which could be used to evaluate inter-city passenger transport systems. The model can facilitate the rapid assessment of a transport system over a range of possible pairs of cities, varying in distance apart and in overall traffic levels, and also estimate the effects of possible changes in the transport systems serving an existing route. Given the total market for travel between two cities, the model estimates the demand for travel on each of a number of transport modes. The characteristics of new or existing systems, the routes over which they might operate, and the travellers who might use them are represented by a suitable set of parameters. These parameters are used as inputs to a model which consists of 3 sequential sub-models: a modal-split model which calculates the number of passengers likely to use each system, a fleet-size model which calculates the number of vehicles required on each system, and a costing model which calculates system costs and revenues and other quantities required for economic assessment. Any part of the model may be run as many times as desired, either alone or in combination with the other parts, so that the effect of any variation in the characteristics of the transport systems, routes or travellers may be estimated.(a)

Walmsley, DA
Transport and Road Research Laboratory Monograph TRRL Lab Rpt. LR866, 1979, 44 p., 8 Fig., 2 Tab., 13 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-241111)
ORDER FROM: TRRL

23 197431

AN INTRODUCTION TO TRANSIT MARKETING

The report presents a general overview of the marketing process as applied to transit, to the value of marketing, and to the marketing plan and its components. It also presents some cautionary remarks about transit marketing. The report contains a selected bibliography of marketing publications as well as a list of marketing assistance sources for transit operators.

Urban Mass Transportation Administration, (UMTA-UPM-40) UMTA-UPM-40-79-1, May 1975, 16 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294954/3ST

23 197440

CHARACTERISTICS OF URBAN TRANSPORTATION DEMAND; APPENDIX

To assist the urban transportation planner, the Urban Mass Transportation Administration's Planning Methods and Support Program researches,

develops, and distributes planning tools, including the documentation of novel planning studies, new design and forecasting techniques, and germane research results. This report is an example. Its contents clearly present usable planning concepts and constitute a valuable addition to the growing set of computerized and manual techniques comprising the UMTA/FHWA Urban Transportation Planning System (UTPS). This report is an Appendix to CUTD handbook. It offers detailed data on individual cities, roads, routes, stations, etc. These are not in a form that is comparable from place-to-place, but may be of interest from an historical perspective for the urban areas concerned.

See also PB-293220, RRIS 25 191689; Bulletin 7902.

Levinson, HS
Smith (Wilbur) and Associates, Urban Mass Transportation
Administration, (UMTA-IT-06-0049) UMTA-IT-06-0049-79-2, Jan.
1979, 213 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294989/9ST

23 197455

BASIC MARKET RESEARCH TECHNIQUES FOR TRANSIT SYSTEMS

Market research provides the foundation for effective transit service delivery. Acceptance or rejection of the system and mandated service modifications are dependent on the public's evaluation. The critical importance of sound marketing efforts emphasized the need for a basic guidebook, geared specifically to the transit industry, outlining the principles and procedures of market research. The major responsibilities of a transit market research activity are to collect data, analyze the needs and preferences of the various target markets, and, subsequently, to forecast the potential demand for transit services. Other key functions of market research within the transit field include assessing needs for services by specific target population segments, evaluating the effectiveness of service improvements and alterations, determining the public's attitude toward the transit system, and measuring the effectiveness of specific advertising campaigns and themes. Three general approaches to be used in a transit marketing capacity were discussed: (1) Sample surveys, (2) Field observation, and (3) Secondary data analysis. In comparing these three broad procedures, each has strengths and weaknesses which make them distinct methods.

Sponsored in part by Texas State Dept. of Highways and Public

Transportation, Austin. Transportation Planning Div.

Hatfield, NJ Guseman, PK
Texas Transportation Institute, Urban Mass Transportation
Administration, Texas State Department of Highways & Public Transp
Res Rpt. TTI -2--10-76-1052-4, UMTA-TX-09-8003-79-2, June 1978, 93
P.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295079/8ST

23 197462

A STUDY OF TRANSIT RIDER CHARACTERISTICS

The report presents the results of a set of transit rider surveys conducted in a relatively well-served, intense transit environment. The bus surveys conducted used an on-board distribution of a mail-back questionnaire which requested the following types of information: basic trip data; alternatives; demographics; and other characteristics. The surveys covered four fixed route bus routes (two in Queens and two in Brooklyn) and one rail rapid transit line on Staten Island. The intent of the bus surveys was to relate the ridership observed to both the source population and the ridership of other services, and to deduce differences which might be specific to the mode and/or which might be useful in planning services. The survey of the rail rapid transit line was generally comparable, but there was another objective of equal importance in this case: a detailed study of the specific origins and destinations on the service of both stations on and off and original origin and final destination. Results from other studies done previously or concurrently are integrated to provide a systematic view of the range of transport alternatives available to the individual in the environments studied. The ridership studies were complemented by an extensive origin-destination study on the rail rapid transit service. The report also discusses basic ridership characteristics, frequency and time, and articulation with other modes.

McShane, WR Menaker, PJ Roess, RP Gilroy, J
Polytechnic Institute of New York, Urban Mass Transportation Adminis-
tration Final Rpt. UMTA-NY-11-0014-79-3, Nov. 1978, 157 p.

Grant DOT-UMTA-NY-11-0014

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-295107/7ST

24 189028

RAIL TRANSPORT IN THE USSR IN 1977 [Zelezodoroznyj transport SSSR v 1977 g.]

Survey of rail transport in the USSR in 1977: Report on the main freight and passenger traffic indices; organisation and action taken to rationalize freight transport and improve operations; economic indices on staff and stock productivity. [Russian]

Ekonomika Zelezodoroznogo Transporta Vol. 3 No. 86, 1978, 32 p., 7 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

24 189030

INTERNATIONAL TRANSPORT POLICY [Mezinarodni prepravni politika]

The author examines rail, inland waterway and road traffic, as well as combined transport within the COMECON. Analyses carried out show that international traffic is developing more rapidly than domestic traffic. In conclusion, it is stressed that railways are and will remain the decisive transport mode for international traffic. [Czech]

Eliasova, J *Zbornik Prac* No. 14, 1977, pp 147-154, 5 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Vysoka Skola, Dopravna v Ziline, Moyzesova 20, 010 00 Zilina, Czechoslovakia

24 189031

THE RAILWAY IN THE PEOPLE'S REPUBLIC OF CHINA [Les chemins de fer en Chine populaire]

No Abstract. [French]
See also *Vie du Rail* No. 1656 for August 27, 1978, pages 4-6 and No. 1658 for September 10, 1978, pages 38-41.

Luccioni, X *Vie du Rail* No. 1654, July 1978, pp 42-44, 1 Fig., 1 Tab., 26 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: French National Railroads, 610 Fifth Avenue, New York, New York, 10020

24 189033

DOES FUTURES RESEARCH HAVE A CORPORATE ROLE?

The author suggests that Futures Research is an indispensable initial step in the Strategic Planning process. For various reasons, including executives' belief that futurism is not "businesslike", it appears unwarranted to establish a Futures Research group independent of the Strategic Planning department. In view of the repeated and serious predictions of the demise of the corporation, what could be a better Futures Research project than to seek ways of reversing these forecasts?

Holloway, C *Long Range Planning* Vol. 11 No. 5, Oct. 1978, pp 17-24

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

24 189061

SANTA FE: BETTER PERFORMANCE THROUGH INDUSTRIAL ENGINEERING

The development of an industrial engineering program on Santa Fe and its applications in the mechanical, maintenance-of-way, clerical and operating department are described. Benefits have included increased productivity and development of better supervisors when they return to the line operations.

Semioli, WJ *Railway Age* Vol. 180 No. 3, Feb. 1979, pp 42-44, 1 Phot.

ORDER FROM: ESL

DOTL JC

24 189071

BRITISH RAIL'S NEW DEAL

Over a 30-year period since the British government assumed control of Britain's railroads, there have been a succession of managerial shufflings and an absence of a concise mission for British Railways. Various legislative actions have provided subsidy for certain services, permitted closing of some light density routes, but failed to provide consistent policy and funding for investment allocations that would assure a viable role for BR.

Bonavia, MR *Transportation Journal* Vol. 18 No. 2, 1978, pp 5-11

ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606

DOTL JC

24 189074

THE UNIT TRAIN: THE RAILROAD'S RESPONSE TO COMPETITION IN THE UNITED STATES

The unit train emerged in the 1960s in response to an erosion of coal traffic handled by rail, a relaxation of ICC's traditional regulatory policies in the wake of the Transportation Act of 1958, and realization of the cost savings possible with special equipment, through operation and marketing techniques. The steps taken in the 1960s enabled railroads to solidify their position in bulk commodity transport and even to challenge for high value traffic, trends which continue to the present.

Starr, JT (Maryland University, Baltimore County) *Transportation Journal* Vol. 18 No. 2, 1978, pp 29-42, 2 Tab.

ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606

DOTL JC

24 189760

INTERCONTAINER. TEN YEARS AFTER [Intercontainer. Dix ans apres]

After describing Intercontainer's first ten years, the author shows how favorably the activities of this subsidiary of the European Railways have developed. He emphasises its dominant role in shipping with the hope that progress be made on the European market. He brings out clearly the fact that any progress in this field depends on the development of the combined transport concept. In this context, he welcomes with great interest the new research undertaken by the UIC on all the aspects of combined transport. [French]

McKenna, D *Rail International* Vol. 9 No. 11, Nov. 1978, pp 872-879, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

24 189788

IRCA/UIC CONGRESS, STOCKHOLM, 7-12 MAY 1979. INVESTMENT ON THE RAILWAYS. THE NATIONAL AND CORPORATE FRAMEWORK

No Abstract.

Harbinson, H *Rail International* Vol. 9 No. 11, Nov. 1978, pp 817-821

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: ESL

DOTL JC

24 189799

SOME PLANNING AND OPERATIONAL ASPECTS OF NEW RAILWAYS

This paper examines planning and operating aspects involved with designing new railways in developing countries. Much of the data was collected during a feasibility study of a new high-speed railway line in Iraq. It was concluded that a new freight-only railway would be economically viable with benefits to the national economy exceeding the financial returns to the railway administration. A traffic model must precede the civil engineering activities operations planning.

Proceedings of the Seminar on Transport Planning in Developing Countries held 11 to 13, July 1978, during the PTRC Summer Annual Meeting at the University of Warwick, England. Co-sponsored by the Transportation Research Board.

Hartley, PM (Crocker (Trevor) & Partners) *Planning & Transport Res & Comp. Sum Ann Mtg. Proc* Proceeding Seminar F, July 1978, pp 138-147, 1 Fig.

ACKNOWLEDGMENT: Planning and Transport Res and Computation Co Ltd
ORDER FROM: Planning and Transport Res and Computation Co Ltd, 109 Bedford Chambers, King Street, London WC2, England

24 190771

CONRAIL FACES CONTINUING PROBLEMS

Conrail predicts it will become profitable by 1980, but needs \$1.3 billion more than the \$2.1 billion current Federal authorization. GAO doubts that

Conrail will be profitable by 1980, and believes Conrail could require substantially more than the appropriated \$2.1 billion and the additional \$1.3 billion. To reverse its deterioration Conrail must improve customer service, increase labor productivity, and modernize its yards and terminals. Conrail made substantial investment in track and equipment rehabilitation, but Conrail's improvements program for modernizing yards and terminals lagged because of time-consuming planning processes and only now is beginning to show some vitality. Conrail assumes that other Federal monies amounting to \$680 million over the next 5 years will be appropriated to replenish the title V employee protection fund and pay its share of Railroad Retirement Fund assessments.

General Accounting Office CED-78-174, Oct. 1978, 76 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-287205/9ST

24 192061

INFORMATION ON ALLEGED CONRAIL MISMANAGEMENT OF CONTRACTING AND TRACK REHABILITATION IN ITS TOLEDO AND FT. WAYNE DIVISIONS

GAO could not substantiate allegations that Conrail had mismanaged (1) contracts for derailment and crew transportation services and (2) track rehabilitation. According to Conrail studies, contracting for derailment and crew transportation services is generally economical because the services are required infrequently or sporadically. GAO did not find evidence of poor rehabilitation on three track sections, and concludes the allegation was based on incomplete and/or inaccurate information.

General Accounting Office CED-79-41, Feb. 1979, 11 p.

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB-290860/6ST

24 193743

RAILROADS IN TRANSITION: MERGING WITH A FUTURE

The end-to-end merger movement has developed as a means of producing single-line service to new markets. DOT and ICC are often apparently pursuing differing policies with respect to redundant railroad plant. In view of the generally poor record of parallel mergers, new attention is being given to consolidated facilities and voluntary abandonment of certain markets. Reduced regulation, rather than government ownership of fixed plant is suggested as a means of strengthening the industry and improving its performance.

Roberts, R *Modern Railroads/Rail Transit* Vol. 34 No. 3, Mar. 1979, pp 55-60

ORDER FROM: ESL

DOTL JC

24 193744

CONRAIL STRESSES RETURN ON ASSETS

A new marketing/sales program on Conrail emphasizes maximum return on freight car investment. The organization develops marketing strategies, determines the price and level of service at which these strategies will be sold, and then implements them while controlling carefully the asset base of cars. The marketing organization is developed around five basic car categories as the basis for so-called business groups. Within each such group are a number of line-of-business units that correspond to more traditional commodity manager functions. Examples of the new strategy in several market situations are described.

Shedd, T *Modern Railroads/Rail Transit* Vol. 34 No. 3, Mar. 1979, pp 70-74, 6 Fig.

ORDER FROM: ESL

DOTL JC

24 193751

LOOK WHO'S BOOMING

Builders of freight cars have long backlogs principally because of the new ways that freight cars are being financed. Short lines, financial institutions, shippers, and private and corporate investors are all buying railroad equipment. Increasingly railroads are becoming movers of other owners' rolling stock. The current effect on carbuilders and possible effects of an economic downturn on these new car owners are discussed.

Gibson, P *Forbes* Vol. 123 No. 5, Mar. 1979, p 52, 1 Phot.

ORDER FROM: Forbes Incorporated, 60 Fifth Avenue, New York, New York, 10011

DOTL JC

24 193752

PUTTING THE CABOOSE BEFORE THE ENGINE?

The new round of end-to-end mergers differs from the side-by-side mergers of the 1960s. While ICC and DOT are on record as favoring mergers to strengthen the industry, only a few of recent mergers are an unqualified success. Most competitive gains achieved by merger are at the cost of other railroads, strengthening the roads that participate and damaging those which do not. Unsolved are basic problems such as low rates on freight that moves most naturally by rail; difficulty and delay in line abandonments and in releasing surplus workers; and unequal and subsidized competition that continues to divert traffic from private railroads to publicly supported highways and waterways.

Cook, J *Forbes* Vol. 123 No. 5, Mar. 1979, pp 43-49

ORDER FROM: Forbes Incorporated, 60 Fifth Avenue, New York, New York, 10011

DOTL JC

24 193756

THE MARKETING APPROACH TO "SKOOKUM" RAILROADING

Canadian Pacific's railway operation has a profitability and return on investment better than most North American railroads. This is achieved through a policy of recognizing the value of assets, pricing accordingly, and selectively serving markets to assure adequate return. Increased utilization of a smaller car fleet, improved train operation, stress on track maintenance, new approaches to domestic containerization, and enhanced management information systems all have roles.

Malone, F *Railway Age* Vol. 180 No. 6, Mar. 1979, p 22, 2 Phot.

ORDER FROM: ESL

DOTL JC

24 194144

RATIONALISATION OF A STATE-OWNED RAILWAY SYSTEM TO MEET INCREASED ROAD COMPETITION

In this editorial, the author discusses the rationalisation problems associated with the Victorian Railways (Australia) which is described as a network of 6578 km of routes radiating from the capital city of Melbourne and the grain ports of Geelong and Portland. In Melbourne itself, population 2.6 M, the metropolitan rail network comprises 339 route-km of commuter lines, of which 188 km are electrified at 1500 volts DC, providing some 1600 M passenger-km annually. The roles of rail and road transport are reviewed, leading to the publication of the Bland report, submitted to the government in 1972, which recommended that the long term interests of Victoria would best be served if there were a progressive extension of the scope for real competition between the railways and the road operators, with ultimate distribution of traffic between modes being based on marked determined charges related to real costs. Changes adopted following the government's acceptance of the Bland report in March 1972 are described, e.g. Contract road buses, branch line passenger services, closure of branch lines, rationalisation of freight operators and the establishment of regional freight centres. A railway map of the Victorian lines provides information on routes on which rail passenger services have been replaced by contract bus services, routes where changeover is in course but not yet completed, lines which have been closed or recommended for closure and freight centres in operation as at 1.3.78. It is noted that the most distant station from Melbourne is 633 km and the average haul for freight is 277 km.

Gibbs, AG (Victorian Railways Board, Australia) *Rail International* No. 9, Sept. 1978, pp 533-541, 1 Fig., 3 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-237973)

ORDER FROM: ESL

DOTL JC

24 194499

RAILWAY TRANSPORT IN THE USSR AND ABROAD

[*Zeleznodoroznyj transport v SSSR i za rubezom*]

Characteristics of the indices of development in Soviet railways in 1977; analysis of the level reached and main trends in the development of technical equipment and in the activity of the SZD and foreign countries. [Russian]

Avetikjan, AA *TsNII* No. 9, UIC Cat. 034 N35, 1978, 212 p., Tabs., Photos., Refs., Apps.

ACKNOWLEDGMENT: International Union of Railways, BD
 ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

24 194638
PROGRESS IN RAILROAD RESEARCH

This biennial report covers the activities conducted exclusively by the AAR Research and Test Department and those activities in which AAR cooperates with other groups including the Federal Railroad Administration and the Railway Progress Institute. The report incorporates a general summary of programs and then gives details of the following specific areas: Dynamic research; Engineering economics; Environmental studies; Metallurgy; Safety; Special Studies; Systems studies; Technical services; Testing Activities; and Track Train Dynamics. There are four appendices: R&T Department Personnel; Consultants and contractors to AAR; Committees related to the work of R&T Department; and Publications of R&T Department.

Association of American Railroads Technical Center No Date, 77 p., 20 Fig., Photos., 4 App.

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

DOTL RP

24 194853
TEN WAYS TO IMPROVE TRANSPORTATION PRODUCTIVITY

The author advocates increased individual investment in freight car supply; ratemaking that will increase freight-car productivity; reorganization of railroad labor along industrial rather than craft lines; a new Northeast restructuring; and continues then with recommendation on inland waterways, coastal shipping and trucking. Illustrations and tables are used to demonstrate some of these points.

Delaney, RV (International Paper Company) *Traffic World* Vol. 178 No. 2, Apr. 1979, p 35, 7 Fig.

ORDER FROM: Traffic Service Corporation, 815 Washington Building, Washington, D.C., 20005

DOTL JC

24 194855
A LEASING SOLUTION TO THE RAIL CAR SHORTAGE

An organization involved in bringing new capital and equipment to railroads, Itel Corp. has become a major owner of freight cars and of short-line railroads. Itel has utilized the tax leveraged lease, operating lease, full-service lease and offers such services as car hire accounting, fleet management, and engineering/maintenance services.

Costello, JM, Jr (Itel Rail Division) *Traffic World* Vol. 178 No. 2, Apr. 1979, pp 70-71, 1 Phot.

ORDER FROM: Traffic Service Corporation, 815 Washington Building, Washington, D.C., 20005

DOTL JC

24 194861
THE SIZE OF TRANSPORTATION INDUSTRIES AND THEIR STABILITY

This paper deals with the predictability of the sizes of transportation companies and issues of stability in the industry. A conceptual approach of physics is applied to analyze effective constraints on industrial dynamics, possibly pointing to a technique for predicting the impacts of certain regulatory reform-proposals. Commercial air carriers, railroads, pipelines, water carriers, motor carriers and bus lines are examined.

Hassler, FL
 Transportation Systems Center SS-20-U3-44, May 1978, 38 p., 18 Fig., 1 Tab.

ACKNOWLEDGMENT: TSC
 ORDER FROM: TSC

DOTL RP

24 194879
RAILWAY PLANNING IN DEVELOPING COUNTRIES: A CASE STUDY OF COLOMBIA

This paper describes a study of possible network changes for the Colombian railroad system. A cost model is developed and the variation of costs with traffic density and with gradient is analysed and found to be different from that expected from experience in developed countries. The evaluation of network changes is carried out by a form of systems analysis in which two new lines and many closures are examined. Closures are evaluated by means of social cost benefit analysis incorporating a consumers' surplus approach. The study recommends fairly radical changes to the present network configuration, these involving the construction of one new line and the closure of several existing ones.

Drew, JN (Andes, University, Colombia) *Transportation Planning and Technology* Vol. 5 No. 1, 1978, pp 13-27, 3 Ref.

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

24 195094
CHINA'S RAILWAYS: A SPECIAL REPORT

A series of articles on China's railways, their quest for modern technology, programs, and problems. Some of the articles are written by Chinese railway experts.

International Railway Journal Dec. 1978, pp 16-74

ACKNOWLEDGMENT: British Railways
 ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010

DOTL JC

24 195126
CZECHOSLOVAK RAILWAY RESEARCH AND ITS CONTRIBUTION TO THE DEVELOPMENT OF THE INTERNATIONAL COLLABORATION OF THE RAILWAYS

The author, Director of the Railway Department's Research Institute in Prague, points out that in Czechoslovakia all modes of transport are organised in accordance with a national plan, in which the Railways occupy a dominant position and carry three-quarters of the total transport demand. He then gives an account of the tasks and content of railway research, i.e. the application of cybernetics, raising of the level and capacity of the Railways, improvement of the viability of rolling stock and installations, protection of the environment and the search for economy measures. In the last part of the article, the author stresses the need for international cooperation in railway research. He quotes various examples, and describes research carried out on the CSD test circuit.

Malina, I *Rail International* Vol. 10 No. 3, Mar. 1979, pp 217-222

ACKNOWLEDGMENT: International Union of Railways, BD
 ORDER FROM: ESL

DOTL JC

24 195541
RAILROADING FOR PROFIT: MARKETING

While transportation demand, environmental concerns and energy shortages would point to greater railroad traffic and profitability, the industry has been losing market share, facing declining profitability and failing to throw off long-term constraints. Marketing is seen as the key to changing these trends which are illustrated with a series of charts and tables. The roles of railroad management, government regulators, railway labor and shippers are all discussed.

Welty, G *Railway Age* Vol. 180 No. 4, Feb. 1979, pp 22-27

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DOTL JC

24 195542
THE RAILROAD MERGERS AND THE COMING OF CONRAIL

Railroads of the early 20th century are described and regional differences noted. The effects of early consolidation efforts, the Transportation Acts of 1920 and 1940, the Ripley Plan and the Esch-Cummins initiative are described. The post-World War II mergers are detailed and discussed with special emphasis on Penn Central and its successor, Conrail. The Klitenic plan for the Midwest, ICC's response to a proposal for Union Pacific/Rock Island merger which was never consummated, is seen as a real solution to

that region's problems. Government and management are seen as primarily responsible for U. S. railroad problems; railway labor costs and productivity are given little attention; government ownership is seen as a solution.

Saunders, R
Greenwood Press No Date, 389 p.

ORDER FROM: Greenwood Press, 51 Riverside Avenue, Westport, Connecticut, 06880

24 195551

THE CHALLENGE OF RATE FREEDOM

Canada has relaxed rate regulation over two decades with the National Transportation Act of 1967 permitting free negotiation of freight rates between railroads and their customers and allowing changes of rates with virtually no regulatory constraint. The free competition was not easily accepted. Costing and marketing have become essential as railroads learn to be competitive and profitable through appreciation of elasticity of demand, need for providing total distribution services and determination of areas of transport where railroads can be competitive.

Latimer, RR *Railway Age* Vol. 180 No. 10, May 1979, p 50

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DOTL JC

24 195682

VANDALISM IS RISING, AND THE RAILROADS NEED HELP

Vandalism is an increasing railroad problem involving derailments, casualties, freight loss and damage, and operating problems. Countermeasures involve technology, police relations, changes in laws, and education. Santa Fe's efforts in getting cooperation of its operating people and in organizing its police department are also described.

Welty, G *Railway Age* Vol. 180 No. 11, June 1979, pp 16-18, 1 Phot.

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24 195696

ANNUAL REPORT OF THE CANADIAN INSTITUTE OF GUIDED GROUND TRANSPORT 1977-78

This Annual Report describes the activities of the Canadian Institute of Guided Ground Transport during the fiscal year 1977-78. Progress reports on ongoing projects and abstracts of final reports on projects completed during the year are presented under the following general headings: (a) communications and control, (b) track structures and dynamics, (c) freezing problems, (d) economics and management, (e) cybernetics and operations research, (f) magnetic levitation, (g) human factors, and (h) special projects. A brief financial summary, some biographical information on the CIGGT researchers, and a list of the Institute's publications are also included.

Bryce, JS Arnold, SN
Canadian Institute of Guided Ground Transport CIGGT Rpt No 78-7,
Dec. 1978, 129 p., 1 Fig., 1 Tab., Refs.

ACKNOWLEDGMENT: CIGGT

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24 195731

TRANSPORT STATISTICS IN THE UNITED STATES. PART 1. RAILROADS, THEIR LESSORS, AND PROPRIETARY COMPANIES

No Abstract.

Interstate Commerce Commission No Date, n.p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

24 196103

MISALLOCATIVE EFFECTS OF VALUE-OF-SERVICE RAIL GRAIN RATES

Value-of-service, based on demand for transportation, rather than cost-of-service had traditionally been the rate-making approach used by railroads even before ICC regulation that has since sanctioned route and commodity rate discrimination. A study of wheat and barley rates in the Midwest indicates a switch to cost-of-service would reduce truck share, cut shipper costs, reduce rail revenues, alter railroad traffic mix, and make trucks

function as feeders to rail service. More efficient transportation and allocation of resources would result.

Martin, MV *Transportation Journal* Vol. 18 No. 3, 1979, pp 74-83, 2 Fig., 2 Tab.

ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606

DOTL JC

24 196104

OPPORTUNITY FOR RAILROAD RESEARCH

In restructuring its research programs, AAR is looking to areas with the potential for high pay-off. Cooperative programs involve projects that railroads can support within their own organizations, as well as through the AAR. Decisions must be made on allocation of resources to assure attention is given to most critical areas and so existing projects can be redirected or eliminated as their value changes. Levels of funding, and budgets for the various research areas are given and the areas themselves are discussed.

Lind, EF *Progressive Railroading* Vol. 22 No. 6, June 1979, p 41, 7 Phot.

ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

24 196358

A LEAN LITTLE ROAD WITH A PIP OF A PROGRAM

Kansas City Southern Lines, major component of conglomerate KCS Industries, is a 1670-mile line in the mid-South which has achieved a dramatic turnaround in profitability and productivity since 1973. Along with new unit coal train traffic, the Profit Improvement Program of KCS management prevades every facet of the railroad's operation and planning. Track and equipment maintenance, short trains, and data processing are all discussed.

Malone, F *Railway Age* Vol. 180 No. 12, June 1979, p 22, 3 Phot.

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24 196362

AIR AND RAIL LABOR RELATIONS, A JUDICIAL HISTORY OF THE RAILWAY LABOR ACT

Major court decisions involving the Railway Labor Act since its enactment in 1926 are published and explained where necessary. Some 150 cases, including the landmark cases in railroad/union negotiations and disputes, are included.

Gohmann, JW
Kendall-Hunt Publishing Company No Date, 373 p.

ORDER FROM: Kendall-Hunt Publishing Company, 2460 Kerper Boulevard, Dubuque, Iowa, 52001

24 196531

SOME CENTRAL ISSUES OF INTERCITY PASSENGER AND FREIGHT TRANSPORTATION IN CANADA

Investigation of the potential for high-speed rail indicates that operation of high speed trains would entail losses comparable to the losses now generated by the obsolete passenger rail in Canada, at an annual level of about \$200 million. Regarding the freight sector, the effectiveness of the freight rates as the major instrument of controlling regional development is examined, with particular reference to the statutory grain rates. The feasibility of railway electrification is considered in the light of available data on traffic volumes and costs and it is concluded that electrification of high density lines is justified economically in the long term, but that it will not take place without significant financial participation by the government.

Lukasiewicz, J (Carleton University, Canada)
Canadian Society for Civil Engineering, Canadian Society for Mechanical Engineering Monograph May 1978, 30 p., 2 Fig., 6 Tab., 32 Ref.

ACKNOWLEDGMENT: TRRL (IRRD-240805), Roads and Transportation Association of Canada

ORDER FROM: Canadian Society for Civil Engineering, 2050 Mansfield Street, Montreal, Quebec, Canada

24 196541

RECYCLING HISTORIC RAILROAD STATIONS: A CITIZEN'S MANUAL

This manual is to assist individuals and local governments interested in undertaking railroad station recycling in their own communities through reports on eight historic stations which have been preserved. The publication discusses basic guidelines for successful projects, and feasibility. The manual raises issues which must be resolved during the reuse process and poses possible solutions to these as they apply to particular types of projects. Potential is also addressed for the inclusion of intermodal transportation centers in recycled stations.

Anderson Notter Finegold, Incorporated, Department of Transportation
Nov. 1978, 83 p., Photos.

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24 196542

RECYCLING HISTORIC RAILROAD STATIONS: A TECHNICAL SUPPLEMENT TO THE CITIZEN'S MANUAL

This report provides detailed documentation, analysis and evaluation of eight historic and architecturally significant railroad stations which have been adaptively reused and recycled for transportation and other community uses. Over 20,000 vacant or underutilized railroad stations represent a vast potential for economically viable adaptive reuse projects. This report is a companion to the manual *Recycling Historic Railroad Stations: A Citizen's Manual* and is intended as a technical supplement to the manual. This report is for use by preservationists, architects, developers, planners, government officials and citizen groups who are seriously interested in undertaking railroad station recycling in their own communities. A case study approach is used to present the technical information on the eight reuse examples. Data was collected through a series of extensive on-site visits and interviews with project participants and local officials. Four major areas of study are developed in the report: architectural and rehabilitation design analysis; market and financial strategies; transportation planning; urban revitalization and community participation. The report emphasizes the economic feasibility of adaptive reuse of historic stations while raising issues which must be resolved during the reuse process and posing possible solutions to these issues as they apply to a particular type of project. Potential for inclusion of intermodal transportation centers in recycled stations is also addressed. The report offers many lessons in successful station reuse, including the need for sound financing, sensitive rehabilitation, and local support.

This Report is also entitled "Reuse of Historically and Architecturally Significant Railroad Stations for Transportation and other Community Needs: Documentation, Analysis, and Evaluation."

Weber, MB McGinley, PJ

Anderson Notter Finegold, Incorporated, Department of Transportation
Tech Rpt. Nov. 1978, 126 p., Photos.

Contract DOT-OST-77-002

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24 196874

STRATEGIC PLANNING STUDIES WITHIN BRITISH RAIL

Over a period of 3 years, British Rail has been carrying out a long-term strategic planning exercise that has looked at the role rail transport is likely to play in the overall transport scene in the United Kingdom. This paper describes in broad outline the nature and scope of the strategic studies and deals with the overall philosophy of strategic planning at the level of a national network. Some of the major study findings are briefly presented.

This paper appeared in *Transportation Research Record* No. 687, *Surface Transport Regulation and Railroad Planning*.

Ashford, N (Loughborough University of Technology, England) *Transportation Research Record* No. 687, 1978, pp 25-30, 1 Fig., 6 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

24 196930

THE RAILROAD SITUATION: A PERSPECTIVE ON THE PRESENT, PAST AND FUTURE OF THE RAILROAD INDUSTRY

This study was undertaken for the Federal Railroad Administration in partial compliance of Section 901 of the Railroad Revitalization and

Regulatory Reform Act of 1976. Section 901 directs the Secretary of Transportation to "conduct a comprehensive study of the U.S. railroad industry". This study provides an overview of the U.S. railroad industry. It describes the present situation and explains how the present situation evolved, concentrating primarily on the period 1929-1976. The likely future of the railroad industry over the next ten years is evaluated. The study concludes with a summary of how "The Railroad Situation" is currently viewed by railroad management, railroad labor, shippers and other concerned parties.

Urba, CE Reebie, RS Liba, CJ Keale, MJ Isacowitz, DA Katz, JS Stone, PV Robertson, AC Singer, L Reebie (Robert) and Associates, Incorporated, Federal Railroad Administration Final Rpt. FRA/OPPD-79-7, Mar. 1979, 500 p., Figs., Tabs.

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24 196977

IRCA/UIC CONGRESS. SECTION II: INVESTMENTS ON THE RAILWAYS. INTER-RELATIONS BETWEEN THE OPERATIONAL SYSTEM OF TRAIN RUNNING, THE CAPITAL INVESTED AND ITS EFFICIENT USE

This report gives results of research into the degree of capital investment in various phases of rail transport and its effect on capacity and productivity. Capital investments in fixed facilities which can increase line capacity and in rolling stock that can increase train capacity and speed are analyzed. Following analysis, the USSR Railways determines what is the most profitable use of capital invested in railway development.

Presented at the Twenty-second Session of the IRCA, IRCA/UIC Congress, Stockholm, 7-12 May 1979.

Kozlov, VE *Rail International* No. 4, Apr. 1979, pp 371-378, 6 Fig.

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24 196978

IRCA/UIC CONGRESS. SECTION II: INVESTMENTS ON THE RAILWAYS. POSSIBILITIES FOR THE IMPROVEMENT OF THE PRODUCTION STRUCTURE OF THE GERMAN FEDERAL RAILWAY BY INVESTMENTS IN TRACK INSTALLATIONS AND VEHICLES

In the face of declining market share, German Federal Railway has mounted a marketing program which requires investment in new and altered lines, development of classification yards, acquisition of rolling stock and expansion of the management information system. Analysis of the options and effects on profitability are described, along with forecasts of future trends.

Presented at the Twenty-second Session of the IRCA, IRCA/UIC Congress, Stockholm, 7-12 May 1979.

Scotland, R *Rail International* No. 4, Apr. 1979, pp 421-445, 16 Fig., 2 Tab.

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24 196985

THE U.S. RAILROADS: SOME ALTERNATIVES FOR IMPROVEMENT

There are numerous strategies for improving railroad performance within the industry as it is currently structured. Although no single approach will solve all of the industry's financial problems, a combination of strategies, followed simultaneously, could achieve this goal. This report, which was undertaken as part of the Section 901 studies required by the Railroad Revitalization and Regulatory Reform Act of 1976, investigates such strategies as better car distribution, lower labor costs, reduced circuitry, and improved yard efficiency. The report presents two screening models that can be used to test a wide variety of improvement strategies. Sensitivity analysis of the most promising strategies are presented for the national system, the Eastern, Southern and Western districts, and four individual railroads. Complete documentation and user's/programmer's manuals are included for each model.

Sussman, JM Martland, CD Juster, RD Kruger, JA Michaels, L Gray, R

Multisystems, Incorporated, Federal Railroad Administration Final Rpt. FRA-OPPD-79-2, Nov. 1977, 359 p., Figs., Tabs., 3 App.

Contract DOT-FRA-757-5266
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PB-295793/AS, DOTL NTIS

24 196986

ORGANIZATION OF NEEDED PROGRAMS WITHIN THE NATIONAL RAIL TRANSPORTATION SYSTEM

This report was developed to assist the DOT and FRA to fulfill a requirement of the 4R Act of 1976 to assess the effects upon the national rail system of alternative rail corporate structures. The study recognized that corporate organization is not an end in itself. Instead it is only a tool to facilitate the efficient and effective management of an enterprise. For the railroads, corporate organization must assist the industry's managements to realize their dual objectives of public service and profit by addressing and resolving problems and/or opportunities. The study surveyed railroad managements, industry associations, and industry statistics in order to identify the current problems/opportunities facing the railroads. The study also surveyed the current organization of individual railroads and the industry. Finally the study considered alternative organizational concepts. The report states the findings that the principal needs of the industry are to organize analytical staff programs to develop and use service quality, cost and profitability information to identify and correct or eliminate uneconomic services. This information would be of special importance in dealing with labor and government.

Reebie, RS Robertson, AC

Reebie (Robert) and Associates, Incorporated Final Rpt. FRA-OPPD-79-3, Jan. 1979, 205 p., Figs., Tabs., 10 App.

Contract DOT-FRA-760-5271

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PB-297116/AS, DOTL NTIS

24 196996

MANAGING THE TRANSPORT SERVICES FUNCTION. SECOND EDITION

This book deals with management organization and administration of transport services responsible for conveying people and goods. Starting with the basic objectives of a transport service, it continues with its structures and

working, operating costs, planning, and also the choice and design of rolling stock. The different aspects studied are illustrated by examples and anecdotes, and examples are proposed for a typical organization.

Woodward, FH

Gower Press UIC Cat. 12 N47, 1977, 321 p., Tabs., Photos.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Gower Press, Guildford, England

24 197001

CREATING A COHESIVE RAIL NETWORK

In 1973, the UIC published its master plan for a standard main-line network on the European continent. A number of aspects of the plan are still under study by both national railways and the UIC. The enthusiasm engendered by publication of the plan and subsequent discussion resulted directly or indirectly in construction of new lines, new layouts and modernisation of track in numerous countries throughout Europe.

International Railway Journal Apr. 1979, p 21, 1 Fig., 2 Tab., 11 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Simmons-Boardman Publishing Corporation, 508 Birch Street, Bristol, Connecticut, 06010

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24 197006

RAILWAY RENEWAL: RAILWAY EXCHANGES AND THE TRANSPORT SYSTEM [Le renouveau du chemin de fer: echanges ferroviaires et systeme de transport]

The author discusses the following: The advantages and role of the railways in transport organization in France; the capacities and adaptative qualities of rail transport; the interregional function of the railway. This work is a valuable contribution towards understanding the role of the railways in the future. [French]

Chesnais, M

Economica UIC Cat. 01 N186, 1979, 343 p., Figs., Tabs., Photos., Refs.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Economica, Paris, France

25 185585

THE REGULATION OF TRANSPORTATION--AN ANALYSIS

This thesis offers a general evaluation and analysis of the process of regulation as it applies to the transportation system in the United States. It traces the development of transportation regulation from its birth as an outgrowth of the Granger laws in the 1870's and 1880's to the present. An evaluation of the agencies responsible for enforcing, interpreting, and applying the regulatory process is included, as well as a discussion of the pros and cons of regulation versus deregulation. Finally, alternatives are offered relative to remedies available to the legislative process to improve current regulatory practices. (Author)

Wells, PD
Naval Postgraduate School MS Thesis June 1978, 85 p.

ACKNOWLEDGMENT: NTIS
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25 186632

SUBSIDIES, CAPITAL FORMATION, AND TECHNOLOGICAL CHANGE: MASS TRANSIT. VOLUME 2

This volume is one of seven case studies. The tools of microeconomic analysis are applied to assess the responsiveness of both the supplier and the user of the subsidized product or service. Particular attention is given to the effects of the subsidies on capital formation and technological change, but general efficiency effects are also considered. Because the bulk of the stimulus to technological change in the transit industry represents a secondary impact, the main focus of the study is on the ways in which the subsidies affect the demand for inputs into the provision of transit service.

Also available in set of 8 reports PC E19, PB-285 287-SET.

Charles River Associates, Incorporated, National Bureau of Standards, (NBS 7700066) Final Rpt. CRA-302.07, NBS-GCR-ETIP-78-41, July 1977, 196 p.

Contract NBS-6-35744

ACKNOWLEDGMENT: NTIS
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PB-285289/5ST

25 186635

SUBSIDIES CAPITAL FORMATION, AND TECHNOLOGICAL CHANGE: SUMMARY AND CONCLUSIONS. VOLUME 8

The report is one of a series of eight volumes prepared for the Experimental Technology Incentives Program, National Bureau of Standards. The first seven volumes are case studies of the microeconomic impacts of subsidy programs in the following industries or segments of an industry: local service air transport, maritime transport, nuclear power, mass transit, health facilities, technical publishing, and municipal wastewater treatment facilities. Emphasis is placed on the impact of subsidies on technological change. The eighth volume provides a summary and analysis of the impact of the subsidies in the seven industries, and gives conclusions with respect to the differential effects of subsidy programs with different structures and methods of administration. It also provides operational guidelines for managers respecting the implementation and evaluation of subsidy programs when capital formation and technological change are either explicit objectives or important results of the programs.

Also available in set of 8 reports PC E19, PB-285 287-SET.

Charles River Associates, Incorporated, National Bureau of Standards, (NBS 7700066) Final Rpt. CRA-302.19, NBS-GCR-ETIP-78-47, May 1978, 114 p.

Contract NBS-6-35744

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25 186650

THE OHIO TRANSPORTATION PROGRAM, 1975-77 BIENNIUM; A REPORT IN RESPONSE TO THE JOINT SENATE-HOUSE PUBLIC IMPROVEMENTS INSPECTION COMMITTEE, 11TH GENERAL ASSEMBLY

Contents: The Ohio transportation program--1976 goals and objectives; Public transportation (Capital improvements, Capital assistance to private non-profit corporations and associations, Rural highway public transporta-

tion demonstration program, Ohio elderly bus fare assistance); Transportation safety (State and community safety, Highway safety, Rail-highway crossings, Ohio's rail-highway project programs); Rail transportation (Rail freight, The Regional Rail Reorganization Act of 1973, Ohio branch line plan, Rail passenger service); Port development (Lake Erie ports, Ohio River facilities, Issues in port development); Aviation (Aviation program summary, County airport program, Ohio's commercial airline service); Highways (New construction- federal aid, Classification of highways, Major arterial highway, Urban highway system, Rural collector highway system, Economic growth center development highways, Special bridge replacement program, Appalachian access road program, Pavement repair and resurfacing, Bridge repair and replacement, Slides, washouts, restoration of haul roads, detours and emergencies, Capital improvement planning and research programs, Miscellaneous highway related programs, Advertising device control program, Pioneer work in metrication, Lands and building program); A new program-Ohio rail transportation authority.

Ohio Department of Transportation Feb. 1976, 76 p.

ACKNOWLEDGMENT: NTIS
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PB-285509/6ST

25 186867

RAIL PLANNING MANUAL. VOLUME II. GUIDE FOR PLANNERS

The report is designed to assist the planner-technician in the details of state rail planning. The contents describe recognized planning procedures, present specific analytical methods, provide practical examples of alternative analytical approaches, and identify data sources and reference materials. The seven chapters represent major segments within the rail planning process; they are titled: Organizing for State Rail Planning; Light Density Lines; Mainline Studies; Special Topics; Participation and Coordination; Implementing the State Rail Plan; Rail Planning and the Statewide Transportation Planning Process. Four appendices are included as follows: (A) a final Bibliography; (B) a Glossary of railroads terms which should prove most useful to the planner-technician; (C) a reprint of FRA regulations on rail service assistance; and (D) a reprint of Volume I-Guide to Decision-makers. A separate abstract of Volume I appears there.

Prepared in cooperation with Creighton (Roger) Associates, Inc., Delmar, NY. See also Volume I, PB-263182.

JWK International Corporation, Creighton (Roger) Associates, Incorporated, Federal Railroad Administration Res Rpt. JWK-76-205, FRA-RFA-78-01, July 1978, 720 p.

ACKNOWLEDGMENT: NTIS
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PB-288426/0ST

25 188152

CURRENT TRANSPORTATION ISSUES IN THE UNITED STATES: VOLUME I: EXECUTIVE SUMMARY

This report summarizes the activities of the first major task in the Commission's work plan--identification of key transportation issues. The report consists of two volumes. Volume I, Executive Summary, presents an overview of the issue identification process, with brief descriptions of the twenty-five key issues and a statement on the implications and conclusions resulting from the issue identification task. Volume II, Issue Papers and Source Materials, contains a full description of the identification task--with discussion of the literature review, mail survey of transportation experts, and public hearings. Volume II contains twenty-five issue papers, describing the key issues and giving a bibliography of sources used. Volume II also has summaries of some of the more significant transportation policy studies identified through the literature review.

National Transportation Policy Study Commission NTPSC-SR-78-01-A, Sept. 1978, 48 p.

ACKNOWLEDGMENT: National Transportation Policy Study Commission
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PB-290372/2ST, DOTL NTIS

25 189050

STATUS REPORT ON THE RATEMAKING REFORMS OF THE 4-R ACT: A REVIEW OF THE SECTION 202 (G) STUDIES

Section 202, Railroad Ratemaking, of the Railroad Revitalization and Regulatory Reform Act of 1976, was to increase the flexibility of ratemaking

by U.S. railroads. The Section mandated studies by DOT and ICC; this report examines the results of the "somewhat unreasonable" tasks assigned the two agencies. The ICC's effort is rated as of higher quality, but neither study addressed the issue of why carriers might make limited use of several of the Section 202 provisions. It was concluded in both that the provisions would have but limited impact; they agreed on the factors inhibiting the use of the provisions but did not concur in their relative importance.

Allen, BJ (Washington State University) *ICC Practitioners' Journal* Vol. 46 No. 2, Jan. 1979, pp 192-203, 1 Tab.

ORDER FROM: Hein (William S) and Company, Incorporated, 1285 Main Street, Buffalo, New York, 14209

DOTL JC

25 189051

SERVICE TO RURAL AND AGRICULTURAL AREAS IN A DEREGULATED TRANSPORTATION ENVIRONMENT

Preserving rural and agricultural America requires resolution of transport problems in terms of levels and quality of service, cost and cost effects, and modal flexibility. This paper examines the impact on rural areas of any change in service regulation and involves questions of abandonments and subsidies. The paper concludes that subsidy is present in the regulated system through internal or cross subsidy; that it will be present in a deregulated system through direct grants. Rail, truck and airlines are examined with respect to local services.

Oliver, DC (Federal Highway Administration) *ICC Practitioners' Journal* Vol. 46 No. 2, Jan. 1979, pp 204-221

ORDER FROM: Hein (William S) and Company, Incorporated, 1285 Main Street, Buffalo, New York, 14209

DOTL JC

25 189059

THE LEGISLATIVE HISTORY OF THE RAILROAD RETIREMENT AND RAILROAD UNEMPLOYMENT INSURANCE SYSTEMS

No Abstract.

Schreiber, DB

Railroad Retirement Board 1978, 492 p., Refs.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

25 189751

"REGULATION" VERSUS "DEREGULATION" IN THE TRANSPORT SECTOR ["Regulation" und "Deregulation: Ansetze im Verkehr"]

The economic consequences of State intervention in various spheres may be far-reaching. This is particularly so as regards the transport sector in the Federal Republic of Germany. Referring to current discussions in the United States on "Regulation" and "Deregulation", the writer shows that the findings in this case are not readily usable when discussing the pros and cons of removing State controls in the European transport markets. [German]

Seidenfuss, HS *Internationales Verkehrswesen* Vol. 30 No. 5, Sept. 1978, pp 283-292, 60 Ref.

ACKNOWLEDGMENT:

ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

25 189762

AN INTEGRATED TRANSPORT POLICY FOR SWITZERLAND

Comments on the results of a Specialist Committee dealing with the study of transport systems in Switzerland for the year 2000. After presenting the whole concept of the various transport modes, the study examines competition, services of interest to the community in general, the hierarchy of transport systems depending on their importance for the country, and the problem of sharing tasks. This study will be submitted to the Federal Council and, if it is endorsed, the first measures for the comprehensive reorganization of structures could start around 1982.

Trachsel, P *Rail International* Vol. 9 No. 11, Nov. 1978, pp 793-801, 1 Tab., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

25 189765

PUBLIC TRANSPORT PLAN 1979/80. PRELIMINARY DRAFT FOR CONSULTATION

The Transport Act 1978 requires non metropolitan county councils in England and Wales to publish public transport plans and reach agreement with operators over the financing and maintenance of socially necessary but commercially unsuccessful public passenger transport services. This publication is the Kent County Council's draft outline public transport plan, presented in 12 sections as follows: (1) county council duties towards public transport; (2) problems of the public transport industry; (3) summary of needs for public transport; (4) county council objectives and policy; (5) area review of public transport; (6) school transport; (7) finance; (8) rail service; (9) consultation; (10) agreements; (11) summary of major tasks to be undertaken over the five years 1979/80-1983/84; (12) appendices consisting of summaries of passenger road services and existing rail services, together with proposals for adjustments, and a summary of major comments on the plan from district councils and other interested bodies.

Kent County Council Monograph 1978, 116 p., Figs., Tabs.

ACKNOWLEDGMENT: TRRL (IRRD-237750)

ORDER FROM: Kent County Council, Highways and Transportation Department, Kent House, Maidstone, England

P7812018

25 189797

A REGIONAL MODEL FOR COMMODITY AND PASSENGER FLOWS

This paper describes a modeling system for strategic planning of transport for the State of Sao Paulo, Brazil which has proved to be a comprehensive, consistent and flexible tool. In running the model, it was found that increasing the number of commodities had less effect on computing costs than increasing the number of zones. The model provides a framework that is both general and operational on which a large number of planning issues can be tested as they involve regional commodity and passenger transport flow.

Proceedings of the Seminar on Transport Planning in Developing Countries held from 11 to 13, July 1978, during the PTRC Summer Annual Meeting at the University of Warwick, England. Co-sponsored by the Transportation Research Board.

Williams, IN Echenique, MH *Planning & Transport Res & Comp, Sum Ann Mtg, Proc* Proceeding Seminar F, July 1978, pp 121-128, 5 Ref.

ACKNOWLEDGMENT: Planning and Transport Res and Computation Co Ltd
ORDER FROM: Planning and Transport Res and Computation Co Ltd, 109 Bedford Chambers, King Street, London WC2, England

25 189798

THE SAO PAULO REGIONAL MODEL FOR COMMODITY AND PASSENGER FLOWS: APPLICATION AND RESULTS

The analytical procedures have provided a method for assessing a wide range of policies at a statewide level. In detail the models have many limitations and their current application is subject to a number of simplified assumptions. It is likely that these limitations can be removed to produce a powerful tool for regional planning. It has been found that the railway system has ample capacity to handle virtually any reasonable demand and that level of traffic can be handled with levels of investment expected to be available.

Proceedings of the Seminar on Transport Planning in Developing Countries held from 11 to 13, July 1978, during the PTRC Summer Annual Meeting at the University of Warwick, England. Co-sponsored by the Transportation Research Board.

Dunford, JE (Mackay (Jamieson) and Partners) *Planning & Transport Res & Comp, Sum Ann Mtg, Proc* Proceeding Seminar F, July 1978, pp 129-137, 6 Tab.

ACKNOWLEDGMENT: Planning and Transport Res and Computation Co Ltd
ORDER FROM: Planning and Transport Res and Computation Co Ltd, 109 Bedford Chambers, King Street, London WC2, England

25 190310

OKLAHOMA STATE RAIL PLAN. EXECUTIVE SUMMARY

This 1978 State Rail Plan is Oklahoma's first official planning document addressing the needs and concerns of the citizens. Its primary focus is on

branch lines eligible for funding under Section 803 of the 4R Act. After examining four abandoned lines it was concluded they have lost the traffic base needed to resume viable operation. It is recommended that Section 803 assistance be modified to allow funding for lines before they reach the abandonment stage. Such pre-abandonment assistance should be for rehabilitation of marginal lines. Users, communities, railroads and the State must cooperate in future rail programs.

Oklahoma Department of Transportation July 1978, 15 p.

ACKNOWLEDGMENT: Oklahoma Department of Transportation
ORDER FROM: Oklahoma Department of Transportation, Planning Division, Oklahoma City, Oklahoma, 73105

25 190311
OKLAHOMA STATE RAIL PLAN. VOLUME 1--STATEWIDE RAIL SYSTEM

This volume of the State Rail Plan has the following sections: Introduction; Oklahoma's State Rail Planning Activities; Oklahoma's Socioeconomic and Land Use Characteristics; Oklahoma's Rail System; Rail Line Classification; Class I Railroads; Class II Railroads; and Rail Freight Usage in Oklahoma.

Oklahoma Department of Transportation July 1978, v.p.

ACKNOWLEDGMENT: Oklahoma Department of Transportation
ORDER FROM: Oklahoma Department of Transportation, Planning Division, Oklahoma City, Oklahoma, 73105

DOTL RP

25 190312
OKLAHOMA STATE RAIL PLAN. VOLUME 2--SPECIAL STUDY LINES

This volume of the State Rail Plan has the following sections: Selection of Lines To Receive Special Study; Alternative Service Continuation Strategies; Rail Line Analysis Procedures; Project Evaluation Procedures; Description and Analysis of Special Study Lines; Recommendations.

Oklahoma Department of Transportation July 1978, v.p.

ACKNOWLEDGMENT: Oklahoma Department of Transportation
ORDER FROM: Oklahoma Department of Transportation, Planning Division, Oklahoma City, Oklahoma, 73105

DOTL RP

25 190313
OKLAHOMA STATE RAIL PLAN. TECHNICAL APPENDIX

This Appendix to the State Rail Plan is divided into four chapters: Railroad Carrier Data Requests; Shipper Survey; Community Impact Analysis of Alternative Rail Service Level Changes; Economic Impact Analysis of Alternative Rail Service Operating Strategies. It includes data for those rail lines in Oklahoma which were selected for detailed study.

Oklahoma Department of Transportation July 1978, v.p.

ACKNOWLEDGMENT: Oklahoma Department of Transportation
ORDER FROM: Oklahoma Department of Transportation, Planning Division, Oklahoma City, Oklahoma, 73105

DOTL RP

25 190769
TRANSPORTATION ISSUES

The Federal Government spends over \$18 billion a year on transportation programs. These programs affect every part of the transportation system including aviation, highways, inland waterways, intercity buses, motor vehicles, ocean shipping, pipelines, rail freight service, rail passenger service, trucking and urban mass transit. This study examines current and emerging issues relating to Federal involvement in transportation. It emphasizes congressional interests and potential congressional needs for GAO assistance.

General Accounting Office CED-78-159, Oct. 1978, 76 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-287194/5ST

25 191247
FOREIGN-SOURCE PROCUREMENT FUNDED THROUGH FEDERAL PROGRAMS BY STATES AND ORGANIZATIONS

The report addresses foreign-source procurement funded through Federal programs by states and selected organizations. Legislation enacted this year

at both the state and Federal levels considerably expands buy-national preferences for U.S. firms competing for such federally financed procurement. Federal and state buy-national preferences are identified and legal issues relating to state and local buy-national preferences are defined. Information on foreign-source procurement by states and organizations is provided for federally assisted highway, urban mass transportation, railroad, airport, municipal wastewater treatment, local public works, and rural electrification programs.

General Accounting Office ID-79-1, Nov. 1978, 81 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-288823/8ST

25 191361
THE IMPACT OF BART ON LOCAL GOVERNMENT EXPENDITURES, REVENUES AND FINANCIAL POLICIES

The working paper presents an assessment of BART's impact on local government expenditures, revenues and financial policies in the Bay Area. The paper includes a comparison of financial trends in Bay Area cities with California cities in general and findings and conclusions on BART's impact on local tax rate decisions, local expenditures and revenues and the financing of local capital improvement projects. A preliminary discussion of local financial policy implications is included.

Prepared by Booz, Allen and Hamilton, Inc., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Giles, PB Graebner, LS Jonash, RS
Metropolitan Transportation Commission, Booz-Allen and Hamilton, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP/WP-31-8-77, Dec. 1977, 84 p.

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291956/1ST, DOTL NTIS

25 191473
REPORT OF THE JOINT INTERIM TASK FORCE ON TRANSPORTATION POLICIES AND FUNDING

The primary purpose of the task force is to review the Oregon Department of Transportation policy as presented in the 1977 policy document and also review the statewide transportation plan. This review is made in the context of available and projected revenues and includes a review of options available to the state in the event the referral of funding measures by the legislature and by initiative results in failure of the measure. The task force also addresses the issues related to "highway" versus "non-highway" use of highway funds.

Oregon Legislative Assembly Mar. 1978, 91 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291498/4ST

25 191587
DOING BUSINESS WITH CHINA

The document contains general information for those persons who desire to conduct foreign business with China. The topics covered are: Approaching the market; contract negotiations and arbitration; currency and payments; shipping and insurance; U.S. regulations on trade with China; China tariffs; going to and visiting China; and trademarks, inventions, and copyrights. Also included in the document are a bibliography, market profile, and exports/imports data on China.

Microfiche copies only.

Industry and Trade Administration Feb. 1979, 50 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-291998/3ST

25 191629
ORGANIZATIONAL STUDY OF THE KANSAS CORPORATION COMMISSION, STATE OF KANSAS, TOPEKA, KANSAS

The report contains three major parts: management summary, findings and recommendations and data processing summary. The objectives of the study

were to evaluate the organization and internal operations of the Commission, and to develop recommendations for improvements. The significant improvements can be made in organization and methods that, when implemented, should assist the Commission and its personnel materially in meeting their regulatory objectives effectively. The Kansas Corporation Commission consists of four divisions regulating the state's utilities and transportation companies. Changes have occurred in the utilities industry in recent years, and computers have become commonplace.

Deloitte, Haskins and Sells, Economic Development Administration
EDA-78-0139, Dec. 1978, 59 p.

Grant EDA-05-6-01729-40

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-289350/1ST

25 191689

CHARACTERISTICS OF URBAN TRANSPORTATION DEMAND; A HANDBOOK FOR TRANSPORTATION PLANNERS

The handbook is intended to guide transportation planners, engineers, and decision-makers in: assessing demands for urban, highway, and transit systems; applying and validating conventional transportation planning techniques; and establishing sound transportation planning decisions. It contains characteristics of urban bus, rail, and highway systems, and urban trip-making. The handbook may be used to compare travel parameters for a given community with those in other cities, thereby providing a basis for cross-checking and refinement. As part of the Urban Transportation Planning System (UTPS) of UMTA and FHWA, it provides basic inputs to the urban transportation planning process as well as ways of checking the results for reasonableness and relevance.

See also report dated Feb 77, PB-265 830.

Levinson, HS
Smith (Wilbur) and Associates, Urban Mass Transportation
Administration, (UMTA-IT-06-0049) UMTA-IT-06-0049-79-1, Apr.
1978, 129 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-293220/0ST

25 192039

CURRENT TRANSPORTATION ISSUES IN THE UNITED STATES. VOLUME II: ISSUES PAPERS AND SOURCE MATERIALS

The report discusses 25 major issues in transportation. Issues were derived from the Commission's literature review, survey, and public hearings. Volume I briefly summarizes the issue identification process and the issues. Volume II provides a detailed review of past transportation studies, a summary of survey and hearing results, and a discussion of the background and importance of each issue. The issues discussed affect many areas of transportation including government regulation, jurisdiction, planning, finance, energy, environment, labor, safety and equity.

National Transportation Policy Study Commission NTPSC/SR-78/01-B,
Sept. 1978, 375 p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-290517/2ST

25 193757

DEREGULATION: A MODEL TO THE NORTH?

An examination of Canada's Transport Act of 1967 leads to the conclusion that deregulation has been beneficial and that market competition has been a significant factor in controlling rates, effectively limiting the monopoly power of railways. The Act changed fundamentally the relationship between the government and railroads. The volume initially places the Act in relation to spreading deregulation throughout the world. Canada's rail traffic and rates are then described. The institutional factors involving carriers, shippers and government in response to the regulatory freedom are discussed. The influence of market competition on railway rate levels, impact of intermodal competition, and remaining regulatory and governmental influence are described. The effectiveness of deregulation and implications of remaining regulation in Canada and elsewhere are covered in concluding chapters.

From book entitled "Railway Pricing Under Commercial Freedom: The Canadian Experience."

Heaver, TD Nelson, JC
British Columbia University, Canada 1977, 344 p.

ORDER FROM: British Columbia University, Canada, Center for Transportation Studies, Vancouver V6T 1W5, British Columbia, Canada

25 194138

REPORT OF THE THIRTY-NINTH ROUND TABLE ON TRANSPORT ECONOMICS HELD IN PARIS ON 19-20 OCTOBER 1977 ON THE FOLLOWING TOPIC: ECONOMIC PROSPECTS FOR RAILWAYS

This paper considers the economic situation of nearly all the European railway undertakings, and states the main problems existing in railway policy. An attempt is made to assess the railways' future share of passenger and freight transport, considering the modal split in short and long-distance transport. The causes of decline in railway usage are considered. The main section of the report concerns the future pattern of railway services, and recommendations are stated for the provision of economic passenger services. Reasons are given for the railways' loss of freight traffic and railway policy regarding investment and marketing are considered. Mention is made of the need for modifying railway networks and conclusions are stated for future policies. This report provided one of the basic documents for the discussion of this subject at the meeting of the council of ministers on 6 December 1977.

See also RRSI 23 182836, Bulletin 7901 for Thirty-eighth Round Table.

Aberle, G Hamm, W
European Conference of Ministers of Transport Monograph 1978, 64 p.

ACKNOWLEDGMENT: TRRL (IRRD-238430)
ORDER FROM: Organization for Economic Cooperation and Devel, Suite
1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006
P7812081

25 194639

RAIL TRANSPORTATION

During the past decade ICC has been dedicated to promotion of free flow of foreign commerce by reducing regulatory impediments. It is cooperating on an organized basis with FMC, CAB and DOT to facilitate growth of intermodal transport. Steps taken to ease existing barriers to free trade are described.

Ex Parte No. 282, (Sub-No. 2). Railroad Consolidations.

Donelan, JF *ICC Practitioners' Journal* Vol. 46 No. 3, Mar. 1979, pp
405-407

ORDER FROM: Hein (William S) and Company, Incorporated, 1285 Main
Street, Buffalo, New York, 14209

DOTL JC

25 195057

CAPITAL GRANTS AND RECURRENT SUBSIDIES: A DILEMMA IN AMERICAN TRANSPORTATION POLICY

Transportation policy in America distinguishes between capital expenditures and recurrent operating and maintenance costs. Federal policy and resources encourage capital-intensive projects, but traditionally have left to state and local governments the responsibility for maintaining and operating the facilities built with federal support. This has led to consistent underestimation of operating costs in the decision process leading to capital expenditures, and to overcapitalization of transportation networks. Today, faced with recurrent costs which strain local resources, there is pressure to broaden federal participation in operations and maintenance, and legislation is beginning to weaken the traditional distinctions between capital and recurrent expenditures.

Wachs, M (California University, Los Angeles); Ortner, J (California University, Irvine) *Transportation (Netherlands)* Vol. 8 No. 1, Mar. 1979, pp 3-19, Refs.

ACKNOWLEDGMENT: Transportation (Netherlands)
ORDER FROM: ESL

25 195064

RAILVIEW: A SHORT STEP DOWN A LONG TRAIL

Having eliminated regulation of fresh fruits and vegetables moving by rail, Interstate Commerce Commission is now watching to see how railroads will use their freedom. Deregulation was a theme of the Railroad Revitalization and Regulatory Reform Act of 1976; specific provisions have met with

lukewarm response and ICC now has undertaken new initiatives which are to be integrated into a revitalization package.

O'Neal, AD (Interstate Commerce Commission) *Railway Age* Vol. 180 No. 8, Apr. 1979, p 58

ORDER FROM: ESL

DOTL JC

25 195107

ADVANCES IN SCIENTIFIC-ENGINEERING PROGRESS IN THE DEVELOPMENT OF TRANSPORTATION AND ITS POWER ENGINEERING IN THE USSR

A characterization is given of the attained level of scientific-engineering progress in the development of transportation and its power plants by the sixtieth anniversary of the Great October Socialist Revolution. The indices of the increase of freight and passenger traffic in the USSR during the period from 1950 through 1975 are presented. The most important features of scientific-engineering progress in the development of transportation are isolated and analyzed according to each type of transportation, and the principal parameters of modern transportation means that are used have been presented.

Velikanov, DP *Power Engineering (USSR Translation)* Vol. 15 No. 5, 1977, pp 61-66

ACKNOWLEDGMENT: EI

ORDER FROM: Allerton Press, Incorporated, 150 Fifth Avenue, New York, New York, 10011

25 195122

ANNUAL REPORT OF TRANSPORT POLICY [Verkehrspolitichesches Jahressgesprach]

Transport policy has evolved in such a way as to constitute a significant aspect of the European Community' policies as a whole. Rationalization of the Railways is of prime importance since their capacities are underused while the roads are overused. Federal investments will, it is hoped, make the DB more attractive by enabling high speed lines to be built, combined transport to be developed, and other important measures to be taken such as the speeding up of customs formalities and the harmonization of services offered within the European Community. [German]

Bulletin der Bundesregierung No. 16, 1979, pp 133-137

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Presse-und Informationsamt der Bundesregierung, Welcker Strasse #11, 5300 Bonn, West Germany

25 195543

RAILOHIO. THE RAIL PLAN FOR OHIO. 1978-79

This state rail plan, RailOhio, is a sequel to three reports produced in compliance with the 3R Act and the first submitted under 4R Act provisions. Chapter I, Rail Planning Framework, presents basic goals and objectives of the Ohio Rail Transportation Authority, as well as its organization and operating procedures. Chapter II, Rail Passenger Planning, includes a status report on Amtrak service in Ohio as well as a summary of the proposed Ohio High Speed Intercity Rail Passenger Plan. Chapter III, Rail Freight Planning, explains the Federal and state freight programs the Authority is implementing, as well as the branch line pre-abandonment, subsidy and acquisition programs. Appendices analyze abandonments and subsidy operations.

Ohio Rail Transportation Authority 1978, 263 p., 18 Fig., 7 Tab., 11 App.

ORDER FROM: Ohio Rail Transportation Authority, State Office Tower, Suite 3414, Columbus, Ohio, 43215

DOTL RP

25 196112

TRANSPORTATION REGULATION

Presents a comprehensive review of the policies and procedures of the ICC, CAB and FMC as they apply to all modes of transportation. New features include charts showing the differences in the nature of regulation among the modes; plus an appendix detailing with the organization and function of DOT.

Fair, ML Guandolo, J

Traffic Service Corporation 7th Ed. No Date, 608 p.

ACKNOWLEDGMENT: Traffic Service Corporation

ORDER FROM: Traffic Service Corporation, 815 Washington Building, Washington, D.C., 20005

25 196518

APPLICATION OF NASA TECHNOLOGY TO A RAPID TRANSIT SYSTEM

NASA has established a new program in technology utilization. It involves full time, on-site contact with the user and is presently being applied in the development of the Metropolitan Dade County (Florida) Rapid Transit System. The NASA Representative identifies technical problems while participating in daily activities and then draws on the agency's expertise to assist in solutions.

Proceedings of the 15th Space Congress, Cocoa Beach, Florida, April 26-28, 1978.

Preston, E (Transit System Development); Beck, PE
Canaveral Council of Technical Societies Volume 1, Session 5, 1978, pp 11-14

ACKNOWLEDGMENT: EI

ORDER FROM: Canaveral Council of Technical Societies, Cocoa Beach, Florida, 32931

25 196570

NATIONAL TRANSPORTATION POLICIES THROUGH THE YEAR 2000. EXECUTIVE SUMMARY

It is concluded that the U.S. transportation system may not be capable of meeting the needs of a growing American for the following reasons: Present levels of private and public investment will not preserve the existing system; Demand for transportation will grow dramatically, exceeding population growth by 9 times for freight and 4 times for Passengers; Capital investment needed to meet this growth by the year 2000 exceeds \$4 trillion with over \$1 trillion from the public sector; Government overregulation is inhibiting return on investment necessary to attract capital for future growth; A maze of federal agencies, congressional committees and conflicting policies is driving up costs and retarding innovation; Highway fatalities could increase 45 percent by 2000; Energy policy impedes production of oil, coal and other forms of energy so as to endanger transportation's ability to keep up with demand. In this summary are 33 of the 80 recommendations approved by the Commission covering the following areas: Government organization; Economic regulation; Non-economic regulation; Ownership and operation; Finance, pricing and taxation; Planning and information; Energy.

National Transportation Policy Study Commission June 1979, 32 p., 4 Tab.

ORDER FROM: GPO

25 196571

NATIONAL TRANSPORTATION POLICIES THROUGH THE YEAR 2000

This report analyzes and forecasts passenger and freight transportation needs for both domestic and international markets. Based on these analyses and in compliance with Public Law 94-280 (1976), 80 policy recommendations are made; 33 of these are summarized in the accompanying Executive Summary. The chapters: Transportation functions, Institutions and activity in the U.S. Federal transportation policy and programs; State and local transportation policies and programs; General social and economic forecasts to the year 2000; Comparative transportation policies in other countries; Technological trends in transportation and communications; Transportation and Externalities; Transportation and energy; Forecasts of future transportation activity; Capital requirements for the transportation forecasts; The relative price of transportation to the year 2000; Emerging transportation issues; Policy recommendations; Impacts of the policy recommendations; Staging policy changes; Summary and conclusions.

National Transportation Policy Study Commission Final Rpt. June 1979, 527 p., Figs., Tabs., Refs., 4 App.

ORDER FROM: GPO

25 196870

PROCEDURES FOR DEVELOPING STATE RAIL PLANS

Several state rail plans have been developed under the Regional Rail Reorganization Act of 1973 and the Railroad Revitalization and Regulatory Reform Act of 1976. These plans typically use an index method to rank those lines that are eligible for continuation subsidies. The usefulness and applicability of the index procedure, however, are characterized by several

problems. The purpose of this paper is to review these problems and to present an alternative method of ranking branch rail lines. This method is the benefit-cost ratio approach, which was used to develop the Iowa Department of Transportation rail plan. The ratio provides estimates, first, of the dollar value of each rail line to shippers, receivers, and the community and, second, of the annualized present dollar value of the cost of operating, maintaining, and upgrading the rail line.

This paper appeared in Transportation Research Record No. 687, Surface Transport Regulation and Railroad Planning.

Baumel, CP Miller, JJ Drinka, TP (Iowa State University, Ames) *Transportation Research Record* No. 687, 1978, pp 2-4, 18 Ref.

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25 196871

REVIEW OF THE BRANCH-LINE POLICY ESTABLISHED BY THE RAILROAD REVITALIZATION AND REGULATORY REFORM ACT OF 1976

The purpose of this paper is to define and analyze the new rail branch-line policy established by the Railroad Revitalization and Regulatory Reform (4R) Act of 1976. On the basis of the statutory provisions, relevant Interstate Commerce Commission and Federal Railroad Administration regulations, and comments filed by the various parties in the relevant abandonment rule-making proceedings, the paper addresses the major procedural and substantive changes regarding abandonment and local rail service assistance and their effects on the allocation of resources in the rail industry and on the balance of power among the various groups involved. One of the important changes made by the 4R Act is the new advance-notice requirements, which include the system diagram maps and the new notice of intent. Another important addition to the procedures is the provision enabling people, firms, and communities to make financial offers; the railroads and the offerors of financial assistance are also permitted to negotiate an agreement that would keep the line in service. In addition, new accounting standards for branch lines and abandonments and a new local rail continuation subsidy program were established. The statutory provisions and regulations do not, however, clarify the criteria by which petitions are granted or denied. One major conclusion is that the new branch-line policy may not help the railroads because the policy has not increased the probability that a particular line will be permitted to be abandoned and, furthermore, the allowed subsidy may not be compensatory. The new branch-line policy may also bring less efficient allocation of resources than the old policy.

This paper appeared in Transportation Research Record No. 687, Surface Transport Regulation and Railroad Planning.

Allen, BJ (Iowa State University, Ames) *Transportation Research Record* No. 687, 1978, pp 5-11, 3 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

25 196875

FREIGHT TRANSPORTATION AND REGULATION OF INTERMODAL COMPETITION

The Interstate Commerce Commission's rules for rate making have traditionally emphasized considerations of equity rather than economic efficiency. A theory for efficient pricing can be advanced as a means of improving the allocation of transportation resources. This paper summarizes two possible pricing schemes. Under the first, called totally regulated second best (TRSB), prices and entry are controlled for all modes to maximize economic efficiency while allowing a mode with economies of scale to break even. Under the second, called partially regulated second best (PRSB), modes without economies of scale are unregulated, and price and entry controls are imposed on a mode with economies of scale in order to maximize economic efficiency for all transportation activities. The paper compares PRSB and TRSB in terms of the potential information requirements, administrative costs, and problems in implementation and shows why each may be of interest as a public policy alternative. Finally, the paper contrasts the actual tariffs in the U.S. rail industry in 1961 with the rules for efficient pricing suggested by the PRSB alternative. The analysis suggests that the rail rates for agricultural commodities may have been too low and that the rail rates for manufactured commodities may have been too high to be economically efficient. /Author/

This paper appeared in TRB Research Record No. 687, Surface Transport Regulation and Railroad Planning.

176

Braeutigam, R (Northwestern University, Evanston) *Transportation Research Record* No. 687, 1978, pp 32-38, 3 Fig., 1 Tab., 13 Ref.

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DOTL JC

25 196877

PERFORMANCE OF PUBLIC AGENCIES IN SAFETY AND ENVIRONMENTAL REGULATION

Industrial safety and environmental regulation are major recent additions to the external activities affecting enterprise organizations. The advent of these programs continues the trend for organizations to bear increasing administrative costs for such programs. Management studies indicate that the relative rank of executives dealing with such matters equals the rank of executives concerned with principal production activities, yet none of the legislation gives attention to the impact of the program on individual enterprise. Both public agencies and enterprises must make preparations for better performance in regulation if the growing needs of public policy are to be met. Public agencies should in turn improve their capacities for the inevitable conflict and its resolution. A key step in this direction is the use of discovery procedures by independent research institutions. Enterprise should systematically measure the total impact of public policy on its organization by means of the social audit so that the costs and benefits to the enterprise of all public policies can be computed. The social audit should be supported by a financial statement and a management audit. Self-reporting is recommended as a means of achieving these audits. /Author/

This paper appeared in TRB Research Record No. 687, Surface Transport Regulation and Railroad Planning.

Nupp, B (Department of Transportation) *Transportation Research Record* No. 687, 1978, pp 46-48, 8 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

25 196976

IRCA/UIC CONGRESS. SECTION 1: INVESTMENT POLICY FOR TRANSPORT. ROUTE INVESTMENTS WITHIN THE SCOPE OF THE NATIONAL TRANSPORT POLICY AS ILLUSTRATED IN THE FEDERAL REPUBLIC OF GERMANY

The German Federal Republic has a Coordinated Investment Program for Federal Transport Routes Planning which requires that funding for through and local roads, waterways, local transport agencies and the German Federal Railway be examined simultaneously and in long term with consideration for not only primary benefits but also secondary effects on environment, energy consumption and labor. Competitive distortions between modes that can be reduced or intensified by route investments will also be considered. Effects on DB from implementation of this planning process are discussed.

Presented at the Twenty-second Session of the IRCA, IRCA/UIC Congress, Stockholm, 7-12 May 1979.

Hausler, U *Rail International* No. 3, Mar. 1979, pp 223-253, 4 Fig.

ORDER FROM: ESL

DOTL JC

25 197292

THE ROLE OF THE RAILROAD FOR SWEDISH GOODS TRANSPORT [Jaernvaegens roll foer sveriges codtransporter]

The following papers were presented at the conference: (1) Swedish railways in an international perspective (Furbaeck, B). (2) Present and future position of Swedish railways in the transport market. Market shares and marketing (Plyme, A). (3) Technical development of rail transport. Goods trains and wagons, container and piggy-back (Carlsson, B). (4) Is rail transport saving energy (Kordi, I). (5) The competition for long-distance freight transport. Rail or lorry transport (Landborn, J and Nelldal, P-L). (6) Shipping as an alternative to overland freight transport (Gustavsson, B). In a panel discussion following the papers, the possibilities of cooperation between Swedish railways and haulage contractors are discussed. [Swedish]

Soederberg, J

Transportforskningskommissionen Monograph TFK Rpt. 1978:10, 1978, 168 p., Figs., 4 Tab., 16 Phot.

ACKNOWLEDGMENT: TRRL (IRRD-241004), National Swedish Road & Traffic Research Institute

ORDER FROM: Transportforskningskommissionen, Grev Turegatan 12A, Stockholm, Sweden

P0341:78-10

25 197335

**ALTERNATIVE SCENARIOS FOR FEDERAL
TRANSPORTATION POLICY: FREIGHT POLICY MODELS.
VOLUME I. SUMMARY SECOND YEAR REPORT**

The research evaluates the economic effects of existing and prospective federal policies governing intercity and international freight and passenger transportation enterprises in the economy of the United States. The analysis encompasses all modes of transportation, including rail, motor, air and intermodal coordinative institutions, and focuses upon the impact of alternative regulatory policies. However, other federal policies including subsidy, taxation, procurement, government ownership and investment, special programs for particular transportation industry problems and impacts of general national policies on transportation are included when relevant. Volume I examines freight policy models.

See also Volume 2, PB294592.

Friedlaender, AF Simpson, R
Massachusetts Institute of Technology, Department of Transportation
Final Rpt. DOT/RSPA/DPB-50/7831, Dec. 1978, 363 p.

Contract DOT-OS-50239

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB-294591/3ST, DOTL NTIS

26 185409

GLOSSARY OF URBAN PUBLIC TRANSPORTATION TERMS

This glossary attempts to serve as a basic reference for persons interested in urban transit planning. It is designed to assist transit system operators to understand the analytical language of urban planners and the latter to understand the operational language of transit system operators. The glossary organizes and to some extent standardizes terms related to urban public transportation. The definitions are organized alphabetically by term. Acronyms and abbreviations are presented at the beginning of each alphabetical section.

Transportation Research Board Special Report No. 179, 1978, pp 1-39

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26 186473

NETWORK FLOWS (A BIBLIOGRAPHY WITH ABSTRACTS)

The bibliography cites research reports concerning applications of network flows to problem solving. Studies on job sequencing, transportation models, water resources, communication systems, data processing, waste disposal, and circuit analysis are included. (This updated bibliography contains 316 abstracts, 37 of which are new entries to the previous edition.)

Reimherr, GW

National Technical Information Service Sept. 1978, 320 p.

ACKNOWLEDGMENT: NTIS

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NTIS/PS-78/1032/8ST

26 186492

CRIME AND LAW ENFORCEMENT IN TRANSPORTATION SYSTEMS (A BIBLIOGRAPHY WITH ABSTRACTS)

Studies are cited on 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. (This updated bibliography contains 88 abstracts, 5 of which are new entries to the previous edition.)

Shonyo, CA

National Technical Information Service Oct. 1978, 94 p.

ACKNOWLEDGMENT: NTIS

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NTIS/PS-78/1139/1ST

26 189056

RAILROADS

No Abstract.

Government Printing Office June 1978, 9 p.

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

26 189839

STORAGE AND RETRIEVAL SYSTEMS FOR HIGHWAY AND TRANSPORTATION DATA

The increasing complexity of operating highway and transportation departments has caused many agencies develop comprehensive computer systems for storage and retrieval of data. This report of the Transportation Research Board reviews and evaluates what has been accomplished to date and includes recommendations for future development. /Author/

NCHRP Synthesis of Highway Practice No. 55, 1978, 30 p., 4 Fig., Tabs., 12 Ref., 3 App.

ORDER FROM: TRB Publications Off

DOTL RP

26 190327

TRANSPORTATION OF ENERGY MATERIALS IN THE UNITED STATES

This bibliography lists 459 books, periodical articles, research reports, and conference papers on the transportation of general/multi-fuel, coal, petroleum and gas, nuclear fuel, and electric power. Emphasis is on the various impacts of this transport in the U.S.: environmental, economic, social, safety, policy, etc. Arrangement is by commodity and by mode. An index by type of impact is included.

Emmett, RC (Northwestern University, Evanston)

Nuclear Science and Engineering Corporation, Department of Energy
July, 1978, n.p.

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: Energy Research Abstracts, NTIS

ORDER FROM: NTIS

ANL/EES-TM-11

26 190335

MEMORANDUM ON RAILWAY DOCUMENTATION

The author, Manager of the UIC Documentation Bureau, takes stock of developments in documentation over the past 10 years; he emphasizes its importance for the railways and the administrative problems to which it gives rise, and provides details of the various levels of information. He goes on to define documentary research by computer and of selective dissemination of information. Finally he analyses the structures and links making up the UIC documentary network, and pinpoints the trends (integration, automation, microcopies, concise documentary summaries) which should set the pattern for the activities of UIC railways in the coming years.

Canyon, V *Rail International* Vol. 9 No. 12, Dec. 1978, pp 957-972, 6 Phot., 65 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

26 191943

RAILROAD FREIGHT TRANSPORTATION. VOLUME 2. 1975-FEBRUARY, 1979 (A BIBLIOGRAPHY WITH ABSTRACTS)

The citations deal with economic impacts, intermodal systems, energy studies, scheduling, rolling stock utilization, rail revitalization, accident studies, cost analyses, and characteristics within specific regions. The bibliography also covers freight car design, engineering, and testing programs as well as train engineering and operations. (This updated bibliography contains 239 abstracts, 89 of which are new entries to the previous edition.)

Kenton, E

National Technical Information Service Mar. 1979, 247 p.

ACKNOWLEDGMENT: NTIS

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NTIS/PS-79/0189/5ST

26 191952

DEMANDS AND NEEDS OF FUTURE TRANSPORTATION. PART 2. SURFACE TRANSPORTATION (A BIBLIOGRAPHY WITH ABSTRACTS)

This bibliography is divided into four sections. Urban, Rail, Marine, and General studies. The urban transportation section contains citations which cover such topics as passenger demand forecasting, future system requirements, needs for new types of transportation modes, planning to reduce future demand, and predictions of usage and feasibility of rapid transit railways, buses, taxicabs, and automobiles. The abstracts of rail transportation studies cover freight forecasting, future passenger usage, and revenue predictions. The last two sections, marine and general, cite reports on the future of the U. S. shipping industry and general freight and passenger projections. which are new entries to the previous edition.)

Kenton, E

National Technical Information Service Apr. 1979, 392 p.

ACKNOWLEDGMENT: NTIS

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NTIS/PS-79/0253/9ST

26 192074

TUNNELING AND UNDERGROUND EXCAVATION CODING MANUAL

The Tunneling and Underground Excavation (TUNEX) Coding Manual contains detailed directives on transcription of data from relevant documents. It includes nearly all elements of the Interagency Committee on Excavation Technology Activity Classification in excavation technology and covers more than 90 percent of all key words listed in the U.S. Geological Survey's Thesaurus of Index Words in Excavation Technology. The entire coding scheme is designed for machine storage and retrieval of data. The

transcription scheme is designed to provide two basic types of information related to any document: an index of data content of the document for generation of computer abstracts and bibliographic listings; and storage and retrieval of the numerical and other hard data of the document. Coding of the document for indexing is done by using three forms designated T1, T2, and Z. Cards T1 and T2 comprise more than half of the manual and include indexing and sight characterization. Detailed data transcription is done using the free field format (FFF) forms included in the manual. An example of a step by step procedure is presented for coding data sets as tables rather than standard FFF. Card Z, containing bibliographic data, includes information on publication characteristics and transcription logistics of the data sets.

Judd, WR Hasan, SE von Frese, R Hume, HR Poulter, DA
Purdue University, National Science Foundation CINDAS-48,
NSF/RA-770721, Sept. 1977, 58 p.

ACKNOWLEDGMENT: NTIS

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PB-291479/4ST

26 192075

**TUNNELING AND UNDERGROUND EXCAVATION CODING
MANUAL, APPENDIXES 1 THROUGH 11: UNIT CODES AND
CONVERSIONS**

This booklet consists of appendices to the Tunneling and Underground Excavation (TUNEX) Coding Manual, CINDAS Report 48. Appendix 1 lists unit codes and conversions. Appendices 2 through 11 contain numerical and alphabetical listings and retrieval guides, including codes, data-set count, and document count for: excavation projects, excavation methods, fragmentation techniques, funding and performing organizations, stratigraphic formation names, geographic locations, machine manufacturers, rock types, project utilization names, and methods of rock testing. In the retrieval guide to funding and performing organizations in Appendix 5, classes such as joint-performing and joint-funding are included. Age and location are listed in the retrieval guide to stratigraphic formation names in Appendix 6.

Purdue University, National Science Foundation CINDAS-48-APP,
NSF/RA-770722, Sept. 1977, 719 p.

ACKNOWLEDGMENT: NTIS

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PB-291480/2ST

26 192099

**TRANSPORTATION FOR THE HANDICAPPED: AN
ANNOTATED BIBLIOGRAPHY OF THE HOLDINGS OF THE
INSTITUTE OF TRANSPORTATION STUDIES LIBRARY,
UNIVERSITY OF CALIFORNIA AT BERKELEY**

The annotated bibliography is concerned with transportation for the handicapped. For the most part, it represents holdings found in the Institute of Transportation Studies Library at the University of California, Berkeley. A few important works not currently in the ITS Library holdings are included. Compilation of the bibliography was carried out during Spring and early Summer, 1978. A quick glance through the bibliography reveals a few citations prior to 1970. This is not due to a lack in ITS Library holdings, but rather reflects the scant attention paid to the subject before the late 1960's in this country. The belated interest of the 1970's has been spurred on by federal and state legislation, as well as by the disabled themselves. Much attention continues on transportation for the disabled, and thus much more in terms of publications can be expected in the near future. The bibliography is broken down into broad subject sections, as indicated by the table of contents following. With the exception of bibliographies, all foreign works are listed in a special section.

Krummes, DC

California University, Berkeley July 1978, 29 p.

ACKNOWLEDGMENT: NTIS

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PB-291871/2ST

26 196111

TRANSPORTATION-LOGISTICS DICTIONARY

For those who ship, receive, store, forward or transport goods. Contains over 4300 terms and abbreviations. A guide to the interpretation and proper use of words, phrases and abbreviations.

Traffic Service Corporation 1st Ed. No Date, 459 p.

ACKNOWLEDGMENT: Traffic Service Corporation

ORDER FROM: Traffic Service Corporation, 815 Washington Building,
Washington, D.C., 20005

Ongoing Research Summaries

00 059406

TRANSIT INDUSTRY INPUT ON THE TUNNELING TECHNOLOGY PROGRAM

The American Public Transit Association will provide transit industry input, advice, and consensus on the Tunneling Technology Program. A review program will be established to review each of the UMTA/TSC R&D Contracts. Each panel will be comprised of experienced technical representatives of the transit industry. The areas include subway system maintenance, subway station design and construction, and tunnel standardization, rapid transit concrete ties and rapid transit tracks.

Although under separate contract to UMTA, U.S. DOT, this project relates to ongoing research performed by the National Academy of Sciences' U.S. National Committee on Tunneling Technology.

PERFORMING AGENCY: American Public Transit Association
SPONSORING AGENCY: Urban Mass Transportation Administration, DC-06-0129
RESPONSIBLE INDIVIDUAL: Butler, GL Tel (202) 426-0090

Contract DOT-UT-60016T (CR)

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: July 1976 COMPLETION DATE: Dec. 1978 TOTAL FUNDS: \$49,054

ACKNOWLEDGMENT: TRAIS (DC-06-0129)

00 102894

STRUCTURAL BEHAVIOR OF A SKEWED, PRESTRESSED CONCRETE, RAILROAD TROUGH STRUCTURE

A heavily skewed, prestressed concrete railroad bridge with a trough-shaped cross-section was heavily instrumented with SR-4 gauges, Carlson stressmeters and strainmeters, vibrating wire gauges, thermocouples, and load cells. Gauges were scanned on a round-the-clock basis for an extended period following concrete pouring to determine stresses due to temperature differentials, prestressing, creep and dead load. Some live load tests were made with moving trains. Results of finite element analyses will be compared with experimental ones.

PERFORMING AGENCY: California Department of Transportation, Office of Structures Design, Study No. 14-624161

INVESTIGATOR: Davis, RE

SPONSORING AGENCY: California Department of Transportation; Federal Highway Administration, Structures and Applied Mechanics Division
RESPONSIBLE INDIVIDUAL: Ballinger Hare

HP&R D-4-115

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: Apr. 1972 COMPLETION DATE: June 1980 TOTAL FUNDS: \$390,500

ACKNOWLEDGMENT: California Department of Transportation, Federal Highway Administration (111102353)

00 135514

RAPID ASSESSMENT OF ROCK MASS CONDITIONS

To develop a technique for the rapid assessment of the integrity of rock slopes, tunnel rock, dam abutments, and embankments. Thermal anomalies associated with known structural defects will be studied and their significance with respect to the behavior of the structure determined. Anomalies investigated will include loose tunnel rock, voids behind shotcrete and/or concrete structures, and leakage through dam abutments or embankments.

PERFORMING AGENCY: Waterways Experiment Station
INVESTIGATOR: Huie, JS
SPONSORING AGENCY: Waterways Experiment Station, DA0M8183

STATUS: Active NOTICE DATE: Aug. 1977 START DATE: July 1974
ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA138183)

00 135516

RAPID EXCAVATION WITH EXPLOSIVES-EXPLOSIVE EXCAVATION IN DIFFERING GEOLOGIC MEDIA AND TOPOGRAPHY

Purpose of study/investigation: To develop improved techniques of excavation with explosives for civil engineering projects that lead to cost stabilization or reduction. This program provides salary and travel funds for planning, executing and reporting field experiments at Corps project sites.

PERFORMING AGENCY: Waterways Experiment Station, Explosive Excavation Research Laboratory
INVESTIGATOR: Mills, RR
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army

STATUS: Active NOTICE DATE: Feb. 1977 START DATE: July 1973

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 356)

00 135518

RAPID EXCAVATION WITH EXPLOSIVES; CHARGE SHAPE, EMPLACEMENT PATTERNS AND FIRING TECHNIQUES

Purpose of study/investigation: To develop controlled Project Lost Creek and the measurements made to get a large structural excavations where some cost advantage would result from the use of larger charges.

PERFORMING AGENCY: Waterways Experiment Station, Explosive Excavation Research Laboratory
INVESTIGATOR: Mills, RR
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army

STATUS: Active NOTICE DATE: Feb. 1977 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 358)

00 135550

RATIONAL DESIGN OF TUNNEL SUPPORTS

The objective is to develop reliable design procedures & to encourage the adoption of improved construction techniques for tunnel support systems that satisfy structural and economic requirements. Various analytical solutions applicable to tunnels constructed by the Corps and other agencies will be documented and/or developed and checked for performance adequacy. The check will be accomplished by the review of instrumentation data from selected projects and follow-through construction and performance appraisal. Corrections will be made to the theoretical analysis for the purpose of arriving at reliable design approaches and construction procedures for tunnel support systems.

PERFORMING AGENCY: Department of the Army, Missouri River Engineering Division
INVESTIGATOR: Redlinger, JF Underwood, LB
SPONSORING AGENCY: Army Corps of Engineers, Department of the Army, 31214

STATUS: Active NOTICE DATE: Feb. 1977 START DATE: July 1975

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 529 2)

00 135658

SURCHARGE LOADING OF FLEXIBLE RETAINING WALLS

The objective of this study is to determine the earth pressure distribution on a flexible retaining wall subjected to a railroad surcharge loading. Classical earth pressure theories of Coulomb, Rankine, and Boussinesq lack experimental validation when used for predicting lateral surcharge earth pressures on flexible retaining walls. Two sheet-pile retaining walls, subjected to railroad loadings, are to be instrumented with earth pressure cells in an effort to directly measure the surcharge pressure distribution.

Common-Objective Study. This project is inactive until a sheet-pile wall becomes available for instrumentation.

PERFORMING AGENCY: New York State Department of Transportation, Engineering Research and Development Bureau, Study No 127-1

INVESTIGATOR: Pyskadlo, RM Renfrew, WW

SPONSORING AGENCY: New York State Department of Transportation; Federal Highway Administration, Structures and Applied Mechanics Division

RESPONSIBLE INDIVIDUAL: Burnett, WC New York State Department of Transportation Tel (518)457-5826 Sallberg Federal Highway Administration Norris Federal Highway Administration

HP&R

STATUS: Inactive NOTICE DATE: Jan. 1979 START DATE: May 1975 TOTAL FUNDS: \$84,000

ACKNOWLEDGMENT: New York State Department of Transportation, Federal Highway Administration (147305353)

00 136152

THE U.S. NATIONAL COMMITTEE ON TUNNELING TECHNOLOGY

The U.S. National Committee on Tunneling Technology was established in 1972, at the request of the Chairman of the Federal Council for Science and Technology, to assess the broad range of activities and related technologies pertaining to the use of subsurface space and to stimulate improvements in underground construction technology. Improvements are needed to meet increasing national demands for providing life-support functions in urban areas and activities of the International Tunneling Association (ITA) environmental impact. The committee's work is focused on subjects considered by the committee to be of highest priority with respect to improvement of the art of underground construction and tunneling, and improvement of conditions to accelerate the use of improved technology throughout the United States. These include both technical and nontechnical activities. The committee will continue its work in encouraging governmental agencies and industry to adopt practices in contracting for underground construction which are more appropriate for this type of work than those which have been traditionally used in this country and to improve the education of engineers, both in the university programs and in continuing education programs, with the long range goal being the general upgrading of planning, design, and construction of underground works. The committee will undertake tasks to review sectors of underground construction technology development and to recommend to government, to industry, and to the universities, actions which should be taken to upgrade both the state of the art in that sector and the application of the most advanced and appropriate technologies in the national interest. The Committee also participates in the activities of the International Tunneling Association (ITA) on behalf of the scientists, engineers, and technologists of the United States. The ITA was formed in 1974, and five cooperative projects are underway on the subjects planning use of the subsurface, research needs, and standardization, safety and contractual sharing of risk.

PERFORMING AGENCY: National Academy of Sciences; National Academy of Engineering

INVESTIGATOR: Bangert, RL Tel (202) 389-6831

SPONSORING AGENCY: Bureau of Mines

RESPONSIBLE INDIVIDUAL: Rogich, DG Tel (202) 634-1220

Contract ET-77-C-01-9051

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Mar. 1972 COMPLETION DATE: Dec. 1980

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 803 2)

00 136165

U.S. NATIONAL COMMITTEE FOR ROCK MECHANICS

The aims of the project are to review new developments and trends in rock mechanics; research, implement and enhance exchange of technical informa-

tion among scientists; identify and encourage research activities that will advance rock mechanics technology; and participate for the United States in the International Society for Rock Mechanics and assist with international efforts to coordinate rock mechanics research. The Committee's activities include identification of research needs, preparation of advisory reports, coordination and participation in domestic and international professional conferences and symposia, and periodic reviews and surveys of national research efforts in rock mechanics and related fields. The Committee also participates in the activities of the International Society For Rock Mechanics (ISRM) on behalf of the scientists, engineers, and technologists of the United States. The ISRM, formed in 1962, sponsors international symposia and congresses and publishes the technical reports prepared by its study commissions, numbering 8 at present.

Also sponsored by 11 Federal agencies and 10 professional societies.

PERFORMING AGENCY: National Academy of Sciences; National Academy of Engineering

INVESTIGATOR: Bangert, RL Tel (202) 389-6415

SPONSORING AGENCY: Bureau of Mines

RESPONSIBLE INDIVIDUAL: Rogich, DG Tel (202) 634-1220

Contract ET-77-C-01-9050

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Dec. 1967 COMPLETION DATE: Sept. 1980

00 138477

EVALUATION OF REPAIR TECHNIQUES FOR DAMAGED STEEL BRIDGE MEMBERS

The first phase of this project will identify and categorize common types of accidental damage to steel bridges and the frequencies of their occurrence; analyze the state of the art of present practice and equipment used for assessing damage and repairing highway and railroad bridges and other steel structures (including heating temperatures, jacking methods, straightening tolerance and degradation of steel's mechanical properties and service life); evaluate techniques that have been applied or may be applied for correcting structural damage; preparation of report of Phase I and outline Phase II research.

PERFORMING AGENCY: Battelle Columbus Laboratories, NCHRP 12-17

INVESTIGATOR: Mishler, HW Tel (614) 424-6424

SPONSORING AGENCY: American Assn of State Hwy and Transp Officials; Federal Highway Administration

RESPONSIBLE INDIVIDUAL: Reilly, RJ Tel (202) 389-6741

Contract HR-12-17

STATUS: Active NOTICE DATE: May 1979 START DATE: Nov. 1976 COMPLETION DATE: July 1978 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: National Cooperative Highway Research Program

00 138532

CONSTRUCTION TECHNOLOGY

The results of the Urban Rail Construction Technology program will assist policy makers and the transit industry in evaluating construction alternatives which show areas of cost savings, safety enhancement and increased performance and reliability. The primary goal of the program is to bring about significant reduction in construction cost of urban rail transit system facilities by implementing new technologies and by improving design, construction and contracting practices in the urban rail transit construction industry. The four major thrusts of the program are underground, at-grade track and wayside, elevated structures and contracting and management.

PERFORMING AGENCY: Urban Mass Transportation Administration; Transportation Systems Center

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Butler, GL

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1973 COMPLETION DATE: 1985 TOTAL FUNDS: \$30,000,000

ACKNOWLEDGMENT: UMTA

00 153558

DEVELOPMENT OF COLORADO LAND USE DATA SYSTEM

To develop technical criteria for identifying potential areas of natural hazard; e.g., floods, landslides, etc. Assess legal requirements of physical data for the designation of natural hazard areas. Develop the process of land use capability classification. Develop a technique for assessing the "environmental carrying capacity" as a land use planning tool. Assess the data system needs for a state land use data bank and develop appropriate software

compatible with these needs.

REFERENCES:

The River Environment Simons, DB; Lagasse, PF; Chen, HH; Schummn, SA, Dept of Intl, Fish & Wildlife Serv, Twin Cities, Minn, Reference Document, Dec. 1975

Identification of Landslides and Mudflow Hazards Related to Land Utilization Development, Simons, DB, Reference Document, 1975

PERFORMING AGENCY: Colorado State University, Fort Collins, Department of Civil Engineering, CSRS COL

INVESTIGATOR: Simons, DB Wengert, NI Heil, R

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1975 COMPLETION DATE: June 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0068159)

00 170632

FATIGUE PHENOMENA IN WELDED CONNECTIONS OF BRIDGES AND CRANES

Size effects shown by earlier ORE studies (D 86) are to be checked by fatigue tests on I beams and box girders, incorporating butt welds as made in a workshop and as made at a construction site. Tests also on smaller beams appropriate to use in cranes and vehicles (co-ordination with B 12) are made. Final tests to be under load spectrum (co-ordination with D 128). Object is to show possible inadequacy of some design rules for structures subject to fatigue. At this time constant amplitude tests on I beams and on box beams have been completed. Tests using load spectrum are still in progress.

Nine reports have been published to date. Question D130.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Thiele, W Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1973

ACKNOWLEDGMENT: UIC

00 170633

STATISTICAL DISTRIBUTION OF AXLE LOADS AND STRESSES IN RAILWAY BRIDGES

Calculation of the dynamic response of bridges under high speed train running (mathematical models, field tests, parameter studies, irregularities), traffic load induced bridge component fatigue (load and moment spectra are determined from traffic and track loading; counting methods, fatigue calculation). Estimates of life under given traffic were made. Traffic spectra have been derived from typical trains. Load spectra have been calculated for given single beams by means of influence lines. A method for calculating the moment range spectrum has been worked out. In the process, traffic and bridge parameters have been treated separately. Stochastic studies of the movement of a random individual load and of continuous loading on the bridge beam have been made. Measurements on bridges have been obtained for comparison with the calculations.

Seven reports have been published to date. Question D128.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Thiele, W Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1972

ACKNOWLEDGMENT: UIC

00 177845

UNDERGROUND LIFELINES IN A SEISMIC ENVIRONMENT

Lifelines supply and distribute essential services and functions to communities (energy, communications, transportation, water). The continued maintenance of these systems in seismic areas is not only vital to the health and safety of the communities they serve, but they also represent nearly one half of the total investment in structures. The safeguarding of these services is, therefore, clearly in the national interest. At the present time, there are no more than rudimentary provisions in a few building codes regulating the planning, design and construction of underground lifelines. The major reason for this is the almost complete absence of scientific and technical knowledge regarding the detailed behavior of these structures in seismic environments. The purpose of this project is to improve such knowledge and to apply it through risk and optimization studies to planning, design and construction of life line structures. The research will concentrate on underground water distribution lifelines. The specific tasks include: (1) a

survey of such underground lifelines, (2) the development of appropriate seismic input, (3) methodology development for modeling and analysis, (4) methodology application to real systems, and (5) risk and decision analyses of lifeline systems. The results of the research will be presented in the form of design aids, guides and specifications, to be utilized by legislative and policy-making bodies, building code officials, utilities, planners, engineers, and the construction industry. This is a supplement to previous Award No. ENV 76-09838.

PERFORMING AGENCY: Weidlinger Associates

INVESTIGATOR: Baron, ML

SPONSORING AGENCY: National Science Foundation, Division of Advanced Environmental Research and Technology, ENV76-09838 A01

Contract

STATUS: Active NOTICE DATE: June 1978 START DATE: June 1977 COMPLETION DATE: Nov. 1978 TOTAL FUNDS: \$42,170

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CD 927 1)

00 179326

DEVELOPMENT OF DESIGN RECOMMENDATIONS FOR CONCRETE TUNNEL LINERS

The objective of this procurement is to develop guidelines and recommendations for structural design of concrete linings of underground structures based upon ultimate strength concepts of concrete behaviour. This concrete may be in the form of either precast segments, cast-in-place, or shotcrete; and may be either reinforced or unreinforced.

PERFORMING AGENCY: Illinois University, Urbana, Department of Civil Engineering

INVESTIGATOR: Paul, SL

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Saulnier, G Tel (617) 494-2006

Contract DOT-TSC-1504

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Apr. 1978 COMPLETION DATE: Apr. 1981 TOTAL FUNDS: \$349,000

ACKNOWLEDGMENT: TSC

00 179327

RAILROAD BALLAST AND SUBGRADE REQUIREMENTS STUDY

The object of this program is to investigate the current railroad substructure practices and technology, related engineering practices, and ongoing research in geotechnology, highway and airfield design and evaluation, and railroad structures. From this investigation criteria and guidelines will be developed for track substructure design and a technology assessment of the current practices will be evaluated. If any inadequacies are discovered from the technology assessment a research program will be implemented to investigate them.

PERFORMING AGENCY: Goldberg, Zoino, Dunicliff and Associates, DOT-TSC-1527

INVESTIGATOR: Simon, R Tel (617) 244-4100

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Lamond, J Tel (617) 494-2544

Contract DOT-TSC-1527

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1978 COMPLETION DATE: Jan. 1980 TOTAL FUNDS: \$326,400

00 179329

DEVELOPMENT OF AN EXTRUDED TUNNEL LINING SYSTEM

The objective of this R&D Program is to design, develop, fabricate, test and demonstrate an extruded liner tunneling system. Such a system would shorten the time requirement to excavate and line a tunnel section and eliminate the need for primary support. The four phases of the 40 month program are: I. Laboratory Research and Development; II. System Engineering Design; III. System Development, and; IV. Field Test and Demonstration.

PERFORMING AGENCY: Foster-Miller Associates, Incorporated

INVESTIGATOR: Maser, K Tel (617) 890-3200

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Saulnier, G Tel (617) 494-2006

Contract DOT-TSC-1516

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Dec. 1977 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$2,088,391

ACKNOWLEDGMENT: TSC

00 179332

IMPROVED DESIGN PROCEDURES FOR UNDERGROUND SUPPORTS

The objective of this procurement is the development of an analysis design approach which uses the principle of optimization, can rationally handle ground-structure behavior and allows incorporation of improved knowledge on ground structure behavior whenever this becomes available.

PERFORMING AGENCY: Massachusetts Institute of Technology
 INVESTIGATOR: Einstein, HH Tel (617) 253-3598
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Silva, LP Tel (617) 494-2351

Contract DOT-TSC-1489

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1978
 COMPLETION DATE: June 1979 TOTAL FUNDS: \$97,000

ACKNOWLEDGMENT: TSC

00 179344

IMPROVED DESIGN PROCEDURES FOR UNDERGROUND STRUCTURAL SUPPORT SYSTEMS IN ROCK

The research objective is to obtain improved analysis and design procedures for structural support systems of underground openings in rock. Present design procedures are based on assumed loads and do not adequately consider the influence of the construction procedure and rock-support interaction. Support systems for large vaults (such as used for underground powerhouses and subway stations) and for intersections of vaults and tunnels have been identified as areas where significant economies in construction can be realized with improved analysis and design procedures. The initial effort includes a review of analysis and design procedures used for selected projects, e.g., the Washington Metro subway system. Measured rock deformations and support strains at sections of the selected projects will also be reviewed. The observed behavior of the rock and support systems of representative underground vault or major tunnel during construction will be correlated with the response of a three-dimensional nonlinear finite element model of this installation during the same simulated sequences of construction. A second analytical study will consider a typical intersection of two underground vaults or major tunnels. After verification of the analysis procedure, the analysis of the intersection will be repeated using a more economical support arrangement than conventionally provided. Cases then will be analyzed to provide sets of parametric curves that can be used for preliminary design of selected support systems.

PERFORMING AGENCY: Agabian Associates
 INVESTIGATOR: Raney, EM
 SPONSORING AGENCY: National Science Foundation, Division of Advanced Productivity Research and Technology, APR76-80044

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Oct. 1977
 COMPLETION DATE: Mar. 1979 TOTAL FUNDS: \$179,900

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CY 39)

00 185230

SUBSURFACE EXPLORATION FOR TRANSIT TUNNELING

Employ selected innovative geotechnical and geophysical exploration and instrumentation techniques on an ongoing transit tunnel project: Evaluate the feasibility, applicability, reliability and cost effectiveness of the selected techniques; use the selected techniques to define the real and relevant geotechnical unknowns in test sections; evaluate the accuracy of the geotechnical predictions with appropriate field instrumentations, monitoring and mapping during construction; to demonstrate the effectiveness of instrumentation and monitoring during construction in documenting the effects of tunneling on adjacent structures; to provide data during construction for use by designers and contractors which can be employed to evaluate tunneling procedures and their effects on ground deformations so that modifications might be employed in critical areas and to evaluate need for protecting structures.

PERFORMING AGENCY: Bechtel Corporation; Haley and Aldrich, Incorporated
 INVESTIGATOR: Sutcliffe, H Tel (617) 628-9600
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Nelson, RN Tel (617) 494-2032

Contract DOT-TSC-1570

STATUS: Active NOTICE DATE: June 1979 START DATE: Sept. 1978
 COMPLETION DATE: June 1981 TOTAL FUNDS: \$41,100,000

ACKNOWLEDGMENT: Bechtel Corporation

00 185235

DEVELOPMENT OF A RAIL PHOTOLOG

Ascertain requirements for field-inventory data for the existing rail system in Connecticut. Develop specifications for rail-photolog equipment. Purchase and test the specified equipment. Provide ConnDOT with a complete photolog file of the entire railway system in Connecticut.

PERFORMING AGENCY: Connecticut Department of Transportation, Bureau of Planning and Research
 INVESTIGATOR: Bowers, DG Tel (203) 529-7741 X49
 SPONSORING AGENCY: Connecticut Department of Transportation
 RESPONSIBLE INDIVIDUAL: Dougan, CE Tel (203) 529-7741 X76

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: July 1978
 COMPLETION DATE: July 1980 TOTAL FUNDS: \$120,000

ACKNOWLEDGMENT: Connecticut Department of Transportation

00 188643

FRACTURE CONTROL IN TUNNEL BLASTING

The objective of this study is to assess the practicality, advantages, disadvantages and cost effectiveness of fracture control methods in tunnel blasting as compared to the conventional smooth wall blasting procedures. The scope of the study consists of implementing fracture control procedures through the use of grooved drill holes in a pilot tunnel under construction for the Massachusetts Bay Transportation Authority (MBTA) in Cambridge, Massachusetts for the proposed Porter Square subway station.

PERFORMING AGENCY: Haley and Aldrich, Incorporated
 INVESTIGATOR: Thompson, DE
 SPONSORING AGENCY: Urban Mass Transportation Administration

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Sept. 1978
 COMPLETION DATE: 1979

00 188666

ATLANTA APPLIED RESEARCH CAVERN

The objective of this applied research and demonstration program is to evaluate advanced tunneling techniques in a Research Chamber and subsequently to use those techniques in the major subway presently under construction in Atlanta, Georgia. A hard rock horseshoe tunnel 60' long and 18' in diameter will be excavated to create the Applied Research Chamber, as a part of the \$1.8 billion MARTA Subway System presently under construction. Research on control blasting; geotechnical instrumentation; conventional, yieldable and rebar cage steel ribs, conventional shotcrete; steel-fiber-reinforced shotcrete; and several types of European and American type rock bolts will be accomplished.

PERFORMING AGENCY: Tudor Engineering Company
 INVESTIGATOR: Rose, DC
 SPONSORING AGENCY: Urban Mass Transportation Administration

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Aug. 1977
 COMPLETION DATE: 1979

00 188668

FULL-SCALE DEMONSTRATION TESTS OF DOUBLE TEE GIRDERS FOR AERIAL GUIDEWAY OF RAPID TRANSIT SYSTEMS

Full-scale tests are essential to determine theoretical and practical aspects of the design and performance of the double tee girders and their potential for use as a standard aerial girder for rail rapid transit systems. These demonstration tests will verify all design methods used, confirm some of the most important construction details, and finally will establish the dynamic performance of the girders under repetitive combined flexure, shear and torsion cyclical loading over required sixty years of service life.

PERFORMING AGENCY: Kaiser Transit Group
 SPONSORING AGENCY: Urban Mass Transportation Administration

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Apr. 1978
 COMPLETION DATE: Mar. 1979

00 188669

SEGMENTED CONCRETE TUNNEL LINERS AND SEALANT SYSTEMS

The objective is to devise, fabricate, and test circular segmented liner systems displaying candidate joint configurations and sealants. The increasing cost of metal liner makes the development and use of precast concrete liner quite attractive. The weak link in a segmental concrete tunnel liner is the potential leaks that may arise at segment junctures.

PERFORMING AGENCY: Bureau of Reclamation

INVESTIGATOR: Spencer, RW

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Lamond, J Tel (617) 494-2544

Contract RA-76-22

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: May 1976 COMPLETION DATE: Dec. 1979

00 188670

TEST SECTION STUDY OF PRECAST TUNNEL LINERS IN THE BALTIMORE RAPID TRANSIT SYSTEM

The objective is to assess the cost and technical performance of the steel-lined and pre-cast concrete-lined tunnels that will be constructed for the Lexington-Market Tunnel Contract.

PERFORMING AGENCY: Mass Transit Administration

INVESTIGATOR: Hoppe, F

SPONSORING AGENCY: Urban Mass Transportation Administration

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Oct. 1977 COMPLETION DATE: 1979

00 188671

ASSESSMENT OF THE POTENTIAL FOR STANDARDIZATION IN RAPID TRANSIT SYSTEMS

The objective is to assess the potential for achieving construction cost economies in tunnel construction through the standardization of components and/or parameters which effect tunnel costs. This study is divided into two phases. Phase I will basically provide a detailed catalogue of the interacting components and engineering factors that have been shown to have a significant effect on tunnel planning, design, construction and operation. Phase II consists of an evaluation of the identified critical components and parameters to establish (a) specific components and/or parameters which are suitable for standardization, and (b) future work needs in the area of standardization.

PERFORMING AGENCY: Hampton (Delon) and Associates, Chartered

INVESTIGATOR: Hampton, D

SPONSORING AGENCY: Urban Mass Transportation Administration

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: May 1977 COMPLETION DATE: Aug. 1979

00 196736

BRIDGE EVALUATION

To determine the stress levels in various bridges on the CN system and to determine the useful life of such bridges, appropriate electronic instrumentation is being developed to measure stress levels in various bridges and to analyze data on such bridges under dynamic loadings. This will optimize capital and maintenance expenditures in the maintenance or renewal of bridges on the CN system.

PERFORMING AGENCY: Canadian National Railways, 111C13806

INVESTIGATOR: Rennie, R

SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1979 START DATE: June

1978 COMPLETION DATE: Dec. 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

00-196750

NATM ALTERNATIVE DESIGN FOR CONSTRUCTION OF MT. LEBANON TRANSIT TUNNEL, PITTSBURGH

This project will provide an alternative design for the construction of the Mt. Lebanon Transit Tunnel in Pittsburgh using the New Austrian Tunneling method (NATM) technology. Phase I includes detailed planning and pre-design investigations involving review of geotechnical details and finite element analysis of selected tunnel sections as an initial check of external loading and geologic conditions.

PERFORMING AGENCY: Port Authority of Allegheny County, PA-06-0052

INVESTIGATOR: Mundo, J Tel (412) 237-7377

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Butler, GL Tel (202) 426-0090

Contract PA-06-0052

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1979 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$460,000

ACKNOWLEDGMENT: FRA

00 196751

NON-DESTRUCTIVE TESTING FOR TUNNEL STRUCTURES

This project involves a comprehensive investigation of existing and new technology applicable/adaptable to testing tunnel integrity. A reliable "non-destructive" method of testing is to be developed. Such a method will be invaluable to old/existing subway systems in determining the structural integrity of old tunnels for development of rehabilitation or replacement programs.

PERFORMING AGENCY: Port Authority Trans-Hudson Corporation, NY-06-0072

INVESTIGATOR: Theofilos, LG Tel (201) 963-2701

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Butler, GL Tel (202) 426-0090

Contract NY-06-0072

STATUS: Active NOTICE DATE: July 1979 START DATE: Aug. 1979 COMPLETION DATE: Aug. 1981 TOTAL FUNDS: \$800,000

ACKNOWLEDGMENT: UMTA

00 196752

ALLOCATION OF RISKS IN URBAN UNDERGROUND CONSTRUCTION

This study will involve the development of a risk analysis methodology to evaluate the impact on owner's cost of alternative allocations of risks associated with geological site conditions among major project participants in urban underground construction. This methodology will be capable of handling all aspects of geological site uncertainty commonly encountered in such construction and of incorporating three or more parties in the analysis of risk allocations.

PERFORMING AGENCY: Massachusetts Institute of Technology, MA-06-0097

INVESTIGATOR: Levitt, RE Tel (617) 253-7118 Logcher, RD Ashley, DB

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Butler, GL Tel (202) 426-0090

Contract MA-06-0097

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1979 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$145,000

ACKNOWLEDGMENT: UMTA

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 specific 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 Railroad Track Structures Research Program consists of Four Tasks: Mathematical Modeling, Ballast and Subgrade Material Performance Tests, Rolling Load Facility Tests and Track Research Laboratory Facility. Work continues only on the Rolling Load Facility Tests.

REFERENCES:

- Technical Data Base Report (Task 2) July 1975, PB-251771
- Functional Requirements for a Facility for Accelerated Service Testing (Task 4), Sept. 1976, PB-263605
- Structural Model and Materials Evaluation Procedures (Task 2), Sept. 1976, PB-262987
- Track Support Systems Parameter Study (Task 2) Sept. 1976, PB-263370
- Finite Element Analysis of a Railway Track Support System-User's Manual (Task 2), Sept. 1976, PB-262988
- Material Evaluation Study (Task 2) Jan. 1977, PB-264215
- Lateral Stability of Ballast (Task 2) Sept. 1977, PB-275035
- A Study of Railroad Ballast Economics (Task 2) Sept. 1977, PB-275102

PERFORMING AGENCY: Association of American Railroads; Illinois University, Urbana, Department of Civil Engineering

INVESTIGATOR: Zarembski, AM Tel (312) 567-3622 Thompson, MR Tel (217) 333-3930

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Moody, HG Tel (202) 426-4377

Contract DOT-FR-30038 (CR)

STATUS: Active **NOTICE DATE:** Aug. 1979 **START DATE:** May 1973 **COMPLETION DATE:** Sept. 1979 **TOTAL FUNDS:** \$823,097

ACKNOWLEDGMENT: FRA

01 038974

CONTINUOUS MEASUREMENT OF DYNAMIC COMPLIANCE CHARACTERISTICS OF RAILROAD TRACK. PHASE 3

The contract is for the design, fabrication, demonstration and furnishing of equipment for the stationary and continuous measurement of dynamic strength/compliance characteristics of railroad track.

REFERENCES:

A Review of Measurement Techniques, Requirements and Available Data on the Dynamic Compliance of Railroad Track, Kaiser, WD et al, Available from NTIS, May 1975, PB-250547/AS

An Experimental Evaluation of Techniques for Measuring the Dynamic Compliance of Railroad Track, Nessler, GL et al, Available from NTIS, July 1978, PB-285559/AS

PERFORMING AGENCY: Battelle Memorial Institute

INVESTIGATOR: Kaiser, WD Tel (614) 424-4505

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: O'Sullivan, WB

Contract DOT-FR-30051 (CPFF)

STATUS: Active **NOTICE DATE:** Aug. 1979 **START DATE:** May 1973 **COMPLETION DATE:** 1981 **TOTAL FUNDS:** \$345,649

ACKNOWLEDGMENT: TRAIS (PR# RP-39)

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) 494-2000

Contract DOT-TSC-995

STATUS: Active **NOTICE DATE:** Aug. 1979 **START DATE:** Apr. 1975 **TOTAL FUNDS:** \$75,552

ACKNOWLEDGMENT: TRAIS (RR-519)

01 059223

STATISTICAL REPRESENTATIONS OF TRACK GEOMETRY

The objective is to conduct analyses of existing track geometry data in order to provide power spectral density and/or other statistical characterizations of the universe of track geometry conditions and to identify fundamental processes.

PERFORMING AGENCY: ENSCO, Incorporated

SPONSORING AGENCY: Transportation Systems Center, R6321

RESPONSIBLE INDIVIDUAL: Weinstock, H Tel (617)494-2000

Contract DOT-TSC-1211 (CPF)

STATUS: Active **NOTICE DATE:** Aug. 1979 **START DATE:** May 1976 **COMPLETION DATE:** Sept. 1979 **TOTAL FUNDS:** \$87,792

ACKNOWLEDGMENT: TRAIS (R6321)

01 059227

USE OF SURFACE ELECTROMAGNETIC WAVES TO DETECT RAIL JOINT FAULTS

The objective of this study is to determine experimentally the characteristics of surface electromagnetic waves (SEW)--transmission, reflection and radiation due to various defective and nondefective rail joints. These experiments are designed to verify the theoretical results for an ideal rail joint and to measure the effects of various perturbations of the rail joint. Also suitable techniques for coupling surface electromagnetic waves to the rail will be investigated. One outcome of this study will be a realistic evaluation of the applicability of the SEW technique to the detection of rail joint faults from a track-guided vehicle.

PERFORMING AGENCY: Missouri University, Rolla

SPONSORING AGENCY: Transportation Systems Center, R6357

RESPONSIBLE INDIVIDUAL: Cecon, H Tel (617)494-2000

Contract DOT-TSC-1217 (CR)

STATUS: Active **NOTICE DATE:** Aug. 1979 **START DATE:** May 1976 **COMPLETION DATE:** July 1977 **TOTAL FUNDS:** \$56,690

ACKNOWLEDGMENT: TRAIS (R6357)

01 059295

TRACK GEOMETRY MEASUREMENT BY HIGH-RAIL VEHICLES

The need for increased track surveillance capability and data collection capability for transportation planning and rail assistance programming has led Iowa's Department of Transportation to purchase a high rail track geometry measuring vehicle. The objective is to examine the capabilities of this vehicle to assist in the improvement of track safety inspection and in data collection for transportation planning and assistance programming. The project will examine both technical and operational aspects of Track Geometry Car usage as an inspection device and as a data collection device.

PERFORMING AGENCY: Iowa Department of Transportation

INVESTIGATOR: Sherfy, MA Tel (515) 296-1222

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Liang, RT Tel (202) 426-1682

Contract DOT-FR-64243 (CR)

STATUS: Active **NOTICE DATE:** Feb. 1979 **START DATE:** June 1976 **COMPLETION DATE:** July 1979 **TOTAL FUNDS:** \$273,415

ACKNOWLEDGMENT: TRAIS

01 059371

IMPROVEMENT OF MAGNETIC TECHNIQUES FOR RAIL INSPECTION

The objective is to improve the magnetic inspection techniques through improvement of the sensing and signal processing methods. The opinion in the railroad industry is that although the ultrasonic systems appear to have the greater potential, it requires further development before it can perform a thorough and complete inspection. Until these techniques are upgraded and proven in the field, magnetic inspection methods offer a good supplementary inspection. The intent is to improve magnetic inspection techniques and equipment so that the performance is improved when operated as an independent system or when providing supplementary support to ultrasonic systems.

PERFORMING AGENCY: Battelle Memorial Institute
 SPONSORING AGENCY: Transportation Systems Center, R6345
 RESPONSIBLE INDIVIDUAL: Ceccon, H Tel (617)494-2000

Contract DOT-TSC-1244 (CPF)

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Aug. 1976
 COMPLETION DATE: Nov. 1977 TOTAL FUNDS: \$97,994

ACKNOWLEDGMENT: TRAIS (R6345)

01 059681

TEST AND EVALUATION OF THE TRACK GEOMETRY MEASUREMENT SYSTEM (TGMS)

The objectives are to: (1) Demonstrate the TGMS on the selected transit property. (2) Evaluate the TGMS under real world operating conditions on the selected transit property. (3) Collect track geometry data on the selected property. (4) Develop a Ways and Structures Maintenance Plan utilizing the TGMS. (5) Determine minimum requirements for real-time output from the TGMS to support Ways and Structures inspection under the Maintenance Plan, and identify the minimum component parts and operating characteristics of TSCs TGMS needed to achieve the minimum real-time output requirements.

PERFORMING AGENCY: Systems Technology Associates, Incorporated
 SPONSORING AGENCY: Transportation Systems Center, R6732
 RESPONSIBLE INDIVIDUAL: Nickles, JE Tel (617) 494-2204

Contract DOT-TSC-1285 (CPFF)

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1976
 COMPLETION DATE: May 1978 TOTAL FUNDS: \$305,215

ACKNOWLEDGMENT: TRAIS (R6732)

01 081797

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 1--TRACK STRUCTURES

Task objectives are development of recommended performance specifications and maintenance and geometric design guidelines for conventional railroad track and related track structures and components. This activity is intended to quantify the adequacy of a guideway that yields an acceptable level of ride quality and safety with minimization of first cost, maintenance costs, and secondary costs such as loss and damage, and wear and fatigue to vehicles. Task will recognize that load environment is a function of track parameters, wheel load, and level of maintenance. The Track Structures Dynamic Test Facility, developed under separate AAR/FRA contract, has the capability of determining the basic structures as affected by different subgrade materials, different types of ballast, various types of ties, spacing and rail sizes. A moving load allows for compaction of ballast subgrade material. Also sensitivity studies of track parameters, including basic alignment of the structure with such factors as minimum length of tangent between curves and deviation from theoretical line and surface, have been made using computer modeling techniques developed in Phase I.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Abbott, RA Tel (312) 567-3616

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Jan. 1975
 COMPLETION DATE: 1978

ACKNOWLEDGMENT: AAR

01 099369

OPERATION OF TEST TRACK AND RAIL INSPECTION EQUIPMENT

Because of the interdependence between each of the newly developed components for track and rail inspection, a critical test and evaluation must be carried out on each to assess its contribution to the total system. From the results of the tests and evaluations, an assessment of the developments can provide the information needed to generate work statements for future developments. In order to facilitate an effective test and evaluation, qualified technical personnel and testing facilities are required. The facilities primarily consist of an NDT laboratory, two test tracks, and a rail inspection vehicle. The NDT laboratory contains the instrumentation needed to perform the

commonly used NDT techniques. The test tracks contain machined and natural rail defects on which inspection equipment can be tested up to speeds of 40 mph. The rail inspection vehicle is a hi-rail vehicle and currently uses ultrasonics exclusively to perform the rail inspection. The hi-rail vehicle provides the mobility required for a test vehicle and has ample space to house newly developed equipment. The staff presently consists of two technicians and two engineers.

PERFORMING AGENCY: Transportation Systems Center

SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Safety Research

RESPONSIBLE INDIVIDUAL: Ceccon, H Tel (617) 494-2000

In-House

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Mar. 1974

ACKNOWLEDGMENT: FRA

01 099378

IMPROVED INSPECTION, DETECTION AND TESTING RESEARCH

The objectives of this program are to provide engineering and field test support services to FRA-sponsored programs and to develop additional track inspection vehicles for the Office of Safety. In the process of collecting data for Amtrak, the Northeast Corridor Project and the Office of Safety, as well as for other FRA R&D programs, 260 tests on some 25 different railroads covered approximately 100,000 miles of track. The track geometry measurement system previously developed can now be utilized to detect safety-related defects. To provide the Office of Safety with three track inspection systems, an existing vehicle is being rebuilt and a new unit is being built.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Peterson, LA Tel 202-426-2965

STATUS: Active NOTICE DATE: Feb. 1978 TOTAL FUNDS: \$6,245,000

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: Garg, VK Tel (312) 567-3596

STATUS: Active NOTICE DATE: Aug. 1977

ACKNOWLEDGMENT: AAR

01 099394

RAIL FLAW DETECTION SYSTEMS

The detector car section of the AAR Technical Center has constantly worked on materials and systems for upgrading the privately-owned and operated rail detector cars using the residual magnetic method as developed and built by the AAR. Along with this, studies of advanced technologies of

rail flaw detection, such as ultrasonics, have been conducted. An ultrasonic rail test system and recording equipment to meet FRA track inspection requirements was initially tested under one of the standard magnetic detector cars. The ultrasonic system significantly increased flaw detection due to its greater sensitivity in the web area. This was followed by construction of a new detector car equipped exclusively with ultrasonics which will be used in refining techniques using this rail flaw detection system.

PERFORMING AGENCY: Association of American Railroads Technical Center

SPONSORING AGENCY: Association of American Railroads

RESPONSIBLE INDIVIDUAL: Garg, VK Tel (312) 567-3596

STATUS: Active NOTICE DATE: Aug. 1977

ACKNOWLEDGMENT: AAR

01 099396

ACOUSTICAL 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: Garg, VK Tel (312) 567-3596

STATUS: Active NOTICE DATE: Aug. 1977

ACKNOWLEDGMENT: AAR

01 138560

TRACK INSPECTION AND TESTING

Develops, recommends, implements and promotes an improved inspection and detection project in support of the FRA National Track Inspection Program. Provides for support of test activities and data collection and coordinates support with the Office of Safety, other FRA elements, government agencies, railroads and support contractors. Makes provisions for instrumentation, operation, maintenance and transportation of automated inspection equipment and for data processing services.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Winn, JB Tel (202) 426-1682

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138561

AUTOMATED TRACK INSPECTION, SYSTEM DEVELOPMENT

The objective of this program is to provide automated equipment to assist the FRA Track Inspectors in monitoring the National track network. A fleet of vehicles will be procured to measure track geometry and internal rail flaws. This fleet includes three existing measurement vehicles which provide real time data to both the inspector and the host railroad. Other measurement systems will be developed and tested for potential use in inspection vehicle.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Winn, JB Tel (202) 426-1682

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138562

IMPROVED TRACK STRUCTURES RESEARCH PROGRAM

The Improved Track Structures Research Program has been established to achieve improvements in the safety of train operations by reducing the frequency of train derailments through the use of guidelines, standards and techniques for achieving safer track structures and to improve the serviceability of the track structures through more effective maintenance techniques and with more durable, yet economic track structure designs. The program

will accomplish these objectives through a series of contract research efforts and research at the Transportation Systems Center addressing both analytical studies and field test verification.

For subprograms see RRIS Nos. 01A 138563 and 01A 138564.

PERFORMING AGENCY: Federal Railroad Administration, Improved Track Structures Research Division

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Krick, RL Tel (202) 426-4377

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138563

TRACK ACCIDENT REDUCTION RESEARCH SUBPROGRAM

The Track Accident Reduction Research Subprogram is directed toward improvement in the number and frequency of train accidents related to track structure causes by identification of operating limits for existing rolling stock running on contemporary track based on limiting adverse wheel/rail dynamic interaction and by specification of the safe structural load bearing limits of existing track systems and required inspection demands.

PERFORMING AGENCY: Federal Railroad Administration, Improved Track Structures Research Division

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Krick, RL Tel (202) 426-4377

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138564

IMPROVED TRACK PERFORMANCE RESEARCH SUBPROGRAM

The Improved Track Performance Research Subprogram is directed toward improvement in track stability and life by development of cost effective guidelines for upgrading current track systems, for designing affordable track system alternatives and for making cost effective maintenance decisions. The following technical areas are being considered: new rail quality, improved rail joining techniques, analysis and design for improved cross tie-track systems, ballast selection-material performance studies, soil stabilization studies, ballast tamping and consolidating equipment performance maximization and track maintenance studies.

PERFORMING AGENCY: Federal Railroad Administration, Improved Track Structures Research Division

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Krick, RL Tel (202) 426-4377

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1975

ACKNOWLEDGMENT: FRA

01 138568

COOPERATIVE RESEARCH PROGRAM ON TIMBER CROSS TIE DEVELOPMENT

Used oak railroad ties were chipped, flaked, and screened by the Forest Products Laboratory to provide face and core furnish for 11 reconstituted ties. The material was fabricated by Potlatch Corporation, Lewiston, Idaho, into flakeboards approximately 0.7 inch thick, and further laminated into 7 x 9 inch x 8 foot ties, each containing 10 laminations. The outer two layers on each face were characterized by oriented flakes, while the inner layers were made using a random-felting technique. Preliminary testing showed the ties to have an apparent modulus of elasticity (MOE) of 900 K psi and a modulus of rupture (MOR) of 3,000 psi. This was approximately 80 and 60 percent, respectively, of the stiffness and strengths of previous ties made under laboratory conditions. Lower bending properties were attributed to less face-flake alignment and poorer resin distribution. Changes in flake fabrication, adhesive application, and alignment techniques have been suggested to improve the performance of the industrially manufactured ties.

Approximately 18 hardwood Press-Lam cross-ties (thick, rotary-cut, press-dried, parallel laminated veneers) were manufactured under laboratory conditions and placed in track service for evaluation. All have performed satisfactorily for a period of from 3-5 years.

REFERENCES:

PERFORMING AGENCY: Forest Products Laboratory; Association of American Railroads Technical Center

INVESTIGATOR: Geimer, RL Tel (608) 257-2211 Youngquist, JA

SPONSORING AGENCY: Forest Products Laboratory
 RESPONSIBLE INDIVIDUAL: Youngs, RL Tel (608) 257-2211
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1973

**01 139163
 ENGINEERING ANALYSIS OF STRESS IN RAILS**

This program is to develop & apply procedures for predicting stresses in rails; to provide a description of stresses required for prediction of rail degradation and rail failure due to fissures, split heads and bolt hole cracks; to assess design and operational trade-offs on thermal, flexural, residual and contact stresses and to provide input to a rail reliability model. The goal is an analytical model where factors in rail degradation may be determined.

REFERENCES:

Preliminary Description of Stresses in Rails Johns, TG; Davies, KB, Report FRA-ORD-76-294

PERFORMING AGENCY: Battelle Columbus Laboratories
 INVESTIGATOR: Sampath, S Tel (614) 424-4597
 SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development; Transportation Systems Center, Office of Ground Systems
 RESPONSIBLE INDIVIDUAL: McConnell, DP Tel (617) 494-2649

Contract DOT-TSC-1038

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: June 1975 COMPLETION DATE: May 1979 TOTAL FUNDS: \$429,000

ACKNOWLEDGMENT: FRA

**01 139165
 COLLECTION AND ANALYSIS OF TEST DATA**

Because of the premature failure of the Kansas Test Track, the contractor is to complete analysis of available data and to conduct a post mortem study of the instrumentation originally installed in concrete cross tie/and concrete slab track. Premature termination of traffic meant that all of the data sought will not be obtained. Remaining instruments are to be examined for condition and environment with the aim of determining if the data that was obtained was valid. Reports describing track performance using the available data will be completed.

REFERENCES:

The Kansas Test Track; Part I-Analysis of Test Data Ball, CG et al, FRA/ORD-79/22.1

The Kansas Test Track; Part II-Appendices Ball, CG et al, FRA-/ORD-79/22.II

PERFORMING AGENCY: Portland Cement Association
 INVESTIGATOR: Colley, BE Tel (312)966-6200
 SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
 RESPONSIBLE INDIVIDUAL: O'Sullivan, WB Tel (202)426-4377

Contract DOT-TSC-FR-90043

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: July 1971

ACKNOWLEDGMENT: FRA

**01 148355
 ROAD MAINTENANCE COST MODEL**

The road maintenance cost model project is directed towards the construction of a large computer model which will simulate the processes by which rail, ties and ballast in a length of track deteriorate under a selected traffic to levels which necessitate their periodic replacement. Incremental costs are to be determined by a routine that deletes each segment of the traffic mix in turn, converting the estimated service life differential to an appropriate annual charge which reflects the simulated "consumption" of the track asset. Progress to date has seen the construction of a rail wear/cost model which is currently being tested in a number of railway applications, and a preliminary tie wear model.

REFERENCES:

Road Maintenance Cost Model Roney, MD; Lake, RW, Canadian Institute of Guided Ground Transport, Interim Report, Mar. 1977

Road Maintenance Cost Model Phase I-Rail Wear Modelling Roney, MD; Turcot, MC; Lake, RW; Schwier, C, Canadian Institute of Guided Ground Transport, May 1978

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-823
 INVESTIGATOR: Roney, MD Tel (613) 547-5777 Turcot, MC Lake, RW

SPONSORING AGENCY: Canadian National Railways; Canadian Pacific Rail; Railway Transportation Directorate; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hanks, WG Tel (514) 877-5771

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Mar. 1976 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$117,780

ACKNOWLEDGMENT: CIGGT

**01 170600
 THE ELECTROSLAG WELDING OF RAIL STEELS**

The first research phase has seen the establishment of the preparation, set-up and operating parameters that are necessary to achieve good weld penetration over the full cross section in standard carbon rails. The longer term objectives include optimization of the metallurgy of the weldment, reduction in the time required to complete a weld, and the introduction of further degrees of process automation. Ultimately, conversion to the fully-automated mode appears to hold the key to development of a cost-effective method of producing high-quality rail welds in track without the high degree of operator-induced variance characteristics of the thermit welding method.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-775

INVESTIGATOR: Cameron, J Tel (613) 547-5908 Mackay, WBF
 SPONSORING AGENCY: Canadian National Railways; Canadian Pacific Rail; Transport Canada Research and Development Centre
 RESPONSIBLE INDIVIDUAL: Rennie, R Tel (514) 877-4337 Tufts, LD Tel (514) 861-6811 Dillon, R Tel (514) 283-4429

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Nov. 1977 COMPLETION DATE: Apr. 1980 TOTAL FUNDS: \$167,262

ACKNOWLEDGMENT: CIGGT

**01 170607
 STANDARD SPECIFICATIONS FOR RAPID TRANSIT
 CONCRETE TIES-TEST AND EVALUATION**

Preliminary specifications have previously been developed for the use of concrete ties for rapid transit. The purpose of this contract is to manufacture both monoblock and duoblock ties in accordance with these specifications and to laboratory test them following established test procedures. Based on the results of these tests, modified preliminary specifications will be developed.

PERFORMING AGENCY: Portland Cement Association, Construction Technology Laboratories

INVESTIGATOR: Hanna, AN Tel (312) 966-6200
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Witkiewicz, P Tel (617) 494-2006

Contract DOT-TSC-1442

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1977 COMPLETION DATE: Mar. 1979 TOTAL FUNDS: \$93,662

ACKNOWLEDGMENT: TSC

**01 170616
 TRACK STRENGTH CHARACTERIZATION PROGRAM**

The purpose of the track strength characterization program is to develop a technique for the determination of the ability of track to withstand anticipated service loads and to utilize this technique for the development of recommended track strength requirements and/or wheel force restrictions for the different categories of track. This program will feature the ability to examine and classify existing tracks with non-destructive methods and with a minimum occupation of the track.

REFERENCES:

Preliminary Outline Track Strength Characterization Program, Zarembski, AM, Sept. 1977

Track Strength Characterization Task Plan May 1978

Measurement of Gauge Restraints: Rail Spreader Tests Zarembski, AM, Dec. 1978

PERFORMING AGENCY: Association of American Railroads Technical Center, K103

INVESTIGATOR: Zarembski, AM Tel (312) 567-3622
 SPONSORING AGENCY: Association of American Railroads Technical Center
 RESPONSIBLE INDIVIDUAL: Zarembski, AM Tel (312) 567-3622

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1978
ACKNOWLEDGMENT: Association of American Railroads Technical Center

01 170618

A THEORY FOR TRACK MAINTENANCE LIFE PREDICTION

Over a period of time, railroad track will settle as a result of permanent deformation in the ballast and underlying soil layers produced by traffic loading. After some period of time, maintenance will be needed to resurface and line the track. Suitable methods do not presently exist for predicting the maintenance life, which is a function of many factors. This study shall develop a theory for prediction of track settlement which is applicable to estimating maintenance life for new or existing track. The research approach, focusing on the inelastic behavior of soil, involves: (1) establishing required characteristics for the track system components, (2) setting up a computer model, (3) studying the behavior of ballast and soil under representative cyclic loading, and (4) validating the model using available field experience, including data from FAST in Pueblo, Colorado.

PERFORMING AGENCY: State University of New York, Buffalo, Department of Civil Engineering

INVESTIGATOR: Selig, ET Tel (716) 831-3113

SPONSORING AGENCY: Department of Transportation, Office of University Research, Res & Special Program Admin

RESPONSIBLE INDIVIDUAL: Ravera, RJ Tel (202) 426-0190

Contract DOT-OS-70058

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1977 COMPLETION DATE: Oct. 1979

ACKNOWLEDGMENT: DOT

01 170625

UNCONVENTIONAL TRACKS

Development of track on concrete base. Various types of rail fastenings are tested in laboratory and on concrete slabs of both in-situ and pre-cast construction. Noise and vibration measurements are made under dense traffic and at high speed. Results obtained from laboratory tests and test track at Radcliffe-on-Trent include vibration and noise comparisons. Apart from experience being compared from main line installations in France, England, Switzerland and Germany, ORE has sponsored tests under high speed at Oelde and tests on sharp curve under dense traffic at Velim. These tests have been completed. A new programme of work is being prepared. The summarizing report was presented to the ORE Control Committee in April 1977.

Seventeen reports have been published to date. Question D87.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Wattecamps, A Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1966

ACKNOWLEDGMENT: UIC

01 170636

UNIFICATION OF THE GEOMETRY OF POINTS WITH RAILS OF 60 KG/M PERMITTING HIGH SPEEDS ON THE DIVERGING TRACK

The object of this study is to obtain uniformity of turnouts and crossover design with 60 kg/m rails, especially those permitting high speed running on the diverging track. Test runs have been made with the SNCF measuring coach on the SNCF and DR track systems over points with different check rail entry slopes. Furthermore, tests have been made on crossovers of different designs for high-speed running on the SNCB, SNCF, SBB and DB systems. These measurements are now being evaluated. A switch with parabolic transition curve for 160 kg/m on the diverging track will be laid by the SNCF later this year.

Three reports have been published to date. Question D121.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Thiele, W Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1973

ACKNOWLEDGMENT: UIC

01 170649

OPTIMUM ADAPTATION OF THE CONVENTIONAL TRACK TO FUTURE TRAFFIC

The relationship between traffic and track geometry is studied, along with the optimization of levelling and alignment operations and a definition of

track supporting structures is given. Reports RP 8 and 9 were submitted to the Control Committee in October 1976. The former report deals with the track in unloaded condition and the latter with the influence of some reinforcement parameters in the performance of the track with regard to level and alignment (processing of statistical data). The definition of track supporting structures is now the main task of the D 117 Committee. The corresponding programme of work was proposed in April 1976 and approved. It has five main points: (1) Study of optimum characteristics of formation materials; (2) Study of measures to be taken against contamination of materials; (3) Study of the mechanism of water penetration into the foundation; (4) Study of the influence of frost; and (5) General dimensioning rules. The first tests were made in the last three months of 1976.

Nine reports have been published to date. Question D117.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Wattecamps, A Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1970

ACKNOWLEDGMENT: UIC

01 170783

DOCUMENTATION AND TESTING OF MULTI-LINEAR PORTION OF FINITE ELEMENT PROGRAM FOR ANALYSIS OF TRACK STRUCTURE

The objective of the research program is the development of a three dimensional finite element program suitable as a tool for optimizing the design of a ballasted track structure. The work being carried out under the current contract involves the testing, debugging and validation of the linear portion of the computer program.

REFERENCES:

Analysis of Rail Track Structures (ARTS) User's Manual Raymond, GP; Turcke, DJ, Canadian Institute of Guided Ground Transport, Apr. 1978

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-822

INVESTIGATOR: Turke, DJ Tel (613) 547-5714 Raymond, GP

SPONSORING AGENCY: Transport Canada Research and Development Centre; Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Rowan, WG Tel (514) 283-5068 Lundgren, JR Tel (202) 293-4182

Contract D-500-372-3

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Aug. 1977 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$25,150

ACKNOWLEDGMENT: CIGGT

01 179328

TRANSIT TRACK SYSTEMS STUDY

The objective of this study was to evaluate and assess US rapid transit track conditions, design, construction and maintenance problems and practices, and to prioritize research requirements based on this evaluation, life-cycle cost analyses and cost-benefit analyses. Most of the information will be obtained from the transit properties with a resultant track structures data base being established. As part of the contract, a workshop was held for the purpose of obtaining industry evaluation of the contractor's findings and to solicit recommendations for future research. The contract was completed with the contractor submitting recommended R&D areas for transit track.

PERFORMING AGENCY: ENSCO, Incorporated

INVESTIGATOR: Cunney, E Tel (703) 321-9000

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Saulnier, G Tel (617) 494-2006

Contract DOT-TSC-1502

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Apr. 1978 COMPLETION DATE: July 1979 TOTAL FUNDS: \$225,678

ACKNOWLEDGMENT: TSC

01 179330

DEVELOPMENT OF DATA PROCESSING FOR AUTOMATIC RAIL FLAW DETECTION

This project will provide a feasibility report on real time digital signal processing and pattern recognition technology in the automatic detection and classification of rail defects. Magnetic tape recordings of ultrasonic transducer echos will be used to test the formulated algorithms.

PERFORMING AGENCY: Sperry Univac Computer Systems, 01 160047
 INVESTIGATOR: Phipps, PL Tel (612) 456-4872
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Mould, JC Tel (202) 426-1682

Contract DOT-FR-8180
 STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Sept. 1978 TOTAL FUNDS: \$98,773

ACKNOWLEDGMENT: FRA

**01 179337
 FUNDAMENTAL PROBLEMS IN RAILROAD TRACK
 MECHANICS**

The objectives of this research are threefold. (1) The derivation and validation of equations for the description of track response to mechanical and thermal loads in the lateral plane. In this, recently derived differential equations will be generalized by including geometrical nonlinearities and the effects of temperature change. To obtain the associated boundary and matching conditions the corresponding variational equation will be derived. Expressions for bending moment, shear and axial forces for the rail-tie system will be used for the physical interpretation of the obtained boundary and matching conditions. Due to errors caused by the transition from the difference equations to the lowest order differential equations for the tie spacings it is also planned to establish a formulation in terms of difference equations. (2) The same objective for the vertical plane. Due to errors of about 10 percent previously found for lateral track deformations caused by the limiting process which yielded differential equations from difference equations it is expected that a similar situation will also exist for the vertical case. Accordingly, a study similar to that in (1) above will be followed. (3) A critical survey of foundation models. This is to include elastic and viscoelastic models used for the analysis of continuously supported structures which have been introduced since 1964. These are to be analyzed in terms of their uniqueness and physical realism with a view toward establishing a sense of order and suitability for their use in the most recently developed analytical procedures.

PERFORMING AGENCY: Delaware University, Newark
 INVESTIGATOR: Kerr, AD
 SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG 78-25433

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Nov. 1978 TOTAL FUNDS: \$43,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 6620)

**01 179687
 TECHNICAL AND ECONOMIC PRACTICALITY OF
 DOWEL-LAMINATING CROSS TIES BEFORE DRYING**

Reduce the cost of manufacturing dowel-laminated crossties. Reducing this cost will make it more practical to use these crossties which are made from small, low-grade underutilized hardwood trees. Dowel-laminate a number of green oak crossties and compare their quality with those that have been dowelled dry (the conventional method). Eighty green red oak half-ties and 10 green red oak full-sized crossties were graded and incised. Sixty of the half-tied were assembled in pairs having various pith orientations and various amounts of preservative at their interfaces. Each pair of half-ties was then laminated together with fluted steel dowels. All of the above ties were weighed and stacked in the conventional way for air drying. This work was done during the week of March 14, 1977 at the plant of the Koppers Co. in Nashua, New Hampshire. In June 1978 the 20 remaining dry half-ties will be dowel-laminated. A comparison for quality will then be made between the ties dowelled green, the ties dowelled dry and the solid ties.

PERFORMING AGENCY: Idaho University, Moscow, College of Forestry and Wildlife and Range Sciences, IDA-ES-0128
 INVESTIGATOR: Howe, JP
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Dec. 1978

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0072910)

**01 185232
 LIFE CYCLE COST METHODOLOGY FOR THE EVALUATION
 OF PROPOSED TRACK-RELATED SAFETY STANDARDS**

This contract is concerned with evaluating economic effects of proposed safety standards that are related to railroad track. The objectives of the contract are to develop a methodology for assessing the economic impact of alternative standards, to define the data requirements and functional relationships for the methodology, and to develop the appropriate data elements. The contract also involves application of the methodology to a set of proposed standard modifications.

PERFORMING AGENCY: Shaker Research Corporation
 INVESTIGATOR: Krauter, AI Tel (518) 877-8581
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Smith, RA Tel (617) 494-2795

Contract DOT-TSC-1594
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$73,982

ACKNOWLEDGMENT: Shaker Research Corporation

**01 185233
 TECHNICAL SUPPORT SERVICES FOR TRACK STRUCTURE
 FAILURE STUDIES**

Support services will be furnished in response to Technical Task Directives in areas of (1) Track Loads, (2) Track Structural Analysis, (3) Component Stress and Failure Analysis, (4) Laboratory Field Experimentation, and (5) Technical Liaison. The first two TTD's are related to instrumentation and collection and analysis of track loads data from the "Perturbed Track Tests" conducted on the Pueblo test track using different locomotives.

PERFORMING AGENCY: Battelle Memorial Institute, G6632
 INVESTIGATOR: Meacham, HC Tel (614) 424-4484
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: McConnell, DP

Contract DOT-TSC-1595
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: Sept. 1980 TOTAL FUNDS: \$465,545

ACKNOWLEDGMENT: Battelle Memorial Institute

**01 188648
 MAINTENANCE-OF-WAY: TRACK LAYING SYSTEMS (TLS)**

The FRA is conducting a number of research and development programs to improve railroad service and economics. In recent years US railroads have shown some interest in the Track Renewal Train to perform maintenance-of-way. The objective of this project is to survey machines used in Europe for out-of-face replacement of ties and tracks and survey the TLS machine being used by AMTRAK to determine the usefulness of the Track Renewal Train concept to the US railroad operation. The economics of cascading ties and the rehabilitation of used cross ties for reuse in branch lines is also being studied.

PERFORMING AGENCY: Unified Industries, Incorporated
 INVESTIGATOR: Cataldi, GR Tel (703) 750-3282 Elkhaim, D Larsen, K
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Orth, CL Tel (202) 755-1877

Contract DOT-FR-8046
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1978 COMPLETION DATE: Mar. 1980 TOTAL FUNDS: \$220,000

ACKNOWLEDGMENT: FRA

**01 188649
 MAINTENANCE-OF-WAY PLANNING PROGRAM**

A cooperative Maintenance-of-Way (MOW) Research Program between Conrail and FRA, which utilizes data from FRA's Track Geometry inspection vehicles and other related track data (traffic, physical, etc.) for MOW planning evaluation. Contractor to determine the contribution of selected set of physical and traffic parameters to the rate of deterioration of track and select the appropriate indicator(s) (track quality index), that can be calculated from data collected by a track geometry measuring vehicle, that will measure the quality of track.

PERFORMING AGENCY: ENSCO, Incorporated, 437
 INVESTIGATOR: Kenworthy, M Tel (703) 960-8500

SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Gross, A Tel (202) 755-1877

Contract DOT-FR-64113

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1978
 COMPLETION DATE: Feb. 1980 TOTAL FUNDS: \$362,956

ACKNOWLEDGMENT: FRA

01 188650

MASTER PLAN FOR EVALUATION OF MAINTENANCE-OF-WAY EQUIPMENT

Railroads currently spend more than \$3 billion per year on Maintenance-of-Way (MOW) and defer billions more. These same railroads have a need to evaluate the variety of equipment available to them for MOW activities. This FRA research program in cooperation with suppliers and railroads is being conducted to evaluate the performance of MOW equipment. MOW equipment evaluation techniques will be generated that Railroads can utilize in evaluating their MOW equipment needs. Contractors will also recommend additional MOW equipment evaluation research programs to be conducted by FRA and the railroad industry.

PERFORMING AGENCY: De Leuw, Cather and Company, DOT-FR-8028

INVESTIGATOR: Shipley, RL Tel (202) 452-0860

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Gross, A Tel (202) 755-1877

Contract DOT-FR-8028

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Mar. 1978
 COMPLETION DATE: Mar. 1979 TOTAL FUNDS: \$158,843

ACKNOWLEDGMENT: FRA

01 188658

RAILROAD TRACK STRUCTURES RESEARCH

This program of Railroad Track Structures Research 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 shall consist of a series of tests conducted at the AAR Truck Structures Dynamic Test Facility Chicago Illinois. Additionally, data analysis and model validation is called for.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Zarembski, AM Tel (312) 567-3622

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Putukian, J Tel (617) 494-2206

Contract DOT-TSC-1541

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1979
 COMPLETION DATE: May 1980 TOTAL FUNDS: \$316,190

ACKNOWLEDGMENT: Association of American Railroads Technical Center

01 188667

DETERMINATION OF VEHICLE INDUCED FORCES ON TRANSIT TRACKS

The objective is to provide experimental data for validation of the analytical tools developed under previous efforts, to obtain engineering data on key parameters of the analytical models, to evaluate the applicability of the tools to define the load environments for design of the tie, fastener and ballast/subgrade components of a transit track structure and to illustrate their application through a pilot application to the track configurations currently existing on the transit test track at the DOT Transportation Test Center at Pueblo, Colorado.

PERFORMING AGENCY: Kaman AviDyne

INVESTIGATOR: Mente, LJ

SPONSORING AGENCY: Transportation Systems Center

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Sept. 1978
 COMPLETION DATE: Mar. 1980

01 193778

INSTALLATION AND TESTING OF THE TRACK GEOMETRY MEASUREMENT SYSTEM

To install rail geometry sensing, recording and analysis package furnished by TSC on a standard car belonging to the NYCTA. Test operation and reliability of the equipment over a two year period by systemwide use.

PERFORMING AGENCY: New York City Transit Authority

INVESTIGATOR: Berger, IM Tel (212) 330-4366

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Nickles, JE Tel (617) 494-2302

Contract DOT-TSC-1635

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: Dec. 1978
 TOTAL FUNDS: \$45,000

ACKNOWLEDGMENT: New York City Transit Authority

01 196723

FEASIBILITY OF TRACK MODULUS MEASUREMENT FROM MOVING VEHICLE

To provide better information on track strength to enable improved allocation of maintenance resources, the feasibility will be determined of measuring track modulus under dynamic conditions and, if feasible, develop electronic hardware and software to measure this property of track and analyze data. This will provide improved information on track strength to enable better allocation of maintenance resources.

PERFORMING AGENCY: Canadian National Railways, U11C13804

INVESTIGATOR: Rennie, R

SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1979 START DATE: Mar. 1978
 COMPLETION DATE: Dec. 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

01 196728

AIR CURTAIN SWITCH PROTECTOR

To develop a qualified prototype based on laboratory patented feasibility model of the air curtain switch. Construction and testing of switch units in a working environment.

PERFORMING AGENCY: Ministry of State for Science and Technology, F35B10001

INVESTIGATOR: Ringer, TR

SPONSORING AGENCY: Ministry of State for Science and Technology

STATUS: Active NOTICE DATE: July 1979 START DATE: June 1976
 COMPLETION DATE: Dec. 1999

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

01 196735

TRACK STRUCTURES RESEARCH

To evaluate the fatigue life and economic life of track structures and components, a track structure test facility at CN Rail's Research Centre is used to evaluate the fatigue life of track structures and components, to develop tools for measurement of centre binding of concrete ties, to evaluate effects of frost heaving in the creation of centre bound track, to develop and evaluate methods for measuring thermal stress in welded rail and to evaluate variation in measurement of track modulus. The goal is to optimize the railway track structure for present and future rail operations and to provide for improved placement of capital and maintenance resources in maintaining the railway fixed plant (track).

PERFORMING AGENCY: Canadian National Railways, 111C13807

INVESTIGATOR: Rennie, R

SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

01 196737

ROADWAY SYSTEMS ANALYSIS

Study all of the factors which contribute to the deterioration of the roadway, to increase scientific knowledge of this phenomenon, and as a result to develop improved roadway and track elements and improved maintenance technology. Study a large collection of data on existing roadway and track elements, for the whole of a large railroad, together with train operations, maintenance applied and historic measurements of roadway and track conditions. A large computer software system has been developed to facilitate these studies, which are currently underway.

PERFORMING AGENCY: Canadian Pacific Limited, 111H54851

INVESTIGATOR: Holt, R

SPONSORING AGENCY: Canadian Pacific Limited

STATUS: Active NOTICE DATE: July 1979 START DATE: Jan. 1978 COMPLETION DATE: Jan. 1983

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

01 196745**SOIL AND BALLAST INVESTIGATION**

The project objective is to identify failure and performance criteria for the soil and ballast in the track structure so that procedures for improved performance can be formulated. The project includes studies of ballast fouling, ballast selection requirements, feasibility of ballast radar, and engineering fabrics utilization.

PERFORMING AGENCY: Association of American Railroads Technical Center, K104

INVESTIGATOR: So, W Tel (312) 567-3599

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: So, W Tel (312) 567-3599

STATUS: Active NOTICE DATE: July 1979 START DATE: Jan. 1979

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 Transport Canada Research and Development Centre 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: Hawthorne, KL Tel (312) 567-3584

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Dancer, DM Tel (202) 426-1227

Contract DOT-FR-64228 (CR)

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1976 COMPLETION DATE: July 1979 TOTAL FUNDS: \$1,900,000

ACKNOWLEDGMENT: FRA

02 058263

ROLL DYNAMICS UNIT/VIBRATION TEST UNIT FOR U.S. DEPARTMENT OF TRANSPORTATION RAIL DYNAMICS LABORATORY

The U.S. Department of Transportation Rail Dynamics Laboratory (RDL) will house the Roll Dynamics Unit (RDU) and Vibration Test Unit (VTU) at the Transportation Test Center, Pueblo, Colorado. The RDL will permit analytical and experimental studies of railroad and transit vehicles, systems, and components in a controlled, reproducible lab environment with minimal risk to equipment and personnel. Through the study of vehicle dynamics in the RDL, the number of dynamic related accidents and derailments and their attendant costs should be reduced significantly. The contractor is responsible to deliver a functional RDU and VTU. The RDU will be capable of simulating speeds of approximately 200 mph and will accommodate vehicles up to 108 feet long, 12 feet, weighing 200 tons. The VTU will subject rail equipment to vertical and lateral vibrations experienced on typical track and handle vehicles up to 90 feet long, 12 feet wide and weighing 160 tons.

PERFORMING AGENCY: Wyle Laboratories

INVESTIGATOR: De Benedet, D Tel (303) 597-4500

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Gross, A Tel (202) 755-1877

Contract DOT-FR-64200

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1975 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$10,414,451

ACKNOWLEDGMENT: FRA

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 potential 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.

Final Report in process of publication.

REFERENCES:

Wayside Derailment Inspection Requirements Study for Railroad Vehicle Equipment, Frarey, JL; Smith, RL; Krauter, AI, FRA/ORD-77-18, May 1977, RRIS 7801 167080

On-Board Failure-Protection Requirements for Railroad Vehicle Equipment, Final Rpt. FRA/ORD-78/72, Mar. 1979

PERFORMING AGENCY: Shaker Research Corporation

INVESTIGATOR: Frarey, JL

SPONSORING AGENCY: Transportation Systems Center, RR-523

RESPONSIBLE INDIVIDUAL: Ehrenbeck, R Tel (617) 494-2233

Contract TSC-1029 (CPF)

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: May 1975 COMPLETION DATE: Mar. 1979 TOTAL FUNDS: \$77,114

ACKNOWLEDGMENT: TRAIS, FRA

02 059427

FREIGHT CAR DYNAMICS RESEARCH PROGRAM

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 their behavior. Validate these models with data gathered by the Track-Train Dynamics Program.

PERFORMING AGENCY: Clemson University

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Tsai, N Tel (202)755-1877

Contract DOT-OS-40018 (CR)

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Nov. 1973 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$313,787

ACKNOWLEDGMENT: TRAIS

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: Hawthorne, KL Tel (312) 567-3584

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1975 COMPLETION DATE: Mar. 1979

ACKNOWLEDGMENT: AAR

02 081799

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 2--WHEEL/RAIL

Overall task goals are to improve knowledge of the mechanics of wheel/rail interactions and to establish recommended performance specifications and design guidelines for wheels and rail. Task will involve applied research in wheel and rail metallurgy in order to determine requirements for improved performance. Research will also be conducted in stress analysis and fracture mechanics with the goal of developing improved design techniques and life cycle prediction methods. Stress analysis will especially concentrate on the contact stresses at the wheel/rail interface. Wear research conducted under Task 9, Advanced Analytical Techniques, will supply important input to this task. Rail corrugation, with initial effort by Canadian participants in TTD, has been studied. The rail stress analysis investigation, with particular effort on determining the stresses within rails as developed by passage of a vehicle, is progressing. In the wheel area, present effort is on developing an elastic-plastic stress analysis because mechanical and thermal stresses can go beyond the yield point of steel.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Hawthorne, KL Tel (312) 567-3584

SPONSORING AGENCY: Association of American Railroads Technical Cen-

ter; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre
 RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1975 COMPLETION DATE: 1978

ACKNOWLEDGMENT: AAR

02 081803

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 7--TEST MANAGEMENT

Task objective 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, NJ Tel (312) 567-3621

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1975 COMPLETION DATE: Mar. 1979

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 life-cycle 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: McGovern, WR Tel (312) 567-3617

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1975 COMPLETION DATE: Mar. 1979

ACKNOWLEDGMENT: AAR

02 099367

PILOT STUDY FOR THE CHARACTERIZATION AND REDUCTION OF WHEEL/RAIL LOADS

This project will be carried out in two phases, with the first phase developing a method for the analytic and experimental characterization of wheel/rail loads. In addition, this phase will provide a detailed program plan and a W/R load field measurement and data reduction plan for a specified track route that will then be implemented in Phase II. During Phase II, the W/R loads on selected track sections will be determined through implementation of the field measurement plan. These loads will be compared with those predicted through application of the analytical methodology. After modification and/or validation, the prediction method will be used to extrapolate W/R load data to alternative track, vehicle and operating conditions. This is intended to identify alternate strategies for reducing those W/R loads which are most closely associated with track degradation.

REFERENCES:

Evaluation of Analytical and Experimental Methodologies for the Characterization of Wheel/Rail Loads, Ahlbeck, D; Harrison, H; Prause, R; Johnson, M, FRA-OR&D 76-276, Intrm Rpt., Nov. 1976

PERFORMING AGENCY: Battelle Memorial Institute

SPONSORING AGENCY: Federal Railroad Administration, Office of Rail Safety Research

RESPONSIBLE INDIVIDUAL: Weinstock, H Tel (617) 494-2459

Contract DOT-TSC-1051

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1975 COMPLETION DATE: July 1979 TOTAL FUNDS: \$583,000

ACKNOWLEDGMENT: FRA

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: Garg, VK Tel (312) 567-3596

SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Lind, EF Tel (312) 567-5790

STATUS: Active NOTICE DATE: Feb. 1979 COMPLETION DATE: 1979

ACKNOWLEDGMENT: AAR

02 128041

CALCULATION OF TRAIN AERODYNAMIC DRAG (FOR ENERGY MANAGEMENT PROGRAM)

The purpose of this project is to: 1. Calculate the steady and unsteady aerodynamic drag of vehicles in tunnels and free air. 2. Modify and/or develop computer programs for the calculation of the aerodynamic drag of vehicles as required by the energy management program. A literature survey and review of the aerodynamics of trains in tunnels under project 3603 is well underway. Also, a computer program has been acquired to estimate the unsteady aerodynamic drag of vehicles in tunnels. With this program, it is now possible to start to perform the drag calculations for the purpose of obtaining preliminary power profile and energy loss estimates. It is anticipated that the program will have to be modified to incorporate the latest information obtained in the literature review. This project covers the calculation of aerodynamic drag for the three cases of deep tunnel, cut and cover, and free air, and studies on propulsion systems with and without energy storage. The result, conceptual designs on a total energy basis. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 3605

INVESTIGATOR: Colavincenzo, O

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 138469

TRUCK DESIGN OPTIMIZATION PROJECT, PHASE II

Phase II of the Truck Design Optimization Project (TDOP) will finalize the performance and testing specifications and economic methodology generated in Phase I; characterize the performance and economics of Type II, special service freight car trucks; develop performance and testing specifications as well as the economic methodology for Type II trucks incorporating wear and performance indices; provide related economic and analytical models of freight car trucks; and determine the feasibility of advanced designs and integrated carbody support systems.

PERFORMING AGENCY: Wyle Laboratories

INVESTIGATOR: De Benedet, D Tel (303) 697-4500 Cappel, K

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Tsai, N Tel (202) 426-0851

Contract DOT-FR-742-4277

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1977 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$2,639,100

ACKNOWLEDGMENT: FRA

02 139178

FACILITY FOR ACCELERATED SERVICE TESTING (FAST)

Accelerated life testing of track structures and certain components of rolling stock. A 4.8 mile loop of track, divided into 22 sections, with experiments on rail metallurgy, ties (hardwood, soft wood, concrete, steel), ballast (different materials, depths, shoulder width), etc. Four 2,000 HP locomotives pulling more than 80 cars (hoppers, tanks, flats) each grossing over 100 tons, at average speed of 42 MPH for a period not to exceed 16 hrs/day five day/week. Measurements taken during other 8 hours. Started operation in September 1976; approximately 415 million gross tons and 230,000 miles have been accumulated thru June 1, 1979. To date, more than 15 technical reports on various results at FAST have been published and several additional reports are currently in preparation.

PERFORMING AGENCY: Federal Railroad Administration, Office of Research and Development

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Spanton, DL Tel (202) 426-0850

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1976

ACKNOWLEDGMENT: FRA

02 148358

EXPERIMENTAL RESEARCH ON RAIL VEHICLE SAFETY USING DYNAMICALLY SCALED MODELS

The objective of this research is to develop experimental techniques for the study of rail vehicle dynamics. Through the use of scaled models, a structural experimental data base on the characteristics of rail car trucks will be assembled. The establishment of this data base (more complete and systematically structured than that feasible from large scale testing) will enable the validation of analytical tools useful in the design of railroad components. An 800 foot test track has been installed and experiments have been conducted on single wheelsets. These confirm predictions from a theoretical model developed for this project. Additional experiments will focus on the dynamics of a complete freight truck.

PERFORMING AGENCY: Princeton University, Department of Aerospace and Mechanical Sciences

INVESTIGATOR: Sweet, LM Tel (609) 452-5305

SPONSORING AGENCY: Department of Transportation, Office of University Research

RESPONSIBLE INDIVIDUAL: Lee, HS

Contract DOT-OS-60147

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1977 COMPLETION DATE: June 1979 TOTAL FUNDS: \$203,000

ACKNOWLEDGMENT: TSC

02 157664

EXPERIMENTAL MEASUREMENTS OF NORMAL SHOCK AND VIBRATION ENVIRONMENTS

Extract and document, in a usable format, the current information on normal shock and vibration loading experienced by radioactive material shipping containers. This will involve: (1) Extraction of data from existing data banks; (2) Conducting of dynamic analysis of switching and coupling shocks; (3) Participation in appropriate test programs.

REFERENCES:

Shock and Vibration Environments for Large Shipping Containers on Rail Cars and Trucks, Magnuson, CF, SAND-76-0427; NUREG-76-6510, May 1977

PERFORMING AGENCY: Sandia Laboratories, A-1049

INVESTIGATOR: Magnuson, CF Tel (505)264-2765

SPONSORING AGENCY: Nuclear Regulatory Commission

RESPONSIBLE INDIVIDUAL: Lahs, W Nuclear Regulatory Commission Tel (301)427-4356

Contract B&R-60190504

STATUS: Active NOTICE DATE: July 1977 START DATE: Dec. 1975 COMPLETION DATE: Oct. 1978 TOTAL FUNDS: \$365,000

ACKNOWLEDGMENT: Nuclear Regulatory Commission

02 160409

LADING DAMAGE PARAMETERS

This project is aimed at the reduction of the current \$300 million annual loss and damage in paid claims and the several billion dollar expense in support costs, unpaid claims and lost revenue. Testing of various product densities and shipments will be used to determine dynamic mechanical response lading parameters such as force constants and damping coefficients. Through analysis the response of various lading as it is influenced by vibration, variations in shipping containers and pallet configurations can be determined. The data will also be used in the development of predictive models to be used in optimizing the rail transportation system.

PERFORMING AGENCY: Rutgers University, New Brunswick

INVESTIGATOR: Morrow, D Tel (201) 932-3679 Richardson, G Vinatoru, M

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Orth, CL Tel (202) 755-1877

Contract DOT-FR-767-4323 (CC)

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1977 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$125,000

ACKNOWLEDGMENT: TRAIS, FRA

02 170591

EXPERIMENTAL DETERMINATION OF COEFFICIENT OF ROLLING ADHESION IN RAIL TRACTION AND BRAKING

The coefficient of rolling adhesion is strongly a function of speed and material, but also is influenced by other parameters, such as surface condition, curvature, traction or braking in the stress contact area. It has never yet been well-determined in these respects, and a VPI test rig of my design has now produced some definitive results never before achieved.

PERFORMING AGENCY: Virginia Polytechnic Institute & State University, 808440-1

INVESTIGATOR: Whitelaw, RL Tel (703) 951-6801

SPONSORING AGENCY: Federal Railroad Administration

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: Sept. 1976 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$67,000

ACKNOWLEDGMENT: Virginia Polytechnic Institute & State University

02 170594

INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF RAIL FREIGHT ROLLING STOCK

The objective of this project is to obtain information on the aerodynamic characteristics of a variety of standard railroad freight rolling stock and of selected configurations, modified to improve their aerodynamics, by means of a series of scale-model wind tunnel investigations. The final report shall indicate applicability and limitations of the test data to full-scale railroad operations.

PERFORMING AGENCY: Hammitt (Andrew G) Associates; California Institute of Technology; Raines Engineering

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Koper, JM Tel (202) 426-0808

Contract DOT-FR-8058

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: May 1978 COMPLETION DATE: May 1979 TOTAL FUNDS: \$110,728

ACKNOWLEDGMENT: FRA

02 170595

TRAIN RESISTANCE

Investigations and analyses of rail freight train aerodynamic and mechanical resistances are being conducted to assist the FRA/OR&D in developing an overview of both near-term and long-range considerations of energy requirements for improved rail freight service. This effort will utilize results of on-going FRA aerodynamic research on various types of rail rolling stock and previous rail energy-related studies conducted by government and industry. Potential energy benefits resulting from freight car design or operational modifications will be assessed from technical and economic considerations.

REFERENCES:

Resistance of a Freight Train to Forward Motion Volume I Methodology and Evaluation, Muhlenberg, JD, Available at NTIS, FRA/ORD 78/04.I, Apr. 1978, PB-280969/AS

PERFORMING AGENCY: Mitre Corporation, Metrek Division, 06.30.09.200
 INVESTIGATOR: Muhlenberg, JD Tel (703) 790-6692
 SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development
 RESPONSIBLE INDIVIDUAL: Koper, JM Tel (202) 426-0808

30000

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1977
 COMPLETION DATE: June 1980

ACKNOWLEDGMENT: FRA

02 170644**PREVENTION OF DERAILMENT OF GOODS WAGONS ON DISTORTED TRACKS**

In April 1975 the B 55 Specialists Committee presented report RP 6 "Conditions for negotiating track twists. Calculation and measurement of important vehicle parameters" which gives guiding principles to the vehicle designer. These will enable him to examine new rolling stock for its safety against derailment on track twists as early as the design stage. In addition, the methods of measurement and the evaluation of the principal vehicle parameters are specified. It is planned to incorporate these conditions in the specifications and the programme of tests for new rolling stock. Further work of the Committee will aim at supplementing the recommendations given in report RP 6 by guiding principles for the cant dependent on the radius of the curve. This still requires the study of its effects on the guiding force. The studies were initiated by a detailed inquiry among the ORE administrations and they are, at present, continued by extensive tests on 2 administrations. Final report, RP 8, in preparation.

Seven reports have been published to date. Question B55.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Jutte, H Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1965
 COMPLETION DATE: Apr. 1978

ACKNOWLEDGMENT: UIC

02 170645**BRAKING AND ACCELERATION FORCES ON BRIDGES AND INTERACTION BETWEEN TRACK AND STRUCTURE**

Study of braking and starting forces on bridges, is now expanded to interaction between long welded rails and bridges. Initial program included tests on plain line to evaluate magnitude and sequence of tractive and braking reactions, tests on steel bridges with and without ballast, and multiple span bridges, to develop theory and recommendations for code of practice. Tests on steel bridges and plain line together with theoretical studies have provided basis for provisional recommendations. Further work is needed to verify reactions on a bridge with continuous deck. The theoretical and experimental methods already developed by the Committee will contribute towards study of temperature reactions from long welded rails, and appropriate arrangements will be combined in future testing.

Twelve reports have been published to date. Question D101.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Savarit, R Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1968

ACKNOWLEDGMENT: UIC

02 170648**INTERACTION BETWEEN VEHICLES AND TRACK**

Track irregularity spectra, setting up a mathematical model (track and vehicle), specification of vehicle/track conditions for ensuring adequate contact, extending knowledge about the wheel/rail contact zone. At this time, work is being done on: 1. Further development and finalisation of the mathematical model for bogie vehicles; 2. Study of comfort standards; and 3. Optimisation of track parameters.

Eight reports have been published to date. Question C116.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Pettelat, A Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1970

ACKNOWLEDGMENT: UIC

02 170657**EFFECT ON THE TRACK OF RAISING THE AXLE LOAD FROM 20 TO 22 T**

It is intended to study the effect of raising the axle load through simulation tests and full scale tests on the Velim test loop. At this time track tests are at present being carried out in varying the values of different parameters such as rails, sleepers and ballast, and for each axle load. Ballast settlement tests are also being made for symmetric and asymmetric wheel loading. In addition, in cooperation with the B 142 Committee, tests are being conducted on the Velim loop with a test-train with 22 t axle load. A first series of tests, corresponding to 50 million tonnes of traffic, has now been terminated.

Question D141.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Jutard, M Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Apr. 1976

ACKNOWLEDGMENT: UIC

02 170660**PERMISSIBLE MAXIMUM VALUES FOR THE Y AND Q FORCES AS WELL AS THE RATIO Y/Q**

The studies are being carried out in 3 directions: 1) Track displacement forces S: the quasi-static tests carried out at Bucharest on a specially fitted track are practically terminated as far as the bogie wagon is concerned and also the line tests with measurements of dynamic forces being carried out by FS, which will be continued by measurements on the test rig by PKP. 2) Criterion of derailment: new series of tests will be made in Derby and in Bucharest toward the end of the year and also on SBB. 3) Limiting values for Y and Q: The additional calculations and the practical work of verifying them will be undertaken by PKP and CFR.

One report has been published to date. Question C138.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Pettelat, A Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978

ACKNOWLEDGMENT: UIC

02 170661**INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS: PHASE III**

This phase contains new tasks not dependent on completion of Phase II work, as well as some of the longer range subtasks of Phase II that were not yet undertaken. The Phase III program, projected to cover a period of five years, has as its goal the development of requirements for advanced systems to meet the future needs of America's railroads as well as the introduction of advanced technology to improve the safety and reliability of present systems. The first stage of Phase III will last about two years and has four major tasks: TTD technology sharing and implementation; advanced design methodology development; train operation aids; and future system studies. A fifth task was added in 1979: advanced freight car research.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Hawthorne, KL Tel (312) 567-3584

SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1978
 COMPLETION DATE: 1982

ACKNOWLEDGMENT: AAR

02 170663**INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS: PHASE III, TASK 2--ADVANCED DESIGN METHODOLOGY DEVELOPMENT**

Task will integrate and apply analytical and experimental techniques to provide a validated design evaluation system to assist in the prevention of catastrophic mechanical failures and support advanced system development in the railroad industry. The subtasks: (2.1) Adapt and illustrate a prototype interactive graphics-supported design evaluation capability; (2.2) Use the Rail Dynamics Laboratory at Pueblo, Col., to validate structural dynamics,

freight-car models and component design methods; (2.3) Complement load-environment data on track structures with investigations of ultimate track strength; (2.4) Conduct a controlled investigation of locomotive or heavy-vehicle/track interactions; (2.5) Provide up-to-date data on fatigue, fracture and wear for railroad materials in a form suitable for advanced design.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Hamilton, AB Tel (312) 567-3649

SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1978 COMPLETION DATE: 1980

ACKNOWLEDGMENT: AAR

02 170666

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS: PHASE II

The overall goal is development of recommended performance specifications and relevant design guidelines to assure the safety of railroad operations with current generation track and equipment. Although originally programmed to end in 1977, many of its subtasks are not complete and some contracts will carry into and beyond 1978. Phase II work continues in these areas: Field testing, wheel/rail integrity studies, dynamic analysis, and specification guidelines. Field tests will complete wayside track data collection at six sites, implement an over-the-road load environment sampling with an instrumented six-car consist, measure wheel thermal/mechanical environment in typical revenue service, and use instrumented brake shoes in single-car stopping and drag brake testing. Wheel/rail integrity studies will publish findings of first-stage wheel/rail and centerplate laboratory wear research, determine residual stress states in rail, validate a risk model that relates rail inspection methods to probability of flaw propagation, develop cost-effective methods to detect damaged wheels. Dynamic analysis will complete final report on harmonic roll and bounce of freight cars due to track irregularities, complete the analytical representation and optimization of draft gear and cushioning units, evaluate results of auxiliary snubbing tests, complete evaluation of truck hunting, issue final evaluation report on instrumented-wheelset tests performed on Amtrak locomotive. Complete specifications for fatigue tests for couplers and truck bolsters; promote introduction of fatigue design guidelines and wheel stress limits into AAR specifications.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Hawthorne, KL Tel (312) 567-3584

SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Feb. 1979 COMPLETION DATE: Mar. 1979

ACKNOWLEDGMENT: AAR

02 179333

TIEDOWN OF NUCLEAR FUEL CASKS TO RAILCARS

An experimental program has been undertaken jointly by the Savannah River Laboratory (with DOE funding) and the Sandia Laboratories (with NRC funding) to investigate shock, vibration, accelerations, stresses, and tiedown forces in a cask-car system during car coupling operations. Results will be extended beyond the experimental range by analytical methods. A standard for tiedown of casks to railcars is to be developed.

PERFORMING AGENCY: Du Pont de Nemours (EI) and Company, Incorporated, Savannah River Laboratory

INVESTIGATOR: Petry, SF Tel (803) 824-6331 Magnuson, CF

SPONSORING AGENCY: Department of Energy; Nuclear Regulatory Commission

RESPONSIBLE INDIVIDUAL: May, GW Tel (803) 824-6331

Contract AT (07-2)-1

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1976 COMPLETION DATE: June 1979 TOTAL FUNDS: \$315,000

ACKNOWLEDGMENT: Du Pont de Nemours (EI) and Company, Incorporated

02 188653

REVIEW AND SUMMARY OF COMPUTER PROGRAMS FOR RAILWAY VEHICLE DYNAMICS

Available computer programs are to be identified and categorized as the following: Lateral Stability; Curving Dynamics; Vertical Dynamics; Wheel/-Rail Contact Geometry and Force; Train Dynamics; Freight Dynamics and Analog/Hybrid Simulations. Authorities are to be selected for evaluation of each computer program group. Formats are to be developed for presentation of summaries and of results. Potential user of the railway vehicle dynamics programs are to be identified.

PERFORMING AGENCY: Virginia University

INVESTIGATOR: Pilkey, WD Tel (804) 924-3291 Reid, RE

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Tsai, N Tel (202) 426-0851

Contract DOT-FR-8076

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Aug. 1978 COMPLETION DATE: Sept. 1979

02 188663

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS: PHASE III, TASK 5--ADVANCED FREIGHT CAR RESEARCH

Performance specifications will be developed in this task for freight car designs that will have improved dynamic performance and structural integrity having particular benefits in the area of reduced track and road bed damage. The task will draw upon the advanced design methods, materials research, vehicle testing, engineering economics, and advanced concept evaluation studies within the Track Train Dynamics program. It will also use the results of the track and rolling stock experiments in the FAST and FEEST projects and other freight car subsystem research projects such as the Truck Design Optimization Program and other D.O.T. programs.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Manos, WP Tel (312) 567-3585

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1979 COMPLETION DATE: 1981

02 194540

AN ELASTIC LAYER RESTING ON AN ELASTIC FOUNDATION AND SUBJECTED TO A MOVING LOAD

This research program addresses a problem of current interest, namely the dynamic interaction between contacting elastic bodies. More specifically, it is directed toward modeling the wheel-railroad interaction problem. The mathematical formulation results in the solution of a mixed boundary value problem. This solution will be investigated for a range of material combinations, wheel force, and speed, yielding the relative normal displacement in the non-contact region and the contact pressure in the contact region.

PERFORMING AGENCY: Clarkson College of Technology, School of Engineering, Mechanical and Industrial Engineering

INVESTIGATOR: Adams, GG

SPONSORING AGENCY: National Science Foundation, Division of Engineering

STATUS: Active NOTICE DATE: July 1979 START DATE: Mar. 1976 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$29,979

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 5746 2)

02 196722

RAILWAY TEST FACILITIES

In response to a recommendation of the RAC/TDC Railway Advisory Committee TDC funded a conceptual definition study on a Canadian Guided Ground Transport Test Centre. A questionnaire was distributed to manufacturers, railways, governments, universities and research organizations to ascertain the needs of the industry and a conceptual definition of a rail test track centre developed. Currently an in-house study on an environmental test facility is underway as a study separate from the test

track centre. Work still continues on the final report on the test track centre, with emphasis being placed on the benefit/cost analysis.

PERFORMING AGENCY: Transport Canada Research and Development Centre, F34A54102

INVESTIGATOR: McClaren, W

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1977 COMPLETION DATE: Mar. 1980

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 196732

INSTRUMENTED WHEEL TESTING

To enable the continuous measurement of vertical and lateral forces applied to rail by locomotives and cars, development of hardware and software for instrumented railway car wheels to enable the continuous measurement and analysis of vertical and lateral forces applied to rail by locomotives and cars under dynamic conditions is to improve productivity and safety of operation of railway rolling stock.

PERFORMING AGENCY: Canadian National Railways, I11C13811

INVESTIGATOR: Rennie, R

SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1979 START DATE: Jan. 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. The Advanced Concept Train (ACT-1) phase calls for delivery of two next generation rail transit vehicles by August 1977 and Advanced Subsystems Development Program (ASDP) calls for component development for near-term industry application.

Subcontractors for the project are St. Louis Car Company, AiResearch Manufacturing Company, Delco Electronics, Westinghouse Air Brake and the Budd Company.

PERFORMING AGENCY: Boeing Vertol Company
 INVESTIGATOR: O'Brien, T Tel (215) 522-3200
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Tucker, HL Tel (202) 426-0090

Contract DOT-UT-10007
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: June 1971 COMPLETION DATE: July 1979 TOTAL FUNDS: \$45,700,000
 ACKNOWLEDGMENT: UMTA (IT-06-0026)

03 046502

RAILWAY 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. When an adequate mathematical model is developed to predict the temperature influenced stresses in a car wheel, these stresses will be superimposed on the stresses developed by the railroad. These results should lead to a better understanding of the various types of failures experienced in service.

PERFORMING AGENCY: Illinois University, Urbana, Department of Theoretical and Applied Mechanics
 INVESTIGATOR: Wetenkamp, HR
 SPONSORING AGENCY: Griffin Wheel Company

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: July 1976
 ACKNOWLEDGMENT: Science Information Exchange (JGF 29)

03 050338

STEERING TYPE RAIL CAR TRUCK DEVELOPMENT

Develop rail car trucks with superior tracking characteristics and ride quality. Freight Car Trucks-DR-1 Steering Assembly for retrofitting conventional 70 & 100-Ton three-piece freight car trucks--to add steering and high speed stability. Multiple units now being manufactured by Dofasco in Canada, and Dresser in the U.S. AAR Certification has been received for these units. DR-2 to be developed in 1979 & 1980, by some manufacturers. These units will be much like a conventional three-piece freight car truck, but with the addition of steering, positive aligned braking, improved ride quality, and high speed stability. Passenger-Transit Car Trucks-Light rail vehicle trucks to be developed by The Budd Company--starting with a retrofit version of the PCC car truck. Heavy rail and passenger truck also to be developed during 1979 & 1980.

REFERENCES:
 An Evaluation of Recent Developments in Rail Car Truck Design, List, HA, ASME #71-RR-1, Apr. 1971, RRIS #050340 in 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

The DR-1 Radial Truck, A Significant Advance in Freight Car Truck Technology, DOT Engineering Conference, Pueblo, Colorado, Oct. 1977

Performance Analysis & Testing of a Conventional Three-Piece Freight Car Truck Retrofitted to Provide Axle Steering, Marcotte, P; Caldwell, WN; List, HA, Winter Annual Meeting ASME, Dec. 1978

PERFORMING AGENCY: Railway Engineering Associates, Incorporated; Canadian National Railways; Dresser Transportation Equipment Division; Dominion Foundries and Steel, Limited; Budd Company
 SPONSORING AGENCY: Railway Engineering Associates, Incorporated; Canadian National Railways; Dresser Transportation Equipment Division; Dominion Foundries and Steel, Limited; Budd Company

RESPONSIBLE INDIVIDUAL: List, HA Cope, GW Bexon, HJ Marvin, R

In-House
 STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1971 COMPLETION DATE: 1980

ACKNOWLEDGMENT: Railway Engineering Associates, Incorporated, Dresser Transportation Equipment Division, Dominion Foundries and Steel, Limited

03 055916

IMPROVEMENT OF RAILROAD ROLLER BEARING CERTIFICATION TEST PROCEDURES AND DEVELOPMENT OF ROLLER BEARING DIAGNOSTICS

The problem of railroad roller bearing failure shall be reviewed giving consideration at a minimum to the effects of the following factors: 1. over and under lubrication. 2. loose bearing components (i.e. cap screws, seals, backing rings). 3. bearing component design. 4. adaptor condition. 5. rebuild procedures. 6. environment (speed, load, temperature). The interaction of factors leading sequentially to different modes of failure should be clearly established. An analytical model of the bearing may be useful in assessing the importance of interaction between these factors leading to bearing failure. Under a modification to the contract concepts for railroad roller bearing detection systems are to be evaluated. These systems are: 1. On-board Thermally Powered Transmitter Bolt; 2. Pulse Echo Ultrasonic Lubrication Detector, and 3. Shock Pulse Damage Detector.

A Final Report is in preparation.

REFERENCES:

Prevention of Roller Bearing-Initiated Burnoffs in Railroad Freight Car Journals, Final Rpt., FRA/ORD-78-16

PERFORMING AGENCY: SKF Industries, Incorporated
 INVESTIGATOR: Allen, G Tel (215) 265-1900
 SPONSORING AGENCY: Transportation Systems Center, RR-523
 RESPONSIBLE INDIVIDUAL: Thompson, W, III Tel (617) 494-2511

Contract DOT-TSC-935 (CPFF)
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Oct. 1974 COMPLETION DATE: May 1979 TOTAL FUNDS: \$113,885
 ACKNOWLEDGMENT: TRAIS (RR-523)

03 059420

PERFORMANCE EVALUATION OF LIGHTWEIGHT INTERMODAL FLAT CARS

Measurement of ride vibration and wear characteristics of one experimental lightweight skeleton TOFC and one COFC flat car in addition to standard TTAX car. Program included 150,000 miles of revenue service with periodic measurements of ride vibration and wear.

Co-sponsored by an industry group including the Trailer-Train Company, Pullman-Standard Division, National Castings Division of Midland Ross, American Steel Foundries Company, and the Santa Fe Railway.

PERFORMING AGENCY: Atchison, Topeka and Santa Fe Railway; ENSCO, Incorporated
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Blanchfield, JR Federal Railroad Administration Tel (202)426-0808

Contract DOT-FR-65218
 STATUS: Completed NOTICE DATE: Sept. 1979 START DATE: Aug. 1976 TOTAL FUNDS: \$750,000

ACKNOWLEDGMENT: TRAIS

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. With service testing nearly complete, attention is now being given to laboratory tests required for recommendations for purchase and acceptance specifications. Fatigue and fracture toughness characteristics of steels used in couplers and the stress levels in the components must be determined. Agreement has been given to merge this project into Phase II of the Track-Train Dynamics Project, Task 5. All of the objectives of the Coupler Safety Project will be retained.

PERFORMING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute

INVESTIGATOR: Morella, NA Tel (216) 229-3400

SPONSORING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute

RESPONSIBLE INDIVIDUAL: Morella, NA Tel (216) 229-3400

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1972

ACKNOWLEDGMENT: AAR

03 081787

RAILROAD TRUCK SAFETY RESEARCH AND TEST PROJECT

This project has the objective of developing guidelines for new specifications for truck bolsters and side frames to meet the increasingly strenuous demands of rail freight transportation. Earlier road service environmental tests to measure loads/stresses to which components are subjected under all types of operating conditions were further broadened into higher speed ranges in late 1977 to 1978. IITRI reduction and analysis of recorded data has been translated to methods of laboratory bolster dynamic tests. Initial lab tests of 1975 through 1978 were conducted at the testing laboratories of American Steel Foundries and Dresser Transportation Equipment Division. An additional fatigue testing program was started in December 1978, and continues at the AAR Technical Center. This lengthy schedule is intended to broaden the experience base and to validate proposed guidelines for an interim bolster fatigue test specification. Such guidelines have been submitted to the responsible review bodies, for future inclusion in AAR specification requirements.

PERFORMING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute

INVESTIGATOR: Evans, RA Tel (312)567-3598

SPONSORING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute

RESPONSIBLE INDIVIDUAL: Evans, RA Tel (312)567-3598

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1973 TOTAL FUNDS: \$250,000

ACKNOWLEDGMENT: AAR

03 081798

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 3--TRUCKS AND SUSPENSION

Overall task objectives are the development of recommended performance specifications and test specifications for conventional three piece trucks. Specifications will be developed through a comprehensive research project built upon the RPI-AAR Railroad Truck Safety Research and Test Project and utilizing dynamic simulation computer models developed in Phase I of the Track Train Dynamics Program. Test specification development will involve determination of service loading and development of techniques necessary for predicting failure under dynamic loads. Task will also involve developing capability to fatigue test truck components. Field testing will include validation of the truck stability model developed by Clemson University and Arizona State University in conjunction with FRA and the TTD program. The model evaluates dynamic stability of a truck under a wide variety of service conditions and validation will enable it to be used in the study of phenomena such as truck hunting. The Harmonic Roll Series computer programs have been used to show how suspension characteristics could be matched with the vehicle to alleviate problems related to rock and roll and harmonic bounce.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Bulloch, R

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1975 COMPLETION DATE: Mar. 1979

ACKNOWLEDGMENT: AAR

03 081800

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS--PHASE II. TASK 4--CAR STRUCTURES

Task objective is the development of recommended performance specifications and design guidelines for railroad freight car structures. Method will involve development of suitable fatigue analysis approach coupled with evaluation of advanced structural analysis methods. Task will include establishing test program goals for environmental loading tests to be pursued during the program. Test plans will be developed and tests conducted to validate fatigue analysis methods for car structural components. The basic approach adopted is a cumulative damage approach using the methodology which has been used in the aerospace and heavy-equipment industries. Development of interim guidelines using this methodology and presently available load spectrum and material fatigue performance was made available to TTD by ACF Industries. Further work in fatigue methodology and acquisition of additional load spectra from environmental sampling is progressing.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Zarembski, AM Tel (312) 567-3622

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1975 COMPLETION DATE: Mar. 1979

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: Punwani, SK Tel (312) 567-3601

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1975 COMPLETION DATE: Mar. 1979

ACKNOWLEDGMENT: AAR

03 099382

WHEEL RESEARCH PROGRAM

It is the objective of this program to prevent the formation of cracks in various wheel locations which can occur because of various conditions and can ultimately result in catastrophic failure. The initial step was a full review of wheel failure statistics to isolate wheel contours generating the most frequent failures. The problem is to be alleviated by considering changes in wheel design and wheel material, with emphasis on design. Finite element analysis is conducted on each characteristic shape of wheel involving stress due to tread loading, lateral loading and to thermal inputs resulting from drag or emergency braking. Such analysis would be followed by service or dynamometer tests to verify results. The initial phase of this involved the 28-inch wheel and was a joint project with Trailer Train Co. It involved cracked wheel plates and shattered rims, and indicated some solutions which

would be generally applicable. In addition to the loading problems, research is being conducted to define problems associated with overheated wheels. It was initially found that criteria for rejecting such wheels were overly restrictive. Non-destructive residual stress measurement techniques, such as the Barkhausen method, are being evaluated for detecting thermally damaged wheels. The thermal fatigue behavior of wheel steels is also being investigated. Detection of rim thermal cracks, utilizing ultrasonic techniques like those used in AAR's rail test program, are also proceeding.

PERFORMING AGENCY: Association of American Railroads Technical Center

SPONSORING AGENCY: Association of American Railroads

STATUS: Active NOTICE DATE: Aug. 1976

ACKNOWLEDGMENT: AAR

03 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 have been completed and a report has been published. The tests included impact testing of several bottom outlet configurations and protective skid proposals. The objectives are to develop design parameters for bottom fittings breakage grooves and protective skids. Through accident data analysis, a review of the vulnerability of appurtenances is continuing.

PERFORMING AGENCY: Association of American Railroads Technical Center

SPONSORING AGENCY: Association of American Railroads; Railway Progress Institute

RESPONSIBLE INDIVIDUAL: Phillips, EA Tel (312) 567-3607

STATUS: Active NOTICE DATE: Aug. 1979

ACKNOWLEDGMENT: AAR

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) & 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: O'Steen, JK

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

IA. AR54162

STATUS: Active NOTICE DATE: Sept. 1979

ACKNOWLEDGMENT: FRA

03 136342

DESIGN OF AN ADVANCED CONCEPT TRAIN

Description: The object of this project is to demonstrate new concepts for the subway and commuter rail car industry. These concepts will reduce life cycle costs; increase passenger appeal; and reduce the impact on the environment. Two vehicles are being built for test and evaluation at TTC. The methods for reducing life cycle costs are: 1. An efficient propulsion system which stores the vehicle braking energy in a flywheel to be used later to accelerate the vehicle. All accessories are shaft driven from this flywheel. 2. Reliability-Designing for reliability and designing parts out of the vehicle.

3. Designing more maintainable equipment. 4. Reducing operating personnel by automaticity and closed circuit T.V. monitors. 5. Reducing track wear thru a better slip-slid control and better ride quality. Less environmental impact thru: 1. Reduced noise using composite wheels. 2. Less thermal emission since the braking energy is stored as rotational energy interferences due to advanced propulsion design.

PERFORMING AGENCY: AiResearch Manufacturing Company; Boeing Vertol Company

INVESTIGATOR: O'Brien, T

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Tucker, HL Tel (202) 426-0090

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Mar. 1972 COMPLETION DATE: Feb. 1979

03 138537

GAS TURBINE-ELECTRIC (GT-E) COMMUTER CARS

The objective is to develop advanced dual powered commuter cars capable of gas turbine or electric propulsion which is equivalent to all-electric car performance, and can provide a no-change ride to suburbs beyond electrified territory. Four GT/E cars were built by General Electric and four by Garrett AiResearch. Two Garrett cars were tested briefly at the DOT Transportation Test Center, Pueblo, Colo. All eight cars were tested in non-revenue service beginning in 1975 on the Long Island Rail Road, and entered revenue service in 1976 for a 12 month evaluation period.

Subcontractors are Garrett AiResearch and General Electric Company and Louis T. Klauder and Associates.

PERFORMING AGENCY: Metropolitan Transportation Authority (New York), NY-06-0005

SPONSORING AGENCY: Urban Mass Transportation Administration; Metropolitan Transportation Authority (New York)

RESPONSIBLE INDIVIDUAL: Mora, J Tel (202) 426-0090

Contract DOT-UT-613

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1971 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$14,800,000

ACKNOWLEDGMENT: UMTA

03 138539

ADVANCED SUBSYSTEMS DEVELOPMENT PROGRAM (ASDP)

The objective of this investigation, a part of the Urban Rapid Rail Vehicle Systems Program, is to achieve transit vehicles that are as reliable, safe and economical as possible, choosing subsystems which reduce the cost of operation and maintenance, reduce energy requirements and/or improve safety, comfort and performance. The components chosen for detailed development are the self-synchronous a-c traction motor, the monomotor truck with active suspension and the synchronous spin-slide control braking system with improved emergency stopping capability.

Subcontractors are Delco Electronics, Budd Company and Westinghouse Air Brake Division.

PERFORMING AGENCY: Boeing Vertol Company

INVESTIGATOR: O'Brien, T

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Tucker, HL Tel (202) 426-0090

Contract DOT-UT-10007

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Dec. 1976 COMPLETION DATE: Jan. 1980 TOTAL FUNDS: \$8,650,000

ACKNOWLEDGMENT: UMTA

03 138559

VEHICLE INSPECTION

Provides surveillance and non-destructive inspection of both vehicle and components. Directs and monitors government and contractor development and evaluation efforts in the areas of automated vehicle on-board surveillance, wayside inspection, and non-destructive inspection of components. Provides for the design and fabrication of transducer, computerized data collection and automated detection systems.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Winn, JB Tel (202) 426-1682

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: Oct. 1976

ACKNOWLEDGMENT: FRA

03 138565

ROLLING STOCK SAFETY

The goal of the Rolling Stock Safety Program is to improve railroad safety through the development of (a) performance criteria for vehicles and vehicle components which are less prone to failures, (b) techniques and mechanics for predicting, detecting, and reacting to the failures which do occur, and (c) concepts to increase the accident survivability of vehicle occupants. Work is being undertaken concerning locomotives, hazardous material tank cars, component failure prevention, and track-train dynamics.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

STATUS: Active NOTICE DATE: Aug. 1977 START DATE: July 1976

ACKNOWLEDGMENT: FRA

03 138796

RADIAL-AXLE FREIGHT CAR TRUCKS

Under an agreement with South African Inventions Development Corp. a radial truck has been developed based on Scheffel principles for use in North America. Limited production samples are now in service.

REFERENCES:

Self-Steering Wheelsets Will Reduce Wear and Permit Higher Speeds., Scheffel, H, Railway Gazette International, Vol. 132 No. 12, 453-456 pp, Dec. 1976

PERFORMING AGENCY: Standard Car Truck Company, Proj. No. 30000

INVESTIGATOR: Bullock, RL Tel (312) 427-1466

SPONSORING AGENCY: Standard Car Truck Company

In-House

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Oct. 1973 COMPLETION DATE: Dec. 1978

03 148336

EVALUATION OF PROTOTYPE HOPPER-BOTTOMS BOXCARS FOR RAILROAD TRANSPORTATION OF GRAINS AND SOYBEANS

Evaluate in the railroad operating and in the physical distribution system environments for bulk agricultural and various types of packaged agricultural and non-agricultural products two prototype hopper-bottom boxcars as a potential method for reducing the seasonal car shortages and costs of transporting grains and soybeans. Two prototype hopper-bottom boxcars will be placed in shuttle service on the Milwaukee Railroad. The service environments designed to exploit their potential will be determined by computer analysis of traffic flow patterns on the railroad. Revenue ton miles of both bulk and packaged shipments in relation to total car mileage and total car days will be determined for the prototype and for conventional box and covered-hopper cars transporting the same quantities of the same products. The performance levels and engineering design characteristics of both prototypes will be evaluated. Costs, advantages, and disadvantages of using the cars will be determined. Engineering design parameters for improving the cars and their performance will be developed. A total of 22 experimental shipments were made in the two prototype cars brought into the United States from Canada for evaluation. Shipments consisted of barley corn and wheat in bulk, and tissue paper, beer, and lumber. The tests disclosed that the side doors need to be redesigned and strengthened. It was observed that the bulk materials could be loaded into and unloaded from the cars with about the same degree of efficiency as when conventional covered hopper cars are used. Packaged and palletized products also could be handled well in both cars. The cars were found to be too small to obtain satisfactory payloads for both bulk and packaged products. It also was found that the cars needed to be redesigned to reduce their tare weights. Performance and cost data developed in the tests are being evaluated.

PERFORMING AGENCY: Chicago, Milwaukee, St. Paul and Pacific Railroad

INVESTIGATOR: Galiher, RD Breakiron, PL

SPONSORING AGENCY: Agricultural Research Service, Department of Agriculture; Chicago, Milwaukee, St. Paul and Pacific Railroad

RESPONSIBLE INDIVIDUAL: Breakiron, PL

STATUS: Completed NOTICE DATE: July 1979 START DATE: Sept. 1976 COMPLETION DATE: Sept. 1978 TOTAL FUNDS: \$60,000

ACKNOWLEDGMENT: Department of Agriculture, Current Research Information Service (CRIS-0043369)

03 159630

FREIGHT CAR UTILIZATION RESEARCH PROGRAM-PHASE II, TASK 6. UTILIZATION IMPACTS OF FREIGHT CAR DESIGN AND SERVICEABILITY

Evaluate the relationships between serviceability and freight car utilization. Analyze utilization costs associated with car purchase decisions based on initial purchase price alone. Standardization of car design will be investigated. Evaluate the utilization costs related to the rejecting of cars by shippers including the costs and benefits of different strategies to reduce the number of expected bad-order cars. Conduct a study to quantify the benefits of cooperative repair programs by individual railroads.

PERFORMING AGENCY: Association of American Railroads

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 426-2608
Wooden, DG Tel (202) 293-4165

92500

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: July 1977 COMPLETION DATE: Sept. 1977 TOTAL FUNDS: \$92,500

ACKNOWLEDGMENT: AAR

03 160405

IMPROVED PASSENGER EQUIPMENT EVALUATION PROGRAM

The objectives of this program are to evaluate new passenger train systems and equipment now under development throughout the world, to develop standard methods and techniques for the evaluation of passenger train equipment, and to develop specifications for passenger train equipment.

REFERENCES:

Improved Passenger Equipment Evaluation Program Technology Review. Semiannual Report, Dow, AL, Unified Industries, Inc.; Federal Railroad Administration, FRA/ORD-77/74, 32 pp., Oct. 1977, PB-277264/AS

Improved Passenger Equipment Evaluation Program Technology Review. Second Semiannual Report, De Villiers, AL, Unified Industries, Inc.; Federal Railroad Administration, FRA/ORD-78/38, May 1978, PB-283659/AS

PERFORMING AGENCY: Unified Industries, Incorporated/SBA

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Lampros, AF Tel (202) 426-9564

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1977 COMPLETION DATE: Apr. 1980 TOTAL FUNDS: \$2,677,428

ACKNOWLEDGMENT: TRAIS

03 165811

RAILCAR STANDARDIZATION--PHASE II

The broad objectives of UMTA's Railcar Standardization program are to reduce or stabilize railcar initial and life cycle costs, reduce maintenance costs, increase fleet availability and permit evolutionary technology improvements. The contractor will perform a series of tasks including one requiring the development of a minimum number of car performance and dimensional specifications which collectively bracket future transit industry requirements.

REFERENCES:

Determination of The Optimal Approach to Rail Rapid Transit Car Standardization, Morris, R, Available at NTIS, UMTA-IT-06-0131-76-1 131 pp, 1976, PB-259-363

PERFORMING AGENCY: Decision Group, IT-06-0175

INVESTIGATOR: Morris, RE Tel (703) 827-0227

SPONSORING AGENCY: Urban Mass Transportation Administration, Office of Technology Development and Deployment

RESPONSIBLE INDIVIDUAL: Mora, J Tel (202) 426-0090

Contract DOT-UT-70043

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1977 COMPLETION DATE: Nov. 1979 TOTAL FUNDS: \$1,000,000

ACKNOWLEDGMENT: UMTA

03 170601

RAIL CAR STANDARDIZATION, PHASE II

APTA will provide industry input, advice and consensus to UMTA contractor in their work in developing the standard rapid rail transit car specification.

PERFORMING AGENCY: American Public Transit Association
 SPONSORING AGENCY: Urban Mass Transportation Administration

Contract DOT-UT-60004
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: May 1976
 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$140,000

ACKNOWLEDGMENT: American Public Transit Association

03 170604
URBAN RAPID RAIL VEHICLES AND SYSTEMS PROGRAM
PHASE IV

The Urban Rapid Rail Vehicles & Systems (URRVS) Program includes two parallel efforts. One activity is directed towards completion of the Advanced Concept Train (ACT) and the other activity supports the Advanced Subsystem Development Program (ASDP).

PERFORMING AGENCY: American Public Transit Association
 SPONSORING AGENCY: Urban Mass Transportation Administration

Contract DOT-UT-60060
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: May 1977
 COMPLETION DATE: June 1980 TOTAL FUNDS: \$389,309

ACKNOWLEDGMENT: American Public Transit Association

03 170608
ENGINEERING DATA FOR CHARACTERIZATION OF
RAILWAY ROLLING STOCK AND REPRESENTATIVE LOADINGS
AND WHEEL PROFILES

This contract will provide engineering data to characterize the fleet of U.S. railway rolling stock, representative loadings and wheel profiles, for the range of freight, passenger and locomotive vehicles in current use or proposed for use in the near future. This data is intended primarily for use in parametric studies of rail vehicle/track system dynamic interactions, and may also be useful to freight systems studies. The efforts of the contractor are expected to result in 1. A characterization of the U.S. freight vehicle fleet in terms of a moderate number of dimensionally similar vehicle categories and reduced number of generic vehicle families expected to have similar dynamic response characteristics; 2. Definition of major categories of locomotives and passenger vehicles; 3. Definition of truck configurations, coupler and representative loading data 4. Engineering parameter descriptions for the above items 5. Population data on major freight, passenger and locomotive groups 6. Descriptions of representative in-service wheel profiles for freight vehicles.

PERFORMING AGENCY: Pullman-Standard Car Manufacturing Company, Champ Carry Technical Center
 INVESTIGATOR: Johnstone, B Przybylinski, P
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Di Masi, FP Tel (617) 494-2210

Contract DOT-TSC-1362
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: June 1977
 COMPLETION DATE: Aug. 1979

ACKNOWLEDGMENT: FRA

03 170617
PERFORMANCE LIMITS OF RAIL PASSENGER VEHICLES

The objective of this research is to identify the dynamic performance capability of conventional and innovative passenger truck designs. As a part of this objective, the best performance capability of generic optimum passive passenger trucks, employing conventional wheel-sets, will be established so that specific truck designs may be compared against the general optimum design. The research consists of defining, in an engineering sense, the performance boundaries (handling, curving, derailment, ride quality, wheel-track force levels, etc.) of current and proposed passenger truck configurations. This work will compare the performance of conventional passenger trucks, optimized conventional trucks and new truck designs (e.g. the radial truck), to determine the performance limits of each class of passenger trucks.

PERFORMING AGENCY: Massachusetts Institute of Technology, Department of Mechanical Engineering
 INVESTIGATOR: Hedrick, JK Wormley, DN Richardson, HH
 SPONSORING AGENCY: Department of Transportation, Office of University Research, Res & Special Program Admin
 RESPONSIBLE INDIVIDUAL: Ravera, RJ Tel (202) 426-0190

Contract DOT-OS-70052
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1977
 COMPLETION DATE: Sept. 1980 TOTAL FUNDS: \$235,800

ACKNOWLEDGMENT: DOT

03 170630
WHEELSETS WITH ASSEMBLED AXLEBOXES: DESIGN,
MAINTENANCE AND STANDARDISATION

Standardization of wheelsets with assembled journal bearings. Maintenance recommendations. Standardization of axles. Comparison of calculation methods. Comparative study of various types of roller bearings. Study of current flow through roller bearings. Fixation of brake discs on small wheels. Present state; (1) Standardisation of wheelsets with assembled journal bearings: a. Field tests on wheels of 920 mm Ø will be continued up to end of 1977. b. Tests on wheels of 1,000 mm Ø according to B 136/RP 2 have been commenced. c. Studies and tests for wheelsets fitted with small wheels are being carried out. Standardisation of axleshafts and fixation of brake discs on small wheels will also be dealt with here. (2) Establishment of a calculation method applicable to future standard wheelsets and recognised by the Member Administrations. The first interim report B 136/RP 3 was approved on October 1976. A full report B 136/RP 6 will be presented in April 1978. (3) Studies of maintenance methods for wheelsets with assembled axleboxes used by the different Administrations; report B 136/RP 7, October 1978. (4) Study of current flow phenomena. Inquiry results being evaluated; Report in April 1979. (5) Study of standardization of dimensions of roller bearings is being made with an inquiry (April 1978). Six reports have been published to date. Question B136.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Minkes, S Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1973
 COMPLETION DATE: 1979

ACKNOWLEDGMENT: UIC

03 170638
STANDARDISATION OF AIR-CONDITIONING AND HEATING
INSTALLATIONS

With the delivery of the Eurofima prototype standard passenger coaches the B 107 Committee has been given an opportunity to study, in conjunction with the B 108 Committee, different air-conditioning systems (single and twin duct systems) installed in virtually identical coaches. Relevant measurements were taken in accordance with a test programme worked out by a joint group of the two Committees B 107 and B 108, the tests being carried out at the Vienna Arsenal Climatic Chambers. The results of these tests are described in the report B 107/RP 4 of October 1975. Further studies concern the interchangeability of given parts of air-conditioning systems and the improvement of the air distribution in the compartments.

Four reports have been published to date. Project B107.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Hoppe, S Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1970

ACKNOWLEDGMENT: UIC

03 170639
CONDITIONS WHICH SHOULD BE COMPLIED WITH BY
WAGON COMPONENTS FOR 22 T AXLE LOAD

Study concerning the adaptation of the present cars to an axle load raised from 20 to 22 t. Theoretical and tentative analysis of the structural elements of the car liable to affect directly the operational reliability and fatigue strength at increased axle loads. In the spring and summer of 1976, measurements were made on some test wagons at the PKP. In December 1976, a test train was subjected to fatigue tests on the test loop at Velim (in cooperation with the D141 Committee). At the beginning of May, the distance run by the test train was estimated at 20,000 Km (1st series with an axle load of 22 tons). Question B142.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Jutard, M Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1976

ACKNOWLEDGMENT: UIC

03 170641

ELASTIC SYSTEMS FOR TRACTION AND SHOCK GEAR (SIDE BUFFERS AND CENTRE BUFFERS)

Research, comparison and development of elastic systems for current and future traction and shock systems. Devices to protect the load (long-stroke shock absorbing systems, other means); preparation of leaflets for elastic systems and long-stroke shock absorbing systems. Acceptance testing of spring systems. Comparative tests with representative specimens of the five families of elastic systems have been concluded. All the results have been summarised in a report (RP 14). A joint leaflet has been prepared which will also include the special conditions for the friction cone, hydrodynamic compression and hydrostatic compression families of elastomers (from reports B 36/RP 12 and 13). The acceptance procedure for elastic elements has been initiated; the "ring spring types B 412B" (RP 16) and "B 412A" (RP 17) have been accepted; acceptance of types Jarret DC 13, Rheinmetall 129-11U and Sagem 12054 is in progress. Testing of load protecting devices (so far dealt with in reports No. 10, 11 and 15) is still to be completed. A leaflet for long-stroke shock absorbing systems has been prepared (RP 18). A joint UIC/OSJD leaflet is being prepared for an elastic system for passenger coaches (all elastic elements between two coupled coaches). Theoretical calculations are in progress for elastic systems dependent on speed.

Eighteen reports have been published to date. Question B36.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Lage, HH Office for Research and Experiments
 STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1959
 ACKNOWLEDGMENT: UIC

03 170643

TESTS ON AUTOMATIC COUPLING

Work has continued to perfect the automatic coupler for wagons, chiefly regarding the interchangeability of various sub-assemblies and the design of the operating components. The engineering work on the automatic coupler for wagons has been completed in time. The revised complete set of drawings for the production of the automatic coupler is available. A rather large number of these couplers are already in use in trains on scheduled services to gather more findings on the wear characteristics and maintenance conditions. In this connection, trains with a total mass of about 5400 tonnes are also being equipped for ore traffic; they were placed in operation early in November 1976. Tests in progress on revenue earning services on the system of various administrations which, in to some extent difficult operating and climatic conditions, are being made with trains of a total mass of up to 5000 tonnes and fitted with couplers of the 1969 type will be continued. Studies covering the final design of the automatic coupler for passenger coaches have been completed. Some details of this coupler vary from that for wagons to do justice to the special conditions of a modern passenger coach; direct coupling with the automatic coupler for wagons is ensured. The first couplers will be supplied during the period ending 1977/beginning 1978. Preliminary tests will then be carried out immediately. The Specialists Committee is taking part in a large number of other studies: devices on the head stocks of wagons, installation drawings and automation questions connected with the automatic coupler.

Twenty reports have been published to date. Question B51.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Lang, M Office for Research and Experiments
 STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1968
 ACKNOWLEDGMENT: UIC

03 170646

STANDARDISATION OF PASSENGER CARS

Inquiry report B 106/RP 1 "Design of passenger accommodation" was presented in October 1971. In conformity with the decision of the 79th meeting of the ORE Control Committee in April 1977, application will be made to UIC to include question S 2031 "Permissible stresses on internal and external parts of passenger coaches" in the B 106 programme of work. Setting up a Specialist Committee B106 had been deferred until the bases for producing a program of work have been provided.

One report has been published to date. Question B106.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Lage, HH Office for Research and Experiments
 STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1970
 ACKNOWLEDGMENT: UIC

03 170647

UNIFICATION OF ELECTRICAL EQUIPMENT FOR PASSENGER COACHES

Standardization of given electrical equipment of passenger coaches such as batteries, lighting, switch boards and instrument cabinets, remote control system for lighting and doors. In connection with the air-conditioning test being carried out by the B 107 Committee, the B 108 Committee is testing power supply systems in the same coaches. These tests cover several (380 V three-phase a.c., 50 Hz and 1000 V d.c.) with rotary transformer as well as systems with a static converter. The results of these tests were published in report B 108/RP 3. Further studies will serve to standardise the electrical equipment of passenger coaches, such as relays, safety fuses, lighting, batteries.

Three reports have been published to date. Project B108.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Hoppe, S Office for Research and Experiments
 STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1973
 ACKNOWLEDGMENT: UIC

03 170654

MODERN SUSPENSION SYSTEMS FOR TWO-AXLED WAGONS

The Specialists Committee made extensive strength and running tests with several selected solutions for existing suspension designs, which were assessed according to specified criteria and, taking as a basis the results of the studies and the tests, presented in April 1976, a proposal for a vertical type of progressive suspension system for two-axled wagons in service (B 13 4/RP 1). Operating tests concerning these solutions, and also studies regarding the profitability and suitability of this wagon for taking an axleload of 22 t, will be continued with a view to preparing a standard solution proposal. Completion of this work is expected in 1977. In addition, studies with newly developed progressive suspension systems for future two-axled wagons were initiated.

One report issued to date. Project B134.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Jutte, H Office for Research and Experiments
 STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1975 COMPLETION DATE: 1977
 ACKNOWLEDGMENT: UIC

03 170658

NON-POLLUTING SANITARY INSTALLATIONS

In view of the doubts existing among passengers and authorities concerning the hygienic conditions of toilet systems installed in railway coaches (as a result of which several Administrations have already tested new solutions and suggested possible improvements) an examination is being made of the present position and of possible improvements. The differences in purchasing and maintenance costs for different variants of non-polluting toilets have also been established. The inquiry report B 140/RP 1, was approved by the Control Committee in October 1975. In accordance with the suggestions of the report, the rapporteur was asked to continue his work of observing the tests being made by the different administrations and to prepare a new report within two years. The second enquiry report was approved in October 1977. A Specialists Committee which presented its programme of work and Action Sheet to the Control Committee in October 1977 has meanwhile been set up.

Two reports have been published to date. Question B140.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Minkes, S Office for Research and Experiments
 STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1974
 ACKNOWLEDGMENT: UIC

03 170659

NON-DESTRUCTIVE EXAMINATION PROCEDURES

The E 139 Committee is studying the standardisation of non-destructive examination procedures for the acceptance testing of running gear at the works. It has initiated its studies by ultrasonic tests in the laboratory on axles; the results are now being evaluated; magnetoscopic tests are in progress. Ultrasonic tests on wheel tyres and solid wheels, which had been collected on various railways were made. A Working Group is preparing a list of expressions used in ultrasonic and magnetoscopic examinations. The E 139 Enlarged Committee, with the participation of representatives from 8 suppliers as Invited Specialists, had been set-up and had held its first meeting.

Question E139.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Minkes, S Office for Research and Experiments
 STATUS: Active NOTICE DATE: Aug. 1978
 ACKNOWLEDGMENT: UIC

03 170665

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS: PHASE III. TASK 4--FUTURE SYSTEM STUDIES

This task will evaluate critically future rail systems options, needs and proposed advanced-concept proposals in order to assess their potential for safe, cost-effective operation to provide direction and priorities for developments of the second stage of Phase III. The subtasks: (4.1) Compile a list of present and future test facilities and match these with future TTD requirements; (4.2) Investigate problem areas in current braking systems, including use of pneumatic system simulation models; (4.3) Survey the scope of options for development of hardware systems from a standpoint of future market opportunities and constraints; (4.4) Explore the engineering economics of car size and include the wheel-load/rail-wear relationships; (4.5) Catalog and evaluate currently proposed advanced concepts and development efforts for couplers, brakes, trucks and other components.

PERFORMING AGENCY: Association of American Railroads Technical Center
 INVESTIGATOR: Punwani, SK Tel (312) 567-3601 Sammon, JP Tel (202) 293-4027
 SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre
 RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1978 COMPLETION DATE: 1980
 ACKNOWLEDGMENT: AAR

03 172456

STANDARDISATION OF WAGONS

Standardization of freight cars (vehicles, subassemblies and parts) is being achieved in accordance with decisions of the Joint Meeting of the 4th/5th Committees of UIC--Operating and Rolling Stock and Motive Power. Test specifications and test programs are being developed. Plans are also made for adaption of operating rolling stock to receive the automatic coupler. Designs of eight types of cars, including three for transporting containers, have been completed with drawings. The ninth and tenth types to be standardized will be complete in 1978, an eleventh in 1979 and work on the 12th type is being undertaken. Standardization of car components is also progressing. To date a welded car truck, a cross gangway and 20-ft ISO container have been completed. Work on two other truck designs is to be concluded in 1978. Preliminary work on car ends and on the mechanical components of the brake system is also proceeding. Test programs are being developed; current attention is directed at leaf springs, fatigue strength of cars and buffing test conditions.

Twenty seven reports have been published to date. Project B12. An extended edition of report B12/RP17 has been published.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Jutte, H Office for Research and Experiments
 STATUS: Active NOTICE DATE: Aug. 1978
 ACKNOWLEDGMENT: UIC

03 179688

IMPROVED AIR DELIVERY SYSTEMS FOR MECHANICALLY REFRIGERATED RAILCARS

Determine feasibility of through-the-load air circulation in railcars, effect of heavier loading on cooling rates and fruit quality. Determine type, size, and location of vent holes in boxes and slipsheets required for improved air circulation in tightly-stacked unitized loads. Stationary tests will be conducted to determine which of three air distribution systems and stacking patterns will give more rapid and uniform cooling of fruit. Paired shipping tests with citrus will then be made from California to eastern markets in conventional and modified railcars with the experimental systems. Condition of shipping container and product in a solid-stacked, in-register, and conventional pattern will be compared. Refrigeration equipment perfor-

mance, cooling rates, and condition of product will be monitored in transit and evaluated. Costs of handling equipment, materials, and labor will be obtained to determine potential savings from unitized and palletized handling compared with conventional handling of individual boxes.

PERFORMING AGENCY: Agricultural Marketing Research Institute, Transportation and Packaging Research Laboratory, 1104-20614-008
 INVESTIGATOR: Kindya, WG
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Feb. 1978 COMPLETION DATE: Feb. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0044323)

03 179689

CONTAINER SYSTEM FOR GRAIN

Develop a concept for a container system for the handling, storage, and transportation of grain. Develop the basic configuration, characteristics, and technique of operation for all major elements of the system including the container, container fabricating equipment, container filler, handling equipment, storage facility, and highway, railroad, and ocean transport vehicles. The end product of this work unit is to be a concept report setting forth working drawings, description of operation, and preliminary projected cost comparison with the present system. A study was made of a river terminal grain storage elevator in Kansas City for the purpose of developing a description of the basic equipment and sequence of flow of grain in a typical terminal elevator. Data developed in the study will be published in a report describing the present system of handling, transportation, and storage involved in moving grain from the farm to the processor in the United States and overseas. Since there is presently no substantive literature describing the present system, identifying its main characteristics and problems, it was decided to develop information for such a report as a necessary first step in the research to determine the feasibility of a containerized storage, transport, and handling system for grain.

PERFORMING AGENCY: Agricultural Marketing Research Institute, Transportation and Packaging Research Laboratory, 1104-20614-006
 INVESTIGATOR: Guilfooy, RF, Jr
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1977 COMPLETION DATE: July 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0043920)

03 185234

PLAN AND ESTABLISH A TRANSPORTATION EQUIPMENT RELIABILITY PROGRAM

TRIP is a government-initiated response to an acknowledged need to collect and analyze national transit equipment reliability information. The information generated will be disseminated to the transit operating industry, equipment suppliers, and federal organizations in order to define reliability problem areas, evaluate improvements, upgrade maintenance, improve equipment service and reduce cost. TRIP will cover rail vehicle reliability data and consists of two phases: Phase I covers the planning, designing, and testing of a small scale transit reliability data bank for a select group of rail vehicle components. Phase II is the establishment and operation of a full scale railcar reliability data bank.

PERFORMING AGENCY: Dynamics Research Corporation
 INVESTIGATOR: Limpert, SB Tel (617) 658-6100 Silvia, PJ
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Robichaud, RH Tel (617) 494-2302

Contract DOT-TSC-1559

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: July 1980 TOTAL FUNDS: \$411,943

ACKNOWLEDGMENT: Dynamics Research Corporation

03 188652

TRANSIT RELIABILITY INFORMATION PROGRAM (TRIP)

APTA will provide transit industry input, advise, and consensus to U.S. DOT-TSC and its contractor in their work to increase the operational reliability of transit equipment. Initial effort of TRIP is to develop an

Experimental Data Bank (EDB) for analyzing reliability of selected components used on Heavy Rail Rapid Transit Cars. The EDB will serve to validate the basic concepts of TRIP. Application of the TRIP concepts will be eventually expanded to all transit car and wayside equipments including that used for fare collection, power, signalling, control, and communication.

PERFORMING AGENCY: American Public Transit Association
 INVESTIGATOR: Gordon, TS Tel (202) 331-1100
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Robichaud, RH Tel (617) 494-2302

Contract DOT-TSC-1615

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 TOTAL FUNDS: \$20,954

ACKNOWLEDGMENT: American Public Transit Association

03 188657

RADIAL-AXLE PASSENGER CAR TRUCKS

Design and production of a self-guided radial-axle passenger car truck capable of operation at speeds of 125 mph. Based on the Scheffel cross-anchor design, the non-powered version will be installed under Amcoach equipment for extended testing at Transportation Test Center.

PERFORMING AGENCY: General Steel Industries, Incorporated; Buckeye Steel Castings

INVESTIGATOR: Jackson, KL

SPONSORING AGENCY: Federal Railroad Administration, Office of Passenger Systems Research and Development; National Railroad Passenger Corporation

RESPONSIBLE INDIVIDUAL: Delousy, C Tel (202) 426-0966

STATUS: Active NOTICE DATE: Aug. 1979

03 195918

IMPROVING REFRIGERATION SYSTEMS IN VAN CONTAINERS FOR TRANSPORT OF PERISHABLES

Develop, evaluate, and demonstrate specific improvements in refrigerated van containers and trailers used to transport perishables and the application of new technology and equipment for environmental control and air distribution to commercial practice in an economical and efficient manner. The USDA van container which is equipped with an unloading compressor, continuous blower operation, and under-the-floor air distribution system will be instrumented to monitor humidity and temperature of air and product automatically in transit. Experimental shipments of a variety of fruits and vegetables will be conducted from various parts of the United States to foreign and domestic markets in all seasons and climates including a shipment of mixed vegetables to the Caribbean. The effectiveness of the interfacing of the air delivery system with different types of packaging, unitizing methods, and loading patterns will be evaluated in paired shipments with conventionally refrigerated containers.

PERFORMING AGENCY: Agricultural Marketing Research Institute, Transportation and Packaging Research Laboratory

INVESTIGATOR: Kindya, WG Breakiron, PL

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: June 1979 START DATE: Aug. 1978 COMPLETION DATE: Aug. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0044695)

04 054561

ON BOARD ENERGY STORAGE FOR TRANSIT CARS

Description: The design, development and testing of an electric propulsion system with an onboard energy storage unit for use on subway 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. Performance by computer analysis indicates a potential energy savings of 30%. Verification of performance compared to conventional car will be accomplished by operation on the NYCTA subway lines.

Subcontractor is Garrett AiResearch

REFERENCES:

Energy Storage Propulsion System for Rapid Transit Cars: System Design and Equipment Description, Raskin, D; Yutko, R, Available at NTIS, UMTA-NY-06-0006-75-1 46 pp, 1975, PB-249063

PERFORMING AGENCY: Metropolitan Transportation Authority (New York), NY-06-0006

SPONSORING AGENCY: Urban Mass Transportation Administration, Office of Technology Development and Deployment; Metropolitan Transportation Authority (New York)

RESPONSIBLE INDIVIDUAL: Mora, J Tel (202)426-0090

Contract DOT-UT-550

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1971 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$1,900,000

ACKNOWLEDGMENT: UMTA

04 058270

ELECTRIFICATION AND ELECTRIC TRACTION

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, Jr Tel (202) 426-9665

PPA-RR-05

STATUS: Active NOTICE DATE: Aug. 1979

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) design analysis, including both magnetic field and circuit modeling of synchronous and asynchronous linear motors; (7) complex computer modeling and analysis of propulsion drive systems.

PERFORMING AGENCY: Kusko (Alexander) Incorporated

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Raposa, FL Tel (617)494-2031

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Apr. 1976 TOTAL FUNDS: \$124,000

ACKNOWLEDGMENT: TRAIS (612-0218)

04 099377

FLYWHEEL ENERGY STORAGE SWITCHER (FESS) SYSTEM ENGINEERING

There are three phases which cover the system analysis, fabrication, testing and demonstration of a yard switching locomotive incorporating a flywheel energy storage unit. This project will utilize available hardware and existing knowledge to design, fabricate, and test the system. The three phases are, Phase I--System Analysis, Economic Analysis, and Bench Testing, Phase II--Design, Hardware Fabrication, Testing and Phase III--Demonstration.

Further work will depend on the results of Phase I, System analysis and

Bench Testing.

REFERENCES:

Flywheel Energy Storage Switcher. Study, Summary and Detailed Description of Analysis, FRA/ORD-79/20.1, Apr. 1979

Flywheel Energy Storage Switcher. Field Data FRA/ORD-79/20.2, Apr. 1979

PERFORMING AGENCY: Garrett Corporation

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr Tel 202-426-0855

Contract DOT-FR-74247 (CPFF)

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Sept. 1977 TOTAL FUNDS: \$428,000

ACKNOWLEDGMENT: FRA

04 170637

TRANSMISSION OF INFORMATION THROUGH A TRAIN-LINE

This study concerns the definition, selection and development of a system for the transmission, first through the UIC loudspeaker cable and subsequently through the automatic coupler, of information which should serve to assist the subsequent automation within the train. Specifications for the transmission system are currently being prepared. These specifications which take into account the results of test runs on the systems of DB, FS, PKP and SNCF will enable recommendations for the choice of a system to be drawn up.

Four reports have been published to date. Question A103.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Vokac, P Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1967

ACKNOWLEDGMENT: UIC

04 179335

ASSESSMENT OF THE PROSPECTS FOR A NEW ENGINE FOR PASSENGER AND FREIGHT RAIL SYSTEMS

Evaluate propulsion for railroads and advise FRA on integration of propulsion R&D with related programs in other government agencies and with industry. Tasks include literature survey of prime movers which have potential for replacing the diesel engine for locomotive propulsion; development of FRA R&D plan for replacement of diesel locomotives with locomotives not requiring petroleum fuel; analysis of plans to study and/or develop prime movers to meet needs of the railroad industry; recommendations for an overall FRA plan in this field.

PERFORMING AGENCY: Spriggs, (JO)

INVESTIGATOR: Spriggs, JO Tel (301) 946-3527

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Kamalian, N Tel (202) 426-9564

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1978 COMPLETION DATE: 1979

04 193777

SUBSYSTEM TECHNOLOGY APPLICATIONS TO RAIL SYSTEMS (STARS)

The objectives of the STARS Program are to apply existing technology to the solution of rail transit operators' pressing technical and operational problems and deploy these solutions in the near term. Furthermore, the subsystem technology applications are to be self-paying such that the development and deployment costs are offset by the benefits to the properties in terms of performance reliability, safety, and service. STARS is a "quick response" program which emphasizes technology which are compatible with existing rail systems, such that deployment can be commenced within the next 5 years in order to improve transit operations and reduce costs. The projects selected for the STARS Program were determined after extensive discussions with the major U.S. transit properties. Subsystems in the program include car equipment, including technology application investigations; controls/communications/power, including technology applications investigations; stations/operations, including technology applications investigations; and maintenance technology application investigations.

Contract to a performing agency not yet awarded.

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Tucker, HL Tel (202) 426-0090

STATUS: Programmed NOTICE DATE: Apr. 1979 START DATE: Sept. 1979
COMPLETION DATE: Sept. 1984 TOTAL FUNDS: \$19,375,000

ACKNOWLEDGMENT: UMTA

**04 196717
PROPULSION**

Important advances have been made with respect to AC traction motor control as a spin off of the linear synchronous motor work on the maglev project. A development program is being defined and the first stage of this program will involve hardware development. This will be done on a cooperative basis with the Department of Industry, Trade and Commerce and private Canadian industry. The theoretical analysis work on the design of AC traction motors and motor control systems will be continued with the University of Toronto in parallel with the hardware development. Some exploratory work will be started into new applications of linear motors (particularly the LSM) for transport applications.

PERFORMING AGENCY: Transport Canada Research and Development Centre, FA34A55114

INVESTIGATOR: Rudback, NE

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1978

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

**04 196721
PROPULSION AND CONTROL SYSTEM FOR THE MLW-LRC
LOCOMOTIVE**

Purpose is to develop a new Propulsion and Control System for a new, light-weight, high speed passenger locomotive. Prototype equipment will be delivered to MLW Industries for testing in the LRC Locomotive. Estimate 200 Equipments will be required for domestic and export units over the next 10 years.

PERFORMING AGENCY: Canadian General Electric Company, I11H21865

INVESTIGATOR: Woodbury, D
SPONSORING AGENCY: Canadian General Electric Company

STATUS: Active NOTICE DATE: July 1979 START DATE: Jan. 1977
COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

**04 196748
DUAL-MODE LOCOMOTIVE (DML) SYSTEM ENGINEERING
STUDY**

The dual-mode locomotive (DML) concept is based upon the idea that a diesel-electric locomotive could operate more efficiently over its duty cycle if it were capable of utilizing wayside electric power when it is available. The Wayside Energy Storage Study, FRA/OR&D-78/78.I-IV, found that such a vehicle is necessary for the successful recovery of braking energy. The study also indicated potential benefits from such a vehicle merely from the electrification of grades and from use on currently electrified or partially electrified routes. The purpose of the Phase I systems engineering study is to further define and quantify the potential benefits of the DML. As part of this study, the contractor will establish a base-line concept with a preliminary design and performance specification. The contractor will also perform an in-depth technical and economic analysis. Subsequent phases of this project, should FRA and DOE decide to continue, would include the selection of an existing locomotive to retrofit, and the detailed design, fabrication and testing phases.

Performing agency to be determined.

SPONSORING AGENCY: Federal Railroad Administration, Office of Research & Development, Freight Service Division

RESPONSIBLE INDIVIDUAL: Koper, JM Tel (202) 426-0808

Contract RFP-DOT-FR-4462

STATUS: Proposed NOTICE DATE: July 1979 START DATE: Nov. 1979
COMPLETION DATE: Sept. 1980 TOTAL FUNDS: \$125,000

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 Tel (312) 567-3587

SPONSORING AGENCY: Association of American Railroads Technical Center; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1975 COMPLETION DATE: 1978

ACKNOWLEDGMENT: AAR

05 157901

SYSTEMS ENGINEERING FOR BRAKING AND COUPLING SYSTEM DESIGN

This program will evaluate the economic impact and engineering performance of various existing and innovative braking and coupling system concepts which might be candidates for future R&D implementation strategies.

PERFORMING AGENCY: Bolt, Beranek and Newman, Incorporated

INVESTIGATOR: Bender, EK Tel (617) 491-1850

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Tsai, NT Tel (202) 755-1877

Contract DOT-FR-8091

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: Jan. 1980 TOTAL FUNDS: \$350,000

ACKNOWLEDGMENT: FRA

05 159634

DESIGN AND FABRICATION OF A WAYSIDE BRAKE INSPECTION SYSTEM FOR RAILROAD VEHICLES

This contract is for the development of a brake inspection system. It is expected that the system will be able to determine the braking performance of freight cars in a dynamic mode as a train passes through the wayside system. Two techniques are to be integrated into the total system. Infrared measurement of the energy dissipated by the wheels. The second technique

will use a short instrumented "reaction rail" section spliced into one rail to give a quantitative indication of the retarding force of the wheels.

A Final Report is in preparation.

PERFORMING AGENCY: Novatek Incorporated

INVESTIGATOR: Spaulding, D Tel (617)272-6230

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Ferguson, J

Contract DOT-TSC-1323

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1977 COMPLETION DATE: June 1979 TOTAL FUNDS: \$77,753

ACKNOWLEDGMENT: TSC

05 170652

BRAKE PADS FOR DISC BRAKES AND COMPOSITION BRAKE BLOCKS

Report No. 1 contains the provisional acceptance conditions for brake pads. Studies concerning the physical and chemical properties of pads have been completed and the results are laid down in RP 2. Further tests should demonstrate the suitability of given test procedures for quality checks and also the correlation with the braking performance. Comparative tests on six different test rigs have been completed, studies concerning the causes of differences in the results are in progress and a report No. 4 will be presented in April 1978. Another enquiry concerning the use of composition brake blocks on all ORE administrations has been evaluated and the contents are laid down in RP 3 (initial enquiry B 64/RP 10). On the basis of reports B 64/RP 10 and B 126/RP 1 the final drafts of two UIC leaflets 541-3 and 541-4 have been worked out in co-operation with the UIC Sub-Committee for Braking. Tests in winter conditions (in the dynamic chamber of the Vienna Arsenal Vehicle Testing Station-MBVA) began in September 1977. Results are being analysed, and decisions on future tests will be taken early in 1978. The revised Action Sheet was approved by the Control Committee in October 1977. The B 126 Committee has been asked to prepare a detailed programme and a supplement to the Action Sheet on the problem of brake power limits.

Three reports have been published to date. Question B126.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Osuch, K Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1973

ACKNOWLEDGMENT: UIC

05 170656

STANDARDISATION OF THE MATERIAL FOR CAST-IRON BRAKE BLOCKS

Programme of work and the Action Sheet were approved by the Control Committee in October 1977. The selected cast-iron brake shoes are currently being supplied and the laboratory tests will be started in December 1977.

Question B146.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Osuch, K Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: June 1977

ACKNOWLEDGMENT: UIC

06 136338

COMPUTER APPLICATIONS IN CONTROL OF RAILWAY SYSTEMS

DESCRIPTION: This project encompasses development activity in the application of computers to the control of main line rail traffic, rail classification yards and high density rail and rapid transit interlockings. The general goals of these efforts are improvement of resource utilization, minimization of delays, and greater rail system throughput. Benefits are reduction in energy consumption and increased attractiveness of rail transport as an alternative to more energy intensive forms of transportation. Classification yard control includes automatic computer control of retarder for precise coupling speeds and the switching network for accurate car routing. Computer based management information systems operate in conjunction with the above for maintenance of rolling stock inventory. Development efforts are aimed at improving yard throughput while maintaining or improving coupling speed accuracy. Main line control projects currently underway emphasize centralization, and simplification of dispatching and routing functions. Systems deployed to date utilize computer-aided control with the basic decision processes being performed by operating personnel. Development efforts are directed toward higher levels of automatic control encompassing larger areas of controlled territory to yield increased operating efficiency. High-density rail and rapid transit interlockings are ideal candidates for computer control because of their complexity and frequency of traffic. Computerized route finding is currently used in GRS systems, and systems in development will automatically perform many more of the necessary control functions allowing higher traffic densities to be accommodated.

PERFORMING AGENCY: General Railway Signal Company

INVESTIGATOR: Conover, HH

SPONSORING AGENCY: General Railway Signal Company

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1975

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AX 615 1)

06 138529

TRACK CIRCUIT RESEARCH PROJECT

The objectives of the Track Circuit Research Project are: 1) to develop a comprehensive file and bibliography on track circuits; 2) to develop analytical and computer models of the track circuit which can be used as research tools; 3) to collect the necessary data in order to validate the track circuit models; 4) to prepare several reports containing the information produced by the project. These reports fall into two separate categories, documentation of the track circuit models and a handbook containing the necessary information to understand track circuits.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Patel, S Tel (312) 567-3618

SPONSORING AGENCY: Association of American Railroads

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1975

ACKNOWLEDGMENT: AAR

06 159656

RAILROAD CLASSIFICATION YARD TECHNOLOGY: NEW CONCEPTS AND ADVANCED TECHNOLOGY IN FREIGHT CAR SPEED CONTROL

The objective of this study is to select only the most promising car speed control concepts and technology and recommend them as candidates for yard integration and test demonstration. The most promising concepts and technology are to be selected on the basis of cost effectiveness, technical suitability and likelihood for near term (ten years or less) application in upgraded or new U.S. yards. The project will assess the advances in the state-of-the-art. The project will result in a recommended plan for yard integration and tests of the most promising concepts and advanced technology.

PERFORMING AGENCY: SRI International

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr Tel (202) 426-0855

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: July 1978 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$190,000

ACKNOWLEDGMENT: FRA

06 159657

RAILROAD CAR PRESENCE DETECTION DEVICES

The objective of this study is to develop a performance specification for car presence detection devices. The project will assess the function and requirements for the device and evaluate the performance of present day devices. The effort will identify and evaluate causes of device failures and collect reliable data on performance. Engineering cost elements will be identified and an analysis of trade-offs between performance and cost.

PERFORMING AGENCY: Shaker Research Corporation

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr Tel (202) 426-0855

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Sept. 1978 COMPLETION DATE: Nov. 1979 TOTAL FUNDS: \$210,000

ACKNOWLEDGMENT: FRA

06 160400

EVALUATION OF SIGNAL/CONTROL SYSTEM EQUIPMENT AND TECHNOLOGY

The status of present-day signal/control equipment and technology both in the United States and abroad will be evaluated. The results will be publicized and recommendations made for further developments and fabrication of a prototype system using the most advanced techniques. One goal of the program is to provide a standardized system for use on passenger routes with emphasis on using the best techniques of present day technology as used throughout the world.

REFERENCES:

Task 1: Assessment of Signal/Control Technology and Literature Review, Taylor, SF; Marshall, JF; Schultz, CM; Whalen, RB, STV, Inc., Kentron, Inc., Dyer (TK), Inc.--Available NTIS, FRA/ORD-78/39.1 195 p. 781, 192, PB-296494/AS

PERFORMING AGENCY: STV, Incorporated

SPONSORING AGENCY: Federal Railroad Administration

Contract DOT-FR-773-4236 (CPFF)

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Sept. 1977 COMPLETION DATE: Apr. 1979 TOTAL FUNDS: \$538,294

ACKNOWLEDGMENT: TRAIS

06 170628

TRANSMISSION OF DATA TO 9.6 KBIT/S

The Committee was set up in October 1976. At the request of the UIC Committee "Data processing", the A 145 Specialists Committee was entrusted with the task of carrying out practical investigations concerning data transmission, particularly on international railway transmission circuits at speeds from 4.8 to 9.6 kbit/s for application on the future international data processing (teleprocessing) network. The tests will only concern those modems that are recommended by the CCITT (V 29). It is suggested that the tests on modems should be made at Vienna-Arsenal and the measurements concerning the bit and block-error rates on the circuits proposed. The following circuits are proposed: Paris, Frankfurt, Vienna, Warsaw, Lucerne, Rome. The first three series of measurements have been made on the above mentioned circuits and the measured values are currently being processed.

Question A145

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Vokac, P Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Oct. 1976

ACKNOWLEDGMENT: UIC

06 170629

ADAPTATION OF MARSHALLING YARDS FOR TAKING WAGONS WITH WHEEL BASE OF MORE THAN 14 M

Adaptation of electric installations in classification yards for shunting of cars with wheelbase of adjacent axles of more than 14 m. The first stage consists of a technical analysis and an economic survey of existing solutions. The following stage will consist of the choice of solution(s) for existing yards and/or yards still to be constructed.

Question D147.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Savarit, R Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978

ACKNOWLEDGMENT: UIC

06 170631

PROPAGATION OF RADIO WAVES

The studies are intended to produce guiding principles and data for planning radio links on railway property, covering stations, lines and tunnels. ORE A 133/RP 1 reviewed the documentation available on radio wave propagation and proposed a classification system for railway terrain. Further to this report, methods for the measurement and test of radio propagation on lines, stations and tunnels were produced and applied to collect a considerable amount of experimental data in a number of Administrations. The first series of measurement for the studies were taken in all of the three principal areas of railway terrain. Further measurements are in progress.

One report has been published to date Question A133.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Gelbstein, E Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978

ACKNOWLEDGMENT: UIC

06 170635

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES

Analysis of possible interference in information transmission installations. Theoretical considerations for different d.c. and a.c. thyristor vehicles and tests. A brief summary of the previous work carried out by the A 122 Committee and of the results obtained have been published in an interim report (A 122/RP 16). It can be said that all important questions relating to tractive vehicles have been cleared up. Basically this also applied to signalling systems. Further studies serve to reveal the disadvantages as regards power collection, determination and definition of interference source characteristics, establishment of sensitivity characteristics of objects subjected to interference, superimposition of multiple source interference and confirmation of methods for calculating induced voltages. Results of investigations into the effects on telecommunication circuits and data transmission due to operating thyristor controlled a.c. tractive units (15 kV 16 2/3 Hz and 25 kV 50 Hz) are given in report A 122/RP 22 of April 1977.

Twenty two reports have been published to date. Question A122.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Hoppe, S Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1970

ACKNOWLEDGMENT: UIC

06 170650

USE OF ELECTRONIC COMPONENTS IN SIGNALLING

The ultimate object of the studies is to determine the types of electronic component which may be used in railway safety systems, also specifying their applications and the conditions in which they may be applied. The present phase of studies in this field has now been completed. A review of the work of this Committee leads to the following results: 1. Description of the working environment for electronics in railway signaling applications (RP 4 and RP 10). 2. General principles, definitions and methods of calculations applicable to safe electronic systems (RP 1, RP 3, RP 5, RP 6, RP 7). 3. Aids to the design of fail-safe electronic circuits (RP 2, RP 8). 4. Safe electronic systems based on computer technology (RP 9, RP 11, RP 12). Furthermore, a general review of the work of this Committee has been prepared (RP 13) and a problem description concerning the transmission of safety information is being prepared to serve as a basis for future work. It has also been agreed that a colloquium on the subject studied by A 118 will take place in 1980 to report on new developments and recent experience in this field.

Thirteen reports have been published to date. Question A118.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Gelbstein, E Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1971

ACKNOWLEDGMENT: UIC

06 193284

IDENTIFICATION AND EVALUATION OF OFF-TRACK TRAIN DETECTION SYSTEMS FOR GRADE CROSSING APPLICATIONS

Study will develop specific conclusions and recommendations on the technical feasibility and cost effectiveness of off-track train detection concepts for activating rail-highway grade crossing warning systems.

PERFORMING AGENCY: GARD Incorporated
INVESTIGATOR: Coleman
SPONSORING AGENCY: Federal Highway Administration, Traffic Systems Division
RESPONSIBLE INDIVIDUAL: Coleman

Contract DOT-TSC-7430007

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: Sept. 1977 COMPLETION DATE: June 1979 TOTAL FUNDS: \$158,000

ACKNOWLEDGMENT: Federal Highway Administration (322118354)

06 196718

LIC SIGNALLING & COMPUTER AIDED DISPATCH FACILITY FOR HIGH SPEED

To provide enhanced schedule adherence and improved safety for the Montreal-Quebec high speed rail passenger service demonstration. A conventional automatic block signaling system and dispatch console will be used with the new passenger service. The addition of Location, Identification and Control (LIC) equipment plus a modern computerized dispatch facility to the planned installation would provide significant additional service reliability benefits at a relatively modest cost. The LIC signaling and computerized dispatch systems are now in an advanced state of development under TDC contracts and would be available for implementation and operational employment on this project.

PERFORMING AGENCY: Transport Canada Research and Development Centre, FA34A13120

INVESTIGATOR: Rudback, NE

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1978 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

06 196719

COMMUNICATION COMMAND AND CONTROL

The Division has placed emphasis on the application of modern electronic equipment and control techniques to improve the operating efficiency of conventional transport systems. Work underway includes study into methods of continuously transmitting train diagnostic signals to the locomotive cab, electro-pneumatic train brakes, computer aided dispatching, and a radio linked location, identification, and control (LIC) train signalling system. Signalling is now entering the stage of limited prototype systems trials. A project is planned for full scale demonstration of this promising new signalling technology, as such a demonstration is considered to be the only way of obtaining acceptance from the major Canadian railway. The export potential for LIC signalling, which is believed excellent, is unlikely to be realized before a full scale Canadian implementation.

PERFORMING AGENCY: Transport Canada Research and Development Centre, F34A54113

INVESTIGATOR: Rudback, NE

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1978

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

06 196730

POLE LINE RESEARCH

To evaluate techniques for detection of internal decay in railroad signal and communication poles, including strength. The research is undertaken since conventional species of wood poles are being depleted and present pole lines have not been adequately maintained by pole replacements. Surveys of certain mainline sections of pole line have commenced to determine the existing condition of the line and evaluate the amount of useful life in the poles to provide adequate reliability of operation. The surveys will continue on all mainline sections where railroad signal circuits are involved. This

research will assist in determining the strength and reliability of existing pole lines for railroad signal operations.

PERFORMING AGENCY: Canadian Pacific Limited, I11H54853

INVESTIGATOR: Tufts, LD

SPONSORING AGENCY: Canadian Pacific Limited

STATUS: Active NOTICE DATE: July 1979 START DATE: May 1977 COMPLETION DATE: Dec. 1983

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

07 049659

HUMAN FACTORS IN RAILROAD OPERATIONS

This continues a program of research and consultation on human factors in railroad safety in support of FRA regulatory responsibilities involving human performance. Current work includes measurement of air contaminants in the train crew environment, development and evaluation of train handling aids, studies of crew alertness, design of a locomotive cab based on functional requirements, and study of employee motivation.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research

INVESTIGATOR: Devoe, DB

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

STATUS: Active NOTICE DATE: Aug. 1977

ACKNOWLEDGMENT: FRA

07 148352

ALCOHOL AND DRUG ABUSE PROGRAMS IN THE RAIL INDUSTRY: PHASE II

To develop techniques and program factors that can be used in the development and improvement of alcohol and drug abuse programs. Included in this development will be the verification cost effective measures, and of program effectiveness evaluation techniques. The end goal is to provide information necessary for every railroad to voluntarily develop an alcohol and drug rehabilitation program that will meet its own organizational objectives and needs.

PERFORMING AGENCY: University Research Corporation

INVESTIGATOR: Mannelo, T Tel (301) 524-3936

SPONSORING AGENCY: Federal Railroad Administration; Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Collins, DM Tel (202) 472-7280

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1977 COMPLETION DATE: Dec. 1979

ACKNOWLEDGMENT: FRA

07 170590

CONFERENCES ON RAILROAD PERSONNEL DEVELOPMENT/ASSISTANCE

Co-sponsor conferences which familiarize railroad labor and management officials with FRA research activities. Topics of these conferences include but are not limited to alcohol and drug rehabilitation research, training and labor-management communications improvement.

Summaries and/or proceedings available on request.

REFERENCES:

Conference on the Detection, Prevention, and Rehab of the Prob Drinker Employee in the RR Industr, Cornell U, Jan 1976, Proceedings 1975

Employee Assistance--An Alternative to Tragedy, Texas Transportation Institute, November 1976, Proceedings 1976

Local Level Labor-Management Workshop (Carson Inn Project) Chicago, Milwaukee, St Paul & Pacific Railroad, Nov. 1976

Conference on Public Support for Railroad Training Stewart (DA) and Associates, Jan. 1978

SPONSORING AGENCY: Federal Railroad Administration, Office of Policy and Program Development

RESPONSIBLE INDIVIDUAL: Vass, TJ Tel (202) 472-7280

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Apr. 1975

ACKNOWLEDGMENT: FRA

07 170662

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS: PHASE III. TASK 1--TTD TECHNOLOGY SHARING AND IMPLEMENTATION

This task will develop effective education and training program aids to

facilitate dissemination to operating levels of what is known now as a result of the TTD research program. The subtasks: (1.1) Promote safer train make-up through improvement in the knowledge of yardmasters, locomotive engineers and other operating personnel; (1.2) Improve safety awareness of maintenance-of-way and maintenance-of-equipment of conditions of track and equipment that affect derailment tendency and catastrophic failure; (1.3) Tell the TTD story through a newsletter to the rail and supply industry, the government and educational community; (1.4) Develop workshops to coordinate and support the technology transfer of the TTD program; (1.5) Plan, organize and promote a TTD conference to involve the general research community, railroads, suppliers, government and universities.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Zotti, RF Tel (312) 567-3585 Miller, CJ

SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1978 COMPLETION DATE: 1980

ACKNOWLEDGMENT: AAR

07 196746

LIGHT AND COMMUTER RAIL ACCESSIBILITY STUDY

In the Surface Transportation Act of 1978 (Title III), Congress required two special accessibility studies: one to be performed by operators of rail rapid transit systems to obtain site specific cost figures of accessibility improvements (Sec. 321 a), and the other to be conducted by the Department of Transportation (Sec. 321 b) to determine ways, desirability, and costs of making light and commuter rail systems fully accessible to elderly and handicapped. The contractor must perform four tasks: (1) categorical analysis of handicapped and development of demand data, (2) census of systems, vehicles/stations/stops and associated barriers, (3) development of evaluation criteria for potential accessibility solutions, and (4) development of accessibility options, estimated costs, and comparison of alternatives. The final report will be the basis for Departmental legislative recommendations to clarify or amend Federal laws pertaining to accessibility requirements affecting the light and commuter rail modes.

PERFORMING AGENCY: Crain and Associates, CA-06-0125

INVESTIGATOR: Crain, JL Tel (415) 323-2471

SPONSORING AGENCY: Urban Mass Transportation Administration, Office of Technology Development and Deployment UTD-30

RESPONSIBLE INDIVIDUAL: Mora, J Tel (202) 426-0090

Contract DOT-UT-90026

STATUS: Active NOTICE DATE: July 1979 START DATE: Feb. 1979 COMPLETION DATE: Jan. 1980 TOTAL FUNDS: \$295,000

ACKNOWLEDGMENT: UMTA

07 196747

FEASIBILITY STUDY OF ADAPTING LIFTS TO LIGHT RAIL AND COMMUTER RAIL VEHICLES

The purpose of this study is to make a detailed census of light and commuter rail vehicles, assess current problems associated with existing bus lifts, provide a definition of the interface constraints associated with retrofitting lifts on these vehicles, and identify additional impediments to accessibility inside these vehicles for the wheelchair handicapped.

PERFORMING AGENCY: Technology Research and Analysis Corporation, MA-06-0025

INVESTIGATOR: McInerney, T Tel (703) 522-2440

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Kangas, R Tel (617) 494-2298

Contract DOT-TSC-1711

STATUS: Active NOTICE DATE: July 1979 START DATE: May 1979 COMPLETION DATE: Nov. 1979 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: UMTA

08 049658

RAIL SAFETY/GRADE CROSSINGS PROTECTION

The program will consist of three major tasks: (1) Development of Application Guidelines for Train 'on board' conspicuity and impact attenuation devices. (2) Innovative System development will study new grade crossing protection concepts. (3) System Analysis will establish inter-administration state and railroad requirements for a data system to accommodate new FRA grade crossing inventory and other data.

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research

INVESTIGATOR: Hopkins, JB Tel (617) 494-2023

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

STATUS: Active NOTICE DATE: Aug. 1977

ACKNOWLEDGMENT: FRA

08 153623

MEASURES OF EFFECTIVENESS FOR RAILROAD-HIGHWAY GRADE CROSSING IMPROVEMENTS

The study will establish appropriate methodology for measuring and evaluating effectiveness of safety improvements at grade crossings in terms of available grade crossing inventory, accident, and economic data.

PERFORMING AGENCY: Federal Highway Administration

INVESTIGATOR: Stewart

SPONSORING AGENCY: Federal Highway Administration, Traffic Systems Division

RESPONSIBLE INDIVIDUAL: Stewart

In-House

STATUS: Active NOTICE DATE: June 1979 START DATE: Sept. 1976 COMPLETION DATE: Feb. 1979 TOTAL FUNDS: \$16,000

ACKNOWLEDGMENT: Federal Highway Administration (335036354)

08 159644

COMPUTER SIMULATION OF DERAILMENT IN RAILWAY GRADE CROSSING COLLISION (ENDEV)

Development of a digital computer program to analyze the collision of road and rail vehicles at grade crossings and a sensitivity analysis of the effect on rail vehicle derailment by several variables.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-735

INVESTIGATOR: Cherchas, D

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: English, GW Tel (613) 547-5777

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Apr. 1977 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$93,666

ACKNOWLEDGMENT: CIGGT

08 159654

GRADE CROSSING SAFETY

Development of reliable and intelligent train detection, constant warning time devices, off-track train detection and warning devices, and active advance warning signals.

PERFORMING AGENCY: Federal Railroad Administration

SPONSORING AGENCY: Federal Railroad Administration

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: 1977 TOTAL FUNDS: \$800,000

08 178037

GRADE CROSSING SAFETY SURVEILLANCE INFORMATION SYSTEM

Correct grade crossing accident-inventory data base. Analyze accident data to develop severity prediction equations for crossings with gates, stop signs, other active devices, and no warning devices. Validate grade crossing accident severity prediction equations.

PERFORMING AGENCY: Federal Highway Administration

INVESTIGATOR: Stewart

SPONSORING AGENCY: Federal Highway Administration, Traffic Systems Division

RESPONSIBLE INDIVIDUAL: Stewart

In-House

STATUS: Active NOTICE DATE: June 1979 START DATE: Mar. 1979 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$6,000

ACKNOWLEDGMENT: Federal Highway Administration (291017354)

08 185241

IMPACT OF INCREASED COAL SHIPMENTS IN THE MINNESOTA-NORTH DAKOTA RAIL CORRIDOR

This study of the Burlington Northern mainline from the western border of North Dakota to Minnesota's Twin Cities and to the Minnesota-Wisconsin border near Superior, WI, will focus on low-cost solutions to problems encountered by communities through which frequent unit trains are handling increasing coal traffic. Of particular concern will be grade crossings and problems involving environment, socioeconomic factors and community development.

PERFORMING AGENCY: Department of Energy; Department of Transportation; Burlington Northern, Incorporated

SPONSORING AGENCY: Department of Energy; Department of Transportation; Burlington Northern, Incorporated

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Oct. 1978 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$2,500,000

08 193281

CONSTANT WARNING TIME DEVICES FOR USE AT RAILROAD GRADE CROSSINGS

This study concentrates on improving reliability, service life, costs, power requirements, and maintenance for constant time warning time devices which are used at railroad grade crossings. Motorist credibility in constant warning devices is also investigated.

PERFORMING AGENCY: Systems Technology Laboratories

INVESTIGATOR: Allen

SPONSORING AGENCY: Federal Highway Administration, Traffic Systems Division

RESPONSIBLE INDIVIDUAL: Coleman

Contract DOTFR8042

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: Mar. 1978 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$250,000

ACKNOWLEDGMENT: Federal Highway Administration (313028354)

08 193282

RAILROAD PASSIVE SIGN EXPERIMENTAL DESIGN

The purpose is to design an experiment to evaluate accident reduction safety benefits of new active advance warning signs at rail-highway grade crossings. Results will also include a plan for obtaining state cooperation in conducting the experiment.

PERFORMING AGENCY: Wisconsin University, Madison

INVESTIGATOR: Berg

SPONSORING AGENCY: Federal Highway Administration, Traffic Systems Division

RESPONSIBLE INDIVIDUAL: Coleman

Contract PO 8-40124

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: July 1978 COMPLETION DATE: Jan. 1979 TOTAL FUNDS: \$10,000

ACKNOWLEDGMENT: Federal Highway Administration (313018354)

08 194539

GRADE CROSSING ACTIVE ADVANCE WARNING SIGNALS

Study will identify types of grade crossings with active devices where active advance warning signals would improve safety. Prototype active advance warning signals will be developed, tested, and evaluated. Guidelines for use of active advance warning signals will be developed.

PERFORMING AGENCY: JGM Associates

INVESTIGATOR: Ruden

SPONSORING AGENCY: Federal Highway Administration, Traffic Systems Division

RESPONSIBLE INDIVIDUAL: Coleman

Contract DOT-FH-9346

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: Sept. 1977 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$150,000

ACKNOWLEDGMENT: Federal Highway Administration (290017354)

08 196720

GRADE CROSSING R & D

Consideration of increasing the future operating speeds of rail passenger trains, particularly in the Montreal-Quebec Corridor, has resulted in R & D projects related to the safety of grade crossing for higher train speeds. Projects already initiated deal with the study of crossing protection for train speeds up to 125 mph, risk of derailment in train/road vehicle collisions, means of reducing the severity of accidents through rail vehicle structural design, and the definition of functional requirements for crossing protection using obstacle detection devices.

PERFORMING AGENCY: Transport Canada Research and Development Centre, FA34A41105

INVESTIGATOR: McClaren, W

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979

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, Metallurgy Division

INVESTIGATOR: Interrante, CG Tel 301-921-2997

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Dancer, DM Tel (202)426-1227

AR-40008

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Sept. 1973 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: FRA

09 135495

EVALUATION OF SHOTCRETE THEORY AND TECHNIQUES

Purpose of study/investigation: To evaluate shotcrete as a construction material for application to Corps project, i.e., to determine correct sampling techniques, pertinent physical properties, problem areas, and limitations of usage. Approach or plan: A summary of what is known about (1) shotcrete from various users, (2) available equipment, and (3) laboratory tests will be made. Both fine and coarse aggregate mixtures will be utilized using the two types of shotcreting equipment (wet and dry). Basic properties, procedures, limitation, and applications will be studied. Progress to date: (1) To date. Laboratory work, approximately 80 percent complete, has been conducted on four types of shotcrete: fine and coarse dry process and fine and coarse wet process shotcrete. Information has been developed on the compressive, tensile, and shear strength of each type of shotcrete. In addition, data have been secured on bond of old shotcrete to fresh shotcrete, permeability and freeze-thaw resistance, and bond to reinforcing steel. (2) Anticipated FY 74. The remaining data on tests mentioned above will be secured, tabulated, and analyzed. The field application phase will be planned and initiated.

PERFORMING AGENCY: Waterways Experiment Station, Concrete Laboratory

INVESTIGATOR: Mather, B

SPONSORING AGENCY: Army Corps of Engineers, Department of the Army

STATUS: Active NOTICE DATE: Feb. 1977 START DATE: July 1973

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 367)

09 136093

PROTECTION OF WOOD IN USE

OBJECTIVE: Modify existing procedures and develop new ones for imparting a high resistance to wood against biological degradation and harmful weathering action, with special attention to minimizing objectionable environmental side effects. APPROACH: Develop new concepts and procedures for preserving wood such as chemical modification of the polysaccharides in wood. Determine the practicality of diffusion-type treatments for various wood species by studying the effectiveness of various combinations of salts and pretreating steps. Develop improved water-repellent-preservative finishes by increasing the permanence of fungicidal chemicals used in such finishes. Improve the permanence of coatings by modifying the surface of wood as an acceptor of finishes. Assess benefits derived from wood preservatives and from treated wood products.

REFERENCES:

Nonconventional Wood Preservation Methods Rowell, RM, ACS Symposium Series 43(4): 47-56, 1977

Characterization of the Attack on Wood by the Marine Borer *Limnoria tripunctata*, Kalnins, MA, Amer. Wood-Preserver's Assoc. Proc. 72: 250-262, 1976

Performance of Single- and Dual-Treated Panels in a Semi-Tropical Harbor, Johnson, BR, Amer. Wood-Preserver's Assoc. Proc., 1977

PERFORMING AGENCY: Wisconsin University, Madison, Forest Products Laboratory

INVESTIGATOR: Feist, WC Tel (608) 257-2211 Gjovik, LR Johnson, BR Rowell, RM

SPONSORING AGENCY: Forest Products Laboratory, 0040038 FPL3212
RESPONSIBLE INDIVIDUAL: Youngs, RL Tel (608) 257-2211

In-House

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: July 1974 COMPLETION DATE: 1978

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 40038 2), Forest Products Laboratory

09 138557

IMPROVED INSPECTION, DETECTION AND TESTING RESEARCH

This Division will plan, implement, sponsor and provide overall technical control and direction to development programs in the area of improved inspection, detection and testing techniques and equipment designed to improve railroad safety. The Division is the FRA contact point for all such programs and will provide for interchange of technological information among interested parties within the department, other government agencies and industry. Programs include Safety Life-Cycle Testing, Vehicle Inspection, Track Inspection and Testing, and Automated Inspection System Development.

For the subprograms see RRIS Nos. 03A 138558, 03A 138559, 01A 138560 and 01A 138561.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Winn, JB Tel (202)426-1682

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1975

ACKNOWLEDGMENT: FRA

09 138558

SAFETY LIFE-CYCLE TESTING

Develops, recommends, promotes and implements, a safety life-cycle testing and evaluation program. Provides facilities, equipment and technology necessary to detect and evaluate the cause and effect of rolling stock and track deterioration/failure thru the accumulation of Life-Cycle testing, data and experience.

PERFORMING AGENCY: Federal Railroad Administration, Improved Inspection, Detection and Testing Research Division

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Winn, JB Tel (202) 426-1682

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Oct. 1977

ACKNOWLEDGMENT: FRA

09 148320

FLAMMABILITY STUDIES AND TOXICOLOGICAL EVALUATION OF MATERIALS USED IN TRANSPORTATION VEHICLES

The increasing use of plastics and other man-made materials in various vehicular interiors poses new flammability, toxicity, and smoke generation hazards. Various government agencies and manufacturers have been considering the establishment of performance standards for materials used in interior finishes and several new materials have been developed in anticipation of such standards. This research describes a comprehensive approach to the general materials testing problem, leading to the establishment of design criteria and standards which shall result in fire-safe vehicles for the future. A complete study shall be made of the burning characteristics of various interior materials ignited inside simulated enclosures. Test conditions shall be varied to investigate the effects of the following factors: 1) Flammability ratings of the materials as obtained from laboratory tests. 2) Ventilation rates as provided by different size openings into the enclosure. 3) Partitioning of the enclosure by use of a fire barrier curtain. 4) Discharge of toxic gases into the interior space. A comparison of the flame resistant properties offered by different materials will be conducted. Results of the research will be used to propose new flammability test standards and specific recommendations for increasing vehicle-interior fire protection will be offered.

PERFORMING AGENCY: Rice University, Rice Center for Community Design and Research

INVESTIGATOR: Margrave, JL

SPONSORING AGENCY: Department of Transportation

RESPONSIBLE INDIVIDUAL: Bolger, PH

Contract DOT-OS-60149
 STATUS: Active NOTICE DATE: Aug. 1978 TOTAL FUNDS: \$175,000
 ACKNOWLEDGMENT: DOT

09 170603
SMOKELESS CABLE

APTA is providing industry input to UMTA and UMTA's contractor in the determination of representative insulation materials from a wide sampling of manufacturers and the determination of whether any of these can meet criteria which will be established by taking into consideration the fire hazards inherent in transit systems.

PERFORMING AGENCY: American Public Transit Association
 SPONSORING AGENCY: Transportation Systems Center

Contract DOT-TSC-1277
 STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Sept. 1976 COMPLETION DATE: June 1979 TOTAL FUNDS: \$29,650

ACKNOWLEDGMENT: American Public Transit Association

09 179345
COMPOSITE MATERIALS COMPRISING REACTION-INJECTION-MOLDING COMBINATIONS OF CARBON FIBERS AND THERMOSETTING RESINS

The objective of the research is to establish feasibility of utilizing chemical compositions comprising polyurethanes and polyepoxides, suitable for adaptation to RIM manufacture, in combination with carbon fibers, carbon fiber veil mats, and carbon fiber kevlar mats. It is the further objective of Phase I to define typical physical characteristics of the composites which can be expected to be processable by means of RIM technology. Finally, it is a still further objective of the study of Phase I to define a part suitable in the transportation industry which would serve as a model for the program to be conducted in Phase II of the project. The research consists of a) definition of a rigid polyurethane matrix suitable for use of RIM machines, comprising the selection of a suitable polyether-diphenyl-methane diisocyanate polymer; b) preparation of test composites the above-described fiber products (chopped fibers, mats), and rigid polyurethane or polyepoxide on a laboratory scale with catalyst systems which are known to be operational in RIM equipment; and c) the more promising products resulting from the above machine casting work will be tested. The transportation field, specifically, the automotive vehicle, is receiving considerable attention because of high energy usage. A much lighter-weight vehicle would help solve this and related problems. However, in order to be of use in the automotive industry, these composites must be manufactured by means of high-speed processes. This research will demonstrate the usefulness of RIM techniques. This research is being supported under the NSF Program Solicitation, "Small Business Innovation Applied to National Needs."

PERFORMING AGENCY: Plastics Technology Associates, Incorporated
 INVESTIGATOR: Hostettler, F
 SPONSORING AGENCY: National Science Foundation, Division of Intergovernmental Science and Public Technology, ISP-77-19711

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Oct. 1977 COMPLETION DATE: Mar. 1978 TOTAL FUNDS: \$24,725

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CY 417)

09 179346
TECHNOLOGY ASSESSMENT OF ADVANCED COMPOSITE MATERIALS

Advanced composites are relatively expensive high-technology materials that are now used selectively in high-performance applications. Manufacturers of advanced composites are predicting that their costs will decrease significantly over the next few years, so that these materials will be competitive with metals in specific mass market applications. Such continuing cost reductions and an increasing need for high-performance materials in at least two major sectors of the economy, automotive transportation and energy conversion, may result in a period of major growth for the advanced composites industry. If this occurs, a new commodity material industry would emerge with all the concomitant changes and impacts implied. The objective of this work is to develop a framework, through the identification of issues and questions related to the development and use of advanced composite materials, for carrying out a comprehensive assessment of potential long-term socioeconomic and environmental impacts which would result from the increasing uses of these materials in various sectors of the economy.

PERFORMING AGENCY: Argos Associates Incorporated
 INVESTIGATOR: Kaiser, R
 SPONSORING AGENCY: National Science Foundation, Division of Exploratory Research and Systems Analysis, ERS77-19647

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Oct. 1977 COMPLETION DATE: Mar. 1978 TOTAL FUNDS: \$24,969

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CY 402)

09 179691
CORRUGATED PACKAGE ENGINEERING

Determine ways to utilize wood resources more efficiently through improved engineering, design, and converting of both existing and underutilized fibers. Determine what performance criteria are needed in converting linerboard and corrugated medium to corrugated fiberboard as produced from existing and underutilized fibers; determine the most efficient placement of fiber in the corrugated structure; establish the relationships between the performance of the component paperboards, combined board and finished containers; provide improved and new engineering and design information about the physical requirements of packaging materials for their efficient performance in the service environment. Determine that the strength of particleboard is affected by rate of loading and duration of load in much the same way that solid wood and hardboard are affected. Evaluate the effect of moisture content on the engineering properties of structural particleboards made from forest residues. These properties generally were not changed by low humidities but were reduced by high humidity. Engineering properties of Forest Service Structural Flakeboard are being evaluated. A number of laminated particleboard railway cross-ties have been fabricated from discarded ties and evaluated. Results are promising. This development could solve supply, disposal, and pollution problems. A first draft of a performance standard for packaging was presented to ASTM D-10. The performance of pallets assembled with staples was found to be acceptable. Further confirmation was found that the use of an impact panel on a forklift truck greatly extends pallet life. Pallets using medium density hardboard as deck material were found to give good resistance to forklift impacts. For conventional nailed wood pallets, butting the first and second to deckboards increased resistance to handling impacts. Auxiliary walls to improve the sound insulation between living spaces in existing buildings were evaluated and found to give significant improvement if not limited by flanking paths. An interrelationship between partition, flanking, and field sound-transmission loss was developed to establish empirical flanking limits.

PERFORMING AGENCY: Forest Products Laboratory
 INVESTIGATOR: Koning, JW, Jr
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Nov. 1972 COMPLETION DATE: June 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0040039)

09 196724
PREMIUM RAIL

Premium rails, comparable in quality to imported quenched and tempered rails, are being developed by alloying and/or controlled cooling procedures in cooperation with the two Canadian rail manufacturers. By 1981 a comprehensive monograph defining the metallurgical properties, weldability and optimum cooling rates of several rail compositions will be published as the culmination of a program thrust to achieve technology development and transfer. A continuing technical monitoring after 1981 is envisaged. It is anticipated that the quality of Canadian rail will continue to improve aided by this CANMET initiative and that the domestic market for premium rail for unit train service in mountainous regions will be satisfied by domestic producers. An improved Canadian premium rail capability will also enhance off-shore marketing possibilities.

PERFORMING AGENCY: Department of Energy, Mines and Resources, Canada, F41A32001
 INVESTIGATOR: Brigham, R
 SPONSORING AGENCY: Department of Energy, Mines and Resources, Canada

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

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 on how to reduce retarder noise locally and to surrounding communities by the use of noise barriers. Information will be obtained by a measurement, barrier construction and evaluation program to be conducted at the Northtown freight classification yard of the Burlington Northern Railroad, Fridley, Minnesota.

PERFORMING AGENCY: Burlington Northern, Incorporated
SPONSORING AGENCY: Transportation Systems Center, OS-507
RESPONSIBLE INDIVIDUAL: Rickley, EJ Tel (617)494-2372

Contract DOT-TSC-1035 (CPFF)

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: May 1975 TOTAL FUNDS: \$69,150

ACKNOWLEDGMENT: TRAIS (OS-507), FRA

10 058675

DEVELOPMENT OF ENGINEERING DATA ON IN-SERVICE PERFORMANCE AND COSTS OF METHODS FOR CONTROL OF URBAN RAIL SYSTEM NOISE

The objective is (1) to develop definitive engineering data on long term costs and performance of four noise control techniques, and (2) to organize and present the data to permit engineering estimates of costs and performance of the techniques on any urban rail transit system in the United States. The techniques are: (a) use of resilient wheels on transit cars, (b) use of damped wheels, (c) use of wheel truing equipment to remove wheel flats and reduce wheel roughness, and (d) use of rail grinding equipment to reduce rail roughness.

REFERENCES:

In-Service Performance and Costs of Methods for Control of Urban Rail System Noise. Experimental Design, Holowaty, M; Saurenman, H; Rosen, S, UMTA-MA-06-0025-76-4Intrm Rpt., May 1976

In-Service Performance and Costs of Methods to Control Urban Rail System Noise. Test and Eval Plan, Saurenman, H; Holowaty, M, UMTA-MA-06-0025-7710Intrm Rpt., Apr. 1977

In-Service Performance and Costs of Methods to Control Urban Rail System Noise. Initial Test Series Report, Shipley, RL; Saurenman, H, UMTA-MA-06-0025-78-7, Aug. 1978

PERFORMING AGENCY: De Leuw, Cather and Company
SPONSORING AGENCY: Transportation Systems Center, UM-949
RESPONSIBLE INDIVIDUAL: Kurzweil, LG Tel (617) 494-2142

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: June 1975 COMPLETION DATE: Nov. 1979 TOTAL FUNDS: \$480,000

ACKNOWLEDGMENT: TRAIS (UM-949), TSC

10 138534

NOISE ABATEMENT

Identified as a major systems problem for transit authorities, this program has as its objective the reduction of noise and vibration on urban rail transit systems. Problem areas have been identified and the noise climate on operating authorities has been appraised. Tests and evaluation of available abatement hardware are to be made. New technology is to be developed. A handbook on noise and vibration control is to be produced.

PERFORMING AGENCY: Transportation Systems Center
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Spencer, PR Tel (202) 426-0090

Contract DOT-UM-604

STATUS: Active NOTICE DATE: July 1976 START DATE: 1971 COMPLETION DATE: June 1979 TOTAL FUNDS: \$3,500,000

ACKNOWLEDGMENT: UMTA

10 148341

WHEEL/RAIL INTERACTION SIMULATOR

Design of a machine which simulates interaction of rails and wheels for purposes of noise measurements.

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can

INVESTIGATOR: Curmi, RA Tel (416)248-3771

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

RESPONSIBLE INDIVIDUAL: Curmi, RA Tel (416)248-3771

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: Dec. 1976 COMPLETION DATE: June 1978

ACKNOWLEDGMENT: Ontario Ministry of Transportation & Communic, Can, Roads and Transportation Association of Canada

10 170655

RAILWAY NOISE

The reference values for the noise and vibration stresses to which people are exposed is established along with the propagation of train running noise and the influence of sound protection barriers and vehicle skirting. Proposals for noise abatement measures for older railway vehicles and the effect of time on the acoustic behaviour of railway vehicles are presented. Noise generation during the wheel/rail rolling contact and when braking and negotiation sharp curves are discussed. A report about noise levels inside and outside the vehicles of various Administrations was approved in the meantime. It takes into account statutory regulations and gives provisional guide values for noise levels. A further report explains radiation and propagation conditions for railway noise in free field on embankments and in cuttings. A detailed work program is being drawn up for dealing with sound variation from bridges. Furthermore, the influence of sound protection barriers and vehicle skirting has been studied. Curve screech and braking noise tests are terminated. The findings have been summarized in a report. An interim report is now available concerning experience with technical noise abatement measures for old vehicles.

Seven reports have been published to date. Question C137.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Thiele, W Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978

ACKNOWLEDGMENT: UIC

10 179325

LOCOMOTIVE IN-CAB NOISE RESEARCH

Occupational noise exposure of railroad workers has been of concern to railroad managements, labor organizations, and the U.S. Department of Transportation. In order to assist DOT in this area, NBS is conducting in-cab locomotive noise measurements sponsored by the Federal Railroad Administration. The objective of this program is the development of a measurement methodology and instrumentation system for assessing the noise environment in locomotive cabs. The information obtained from this assessment is in a form such that the total noise exposure or "dose" of each of the crew members can be determined. In addition, the measurement techniques utilized provide a means of identifying individual component sources as well as specific locomotive operations which contribute to the noise levels in the locomotive cab.

REFERENCES:

Locomotive In-Cab Noise--Towards a Standardized Measurement Methodology, Clark, RM; Kilmer, RD; Blomquist, DS, 77 Nat'l Noise Conf on Transp Noise Control Hampton, Va 7710, Proceedings, 1977

PERFORMING AGENCY: National Bureau of Standards, 7353432

INVESTIGATOR: Kilmer, RD Tel (301) 921-3783

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: McCown, RJ Tel (202) 426-1227

Contract IAG-AR-T4269

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1976 COMPLETION DATE: May 1980

ACKNOWLEDGMENT: National Bureau of Standards

10 179685

RAILROAD RIGHT-OF-WAYS AS WILDLIFE HABITATS IN STORY COUNTY, IOWA

Inventory the kinds and numbers of mammals and birds that utilize habitats found along railroad right-of-ways in an intensely farmed region of central Iowa. Associate bird and mammal use with specific right-of-ways habitats. Assess the relative importance of railroad right-of-ways to the total available wildlife habitat in Story County Iowa. Sampling plots will be selected by a stratified random method and will comprise about 5% of the rural, right-of-ways in Story County, Iowa. The strata will be active Right-of-ways,

abandoned right-of-ways, right-of-ways with exceptional native prairie, and right-of-ways adjacent to wetlands. Vegetation in all sampling plots will be covermapped. A census of birds and rabbits will be taken in each season of the year using a plot method known as the bounded count. Small mammal populations will be evaluated by trapping. Other mammal activity will be determined by evaluating "sign". The relative importance of right-of-way habitats will be assessed by comparisons with similar evaluations done on other wildlife habitat in Story County. A total of 20 study plots each including 0.25 mile of right-of-way were randomly selected to represent about 5% of the total non-urban rights-of-way in Story County. Major vegetation communities were identified on each plot and mapped during summer 1977. The vegetation cover-maps were then duplicated for use in plotting locations of birds sighted on the plot during censusing. Bird, rabbit, and small mammal censusing were conducted during fall 1977. Song Sparrows, Dark-eyed Juncos, Ring-necked Pheasants, Tree Sparrows, House Sparrows and American Goldfinches were the most frequently seen species among the 52 different kinds identified. Dark-eyed Junco and House Sparrow were the most abundant. Cottontail rabbits were sighted on 65% of the plots and 6 species of rodents and 2 species of shrews were trapped on the plots. The deer mouse (*Peromyscus maniculatus*) was the most numerous and abundant. Bird censusing will continue to determine frequency and density of species in winter, spring, and summer.

PERFORMING AGENCY: Iowa State University, Ames, Department of Animal Ecology, IOW02268

INVESTIGATOR: Klaas, EE Braband, LA

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1977 COMPLETION DATE: June 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0073892)

10 188647

URBAN RAIL NOISE ABATEMENT PROGRAM

Provide services of an Advisory Board comprised of cognizant transit professionals recruited from rail transit properties (those operating, under construction and in design). Advisory Board, from the transit operators point of view, will review with U.S. DOT-TSC and its contractor both the progress and findings on the following contracts: (1) SEPTA In-Service Test & Evaluation Project--Acoustical performance and cost-benefits of various types of resilient/damped wheels and techniques for wheel truing and rail grinding. (2) Elevated Structure Noise Control Project--Inventory of elevated rail rapid transit structures and assessment of noise reduction techniques. (3) Handbook of Urban Rail Noise & Vibration Control--Development of design, construction, operation and maintenance guidelines for control/minimization of noise and vibration associated with urban rail systems.

PERFORMING AGENCY: American Public Transit Association, 7232

INVESTIGATOR: Gordon, TS Tel (202) 331-1100

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Kurzweil, LG Tel (617) 494-2142

Contract DOT-TSC-1123

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: May 1976 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$68,000

ACKNOWLEDGMENT: American Public Transit Association

10 188654

HANDBOOK OF URBAN RAIL NOISE AND VIBRATION CONTROL

The objective of this contract is to produce a Handbook for the Prediction and Control of Urban Rail Noise and Vibration. This Handbook is intended to serve as a major source of information for transportation engineers and acousticians as well as a convenient tool for transit property personnel in their daily requirements for measurement, assessment, and control of rail noise and vibration.

PERFORMING AGENCY: Wilson, Ihrig and Associates, Incorporated, MA-06-0025

INVESTIGATOR: Wilson, G Tel (415) 658-8386

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Kurzweil, LG Tel (617) 494-2142

Contract DOT-TSC-1613

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$110,000

10 188655

DEVELOPMENT OF A NOISE CONTROL DESIGN GUIDE FOR EXISTING ELEVATED RAIL TRANSIT STRUCTURES

Primary objective will be development of rules for reducing noise on those types of urban rail elevated structures which have the greatest environmental noise impact in the U.S. Deliverables will include an "Inventory of U.S. Urban Rail Transit Elevated Structures," computer implementation of relevant elevated structure noise models, a "Noise Control Design Guide for Existing Elevated Rail Transit Structures," and an experimental design for in-service test and evaluation of selected treatments.

PERFORMING AGENCY: Bolt, Beranek and Newman, Incorporated, UM-06-0025

INVESTIGATOR: Ungar, E Tel (617) 491-1850

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Kurzweil, LG Tel (617) 494-2142

Contract DOT-TSC-1531

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: June 1978 COMPLETION DATE: July 1980 TOTAL FUNDS: \$322,000

10 188673

ENHANCEMENTS TO THE SES COMPUTER PROGRAM AND ITS APPLICATIONS

The objective is to improve the current version of the Subway Environment Simulation (SES) computer program, expand its applications based on current needs of the transit industry, and facilitate its utilization by the industry. Task work involves the review and analysis of the state-of-the-art in subway environmental control, particularly with regard to fire-emergency control techniques; major revisions in the SES program and its documentation; and transfer of software maintenance capabilities to TSC computer equipment.

PERFORMING AGENCY: Parsons, Brinckerhoff, Quade and Douglas, Inc.

INVESTIGATOR: Kennedy, WD

SPONSORING AGENCY: Transportation Systems Center

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Sept. 1978 COMPLETION DATE: Mar. 1980

10 193280

MEASUREMENT AND PREDICTION OF NOISE FROM NEARBY AIR AND RAIL OPERATIONS-FOR HIGHWAY PROJECTS

Prepare manual for evaluating and predicting community noise levels, resulting from air, rail and highway operations.

PERFORMING AGENCY: Transportation Systems International

INVESTIGATOR: Woo

SPONSORING AGENCY: Federal Highway Administration, Implementation Division, 400 7th Street, SW

RESPONSIBLE INDIVIDUAL: Bova

Contract DOT-FH-11-9533

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: Sept. 1978 COMPLETION DATE: Apr. 1979 TOTAL FUNDS: \$29,000

ACKNOWLEDGMENT: Federal Highway Administration (349108356)

10 196753

SUBWAY ENVIRONMENTAL SIMULATION PROGRAM

To validate specific portions of the Subway Environment Simulation (SES) program and to provide current information for the Subway Environmental Design Handbook for its use in predicting temperature distribution patterns during peak operating periods, safety ventilation operations, equipment operation cost savings, effectiveness of dome reliefs and temperature stratification patterns in large stations typical of the WMATA system.

PERFORMING AGENCY: Washington Metropolitan Area Transit Authority, DC-06-0267

INVESTIGATOR: Garrett, V Tel (202) 637-1158
SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Butler, GL Tel (202) 426-0090

Contract DC-06-0267

STATUS: Active NOTICE DATE: July 1979 START DATE: July
1979 COMPLETION DATE: May 1981 TOTAL FUNDS: \$451,000

ACKNOWLEDGMENT: UMTA

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, Jr Tel (202) 426-9564

STATUS: Active NOTICE DATE: Aug. 1977 COMPLETION DATE: Apr. 1979

ACKNOWLEDGMENT: FRA

11 058375

MORGANTOWN PERSONAL RAPID TRANSIT SYSTEM IMPACT EVALUATION PHASE I

This study consists of four phases as follows: (1) Pre-PRT phase prior to passenger service of the system, (2) Interim Phase during initial passenger service, (3) Operational Phase following introduction of revenue service, and (4) Final Phase integrating all data about Phase I system. The study objectives include (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 toward the systems, (e) to measure the impact of the PRT on travel and traffic, the economy, the society, and the environment in the PRT corridor. The Pre-PRT and Interim Phases have been completed. The Operational Phase is scheduled for completion in February 1979. The Final Report Phase is scheduled for completion in March 1979.

PRT Impact Study, Pre-PRT Phase. March 1976, Volume 1- Travel Analysis, SEG Elias; Volume 2-Data Collection Methodology and Coding Manual; Volume 3-Frequency Tabulations from Transportation Related Surveys, CN Redwine. Interim Phase. June 1977, Impact Evaluation of Morgantown PRT 1975-1976 Ridership: Interim Analysis, M.D. Stearns and K.H. Schaeffer.

PERFORMING AGENCY: West Virginia University, WV-03-0006 DOT-TSC-1316

INVESTIGATOR: Elias, SEG Tel (304) 293-5536

SPONSORING AGENCY: Transportation Systems Center, UM-839; Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Stearns, MD Tel (617)494-2796 Rubin, D Tel (617) 494-2160

Contract DOT-TSC-985

STATUS: Inactive NOTICE DATE: Jan. 1979 START DATE: Jan. 1975 COMPLETION DATE: Feb. 1979 TOTAL FUNDS: \$272,333

ACKNOWLEDGMENT: UMTA, West Virginia University, TSC

11 059365

ANALYSIS OF THE MORGANTOWN INDUCTIVE COMMUNICATION SYSTEM DESIGN

Provide a report documenting the Morgantown Inductive Communication System Design. The report shall contain the following elements: a) Provide a general description of the MPRT System and its operation including a description of the Control and Communications System; b) Describe the system level design requirements and the resulting design, analysis and development test program undertaken to meet and validate these requirements as well as the rationale that led to the selection of the communication techniques implemented in the MPRT System; c) Describe the significant analysis and test results obtained, with emphasis on the major problem areas encountered at Morgantown and the solutions to these problems; d) Provide a detailed description of efforts made to develop a guideway analytical model, any validation tests performed and known limitations of work done to date. Define areas which must be expanded or validated to develop a useful guideway model.

PERFORMING AGENCY: Boeing Company, P.O. Box 3999, DOT-TSC-1275

INVESTIGATOR: Johnstone, T Tel (206) 773-1826

SPONSORING AGENCY: Transportation Systems Center, R6782

RESPONSIBLE INDIVIDUAL: Yoh, P Transportation Systems Center Tel (617)494-2271

Contract DOT-TSC-1275 (CPF)

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Sept. 1976 COMPLETION DATE: Apr. 1979 TOTAL FUNDS: \$21,525

ACKNOWLEDGMENT: TRAIS (R6782)

11 059435

ALTERNATIVE GUIDEWAY CROSS SECTION STUDY

The successful implementation of advanced technology transportation systems-systems more advanced than those currently being investigated in UMTA's Automated Guideway Transit (AGT) program-may well depend on the ability of system designers to develop low cost, elevated, aesthetically pleasing guideways permitting extensive switching and carrying two-way vehicle flow. Possible guideway configurations which meet these criteria include those with an elevated single beam span which can support two-way flow by either suspending the vehicles from the side of the beam or in an over-and-under configuration. What is needed is a rational approach to measure the overall effectiveness of the various guideway possibilities, particularly with regard to structural efficiency and cost.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Wormley, DN

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Ravera, RJ Tel (202) 426-9364

ID DOT-AS-70005

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Oct. 1976 TOTAL FUNDS: \$20,000

ACKNOWLEDGMENT: TRAIS

11 059924

MULTI-DISCIPLINARY STUDY OF THE USE OF TRAINS OR PLATOONS OF VEHICLES FOR URBAN AUTOMATED GUIDEWAY TRANSPORTATION (AGT)

The project undertakes research on the use of trains or platoons of vehicles in combination with individual small vehicles for urban automated transportation. The multi-disciplined study will undertake two tasks: 1) System Operations-Relate the technological characteristics of the trained AGT systems to the potential economic and service advantages these systems offer. 2) Vehicle Control- Investigate vehicle control configurations. Determine what kind of vehicle control system will permit operations at the highest capacity level. Derive and justify the safety assumptions and synthesize and simulate the controller configuration. Conduct a single-vehicle/train capacity analysis.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Shladover, SE

SPONSORING AGENCY: Urban Mass Transportation Administration, MA-11-0029

RESPONSIBLE INDIVIDUAL: Hoyler, RC Tel (202) 426-4047

Grant DOT-MA-11-0029

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Sept. 1976 COMPLETION DATE: Nov. 1978 TOTAL FUNDS: \$47,000

ACKNOWLEDGMENT: TRAIS (MA-11-0029)

11 135604

COMMAND AND CONTROL SYSTEMS FOR ADVANCED TRANSPORTATION SYSTEMS

This project is a study of new "people mover" concepts which may evolve to provide practical attractive alternatives to the private automobile as a mode of transportation. Each concept requires a command and control system not only to provide safety but also to ensure efficient and expeditious movement of traffic. In all cases operation is automatic with respect both to the onboard control of the propulsion and brakes of the individual vehicles and also to the overall coordination of system functions. Development effort has been directed toward meeting new requirements of advanced system concepts. Especially in the area of Personal Rapid Transit, controls are being developed to meet the conflicting need to achieve traditional standards of rapid transit safety while permitting the short headways necessary for

acceptable capacity with small vehicles. A family of control systems is being realized for applications varying widely with respect to vehicle characteristics, guideway configuration, and operating policy (scheduled or demand modes of service).

PERFORMING AGENCY: General Railway Signal Company
 INVESTIGATOR: Auer, JH
 SPONSORING AGENCY: General Railway Signal Company

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1974

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (AQ 881 2)

11 138792

MORGANTOWN PRT SYSTEM

Develop a personal rapid transit system capable of carrying 5,000 passengers per lane per hour at a 15-second headway, prove the technical feasibility of a fully automated PRT, determine economic and service benefits of a PRT system and assess the institutional problems encountered in building such a system in an urban environment. The concept of automatic control for a vehicle system operating on close headways and the fail-safe concept using checked redundancy have been validated. Design for expansion of the system is underway. Present system is being expanded under an UMTA Capital Grant of \$63.5M to the West Virginia Board of Regents from 3 stations, 5.4 miles single lane guideway, and 45 vehicles to 5 stations, 8.4 miles single lane guideway, and 73 vehicles. An Additional maintenance facility, a heated power rail, and other technical improvements will also be added.

REFERENCES:

Morgantown PRT System Boeing Aerospace Company, Nov. 1975
 PRT Impact Study (Pre-PRT Phase) Elias, SEG, Mar. 1976
 Morgantown PRT Operation & Maintenance History Stone, AL, Boeing Aerospace Company, Jan. 1977
 Morgantown PRT Impact Evaluation. Interim Analysis Of Ridership, Stearns, M; Schaeffer, K, Mar. 1977

PERFORMING AGENCY: Boeing Company; West Virginia University
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Barsony, SA Tel (202) 426-2896

Contract WV-06-0005

STATUS: Active NOTICE DATE: Aug. 1977 START DATE: 1970 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$60,000,000

ACKNOWLEDGMENT: UMTA

11 148334

NON-CONTACT SUSPENSION/PROPULSION TECHNOLOGIES

An integrated-magnetic levitation/propulsion system is a possible candidate for achieving noiseless, lightweight urban and moderate speed interurban transportation. The objective of this research is to explore the feasibility of such systems for high-speed interurban transportation. A single-sided linear induction motor (LIM) and reaction rail will be fabricated and tested on the rotating wheel facility operated by the Canadian Institute of Guided Ground Transport at Queens University in Kingston, Ontario. These tests and subsequent analysis will be used to place SLIM performance in context with competing magnetic levitation schemes.

REFERENCES:

Integrated Suspension and Propulsion of Guided Ground Transportation Vehicles with a SLIM, Katz, RM, June 1979

PERFORMING AGENCY: Mitre Corporation, Metrek Division
 INVESTIGATOR: Katz, RM Tel (703) 827-6685
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Bartholow, B Tel (202) 426-9364

Contract DOT-UT-50016

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: June 1976 COMPLETION DATE: June 1979 TOTAL FUNDS: \$409,000

ACKNOWLEDGMENT: DOT

11 148346

NON-CONTACT SUSPENSION/PROPULSION TECHNOLOGIES

This is a US/Federal Republic of Germany cooperative research project. The objective is to determine the limits of allowable guideway flexibility and roughness for high-speed attraction magnetic levitation systems. Tests will be conducted using the German-developed 400 K/h KOMET test vehicle and track. The test data will be used to validate vehicle/guideway computer simulations which will be used to perform parametric studies.

PERFORMING AGENCY: Mitre Corporation, Metrek Division

INVESTIGATOR: Milner, JL Tel (703)790-6456

SPONSORING AGENCY: Office of the Secretary of Transportation; Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Ravera, RJ Tel (202)426-9365

Contract DOT-TSC-1263

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Sept. 1976 COMPLETION DATE: Sept. 1977 TOTAL FUNDS: \$90,000

ACKNOWLEDGMENT: DOT

11 148347

ASSESSMENT OF TECHNOLOGY BASE AND APPLIED RESEARCH FOR NON-CONTACTING VEHICLE SUSPENSION AND PROPULSION SYSTEMS

The research shall assess critically the technological base available for the evaluation of non-contacting suspension and propulsion systems in urban and intercity transport systems. The assessment involves critical reviews of existing data, identification of gaps in current technology and areas which show promise for the future. An applied research program to provide performance data for selected ferromagnetic and fluid non-contacting propulsion and suspension systems complements the general assessment.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Wormley, DN Tel (617)253-2246 Hedrick, JK Richardson, HH

SPONSORING AGENCY: Department of Transportation

RESPONSIBLE INDIVIDUAL: Barrows, T Tel (617) 494-2758

Contract DOT-OS-60135

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: June 1976 COMPLETION DATE: June 1980 TOTAL FUNDS: \$226,000

ACKNOWLEDGMENT: DOT

11 149463

SYNCHRONOUSLY OPERATING LINEAR ELECTRIC MOTORS FOR GROUND TRANSPORTATION

To conduct studies, primarily analytical, of certain aspects of linear synchronous motor operation and design. To review work of General Electric, done under a related contract, on the design of linear synchronous motors, and on the construction and testing of a small scale model of such machines.

REFERENCES:

Preliminary Method for Design of a Linear Synchronous Motor, Inductor Type, Levi, E, Jan. 1977

PERFORMING AGENCY: Polytechnic Institute of New York, Department of Transp Planning & Engineering, 333 Jay Street, PR-4227

INVESTIGATOR: Levi, E Tel (212)643-4486 Birenbaum, L Zabar, Z

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Guarino, M, Jr Tel (202)426-9665

Contract DOT-FR-64227

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: Sept. 1975 COMPLETION DATE: 1979 TOTAL FUNDS: \$62,660

11 156700

DYNAMIC EXPERIMENTS OF ALTERNATIVE GUIDEWAY-VEHICLE SYSTEMS

The broad purpose is to experimentally investigate vehicle-elevated guideway response dynamics. Non-dimensional system responses such as critical bending moments on multiple-span bridges and associated heave accelerations of passing, sprung-mass vehicles are correlated with computer-aided predictions. Similar results are being obtained for cable-stayed bridges and curved spans.

REFERENCES:

Experiments in Guideway-Levitation Vehicle Interaction Dynamics, Wilson, JF, NTIS, FRA-OR&D 76-259, July 1976

Experiments in Guideway-Levitation Vehicle Interaction Dynamics, Wilson, JF, NTIS, July 1976, PB-257941

Transient Dynamics of Curved Guideway Structures: Frequency Spectra, Wilson, JF; Garg, DP, AIAA/ASME 18th Structures Conference, Paper 77-371, Mar. 1977

Transient Dynamics of Curved Guideway Structures for Urban Vehicles Dynamic Responses, Wilson, JF, Proc 8th Annual Conf on Modeling and Simulation, Apr. 1977

Orthotropic Plate Responses to Convective Loads Wilson, JF, Develop-

ments in Theoretical and Applied Mechanics, Volume 9, 1978

Dynamics of Curved Guideway Spans for AGT Vehicles Wilson, JF; Joseph, TP, Proc Conf Automated Guideway Transit Tech Devel; US DOT, Mar. 1978

Frequencies of Annular Plate and Curved Beam Elements Wilson, JF; Garg, DP, AIAA Journal, Mar. 1978

Dynamic Experiments of Alternative Guideway-Vehicle Systems, Part I, Wilson, JF, DOT/RSPA/DPB-50/7711, June 1978

PERFORMING AGENCY: Duke University, 343-9934

INVESTIGATOR: Wilson, JF Tel (919) 684-2434 Garg, DP

SPONSORING AGENCY: Department of Transportation, Office of University Research, Res & Special Program Admin

RESPONSIBLE INDIVIDUAL: Ravera, RJ Tel (202) 426-0190

Contract DOT-OS-60130

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: June 1976 COMPLETION DATE: Mar. 1979 TOTAL FUNDS: \$116,361

ACKNOWLEDGMENT: Duke University

11 159658

AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY PROGRAM, SYSTEM SAFETY AND PASSENGER SECURITY PROJECT

The objectives of the project are to develop automated guideway transit guidelines for: (1) passenger security; (2) evacuation and rescue, (3) passenger safety and convenience services, (4) develop a model of the passengers values and needs with regard to personal security, (5) determine safe emergency deceleration and jerk maxima and passenger seat retention characteristics, and (6) evaluate and disseminate guidebook information through safety and security workshops.

As part of this effort a study on the effects of a closed-circuit television system on passenger security perception is being conducted in cooperation with the New York City Transit Authority. Subcontractors are University of Virginia and the Vought Corporation

PERFORMING AGENCY: Dunlap and Associates, Incorporated

INVESTIGATOR: Pepler, RD Tel (202)655-3971

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Sussman, ED Tel (617)494-2041

Contract DOT-TSC-1314

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Jan. 1977 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$588,000

ACKNOWLEDGMENT: UMTA

11 159659

AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY PROGRAM, VEHICLE LATERAL CONTROL AND SWITCHING (VLACS) PROJECT

The VLACS project will develop AGT vehicle lateral control and switching concepts that (1) reduce cost, weight, and complexity, (2) improve performance (ride quality), life, reliability, and increase switching capability. The VLACS project provides for an experimental program to validate and evaluate the analytical design studies. Both contact (mechanical) and non-contact (wire follower) lateral control systems will be evaluated. To aid government officials, transit planners and system manufacturers, the VLACS project will develop lateral control and switching system guideline specifications and data base of the current technology.

PERFORMING AGENCY: Otis Elevator Company, Transportation Technology Division

INVESTIGATOR: Haines, GA Tel (303) 343-8780

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Izumi, G Tel (202) 426-4048

Contract DOT-UT-70088

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: Aug. 1977 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$869,477

ACKNOWLEDGMENT: UMTA

11 159660

AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY PROGRAM, VEHICLE LONGITUDINAL CONTROL AND RELIABILITY

Reduce cost and complexity and increase reliability of Longitudinal Control Systems through the following steps: (1) Technology Evaluation and Model

Development; (2) Vehicle Longitudinal Control Studies; (3) Reliability Enhancement Studies; (4) Entrainment and Platooning Studies; (5) Experimental Program; (6) Data Base Development and Guidelines Specification and Requirements.

PERFORMING AGENCY: Otis Elevator Company, Transportation Technology Division

INVESTIGATOR: Schumacher, PJ Tel (303)343-8780

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Hoyler, RC Tel (202) 426-4047

Contract DOT-UT-70048

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: May 1977 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$2,562,000

ACKNOWLEDGMENT: UMTA

11 159662

AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY. SYSTEMS OPERATION STUDY

The objectives of the System Operation Study are to evaluate the applicability of AGT systems to alternative application areas as well as to make AGT computer analysis tools available to AGT systems and investigate the operational characteristics of automated guideway transit systems in network configurations such as simple shuttles or loop, line haul networks and complex or area-wide networks.

PERFORMING AGENCY: General Motors Corporation, Transportation Systems Division

INVESTIGATOR: Thompson, J Tel (313)575-8485

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: MacKinnon, D Tel (202) 426-4047

Contract DOT-TSC-1220

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: July 1976 COMPLETION DATE: 1979 TOTAL FUNDS: \$3,683,091

ACKNOWLEDGMENT: UMTA

11 160276

AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY PROGRAM, GUIDEWAY AND STATION TECHNOLOGY PROJECT

Develop guideway, station and weather protection concepts which will reduce the cost of AGT systems. The work includes: state-of-the-art reviews of existing AGT guideways and stations found at AGT and AGT related systems and weather protection provisions and techniques; the development of design guidelines for AGT guideways and stations including site integration; the development of evaluation models, including cost and implementation time, for AGT guideways and stations; and the development of a dynamic model calibrated by using ride quality data from selected AGT systems.

REFERENCES:

AGT Guideway and Station Technology, Volume 2, Weather Protection Review, Stevens, RD; Nicarico, TJ; McGean, TJ, UMTA-IT-06-0152-79-1Aavail NTIS, Mar. 1978

AGT Guideway and Station Technology, Volume 3, Guideway and Station Review, Stevens, RD; Dolan, CW; Pour, RJ; Nettles, TA, UMTA-IT-06-0152-79-2Aavail NTIS, Sept. 1978

PERFORMING AGENCY: De Leuw, Cather and Company, P2914

INVESTIGATOR: Stevens, RD Tel (312) 346-0424

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Izumi, G Tel (202) 426-4047

Contract DOT-UT-70066 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: July 1977 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$999,685

ACKNOWLEDGMENT: TRAIS

11 160399

FRA ADVANCED SYSTEMS PROGRAMS

The FRA Advanced Systems Programs were reduced to that of only monitoring activities of other countries. The Department took this action to reflect the position that revitalizing and upgrading our existing railroads was of a higher priority than developing technology for advanced systems that would not be needed for some years to come. The Department should keep abreast of the technology developments in other countries so that when it is again decided that this country needs to develop advanced systems, we will

have the right information on which to base our technical choices from our own independent evaluations of the state-of-the-art.

PERFORMING AGENCY: Massachusetts Institute Of Technology
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Kamalian, N

Contract DOT-FR-751-4331 (CR)

STATUS: Completed NOTICE DATE: Sept. 1979 START DATE: Sept. 1977 TOTAL FUNDS: \$9,945

ACKNOWLEDGMENT: TRAIS

11 170589

ACCELERATING WALKWAY DEMONSTRATION

A moving walkway which accelerates a user from a 1.5 mph entrance speed to a 7.5 mph cruise speed and then decelerates the user back to a 1.5 mph exit speed is being developed, tested and demonstrated. The system provides an up to five times improvement in cruise speed compared to conventional constant speed moving walkways.

PERFORMING AGENCY: Port Authority of New York and New Jersey, IT-06-0126

INVESTIGATOR: Fruin, J Tel (201) 963-7205

SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Izumi, G Tel (202) 426-4048

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: July 1976 COMPLETION DATE: Dec. 1982

ACKNOWLEDGMENT: UMTA

11 170593

ECONOMIC FEASIBILITY OF A MAGNETICALLY LEVITATED TRANSPORTATION SYSTEM IN THE CANADIAN CORRIDOR

The economic feasibility of a magnetically-levitated high-speed (350 km/h and (450 km/h) passenger system in the Canadian Corridor is being evaluated in terms of its relative viability vis a vis very-high-speed conventional rail (300 km/h) and intermediate-speed conventional rail (200 km/h) alternatives. Project objectives include design optimization, the investigation of possible implementation scenarios and development time frames, and an assessment of economic and/or commercial viability.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-848

INVESTIGATOR: Lake, RW Tel (613) 547-5777 Boon, CJ Eastham, AR

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Audette, M Tel (514) 283-2880

Contract OST-77-00109

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Dec. 1977 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$214,000

ACKNOWLEDGMENT: CIGGT

11 170605

AGTT/AGRT SUPPORT AND CONSENSUS

APTA will provide UMTA's AGRT and AGTT programs with transit industry input, advice, and consensus on automated guideway transit technology and advanced group rapid transit in such areas as classification, basic requirements, service and operational requirements, passenger accommodations, system and subsystem design requirements, and system verification, certification, and acceptance.

PERFORMING AGENCY: American Public Transit Association

SPONSORING AGENCY: Urban Mass Transportation Administration

Contract DOT-UT-70058

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Feb. 1977 COMPLETION DATE: June 1980 TOTAL FUNDS: \$99,738

ACKNOWLEDGMENT: American Public Transit Association

11 170621

VEHICLE DATA ACQUISITION SYSTEM

One of the SEATAC SLT vehicles will be instrumented with sensors, scanner, and data storage device to be designed and developed. The device will record the condition of 32 sensors for the most recent 20 minutes in order to aid with vehicle diagnostics in the event of a failure. A data processing system will produce a strip chart of the recorded sensor outputs

within one hour of a failure. A failure analysis wing VDAS will be carried out for 6 months, and the results, including cost effectiveness of such a system, documented in a Final Report.

PERFORMING AGENCY: SEA-TAC International Airport, Port of Seattle
INVESTIGATOR: Bitts, MK Tel (206) 433-5407

SPONSORING AGENCY: Urban Mass Transportation Administration
RESPONSIBLE INDIVIDUAL: Hoyler, RC Tel (202) 426-4047

Grant DOT-WA-06-0009

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Aug. 1977 COMPLETION DATE: July 1978 TOTAL FUNDS: \$88,295

ACKNOWLEDGMENT: UMTA

11 193781

STUDY OF REQUIREMENTS FOR ADVANCED INTERCITY TRANSPORTATION SYSTEMS

This project investigates the requirements for advanced intercity transportation in selected corridors in light of needs for energy efficiency and improved productivity. Various new technologies including tracked levitated vehicles and hybrid systems are considered.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Richardson, HB

SPONSORING AGENCY: Federal Railroad Administration

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: Mar. 1979 COMPLETION DATE: Sept. 1980

ACKNOWLEDGMENT: Massachusetts Institute of Technology

11 196716

HIGH SPEED GUIDED GROUND TRANSPORT APPLICATIONS

The results of various advances in high speed technology will be incorporated in preliminary application studies, in order to guide and focus further component and concept developments:

PERFORMING AGENCY: Transport Canada Research and Development Centre, F34A53124

INVESTIGATOR: Myers, B

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1978 COMPLETION DATE: Mar. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

11 196729

TRACKED LEVITATED VEHICLES

A continuing thrust area investigates the potential of advanced types of tracked levitated vehicle ground transportation systems having non-contact suspension, guidance and propulsion, for high speed intercity travel, airport access and urban applications. The research and application challenges have stimulated strong cooperation among various programs worldwide, particularly in magnetic levitation and linear synchronous motor research to which Canada has contributed significantly. A main goal of the Division's track levitated vehicle work has been to investigate this technology as a possible long term future alternative for Canadian intercity passenger transport for distances up to 500 miles. At present a system concept has been defined which is uniquely suited to Canadian demographic and climatic conditions. It is planned to proceed with the construction and test of the critical high technology components essential to the present design concept.

PERFORMING AGENCY: Transport Canada Research and Development Centre, F34A54112

INVESTIGATOR: Rudback, NE

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1978

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

11 196738

EVALUATION PROJECT FOR INTEGRATED MAGNETIC SUSPENSION AND PROPULSION USING A SLIM WITH AN IRON-ONLY REACTION RAIL

An experimental program (with analysis at the Mitre Corp.) to evaluate the single-sided linear induction motor for an integrated suspension-propulsion system for guided ground transport is underway. Subsequent to experimen-

tation with a squirrel-cage rail, a solid steel-only rail has been mounted on the rim of a 7.7m diameter 0-101 km/h test wheel. A 1.73m long 6-pole motor is mounted in a 6-component force balance and energized by a 200 kva PWM inverter. Tests are being conducted over a wide range of operating conditions and data (3 phase voltages, currents, powers, frequency, speed, gap, forces, moments & flux distribution) are sampled, processed and stored in S.I. units by a 64-channel minicomputer acquisition system.

See also RRIS 11 148334.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-902

INVESTIGATOR: Eastham, AR Tel (613) 547-3237 Dawson, GE Atherton, DL Schwalm, CL

SPONSORING AGENCY: Mitre Corporation

RESPONSIBLE INDIVIDUAL: Katz, RM Tel (703) 827-6685

STATUS: Active NOTICE DATE: July 1979 START DATE: June 1979 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$53,000

ACKNOWLEDGMENT: CIGGT

11 196739

AN ASSESSMENT OF THE DYNAMIC BRAKING PERFORMANCE OF A SLIM WITH A SQUIRREL-CAGE

REACTION RAIL

An experimental program to evaluate the dynamic braking performance of a SLIM with a squirrel-cage reaction rail is underway. The laminated squirrel-cage rail is mounted on the rim of a 7.7m diameter 0-101 km/h test wheel. A 1.73m long 6-pole linear induction motor primary is mounted in a 6-component force balance and energized by a 200 kva PWM inverter. Tests are being conducted throughout the plugging, motoring and dynamic braking regions and data (3 phase voltages, currents & powers, frequency, speed, gap, forces, moments & flux distribution) are sampled, processed and stored in SI units by a 64-channel minicomputer acquisition system.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-920

INVESTIGATOR: Eastham, AR Tel (613) 547-3237 Dawson, GE Schwalm, CL

SPONSORING AGENCY: Canadair Services Limited

RESPONSIBLE INDIVIDUAL: Williamson, BF Tel (613) 389-9023 Wallace, A

STATUS: Active NOTICE DATE: July 1979 START DATE: May 1979 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$13,000

ACKNOWLEDGMENT: CIGGT

12 058838

SYSTEM SAFETY-AN INTERDISCIPLINARY APPROACH TO TRANSPORTATION SAFETY

The effort concerns the applicability of system safety concepts at the planning and design stages of new transportation facilities, equipment or programs and in the operational stages of existing facilities or ongoing programs. Specific results shall be generated in methodology and guidelines and in case studies. The specific objectives of the safety research are: 1. To transfer applicable systems concepts to the transportation safety sector. 2. To identify and resolve key issues in transportation safety. 3. To develop a transportation systems safety methodology applicable to the transportation industry-A symposium co-sponsored by TRB on the applicability major and used of system safety in transportation will be organized in May 1979.

REFERENCES:

Transportation Systems Safety. A Literature Search and Annotated Bibliography, Cantilli, EJ et al, Mar. 1976

Key Issues in Transportation Safety Horodniceanu, M et al, June 1976

Transportation System Safety Methodology Cantilli, EJ et al, Jan. 1977

Safety Issues in Transportation Horodniceanu, M et al, Feb. 1978

TSM: Applicability to the Highway Mode Horodniceanu, M et al, Feb. 1978

A Behavioral Consideration of the Pilot-Air Traffic Controller Interface, Salzinger, K et al, Final Report, Jan. 1978

TSM: Applicability to the Rail-Rapid-Transit Mode Cantilli, EJ et al, Final Report, May 1978

PERFORMING AGENCY: Polytechnic Institute of New York, Transportation Training and Research Center

INVESTIGATOR: Pignataro, LJ Tel (212) 643-5272 Cantilli, EJ

SPONSORING AGENCY: Department of Transportation

RESPONSIBLE INDIVIDUAL: Bolger, PH Tel 202-4264458

Contract DOT-OS-50241

STATUS: Active NOTICE DATE: Jan. 1979 START DATE: Sept. 1975 COMPLETION DATE: June 1979 TOTAL FUNDS: \$469,157

ACKNOWLEDGMENT: TRAIS (PUR-50315), OST, Polytechnic Institute of New York

12 059864

EVALUATION OF SAFETY OF LOADING AND SECUREMENT HARDWARE FOR TRANSPORTING WHEELCHAIR PASSENGERS ON TRANSIT VEHICLES

The objectives includes: (1) developing safety guidelines for wheelchair loading equipment, (2) determining the crashworthiness of standard wheelchairs secured by selected, representative securement systems, (3) comparison of parameters other than safety of systems being tested (i.e., ease of use, acceptability to user, costs), (4) recommendation of design modifications if they are found to be needed, (5) establishment of the cost effectiveness of the securement systems, and (6) development of educational materials for users and operators of wheelchair loading and securement facilities.

PERFORMING AGENCY: California Department of Transportation

INVESTIGATOR: Stewart, C

SPONSORING AGENCY: Urban Mass Transportation Administration, CA-06-0098-00-01

Contract CA-06-0098-00-01 (FFP)

STATUS: Active NOTICE DATE: Oct. 1978 START DATE: Jan. 1977 COMPLETION DATE: July 1979 TOTAL FUNDS: \$195,000

ACKNOWLEDGMENT: TRAIS (CA-06-0098-00-01)

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 03--Materials Study; Phase 05--Head Study; Phase 07--Safety Relief Devices; Phase 08--Reduced Scale Model Studies; Phase 10--Design Study Car; Phase 11--Thermal Effects Studies; Phase 12--Vessel Failure Research; Phase 13--Head Shield Study; Phase 14--Stub Sill Buckling Study; Phase 15--Switchyard Impact Tests; and Phase 16--Tank Car Wear Experiments are completed. The other phases, on which work is continuing, are the following: Phase 01--Accident Review; Phase 02--Accident Data Analysis; Phase 04--Literature Review; Phase 06-- Safety Valve in Liquid Study; Phase 09--Design Study, Tanks and Attachments.

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: Aug. 1979 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 099389

RAIL VEHICLE SAFETY RESEARCH PROGRAM

This program has as its objectives: (1) Increase the safety of hazardous material cars; (2) Decrease number and severity of accidents caused by vehicle component failures; (3) Decrease the number of accidents caused by human error; (4) Reduce the number and severity of grade crossing accidents; (5) Improve communication and control systems. 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

PERFORMING AGENCY: Federal Railroad Administration, Office of Rail Safety Research

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

STATUS: Active NOTICE DATE: Aug. 1977

ACKNOWLEDGMENT: FRA

12 099392

LOCOMOTIVE CAB SAFETY

A number of special projects directed toward improving the safety of the work space provided for operating crews in the cabs of locomotives have been undertaken. After an in-depth review of FRA-funded studies of accidents and potential hazards, it was determined that the railroad industry should respond with effective cab improvements. AAR had Electro-Motive and General Electric develop "clean" locomotive cab mock-ups. Modifications were based on reviews of these mock-ups. As a result, about 20 improvements are being incorporated in the cabs of production locomotives. These changes eliminate potentially hazardous sharp corners and edges, provide protective padding on certain exposed surfaces, provide added protection to prevent injuries associated with cab doors, provide improved drinking water facilities and improved sanitary facilities. Another project is a study of the consequences of head-on and rear-end collisions between trains. A test program is intended to provide the information necessary to redesign locomotives to increase the survival rate in train-to-train collisions. Furthermore locomotive cab seats are being examined in light of human factors criteria to arrive at generic specifications for the design and development of safer, more comfortable seats to be incorporated in new locomotive deliveries.

PERFORMING AGENCY: Association of American Railroads Technical Center

SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railroad Labor Organizations

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1979 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 simply by comparing 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) 567-3607

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 099428

RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT. PHASE 6-SAFETY VALVE DISCHARGE CAPACITY

When a tank car carrying liquified compressed gas is heated in a fire, its contents can expand to where the tank can become nearly shellfull at the safety valve pressure setting. The safety valve must then maintain safe tank pressure by momentarily discharging liquid. It may also be called upon to do this through liquid discharge in the event the tank is overturned and exposed to fire. As in other pressure vessel codes, the tank car specifications require that safety valves be sized and tested on the basis of vapor discharge. There being no firm data on liquid discharge capacities, this Phase was established with the objective of determining such capacities by means of full-scale test. Toward this end, a special 20,000 gallon test tank was fabricated with provisions for mounting the currently used safety valves on both the top and bottom of the tank. The tank has been installed at Edwards Air Force Base, and tests have been run using water, air, and vapor and liquid LPG. This program is being conducted on a cooperative basis with the FRA. Results, not yet available, will be published after all data is reduced.

See also RRIS 12A 081788.

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) 567-3607

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1970

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 complete covering the five year period 1971-1975 and a report is in preparation. 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) 567-3607

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1970

ACKNOWLEDGMENT: AAR

12 130946

QUANTITATIVE DESCRIPTIONS OF TRANSPORTATION ACCIDENTS INVOLVING HAZARDOUS MATERIALS

Description: Sandia's continuing effort in this area includes the following major components: Assessment of the probability of occurrence and the severity of the five major environments (impact, fire, puncture, crush and

immersion) experienced by casks or containers in air, highway and rail transportation. Analyses of these predicted environments to assess possible revisions or regulatory standards. Consideration of specific examples, e.g., the response of a radioactive material shipping cask involved in a rail grade crossing accident, to determine threat probabilities for potentially large contamination incidents. Revision of analytical descriptions to make the results more applicable to an increasing number of specific risk analysis studies aimed at optimizing procedures for transporting radioactive materials. Compilation of pertinent accident information in a data bank to provide retrievability of specific information to parties performing analyses.

This project is also supported by Sandia Laboratories.

PERFORMING AGENCY: Sandia Laboratories, Nuclear Materials Transportation Technology Dept 4550

INVESTIGATOR: McClure, JD Hartman, WF Foley, JT

SPONSORING AGENCY: Department of Energy, Division of Waste Management and Transportation

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1975

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GPW 51 1)

12 135594

PHYSICAL PARAMETERS OF TRANSPORTATION ACCIDENTS

Sandia's continuing effort in this area includes the following major components: Assessment of the probability of occurrence and the severity of five major transportation accident environmental categories (impact, fire, puncture, crush and immersion) that may be experienced by casks or containers in air, highway, rail, and water transportation. Analyses of these environmental categories can be used in the consideration of possible revisions of the regulatory standards. Consider the specific examples, e.g., the response of a radioactive material shipping cask involved in a rail grade crossing accident to determine the threat probabilities for potentially large contamination incidents. The analytical description available in these studies are applicable to specific risk analysis studies aimed at optimizing procedures for transporting hazardous materials. Compilation of pertinent accident information in a data bank provides retrievability of specific information to parties performing transportation accident analyses.

PERFORMING AGENCY: Sandia Laboratories, Nuclear Materials Transportation Technology Dept 4550, ALO 117B

INVESTIGATOR: McClure, JD Tel (505) 264-8753 Foley, JT Davidson, CA

SPONSORING AGENCY: Department of Energy, ETW, Transportation Branch

RESPONSIBLE INDIVIDUAL: Chitwood, PB Tel (202) 353-4077

Contract DE-AC04-76DP00789

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1975

ACKNOWLEDGMENT: Department of Energy

12 135596

MAINTENANCE OF A TRANSPORTATION ACCIDENT ENVIRONMENTAL DATA BANK

The maintenance of this data bank involves the active pursuit of sources of new data, the updating of indices, and responding to official users who wish to obtain environmental data. A necessary part of this continued work is the processing of data and entry into the storage and retrieval system. As needs for new data are identified, these will be sought. User requests for nonexisting data are expected to be a major contributor to this identification.

REFERENCES:

Transportation Accident Environment Data Index Foley, JT; Davidson, CA, SAND 75-0248C, Apr. 1977

PERFORMING AGENCY: Sandia Laboratories, Applied Mechanics Division II, 5522, AL 0517A

INVESTIGATOR: Foley, JT Tel (505) 264-3036 Davidson, CA

SPONSORING AGENCY: Department of Energy, Environmental Control Technology Division

RESPONSIBLE INDIVIDUAL: Sisler, JA Tel (301) 973-5361 Priddy, TG Tel (505) 264-6764

Contract AL 051

STATUS: Active NOTICE DATE: Oct. 1978 START DATE: July 1975 TOTAL FUNDS: \$330,000

ACKNOWLEDGMENT: Department of Energy

12 135599

FULL SCALE VEHICLE TESTING PROGRAM

This project plans full scale accident tests to determine the integrity of shipping casks for transportation of nuclear wastes. The problem of transporting nuclear wastes becomes more acute as operating reactors increase. Demonstrations of shipping container integrity are necessary. Three extreme accident full scale tests using obsolete casks are planned: (1) High speed locomotive impact on stalled truck cask; (2) High speed derailment of rail cask into solid abutment followed by fire; (3) Truck mounted cask at high speed into solid barrier. Modeling and analysis will precede instrumented tests. Results will aid in prediction of performance of currently used, better designed casks.

PERFORMING AGENCY: Sandia Laboratories, AL 3617A
 INVESTIGATOR: Yoshimura, HR Tel (505) 264-2452
 SPONSORING AGENCY: Department of Energy, Environmental Control Technology Division
 RESPONSIBLE INDIVIDUAL: Sisler, JA Tel (301) 973-5361

Contract E(29-1)-789

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: July 1975 TOTAL FUNDS: \$1,170,000

ACKNOWLEDGMENT: Department of Energy

12 135719

DYNAMIC PROPERTIES OF PACKAGING MATERIALS IN TRANSPORT ACCIDENTS

The aim of the project is to develop data on dynamic material properties for materials of construction for shipping casks, particularly those properties required for analysis of transport accidents. Structural problem areas during dynamic loading of shipping casks will be delineated; experimental techniques (mostly models) will be used for material and structure studies. Results will be used as benchmarks for computer codes being developed at LASL for dynamic loading problems of shipping casks.

PERFORMING AGENCY: Battelle Memorial Institute, CH 0407A
 INVESTIGATOR: Robinson, RA Tel (614) 424-6424 X3414
 SPONSORING AGENCY: Department of Energy, Environmental Control Technology Division
 RESPONSIBLE INDIVIDUAL: Sisler, JA Tel (301) 973-5361

Contract W-7405-ENG-92

STATUS: Active NOTICE DATE: Feb. 1977 START DATE: July 1975

ACKNOWLEDGMENT: Department of Energy

12 138531

SAFETY AND RELIABILITY

The objective is to improve the safety and reliability of urban rail systems through data gathering, analysis and hardware development. This includes vehicle crashworthiness analysis (current and proposed models) and computer models, feasibility studies of obstacle detection and study of safety hardware along with establishment of National Reliability Data Bank.

PERFORMING AGENCY: Transportation Systems Center
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Spencer, PR Tel (202) 426-0090

Contract UM-604

STATUS: Active NOTICE DATE: Aug. 1977 START DATE: 1974 TOTAL FUNDS: \$2,800,000

ACKNOWLEDGMENT: UMTA

12 138567

SAFETY VALVE STUDY

By analysis and small scale experiments, study the flow phenomena occurring when a safety valve of a pressurized tank car discharges when engulfed in a fire.

PERFORMING AGENCY: Maryland University, College Park
 INVESTIGATOR: Sallet, DW Tel (301) 454-4216 Ext 4
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Dancer, DM Tel (202) 426-1227

Contract DOT-FR-64181

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: June 1976 COMPLETION DATE: Feb. 1980

ACKNOWLEDGMENT: FRA

12 148324

THE DEVELOPMENT OF A SYSTEMS RISK METHODOLOGY FOR SINGLE AND MULTI-MODAL TRANSPORTATION SYSTEMS

The purpose of the research is to develop and verify a probabilistic systems methodology for the quantitative risk assessment of existing or future transportation systems. The objective of the first phase of the research was to develop primary risk models for estimating the probability of failure of each major component in air transportation, rail transportation and highway transportation.

REFERENCES:

Development of a Risk Methodology for Transportation Systems Safety, Transportation Systems Safety Research Group, Technical Report, Feb. 1976

Development of a Risk Methodology for Transportation System Safety, Final Report, Oct. 1976

PERFORMING AGENCY: Illinois University, Urbana, Department of Mechanical & Industrial Engineering

INVESTIGATOR: White, RA Tel (217) 333-0356

SPONSORING AGENCY: Department of Transportation, Office of University Research, Res & Special Program Admin; Illinois University, Urbana

RESPONSIBLE INDIVIDUAL: Ravera, RJ Tel (202) 426-0190

Contract DOT-OS-50238

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1975 TOTAL FUNDS: \$159,000

ACKNOWLEDGMENT: DOT

12 148348

TRANSPORTATION SAFETY INFORMATION SYSTEM (TRANSIS)

The objective of this system is to make data and information on safety performance and on on-going safety activities in all transportation modes readily available to DOT managers to allow intermodal comparisons. The system contains national data on accidents, injuries, and fatalities by month and by transportation mode, with certain exceptions due to limitations within modal accident reporting systems. Data and information are collected from DOT operating elements on a quarterly basis.

The quarterly Transportation Safety Information Report is available from NTIS.

PERFORMING AGENCY: Transportation Systems Center, OP-939

INVESTIGATOR: Gay, WF Tel (617) 494-2192

SPONSORING AGENCY: Department of Transportation, Office of Environment and Safety, 400 7th Street, SW

RESPONSIBLE INDIVIDUAL: McDonald, G Tel (202) 426-4492

STATUS: Active NOTICE DATE: Aug. 1979 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: DOT

12 170651

AUTOMATIC WARNING OF TRACK MAINTENANCE GANGS

Study of problems linked with the perception of acoustic warning signals (noise produced by track working machines) and determination of optimum acoustic and visual signals for the warning, of maintenance gangs working on the track, of the approach of trains. Study of systems for the automatic initiation and transmission of the announcing of trains approaching the track working site. The study of the noise produced by track working machines has formed the subject of a draft UIC leaflet, examined by the competent Sub-Commissions of the UIC in 1974. The studies and tests should, in a few months, permit the best acoustic signals for the warning of gangs working on the track to be defined. Tests on automatic radio transmission announcing systems are shortly going to be undertaken.

Eight reports have been published to date. Question A124.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Gelbstein, E Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1970

ACKNOWLEDGMENT: UIC

12 170780

SAFETY AND SYSTEM ASSURANCE

Continue development of safety plans for rail transit, and initiate safety plans for light rail and bus transit systems. Continue requirements and priorities

of rail and bus systems on safety matters. Develop means to communicate safety information among transit systems and federal government.

PERFORMING AGENCY: American Public Transit Association
SPONSORING AGENCY: Urban Mass Transportation Administration

Contract DOT-UT-60061

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Dec. 1976 COMPLETION DATE: Nov. 1979 TOTAL FUNDS: \$531,613

ACKNOWLEDGMENT: American Public Transit Association

12 188661

RAIL SAFETY INFORMATION SYSTEM

This computer information system consists of accident/incident reports and exposure data; inspection data on track, locomotives, equipment, signals, operating practices and hazardous materials; and the National Railroad-Highway Crossing Inventory. The system is used for report generation, statistical analysis, and research.

PERFORMING AGENCY: Federal Railroad Administration, Office of Safety, Reports and Analysis Division

SPONSORING AGENCY: Federal Railroad Administration, Office of Safety, Reports and Analysis Division

RESPONSIBLE INDIVIDUAL: Haden, RB Tel (202) 426-2762

STATUS: Active NOTICE DATE: Aug. 1979

ACKNOWLEDGMENT: FRA

12 188664

DEVELOPMENT OF A TRAINING PACKAGE FOR HANDLING TRANSPORTATION EMERGENCIES INVOLVING RADIOACTIVE MATERIALS

This training package is designed to improve the knowledge, performance and confidence of emergency response personnel in the characteristics of radiation and the measure which must be taken for their own protection and the protection of the public pending arrival or guidance of radiological experts. This training, although not highly technical, will be practical so that students will grasp the fundamentals of radiation safety and retain sufficient information to assist them in providing the proper response. The training program will include practical class training periods and suitable reference material for later self study and review. This training package will extend the knowledge and performance methodology of personnel who have taken the training course "Handling Hazardous Materials Transportation Emergencies." The length of this course is estimated to be eight classroom hours, and include a set of 35 mm slides, pulsed synchronized audio tapes, interactive Student Workbooks, an Administrator's Guide, and student evaluation Questionnaire.

PERFORMING AGENCY: Canyon Research Group, Incorporated, 3058

SPONSORING AGENCY: Office of the Secretary of Transportation
RESPONSIBLE INDIVIDUAL: Carriker, W

Contract DOT-RC-82040

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$64,912

ACKNOWLEDGMENT: Canyon Research Group, Incorporated

12 193283

LIQUID METAL FAST BREEDER REACTOR SPENT FUEL SHIPPING TECHNOLOGY

The program will develop technology and provide equipment and methods for safe shipment of short-cooled liquid metal fast breeder reactor spent fuel. The shipping cask safety will be demonstrated by experimental tests of prototype hardware which will be exposed to normal environments as well as planned failure tests. The failure tests will insure cask integrity and ability to predict cask response to hazards and establish criteria for public safety.

PERFORMING AGENCY: Sandia Laboratories, Regional and Transportation Assist Division

INVESTIGATOR: Jefferson, RM Freeman, JM

SPONSORING AGENCY: Department of Energy, Reactor Research and Technology Division

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: Mar. 1975 COMPLETION DATE: Oct. 1984

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GPU 189 3)

12 196740

RESPONDERS GUIDEBOOK FOR RADIOACTIVE MATERIALS TRANSPORTATION INCIDENTS

This Guidebook is to provide first responders to transportation incidents involving radioactive materials with practical information for dealing with the situation pending arrival of information from radiological experts. Examples of accidents, common packages, labels, placards, and shipping papers are illustrated. Space is provided for user notation of needed phone numbers and reporting information. A tabulation will allow a responder to determine if a civil defense type radiation survey instrument is useful for the identified radioisotope in the incident.

PERFORMING AGENCY: Oak Ridge Associated Universities, Medical and Health Sciences Division

INVESTIGATOR: Ricks, R Tel (615) 576-3130

SPONSORING AGENCY: Department of Transportation

RESPONSIBLE INDIVIDUAL: Carriker, AW Tel (202) 426-0656

Contract DOE-40-744-79

STATUS: Active NOTICE DATE: July 1979 START DATE: Mar. 1979 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$18,500

ACKNOWLEDGMENT: DOT

13 170609

PARAMETRIC STUDIES FOR RAILROAD ELECTRIFICATION AND TRACTION

This effort includes site specific system studies of various train consists for passenger and freight transportation. A simple computer train operation program is available permitting us to simulate traction equipment parameters and speed profiles along the route in order to achieve the specified goals. Traction equipment characteristics and their interaction with the assumed speed profiles are evaluated. Speed profiles are modified to match the anticipated track improvements. The work centers around the Northeast Corridor, though studies of other high density lines are anticipated. Findings are published, at frequent intervals, in the form of letter reports to the sponsor.

PERFORMING AGENCY: Jet Propulsion Laboratory

INVESTIGATOR: Macie, TW Tel (213) 354-4432

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Guarino, M, Jr Tel (202) 426-9665

Contract DOT-AR-30006

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: Oct. 1977 COMPLETION DATE: Oct. 1978

ACKNOWLEDGMENT: FRA

13 170653

HIGH POWER TRACTION CURRENT COLLECTION AT HIGH SPEED

This study concerns the performance of the "overhead contact system/pantograph system" at high speeds and also the problem of power transmission under severe loading conditions. The first remit was to prepare a mathematical model for the study of the "overhead contact system/pantograph system". A first recommendation has been produced for pantographs and

lightoverhead contact systems for high voltage current. Exact recommendations concerning the same problem are now being prepared. The study of other sections of the program of work is progressing (measuring equipment to determine the upward contact force, determination of the currents acceptable at the point of contact, etc.).

Nine reports have been published to date. Question A129.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Jutard, M Office for Research and Experiments

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1973

ACKNOWLEDGMENT: UIC

13 179334

ELECTRIFICATION OF HIGH-DENSITY LINES

The 4R Act provides loan guarantees for electrification of high-density lines if it can be shown economically beneficial. The 300-mile line between Harrisburg, Pa., (Enola) and Pittsburgh, Pa., (Conway) carries the heaviest freight tonnage of any U.S. route. This segment and certain segments of presently electrified lines east of Harrisburg will be studied in terms of projected traffic levels; projected costs of electric power and diesel fuel; most effective methods of electrified operation; electric power supply and catenary system; effects of electrification on signals and communications; and financial implications of electrification.

PERFORMING AGENCY: Gibbs and Hill, Incorporated

INVESTIGATOR: Hulme, WN Tel (212) 760-4697

SPONSORING AGENCY: Consolidated Rail Corporation

RESPONSIBLE INDIVIDUAL: DeGennaro, RE Tel (215) 594-1000

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: 1977 COMPLETION DATE: 1979

15 129701

METRO IMPACT STUDY

As part of its ongoing programs, the Metropolitan 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, concentrating on traveler impacts.

PERFORMING AGENCY: Metropolitan Washington Council of Governments, 1875 Eye Street, NW, Suite 200

INVESTIGATOR: Dunphy, R Tel (202) 223-6800

SPONSORING AGENCY: Urban Mass Transportation Administration, Office of Planning Assistance, UPM-13

RESPONSIBLE INDIVIDUAL: Steinmann, R Tel (202) 426-2360

Contract DC-09-7001

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Mar. 1976 COMPLETION DATE: Dec. 1983 TOTAL FUNDS: \$1,500,000

ACKNOWLEDGMENT: UMTA

15 160469

BART IMPACT PROGRAM, THE LAND USE PROJECT

A major study area of the overall BART Impact Program, the Land Use Project will examine the effects of BART on (1) decisions about the location of residences, urban development, and activity patterns within the San Francisco Bay Area, (2) the behavior of the market for real property which exercises a major influence of such decisions, and (3) the resultant spatial distributions of people, activities, and development.

PERFORMING AGENCY: Metropolitan Transportation Commission

SPONSORING AGENCY: Office of the Secretary of Transportation

Contract DOT-OS-30176/205 (CC)

STATUS: Active NOTICE DATE: June 1978 START DATE: Jan. 1977 COMPLETION DATE: Sept. 1978 TOTAL FUNDS: \$600,000

ACKNOWLEDGMENT: TRAIS

15 179331

MARTA IMPACT STUDY

This study is designed to provide a continuing assessment of the impacts of the new rail rapid transit system in Atlanta. Work prior to the scheduled opening in later 1978 concentrates on obtaining "before" and base-case data and on the impacts of construction. Operational impact measurement begins in 1979.

PERFORMING AGENCY: Atlanta Regional Commission

INVESTIGATOR: Stone, J Tel (404) 656-7700

SPONSORING AGENCY: Urban Mass Transportation Administration, Office of Planning Assistance, UPM-13

RESPONSIBLE INDIVIDUAL: Steinmann, R Tel (202) 426-2360

Contract GA-09-7001

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Mar. 1976 COMPLETION DATE: Dec. 1983 TOTAL FUNDS: \$750,000

ACKNOWLEDGMENT: UMTA

15 179338

THE URBAN TRAVEL DEMAND FORECASTING PROJECT: WORKSHOP FOR TRAVEL DEMAND POLICY ANALYSIS

This research is a supplement to a previously completed project which was funded to develop and apply behavioral travel demand forecasting models for different policy issues. The project prepared a data of behavioral travel demand models. The investigators carried out validation tests of the data and models, and applied these techniques to selected policy analyses in cooperation with local transportation authorities. In addition, with UMTA, Software Systems Division funding, they designed and conducted a short course in forecasting methods for planning officials. This supplemental grant will allow for further validation of the models by providing easy access to project data and software, through documentation, formatting and support, so that researchers and planners from other regions may supplement, check and generalize project findings.

REFERENCES:

Demographic Data for Policy Analysis McFadden, D; Cosslett, S; Duguay, G; Jung, W, June 1977

Disaggregated Supply Data Computation Procedures Reid, FA, June 1977

Attitudes, Beliefs, and Transportation Behavior Johnson, MA, Aug. 1977
Survey Data and Methods Johnson, MA, Oct. 1976

Forecasting Travel Demand in Small Areas Using Disaggregate Behavioral Models: A Case Study, Johnson, MA; Adiv, A, Aug. 1977

Demand Model Estimation and Validation McFadden, D; Talvitie, AP, June 1977

PERFORMING AGENCY: California University, Berkeley

INVESTIGATOR: McFadden, D Tel (415) 642-3304

SPONSORING AGENCY: National Science Foundation, Division of Advanced Productivity Research and Technology, DAR74-20392 A06

RESPONSIBLE INDIVIDUAL: Miller, TC Tel (202) 634-1785

Grant DAR74-20392 A06

STATUS: Active NOTICE DATE: June 1979 START DATE: July 1978 COMPLETION DATE: June 1979 TOTAL FUNDS: \$1,002,364

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1917)

15 179339

LABORATORY TESTING OF PREDICTIVE MODELS

This project will improve the existing Integrated Transportation and Land Use Model Package (ITLUP) developed previously by a team headed by the present principal investigator. Several existing models will be incorporated into ITLUP, including a basic employment model, a nonbasic employment model based on the Harris model, and a residential model disaggregated by income class based on the DRAM model, a derivative of IPLUM developed by the principal investigator under a previous grant. Several other existing models will be evaluated for possible integration, including modal split models, multipath assignment procedures, and air pollution emission and diffusion models. In addition, an attempt will be made to develop an operational housing characteristics model, and to incorporate simple models to investigate the energy consequences of different urban forms and transportation networks. Finally, the improved package will be used to test the impact of several policy options: Several low capital options in urban transportation will be tested such as gasoline taxes or quotas, parking taxes, parking space restrictions, and commuter taxes. The difference in the land use impacts of rail transit lines and busways will also be tested.

PERFORMING AGENCY: Pennsylvania University, Philadelphia, School of Arts & Sciences, City and Regional Planning

INVESTIGATOR: Putman, SH

SPONSORING AGENCY: National Science Foundation, Division of Advanced Productivity Research and Technology, APR73-07840 A04

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Dec. 1977 COMPLETION DATE: Dec. 1978 TOTAL FUNDS: \$99,950

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1344 1)

15 179672

EVALUATION OF ALTERNATIVE RURAL FREIGHT, TRANSPORTATION, STORAGE AND DISTRIBUTION SYSTEMS

Measure the social and economic costs and benefits of alternative rural transportation networks on rural communities. Develop and employ procedures to evaluate the costs and benefits of ownership alternatives and abandonment of railroad lines. The study will examine the social and economic impacts of six specific branchline abandonments which have taken place since World War II. Criteria of community success such as sales tax receipts, bank deposits, property values, school enrollment, telephone and utility services, and population will be utilized to compare communities on abandoned branchlines with: Nearby communities with continued rail service; distant communities with continued rail service; and nearby communities without rail service for an extended period, within the abandoned communities, the economic success of firms directly affected by abandonment, such as elevator and trucking firms, will be analyzed in terms of investment, profitability, and commodity and product mix.

PERFORMING AGENCY: South Dakota State University, Department of Economics, SD00789

INVESTIGATOR: Lamberton, CE

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1977

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0072991)

15 188644

SOCIOECONOMIC IMPACTS RELATED TO THE PLANNING, CONSTRUCTION AND OPERATION OF URBAN TRANSPORTATION TUNNEL PROJECTS

The objective of the study is to investigate the social and economic impacts arising from the planning, construction and operation of transportation tunnels. These tunnels can be either highway tunnels or mass transportation (subway) tunnels. Only tunnels in urban areas are being studied. The work consists of three phases. Phase I identified and listed impacts, using as source materials 100 recent EISs, as well as other relevant literature, particularly that concerning citizen involvement. Phase II will begin with the measurement of the identified impacts. Existing measurement methods will be utilized where possible, new measurement devices will be suggested where needed and feasible, and impacts that are not capable of being quantified will be so identified. An impact prediction model will then be constructed. In Phase III, the impact prediction model will be tested as to both applicability and reliability. Impacts will be predicted in a real-life situation in order to determine whether the model can actually be used by planners.

PERFORMING AGENCY: ABT Associates, Incorporated

INVESTIGATOR: Wolff, PC

SPONSORING AGENCY: Federal Highway Administration

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Sept. 1977 COMPLETION DATE: May 1981

15 188646

URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES TRANSPORTATION TASK FORCE--THIRD YEAR

This activity will develop a prioritized and augmented set of transportation needs as seen by the nation's largest cities and urban counties. A set of summary bulletins on these needs will be developed and disseminated. Summary briefs on DOT demonstrations in priority areas will be prepared and distributed. Information packages on handicapped and elderly transportation transit pricing and transit systems performance will also be developed.

REFERENCES:

Transit Actions (Preliminary Version) Dec. 1978

PERFORMING AGENCY: Public Technology, Incorporated

INVESTIGATOR: Burke, AC Tel (202) 452-7839

SPONSORING AGENCY: Office of the Secretary of Transportation; Urban Mass Transportation Administration; Federal Highway Administration

RESPONSIBLE INDIVIDUAL: Linhares, AB Tel (202) 426-4208

Contract DOT-OS-80060

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: June 1978 COMPLETION DATE: June 1979 TOTAL FUNDS: \$697,000

ACKNOWLEDGMENT: DOT

15 188656

METHODS FOR THE PREDICTION OF TRANSPORTATION SYSTEM IMPACTS

This project will recommend procedures to be used in predicting the impacts of high capital transit. The purpose is to offer guidance in the preparation of Alternatives Analyses required by UMTA. The project focuses on those impacts which can be used by UMTA to decide which urban corridors are most worthy of study and which transit alternatives are most cost-effective.

PERFORMING AGENCY: Charles River Associates, Incorporated

INVESTIGATOR: Dunbar, F Tel (617) 266-0500 Winston, B

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Spear, B Tel (617) 494-2276

Contract DOT-TSC-1572

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Aug. 1978 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$139,077

ACKNOWLEDGMENT: Charles River Associates, Incorporated

15 192693

EMPIRICAL ESTIMATION OF A PROBABILISTIC RESIDENTIAL LOCATION MODEL AND APPLICATION TO VALUE CAPTURE/JOINT DEVELOPMENT POLICIES

Development of a framework for the integrated forecasting of travel demand and residential property values. Consistency of this method with current travel demand forecasting procedures. Computer programming and testing of the method with Chicago area data. Application of the method to policy simulation experiments focused on the value capture/joint development potential of rapid transit plans.

REFERENCES:

Probabilistic Choice Framework for the Integrated Forecast of Travel Demand, Residential Land Use and Property Values, Anas, A, Jan. 1978

The Effects of Transportation-Land Use Policies on Housing Values and Household Welfare, Anas, A, Nov. 1978

PERFORMING AGENCY: Northwestern University, Evanston, Technological Institute, 5313-650; Northwestern University, Evanston, Department of Civil Engineering

INVESTIGATOR: Anas, A Tel (312) 492-7629

SPONSORING AGENCY: National Science Foundation

Grant SOC77-18264

STATUS: Active NOTICE DATE: Dec. 1978 START DATE: Sept. 1978 COMPLETION DATE: Mar. 1979

ACKNOWLEDGMENT: Northwestern University, Evanston

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 & Communication, 3607

INVESTIGATOR: Soots, V

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

16 148321

ENERGY MANAGEMENT FOR ELECTRIC POWERED TRANSPORTATION SYSTEMS

The purpose of this research is to further the state-of-the-art of energy management in electrically powered transportation systems. Inherent in this objective is the determination of the relationships between the energy consumption of electric vehicles and their design capabilities and operating practices. Through this understanding, energy management strategies may be evaluated within a cost-benefit framework. The objectives of the work are: 1) To develop a realistic computer-based simulation model of energy consumption and cost in electric-powered transportation systems. This model will incorporate and link together the following three modules: (a) Train Performance Programs; (b) Energy Consumption Simulation; (c) Energy Cost Simulation. The advantage of this approach lies in its flexibility as it is anticipated that this technique will be able to accommodate any present or future system. 2) To develop strategies and guidelines for increasing the energy efficiency of electrically powered transportation systems. Used by the transit operators and designers, these guidelines would be applied to the modification of present systems and the construction of new ones. The strategies will be evaluated within the framework of the simulation model, and validated through application to selected real-world systems.

PERFORMING AGENCY: Carnegie-Mellon University, Department of Mechanical Engineering

INVESTIGATOR: Uher, RA Tel (412) 578-2960

SPONSORING AGENCY: Department of Transportation, Office of University Research

RESPONSIBLE INDIVIDUAL: Hopkins, JB Tel (617) 494-2023

Contract DOT-OS-60129

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1976 COMPLETION DATE: Sept. 1978 TOTAL FUNDS: \$170,840

ACKNOWLEDGMENT: DOT

16 193782

EMERGENCY PLANS FOR FUEL DEMAND

A project geared toward the development of a series of contingency plans for fuel use in the transportation sector in the event of an energy supply emergency. These plans, which do not include rationing or pricing techniques, are designed to channel energy consumption into the most vital

and essential uses. This activity has been mandated by the Energy Policy and Conservation Act of 1975. The M.I.T. effort involves generation and evaluation of alternative plan strategies with attention directed toward issues of equity, legality and the ability to implement and enforce the proposed measures.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Roos, D

SPONSORING AGENCY: Department of Energy

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: June 1978 COMPLETION DATE: June 1979

ACKNOWLEDGMENT: Massachusetts Institute of Technology

16 196727

INTERCITY INTERMODAL SYSTEMS

Develop an intermodal strategy aimed at increasing energy efficiency of passenger transport. 1. Develop a methodology to determine comparative measures of energy efficiency as a function of mode. 2. Apply results of intermodal energy studies to Ministry Multimodal planning initiatives (e.g. Southern Ontario passenger study).

PERFORMING AGENCY: Transport Canada Research and Development Centre, F34A12308

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1977 COMPLETION DATE: Mar. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

16 196743

RAILWAY DIESEL FUEL FROM COAL

To examine the feasibility of obtaining railway diesel fuel from coal with particular emphasis on the Fischer-Tropsch type synthesis. The work under this contract shall include the following: Literature reviews and discussions addressing the preparation of a report covering the general question of energy sources, the question of fuel requirements in railway transportation in Canada, present sources of the required fuel, the possible future sources of similar fuels, methods of producing similar fuels by synthesis from various fossil hydro-carbon reserves, the Fischer-Tropsch type synthesis including its known performance and future prospects as a long term means of synthesizing engine fuels, and an evaluation of other possible synthesis of hydro-carbons for railway diesel fuel applications.

REFERENCES:

Railway Diesel Fuel from Coal Wojciechowski, BW

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-821

INVESTIGATOR: Wojciechowski, BW Tel (613) 547-5777

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Eggleton, PL Tel (514) 283-7512

Contract 8834

STATUS: Inactive NOTICE DATE: July 1979 START DATE: May 1978 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$15,000

ACKNOWLEDGMENT: CIGGT

16 196749

ALTERNATE FUELS FOR MEDIUM-SPEED DIESEL ENGINES

Under a DOE contract, SWRI began work to investigate the use of alternate fuels in medium-speed diesel engines. This class of engines, characterized by a rated speed between 800 and 1200 RPM, is used in several types of essential transport functions--rail, river and intercoastal shipment of goods. The intent of this project is to demonstrate the ability of this type of diesel engine to operate on certain alternate or non-standard fuels and to define the performance, piston ring wear, and emissions characteristics of the engine for such operation. In the initial phase of the program, two categories of fuel are being evaluated. These categories are defined as (1) off-specification diesel fuels and (2) non-diesel fuels. (1) includes fuels with one or more properties which do not lie within the currently accepted range of specifications; (2) includes fuels such as alcohol, gasoline and non-diesel type liquid fuels derived from coal.

PERFORMING AGENCY: Southwest Research Institute, Engine Research & Development, Dept of Engine & Vehicle Res, 11-5361

INVESTIGATOR: Storment, JO Tel (512) 684-5111

SPONSORING AGENCY: Department of Energy, Asst Secretary for Cons &
Solar Appl, Off of Trans Programs; Federal Railroad Administration;
Association of American Railroads

RESPONSIBLE INDIVIDUAL: Alpaugh, R Tel (202) 376-1860

Contract EM-78-C-01-4266

STATUS: Active NOTICE DATE: July 1979 START DATE: July
1978 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$472,000

ACKNOWLEDGMENT: FRA

17 059062

SOFTWARE DEVELOPMENT FOR THE PROJECTION OF COMMODITY FLOW PATTERNS

The objective is for the development of data reduction and analysis programs to project commodity flow patterns as an input to development of a national transportation simulator capability.

PERFORMING AGENCY: Transportation Systems Center
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Chamberlain, C Tel (617) 494-2087

In-House

STATUS: Active NOTICE DATE: Aug. 1978 TOTAL FUNDS: \$70,000

ACKNOWLEDGMENT: TRAIS (R6831)

17 138526

MISSOURI PACIFIC'S COMPUTERIZED FREIGHT CAR SCHEDULING SYSTEM

To develop and implement an automated freight car scheduling system. A prototype capability will first be developed. This research and demonstration project will establish the feasibility and determine the operational benefits of automated freight car scheduling. The project will provide considerable impetus to interline freight car scheduling reports and demonstrations will be made available to the railroad industry and the procedures, computer programs and related documentation of MoPac's Transportation Control System including the automated freight car scheduling system will be made available to interested railroads.

REFERENCES:

State-of-the-Art Survey Apr. 1976
Project Work Plan Mar. 1976
System Functional Requirements July 1977
System Performance Measurements Feb. 1978

PERFORMING AGENCY: Missouri Pacific Railroad Company
INVESTIGATOR: Sines, GS
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 426-2608

Contract DOT-FR-65139

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Nov. 1975 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$5,500,000

ACKNOWLEDGMENT: FRA

17 148350

EMPLOYEE INFORMATION SYSTEM. PHASE I

To review and analyze for validity and usefulness currently available railroad employee wage and employee operating statistics and to develop an employee information system that will consist of valid and useful data from currently available sources in a form readily transferable to research and publication. Preliminary productivity measurements will be developed and recommended to the FRA.

PERFORMING AGENCY: Booz-Allen Applied Research, Incorporated
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Collins, DM Tel (202) 472-7280

Contract DOT-FR-T5164

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Sept. 1976 COMPLETION DATE: May 1977 TOTAL FUNDS: \$69,768

ACKNOWLEDGMENT: FRA

17 159625

FREIGHT CAR UTILIZATION RESEARCH-DEMONSTRATION PROGRAM-STRUCTURING ORGANIZATIONAL CONTROL MECHANISMS

The program shall complete a report on organizational control mechanisms to facilitate integrated car management. It shall translate the basic concepts of this report into a presentation which it will deliver to management personnel on selected railroads. The program will also investigate the feasibility of developing a management game embodying the basic concepts of the report and if feasible, will work to develop such a game for use by railroad middle and upper level managers. If such a game is deemed not feasible, the Program will work to develop more detailed sample procedures to implement the report's basic concepts.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: French, PW Tel (202) 293-4165 Muehlke, RV

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 426-2608 Taylor, CE Tel (202) 293-4084

Contract DOT-FR-771-5279

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: July 1977 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$55,000

ACKNOWLEDGMENT: AAR

17 159628

FREIGHT CAR UTILIZATION RESEARCH-DEMONSTRATION PROGRAM-INDUSTRYWIDE FREIGHT CAR MANAGEMENT

The Program will monitor, evaluate and promote the multi-level car management project. Draft and publish a report on the project. Assist in the expansion of the concept to other railroads, car types, commodities or shippers when this becomes feasible. The Program will work with key individuals and committees in the industry to promote the system devised by Task Force 4 of Phase II. Part of the promotion will entail specifying the interrad balancing mechanism and the car grading system in greater detail in response to comments and questions from the industry. This program will also be prepared to develop computer software to assist these activities.

PERFORMING AGENCY: Association of American Railroads
INVESTIGATOR: French, PW Tel (202) 293-4165 Muehlke, RV
SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads
RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 426-2608 Taylor, CE Tel (202) 293-4084

Contract DOT-FR-771-5279

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: July 1977 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$100,000

ACKNOWLEDGMENT: AAR

17 159631

RAILROAD OPERATIONS MODULAR PROCESSING SYSTEMS (ROMPS)

ROMPS is a mini-computer based telecommunications data processing system for smaller railroads which will assist them in automating many clerical railroad functions presently undertaken manually. Data is input through CRT terminals located at each short line railroad. An on-line data base provides each road with car location and management information inquiry responses. ROMPS provides data to the AAR TRAIN II system for improved informational content of the national freight car information system.

REFERENCES:

Railroad Operations Modular Processing System: System Design Summary, Apr. 1978, NTIS PB-285442/AS

PERFORMING AGENCY: Ocean Data Systems Incorporated
INVESTIGATOR: Bochner, A Tel (301)881-3031
SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads
RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 426-2608

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: July 1976 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$700,000

ACKNOWLEDGMENT: AAR

17 159648

NETPAC/2 PROJECT COST AND RESOURCE ACCOUNTING COMPUTER PROGRAM DEVELOPMENT

To produce a resource and cost accounting system for project planning and control to be added to an existing critical path time program (NETPAC/1). The program will produce 7 report classes (1) progress data (2) project cost (3) cost of work (4) cumulative cost (5) cost histogram (6) resource histogram (7) account code. The program is intended to provide reasonable accurate but timely cost and resource usage information on demand.

REFERENCES:

Handbook of Critical Path Law, CE; Lach, DC, Published by the Authors, 9th Printing, 1975

Project Management and Cost/Budget Control AREA Conference, Pittsburgh, Penn., 19-20 Oct 1976.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-825

INVESTIGATOR: Law, CE Tel (613)547-5777 Lockhart, M Bryce, JS
 SPONSORING AGENCY: Canadian Institute of Guided Ground Transport
 RESPONSIBLE INDIVIDUAL: Law, CE Tel (613)547-5777

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Aug. 1977
 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$4,000

ACKNOWLEDGMENT: CIGGT

17 160402

FAST DATA MANAGEMENT AND ANALYSIS

To provide a data management system for the Facility for Accelerated Service Testing (FAST) test data, conduct appropriate data analysis and evaluation efforts, and report the resultant conclusions. FAST data analysis and report will provide the foundation for engineers in the railroad industry to make technical and economic decisions to update and improve railroad design, maintenance, and operations practices.

PERFORMING AGENCY: Association Of American Railroads, 1920 L Street, NW

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Gray, D Tel (202) 755-1877

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1977
 COMPLETION DATE: Mar. 1979 TOTAL FUNDS: \$728,307

ACKNOWLEDGMENT: TRAIS

17 179340

MODELS FOR COMPLEX SYSTEMS

This research will develop probabilistic models for complex systems. The investigation of parametrically simple models for dependent sequences of random variables will be continued. Situations represented by such models include, the sequence of access path lengths in a data base system, the number of vehicles in moderately congested traffic crossing a fixed point on a road during consecutive time intervals of fixed length; and daily river flow data. The structural and limiting results of these dependent sequences of random variables in queueing models will be studied. Finally, the processes will be investigated in a randomly changing environment.

PERFORMING AGENCY: Naval Postgraduate School, School of Engineering, Operations Research

INVESTIGATOR: Jacobs, PA

SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG77-09020

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Nov. 1977
 TOTAL FUNDS: \$22,032

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 6664)

17 188645

TARIFF MODERNIZATION PROGRAM--PHASE II

This industry-wide program, involving shippers, carriers and tariff publishers, is planned to convert the requirements developed in Phase I into specific recommendations and solutions for simplifying, modernizing and improving the presentation of transportation tariff information. The plan contains tasks for nine technical work groups, each of which will require the support of experienced tariff and systems personnel.

PERFORMING AGENCY: Transportation Data Coordinating Committee

INVESTIGATOR: Guilbert, EA Tel (202) 293-5514

SPONSORING AGENCY: Transportation Data Coordinating Committee

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1979

17 188651

LOCOMOTIVE DATA ACQUISITION PACKAGE (LDAP)

The objective is to produce a sophisticated, rugged and portable Locomotive Data Acquisition Package (LDAP) for line-haul data recording and analysis directly on board the locomotive. Currently such systems do not exist. This system will be used to systematically monitor, define, and analyze those parameters directly affecting locomotive operational efficiency and reliability.

PERFORMING AGENCY: California University, Berkeley

INVESTIGATOR: Abbott, RK Tel (415) 843-2740 X6450

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Koper, JM Tel (202) 426-0808

Contract AR-74348

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1977
 COMPLETION DATE: Jan. 1980 TOTAL FUNDS: \$400,000

ACKNOWLEDGMENT: FRA

17 192818

DEVELOPMENT OF A TRANSPORTATION TEACHING COMPUTER PACKAGE

The project will continue the development of a computer network model designed to aid in the teaching of transportation systems analysis. This program, TTP, is currently in use at M.I.T. by both graduate and undergraduate students.

PERFORMING AGENCY: Massachusetts Institute of Technology, Department of Civil Engineering

INVESTIGATOR: Lerman, S Tel (617) 253-7110

SPONSORING AGENCY: Lilly Foundation, Eli Lilly and Company

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: Sept. 1978
 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Massachusetts Institute of Technology

17 196726

FREIGHT SYSTEMS IMPROVEMENTS (YARDS)

Automated data handling and control techniques in rail yard operations will be tested and evaluated in operations, with a view to extend the concept to other applications.

PERFORMING AGENCY: Transport Canada Research and Development Centre, F34A55122

INVESTIGATOR: Rudback, NE

SPONSORING AGENCY: Transport Canada Research and Development Centre

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1977
 COMPLETION DATE: Apr. 1980

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

17 196731

FASTWAY

Through the application of available computer technology-to obtain, record, process and retrieve information to all carload shipments, for increased timeliness and accuracy at reduced overall cost. The project will influence related procedures in Marketing and Sales, Accounting, Transportation, Intermodal Services, and within Customer Service Centres. Functions involve: obtaining and coding shipment orders, rating, routing, waybilling, consist card preparation, waybill termination procedures, empty car movement documentation. Fastway will eliminate, modify or create new functions. Phase One-Ottawa CSC pilot project; Phase Two-Forward Traffic Only; Phase Three-Add on received traffic. This system will allow direct access to the computer by means of CRT displays to provide information covering all waybill, shipment documentation and accounting data.

PERFORMING AGENCY: Canadian Pacific Rail, I11H54855

INVESTIGATOR: Gnam, PR

SPONSORING AGENCY: Canadian Pacific Rail

NOTICE DATE: Active COMPLETION DATE: Apr. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

17 196741

INTERMODAL MANAGEMENT INFORMATION SYSTEM PHASE II AND III

To complete the development of an intermodal management information system (IMIS) as part of the FRA intermodal freight program. Three distinct modular systems will be developed: intermodal equipment control system; repetitive waybilling and rating system; and, profitability reporting system. Phase I and Phase II have been completed. Phase III, in progress, includes the development of baseline specifications, detailed design, programming and implementation on a major railroad. When the system has been in operation for four months a post audit will be conducted to ensure it is performing as intended. Final reports including programs and documentation will be made available to the industry.

PERFORMING AGENCY: PRC Systems Sciences Company
INVESTIGATOR: Peternick, J Tel (202) 893-1800 Fredrickson, V Pflugrad, A Rynders, B
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Brooks, WR Tel (202) 472-1015

Contract DOT-FR-741-5157

STATUS: Active NOTICE DATE: July 1979 START DATE: Sept. 1977 COMPLETION DATE: 1980 TOTAL FUNDS: \$1,100,000

18 059894

STUDY OF FEASIBILITY AND IMPACTS OF ALL-INCLUSIVE TRANSPORTATION TRUST FUNDS AS A MECHANISM FOR TRANSPORTATION FINANCE

This study will study the feasibility of designing and implementing multi-modal transportation trust funds at the Federal state and regional level. The feasibility analysis will address the following factors: 1) existing and potential funding sources at the respective levels; 2) compatibility among the funds and their levies; 3) institutional changes required to implement these funds; 4) effect on political decision-making process; and 5) flexibility to meet differing transportation needs in the various states and localities.

PERFORMING AGENCY: Polytechnic Institute of New York, Transportation Training and Research Center

INVESTIGATOR: Roess, RP Crowell, WH

SPONSORING AGENCY: Urban Mass Transportation Administration, NY-11-0014

RESPONSIBLE INDIVIDUAL: Stratton, J

Grant NY-11-0014

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: June 1976 COMPLETION DATE: Aug. 1978 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: TRAIS (NY-11-0014)

18 059897

REGIONAL FINANCING ALTERNATIVES FOR MASS TRANSIT

The project will compare alternative regional financing mechanisms for mass transit in terms of their economic efficiency, equity, fiscal impact, locational and land use incentives, and administrative feasibility. Six alternative revenue sources will be analyzed and evaluated according to the following criteria: 1) property (and land) taxes; 2) income taxes; 3) sales taxes; 4) user charges; 5) intergovernmental grants; and 6) general revenues.

PERFORMING AGENCY: Syracuse University

INVESTIGATOR: Puryear, D

SPONSORING AGENCY: Urban Mass Transportation Administration, NY-11-0003

RESPONSIBLE INDIVIDUAL: Jasper, N Tel (202) 426-0081

Grant NY-11-0003

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Oct. 1976 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$98,062

ACKNOWLEDGMENT: TRAIS (NY-11-0003)

18 080324

THE RAILWAY FREIGHT RATE ISSUE IN CANADA

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.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-834

SPONSORING AGENCY: Canadian Institute of Guided Ground Transport; Canadian National Railways; Canadian Pacific Limited; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Schwier, C Tel (613) 547-5777

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: May 1974 COMPLETION DATE: May 1979 TOTAL FUNDS: \$45,000

ACKNOWLEDGMENT: CIGGT

18 129724

FREIGHT CAR AND LOCOMOTIVE COSTING

Develop a set of methodologies and procedures for use in estimating the nature of cost and its variability in purchasing, maintaining, and operating freight cars and locomotives with application to pricing control and other management purposes.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company; Southern Railway System; Reebie (Robert) and Associates, Incorporated

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Lawler, JD Tel 202-426-0771

Contract DOT-FR-55055

STATUS: Inactive NOTICE DATE: Sept. 1979 START DATE: June 1975 TOTAL FUNDS: \$485,021

ACKNOWLEDGMENT: FRA

18 129729

RAILROAD YARD OPERATIONS COSTING METHODOLOGY

To develop, test, and justify a set of methodologies and procedures to be used for estimating the cost of providing, maintaining, and operating Yards and Terminals and their application to pricing, control, investment and other management purposes.

PERFORMING AGENCY: Haskins and Sells; Seaboard Coast Line Railroad; Whitten (Herbert O) and Associates

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Lawler, JD Tel 202-426-0771

Contract DOT-FR-65135

STATUS: Inactive NOTICE DATE: Sept. 1979 START DATE: June 1976 TOTAL FUNDS: \$482,299

ACKNOWLEDGMENT: FRA

18 138514

GENERAL AND ADMINISTRATIVE SERVICES COSTING METHODOLOGY

To develop, test, and justify a set of methodologies and procedures to be used for estimating the economic costs of providing and maintaining railroad general administrative services and for management control and decision making.

PERFORMING AGENCY: Price Waterhouse and Company

INVESTIGATOR: Scanlan, J

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Lawler, JD Tel (617)423-7330 x219

Contract DOT-FR-5167

STATUS: Active NOTICE DATE: Aug. 1978 COMPLETION DATE: Dec. 1977

ACKNOWLEDGMENT: FRA

18 159635

RAILWAY COSTING ORDER REVIEW

This work is not a stand-alone project, but consists of integrating CIGGT costing work with that of research teams assembled by the Canadian Transport Commission for the purpose of thoroughly revising railway costing order procedures.

REFERENCES:

Railway Costing Study, Phase I Report Canadian Transport Commission, Nov. 1977

Railway Costing Study, Phase II, Draft Canadian Transport Commission

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-828

INVESTIGATOR: Lake, RW Tel (613) 547-5777 Schwier, C Roney, MD Turcot, MC Boon, CJ Bunting, PM Ellert, JC Kerr, CN

SPONSORING AGENCY: Canadian Transport Commission

RESPONSIBLE INDIVIDUAL: Lake, RW Tel (613) 547-5777

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: May 1977 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$120,000

ACKNOWLEDGMENT: CIGGT

18 177624

COSTING OF RAIL SERVICE

Development of new methods for obtaining an empirical understanding of the costs or providing various types of rail service. Using mathematical techniques based on engineering principles and statistical analyses based on cost and output data, hybrid techniques will be developed to examine the relation between output and costs. A relatively simple rail operation will be identified where commodities are relatively homogenous; the network is simple and terminal activities are as uncomplicated as possible. An example might be a train service moving grain from a country elevator to a river terminal.

PERFORMING AGENCY: Northwestern University, Evanston, Transportation Center, 425

INVESTIGATOR: Daughety, AF Tel (312) 492-5183 Turnquist, M

SPONSORING AGENCY: Department of Transportation

RESPONSIBLE INDIVIDUAL: Ravera, RJ Tel (202) 426-0190

Contract DOT-OS-70061

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1977 COMPLETION DATE: Oct. 1980 TOTAL FUNDS: \$123,996

ACKNOWLEDGMENT: Northwestern University, Evanston

18 193780

RAIL SYSTEM INVESTMENT ANALYSIS

Study objective is to provide DOT with background information on rail investment for use in developing policies on capital assistance to railroads, and to provide manuals and case studies to guide government officials and railroads in computing the internal rate of return (IRR) for railroad capital investments. Research included literature search; field work at 13 railroads; computation of IRR corporate perspective for 63 sample projects; computation of IRR from national economy perspective for 27 sample projects; assessment of adequacy of railroad revenues using financial ratios; and determination of railroad's required returns on investment and equity using the comparable earnings approach.

Five additional reports are to be published in 1979.

REFERENCES:

Rail System Investment Analysis: Literature Search Ernst and Ernst; Banks (RL) and Associates, Inc., 1978, RRIS 18 188696

Rail System Investment Analysis: Description of the Railroad Investment Process, Ernst and Ernst; Banks (RL) and Associates, Inc., 1978, RRIS 18 188697

Rail System Investment Analysis: Financial Analysis of Investment Projects from Individual Corporate Perspective, Ernst and Ernst; Banks (RL) and Associates, Inc., 1978, RRIS 18 188698

Rail System Investment Analysis: Analysis of Investment Projects from the Railroad Industry Perspective, Ernst and Ernst; Banks (RL) and Associates, Inc., 1978, RRIS 18 188699

PERFORMING AGENCY: Ernst and Ernst

INVESTIGATOR: Lutes, GS Tel 6334

SPONSORING AGENCY: Office of the Secretary of Transportation

RESPONSIBLE INDIVIDUAL: Harman, JE Tel (202) 426-4220

Contract DOT-OS-60097

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: Sept. 1975 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$458,444

ACKNOWLEDGMENT: Ernst and Ernst

18 193784

UTILIZATION OF RESOURCES IN MULTI-MODAL TRANSPORTATION SYSTEMS

A general theory of vehicle, labor and fixed facility resource utilization. Initial work to analyze the vehicle cycle and its economic implications. Case studies in cooperation with private carriers.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Manheim, ML

SPONSORING AGENCY: Office of the Secretary of Transportation

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: Aug. 1977 COMPLETION DATE: Oct. 1979

ACKNOWLEDGMENT: Massachusetts Institute of Technology

18 193786

TECHNOLOGY AND MARKET STRUCTURE IN THE REGULATED TRUCKING INDUSTRY

This research analyzes the costs of 250 regulated common carriers of general commodities over a ten-year period and performs a number of policy simulations utilizing alternative scenarios with respect to market structure. In addition, it documents the computer software needed to estimate the cost functions and performs the policy simulations.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Friedlaender, AF

SPONSORING AGENCY: Department of Transportation

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: June 1978 COMPLETION DATE: May 1979

ACKNOWLEDGMENT: Massachusetts Institute of Technology

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.

A recent Federal Railroad Administration study used the research demand forecasting models to predict Alaska Railroad freight flows by commodity type. Rail data was also used by the Canadian government in studying the feasibility of a Canadian railroad system extension to Alaska.

PERFORMING AGENCY: Alaska University, College

INVESTIGATOR: Gorsuch, L

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Swerdloff, CN

Contract DOT-OS-40008 (CS)

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: June 1973 COMPLETION DATE: June 1979 TOTAL FUNDS: \$222,959

ACKNOWLEDGMENT: TRAIS (PR# PUR-2-30685)

20 058467

DATA REQUIREMENTS ON INTERCITY FREIGHT DEMAND PLANNING

The objective is a critical review of present data sources and reporting methods. Emphasis is on the usefulness of the data in calibration and estimation of existing forms of demand models and recommendations on better sources or collection techniques for more effective forecasting of commodity flows. Data of primary concern are indications of shippers' choice; commodity attributes; production, consumption and pricing of commodities; and transportation attributes. A careful review of the form of the model and variables needed to predict modal choice by shippers is made. Various methods of data collection, processing, storage and retrieval and their related costs are evaluated for achieving the goals.

REFERENCES:

Design of a Structure and Data Analysis Scheme for Intercity Freight Demand Forecasting, Chung, C; Roberts, PO, CTS Rept. #75-15, 154 pp, Sept. 1975

A Commodity Attribute Data File for Use in Freight Transportation Studies, Samuelson, RA; Roberts, PO, CTS Rept. #75-20, 27 pp, Nov. 1975

Developing Freight Origin-Destination Data for Use in Freight Planning, Roberts, PO, CTS Rept. #76-3, Feb. 1976

PERFORMING AGENCY: Massachusetts Institute of Technology, Center for Transportation Studies

INVESTIGATOR: Roberts, PO Tel (617) 253-7123

SPONSORING AGENCY: Transportation Systems Center, OP-509

RESPONSIBLE INDIVIDUAL: Wright, DG Tel (617) 494-2196

Contract DOT-TSC-1005 (CR)

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Apr. 1975 TOTAL FUNDS: \$38,000

ACKNOWLEDGMENT: TRAIS, Massachusetts Institute of Technology

20 059960

POLICY SENSITIVE FREIGHT MODEL DEVELOPMENT

This effort will support the development and testing of disaggregate, behavioral models of intercity freight demand which can be used for the analysis of a wide range of Federal policy and program options. The proposed model must allow the Federal Government to address a wide spectrum of policy, program legislative and regulatory issues. The model should permit examination of the effects of mode specific development, pricing, technology, and deregulation alternatives upon the shipper decisions regarding the selection of transportation alternatives and be able to estimate national flows of freight by commodity and geographic detail.

PERFORMING AGENCY: Massachusetts Institute of Technology, Center for Transportation Studies, 84778

INVESTIGATOR: Roberts, PO Tel (617) 253-7123

SPONSORING AGENCY: Office of Policy and International Affairs; Office of Intermodal Transportation, Department of Transportation

RESPONSIBLE INDIVIDUAL: Swerdloff, CN Tel (202) 426-4163

Contract OS-70006

STATUS: Active NOTICE DATE: Mar. 1979 START DATE: Jan. 1977 TOTAL FUNDS: \$292,584

ACKNOWLEDGMENT: Massachusetts Institute of Technology

20 083533

ECONOMIC ANALYSIS OF THE UNITED STATES GRAIN EXPORTING SYSTEMS

Evaluate private versus state trading systems for grain with respect to: Returns to producing, marketing and processing firms; relative market power between countries with different systems; comparative advantage; relative efficiencies of time, farm and place utilities under different systems; rate of technological change and progress including capital losses and replacement; their respect to commodity futures markets. Evaluate alternative export marketing techniques and strategies with respect to: the adequacy of the U.S. system of grades and standards; the logistics of costs of marketing and transportation. Comparative data will be collected on Canadian and U.S. grain handling costs and procedures. Structural and policy differences will be compared wherever possible. System performances will be compared on the basis of handling costs and producer returns. Analysis of capital investment decisions in the two systems will also be made. Data on price quality relationships for wheat will be collected and analyzed to determine the validity of present grading factors. North Dakota production data will be assembled on a county basis for use in a transportation model designed to analyze various rate policies for west bound shipments of wheat and barley. Existing transportation rates will be used to generate optimal flow patterns. Alternative rate policies will be compared to existing rate solutions. Work was continued on a study of the Canadian grain marketing system. A Master's thesis was completed on a descriptive analysis of Canadian grain marketing policies. This study also made a comparative analysis of the U.S. and Canadian marketing systems at the county level. A study of the economic significance of quality factors in North Dakota was conducted, using yield and quality data from the branch experiment stations throughout North Dakota. This study also evaluated major varietal differences and analyzed the interrelationships among quality factors.

REFERENCES:

Comparison of the Marketing Systems of the U.S. and Canada Peltier, KA, NDSU, Department of Agricultural Economics, Unpublished MS Thesis, 1977

Analysis of Wheat Quality Factors Mittleider, JF, NDSU, Department of Agricultural Economics, Unpublished MS Thesis, 1977

An Economic Evaluation of Yield and Quality Differences Among Selected Hard Red Spring Wheat Varieties Ag. Econ., Mittleider, JF; Anderson, DE, NDSU, Agricultural Experiment Station, Report No. 121, 1977

An Analysis of the Relationships Among Specific Quality Characteristics for Hard Red Spring & Durum Wheat, Ag. Econ., Mittleider, JF; Anderson, DE, NDSU, Agricultural Experiment Station, Report No. 122, 1977

Marketing Canadian Wheat Anderson, DE, Presented Kansas Wheat Commission Marketing Seminar Apr 77, Unpublished Paper, 1977

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics, ND01354

INVESTIGATOR: Anderson, DE

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1977 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: North Dakota State University (CRIS 0060238)

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 tech-

niques to obtain primary data as required to carry out specified research. For-hire livestock truckers were found to be principally small but quite stable businesses. Utilization of equipment was high, and rates charged were highly correlated with distance and size of truck. Little basis was found for believing that economic regulation at the interstate level would improve trucking performance. Analysis of a transshipment model of a corn-soybean producing area showed that adverse impacts from rail line abandonment are not likely to be uniform. Certain local marketing firms were shown to lose substantial volumes of patronage by farmers, even though the total marketing costs for the area increased by only 0.1 percent in response to abandonments. The application of waterway user charges sufficient to cover Federal expenditures on waterways were estimated to cause a two-percent increase in marketing costs. Data were assembled for analysis of the cost of operating refrigerated trucks for hauling produce. Also, a survey of truck brokers to determine their role in exempt trucking was performed, and a number of rate, service and other proposals for change in transportation were analyzed for their impacts on agriculture.

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 Cattlemen's Assn, Jan. 1974

Changing Technology in Grain Transportation Hutchinson, TQ, International Corn 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: Aug. 1978 START DATE: June 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (G4 41788 46 286117)

20 099646

EVALUATION OF PUBLIC TRANSPORTATION POLICIES AFFECTING AGRICULTURE

Assess on a regular basis the economic performance of the general-purpose transportation system for agriculture and the effect on efficiency and equity of proposed adjustments in services and rates. Project short and long-run needs for 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. For-hire livestock truckers were found to be principally small but quite stable businesses. Utilization of equipment was high, and rates charged were highly correlated with distance and size of truck. Little basis was found for believing that economic regulation at the interstate level would improve trucking performance. Analysis of a transshipment model of a corn-soybean producing area showed that adverse impacts from rail line abandonment are not likely to be uniformly borne. Certain local marketing firms were shown to lose substantial volumes of patronage by farmers, even though the total marketing costs for the area increased by only 0.1 percent in response to abandonments. The application of waterway user charges sufficient to cover Federal expenditures on waterways were estimated to cause a two-percent increase in marketing costs. Data were assembled for analysis of the cost of operating refrigerated trucks for hauling produce. Also, a survey of truck brokers to determine their role in exempt trucking was performed, and a number of rate, service and other proposals for change in transportation were analyzed for their impacts on agriculture.

REFERENCES:

Livestock, Trucking Services: Quality, Adequacy and Shipment Patterns, Hoffman, LA; Boles, PP; Hutchinson, TQ, Economic Res Service,

AER-312, Oct. 1975

Operations of For-Hire Livestock Truckers Boles, PP, Economic Res Service, AER-342, July 1976

Impact of Higher Gasoline Prices on Rural Households, Hoffman, LA, Economic Res Service, 4 pp, Apr. 1976

Discussion of a Sequential Link Approach to Evaluating Transportation Facility Adjustments, Gerald, JO, Sou. Journal of Agric Econ., V8 N1, pp 35-37, July 1976

Estimation of Demand for Transp of Agric Commod Miklius, W; Casavant, KL; Garrod, PV, Amer Journal of Agric Econ, V58 N2, pp 217-223, May 1976

PERFORMING AGENCY: Economic Research Service

INVESTIGATOR: Gerald, JO Hutchinson, TQ

SPONSORING AGENCY: Department of Agriculture, NEA-14-125-11-00

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (G4 41660)

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, 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. For-hire livestock truckers were found to be principally small but quite stable businesses. Utilization of equipment was high, and rates charged were highly correlated with distance and size of truck. Little basis was found for believing that economic regulations at the interstate level would improve trucking performance. Analysis of a transshipment model of a corn-soybean producing area showed that adverse impacts from rail line abandonment are not likely to be uniformly borne. Certain local marketing firms were shown to lose substantial volumes of patronage by farmers, even though the total marketing costs for the area increased by only 0.1 percent in response to abandonments. The application of waterway user charges sufficient to cover Federal expenditures on waterways were estimated to cause a two-percent increase in marketing costs. Data were assembled for analysis of the cost of operating refrigerated trucks for hauling produce. Also, a survey of truck brokers to determine their role in exempt trucking was performed, and a number of rate, service and other proposals for change in transportation were analyzed for their impacts on agriculture.

REFERENCES:

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, Hoffman, LA, Transportation Com Amer Nat'l Cattlemen's Assn, San Diego, Jan. 1974

Changing Technology in Grain Transportation Hutchinson, TQ, International Corn Quality Conference, Champaign, Ill.

Problems in Transporting Fiscal 1974 Grain and Soybean Exports, Umberger, DE; Hutchinson, TQ, Economic Research Service, For. Agri. Trade of U.S.

PERFORMING AGENCY: Illinois University, Urbana, USDA, National Economic Analysis Division

INVESTIGATOR: Bunker, AR

SPONSORING AGENCY: Economic Research Service, NEA-14-125-17-01

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0041787), Smithsonian Science Information Exchange (GY 41787)

20 129727

DOMESTIC AND INTERNATIONAL TRANSPORTATION OF U.S. FOREIGN TRADE: 1976

Objective is to obtain, (a) New Data on the domestic origins and destinations, and the characteristics of domestic transportation, for commodities being transported via international air and vessel movements in U.S. foreign trade, and (b) New data on the transshipment of this type of commodity by truck and rail between U.S. and Canada (or Mexico) for trade with other foreign countries. Data will be collected by a sample survey (50,000 observations) and merged with existing data on international trade.

Co-sponsors are St. Lawrence Seaway Development Corp., U.S. DOT; U.S. Army Corps of Engineers, Institute for Water Resources, Ft. Belvoir, Virginia; Maritime Admin, Dept of Commerce, Office of the Secretary-U.S. DOT.

REFERENCES:

Domestic and International Transportation of U.S. Foreign Trade--1976, Bureau of the Census, RRIS 20 180409

PERFORMING AGENCY: Department of Commerce, Bureau of the Census, Economic Surveys Division, 63-7108

INVESTIGATOR: Lutz, C Tel (202)763-5430

SPONSORING AGENCY: Office of Policy and International Affairs; Department of Transportation, Office of Intermodal Transportation

RESPONSIBLE INDIVIDUAL: Murphy, RD Tel (202)426-4448

Contract DOT-AS-50059

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Oct. 1975 TOTAL FUNDS: \$600,000

ACKNOWLEDGMENT: Office of Policy and International Affairs

20 136085

STUDY OF RADIOACTIVE MATERIAL TRANSPORT PROBLEMS 1976-2000

The aim of the project is to examine future transportation systems, trends, and problems associated with transport of nuclear fuel cycle materials, petroleum, coal & natural gas to assure a more orderly problem solving approach. Work areas included: (1) characterize the current transportation systems; (2) project future transportation needs and systems; (3) identify and analyze potential future transportation problems; (4) suggest actions to minimize impact of potential problems.

REFERENCES:

Identification and Prioritization of Concerns in Coal Transportation Now Through 2000, DeSteele, JG; Franklin, AL, PNL-SA-6527, May 1978

PERFORMING AGENCY: Battelle Memorial Institute/Pacific Northwest Labs, RL 6617B

INVESTIGATOR: DeSteele, JG Tel (509) 946-2519

SPONSORING AGENCY: Department of Energy, Environmental Control Technology Division

RESPONSIBLE INDIVIDUAL: Sisler, JA Tel (301) 973-5466

Contract DOE-AT-45-1-1830

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1975 COMPLETION DATE: July 1978 TOTAL FUNDS: \$575,000

ACKNOWLEDGMENT: Energy Research and Development Administration

20 138364

EVALUATION OF ALTERNATIVE TRANSPORTATION SYSTEMS AND POLICIES FOR RURAL MISSOURI

Estimate transport requirements to 1985 and 1990. Estimate economic effects of alternative rural transport systems. Assess state and federal roles in setting transport policy and planning and regulating transport systems. Study economic effects of alternate plans and policies on carriers, shippers and rural areas. Present Missouri rural transport system will be described. Demand for services will be measured and projected to 1985 and 1990. Expected changes in the system will be identified. Cost and service levels will be compared under simulated modal combinations and regulatory patterns. Merits of alternative systems and policies will be evaluated. Published study of grain production and marketing and projection of transportation demand for grain movement to 1985 in 16 county areas of Northwest Missouri. Purpose was to determine a grain distribution system yielding highest net return to producers and marketers. Results indicated possibility of contribution of up to \$2.6 million annually to farmer net income, before considering transportation and elevator upgrading costs, through assembly and storage adjustments to permit larger volume shipments in long-haul transport. Published study of Missouri's transportation system which documents the need for increased attention to upgrading of agricultural and rural

transportation facilities and services. This report serves as an information bank for the ongoing transportation policy work of regional, state and community agencies and university researchers, and for educational efforts in the field of transportation policy, planning and public issues. Completed work on projection of estimated transportation demand for movement of grain and fertilizer in Missouri, by counties, to 1990. These projections provide a base for further work on rural transportation systems in Missouri, for study of barge transportation potential on the Missouri River-Mississippi River system (MO-40-2), and for Missouri input to NC-137 (MO-40-1).

REFERENCES:

Missouri Rural Transportation in Jeopardy Moser, DE, Missouri University, Extension Division, Vol. 18; No. 8, Aug. 1975

An Economic Analysis of Alternative Grain Transportation Systems in Northwest Missouri, Salomone, D; Moser, DE; Headley, JC, Univ Missouri, Agricultural Experiment, Stat Res Bulletin 1019, 138 p., 77

Missouri's Transportation Systems and Policies for Rural Missouri, Moser, DE; et al, University of Missouri, Columbia, 351 p.

PERFORMING AGENCY: Missouri University, Columbia, Department of Agricultural Economics, MO00040

INVESTIGATOR: Moser, DE Rudel, R

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1975 COMPLETION DATE: June 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0068730)

20 138367

NATIONAL TIMBER AND WOOD PRODUCTS REQUIREMENTS

Analyze the present and prospective consumption of timber and wood products in the national economy by components and relate these requirements to the national to the national timber supply situation. Develop and apply sampling systems to measure quantities consumed in construction, manufacturing, shipping, and other major end uses. Develop and apply accurate models which monitor shifts in wood raw materials use. Develop and apply techniques for converting wood product consumption estimates into estimates of timber supply requirements. **PROGRESS REPORT:** A study of nonresidential and nonhousekeeping building construction activity found it increased from 1 billion square feet in 1961 to 1.7 billion square feet in 1973. The largest increase was in commercial buildings such as stores, warehouses, and office buildings. Nonhousekeeping, hospital, and other buildings also showed increases. Construction of Industrial, religious, and educational buildings declined during the period. Lumber, plywood, hardboard, and particleboard usage in these structures increased during the period, while glue-laminated lumber, insulation board, and structural wood-fiberboard decreased. Construction value for all building increased from \$16.05 per square foot of floor area in 1961 to \$24.15 in 1973--an average annual rate of 3.5 percent. A computer retrieval and compiling system has been established, containing primary wood processing mill capacity, type, and location for analysis of trends and regional patterns in timber requirements. Annual woodpulping capacity in the U.S. has increased from 4.4 to 51.5 million tons since 1920, with average mill capacity increasing nearly ten times to 426 tons per day. Kraft pulp capacity now dominates the industry with the South leading in total pulp capacity. Panelboard production capacity data have been collected.

PERFORMING AGENCY: Forest Products Laboratory, FPL-4202

INVESTIGATOR: Stone, RN Marcin, TC Reid, WH

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1977 START DATE: Apr. 1975 COMPLETION DATE: Apr. 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0042894)

20 138370

EVALUATION OF PUBLIC TRANSPORTATION POLICIES AFFECTING AGRICULTURE

Assess on a regular basis the economic performance of the general-purpose transportation system for agriculture and the effect on efficiency and equity of proposed adjustments in services and rates. Project short and long-run needs for 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. **PROGRESS REPORT:** For-hire livestock truckers were found to be principally small but quite stable businesses. Utilization of equipment was high, and rates charged were highly correlated with distance and size of truck. Little basis was found for believing that economic regulation at the interstate level would improve trucking performance. Analysis of a transshipment model of a corn-soybean producing area showed that adverse impacts from rail line abandonment are not likely to be uniformly borne. Certain local marketing firms were shown to lose substantial volumes of patronage by farmers, even though the total marketing costs for the area increased by only 0.1 percent in response to abandonments. The application of waterway user charges sufficient to cover Federal expenditures on waterways were estimated to cause a two-percent increase in marketing costs. Data were assembled for analysis of the cost of operating refrigerated trucks for hauling produce. Also, a survey of truck brokers to determine their role in exempt trucking was performed, and a number of rate service and other proposals for change in transportation were analyzed for their impacts on agriculture.

REFERENCES:

Effects of the Proposed Northeast-Midwest Rail Reorganization on Rural Areas, U.S. Senate, Agriculture and Forestry Comm, Mar. 1975

PERFORMING AGENCY: Kansas State University, USDA Transportation Economics Division, NEA-14-125-53-01-X1

INVESTIGATOR: Casavant, KL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed **NOTICE DATE:** July 1979 **START DATE:** July 1974 **COMPLETION DATE:** July 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0041974)

20 153650**MULTI-MODAL, MULTI-STATE TRANSPORTATION SYSTEM EVALUATION**

Evaluation of the feasibility of a multi-modal, multi-state corridor extending from Kansas City, Missouri to Jacksonville, Florida for the movement of goods and people. Project reports for 1st and 2nd years, including the test design and limited application have been completed. These reports are available upon request, from NTIS.

PERFORMING AGENCY: University of North Florida, Jacksonville, Department of Transportation and Logistics

INVESTIGATOR: Sharp, GS Tel (904) 646-2860 Smith, JA, Jr

SPONSORING AGENCY: Department of Transportation, Office of University Research

RESPONSIBLE INDIVIDUAL: Nupp, B Tel (202) 426-4447

Contract DOT-OS-60512

STATUS: Active **NOTICE DATE:** Aug. 1979 **START DATE:** Aug. 1978 **COMPLETION DATE:** June 1980 **TOTAL FUNDS:** \$950,000

ACKNOWLEDGMENT: University of North Florida, Jacksonville

20 156542**EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS**

Estimate rural freight transportation requirements to 1985 and 1990. Estimate the optimal rural freight transportation storage and distribution system. Evaluate the economic effects of alternative railroad ownership and financial policies. Develop models to estimate the volume of agricultural outputs and inputs requiring transportation and project to 1985 and 1990 the spatial and temporal pattern of products to be transported. With this information an optimal rural freight transportation storage and distribution system will be estimated using a time staged transshipment model of spatial equilibrium. The use of this model will enable us to scenario alternative rail reorganization schemes and assess the sensitivity of the suggested transportation system to changes in the cost of alternative modes of transportation. In addition, we will inventory and describe existing ownership patterns and develop procedures to evaluate the costs and benefits of ownership

alternatives and abandonment of railroad lines. Substantial progress has been made toward the completion of an estimate of the demand for rural transportation in the State of Michigan. Appropriate methodology has been developed and is currently being implemented to make demand projections in 1985, 1990 and 2000 under alternative domestic and foreign demand scenarios. Michigan State has taken a leadership role in developing appropriate methodological procedures to be used by other stations cooperating in the NC-137 regional project. Specific results will be forthcoming on projected quantities of grain requiring transportation services in the State of Michigan. In addition, we are in the initial stages of research directed toward the estimation of an optimal rural freight transportation storage and distribution system in a selected geographical region of Michigan. Also completed was a study of the national income and employment impacts of abandonment of specific Michigan railroad branch lines.

PERFORMING AGENCY: Michigan State University, East Lansing, Department of Agricultural Economics, CSRS MICL

INVESTIGATOR: Thompson, SR

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, MICL01254

STATUS: Active **NOTICE DATE:** July 1979 **START DATE:** Oct. 1976 **COMPLETION DATE:** Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070878)

20 156591**EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION, STORAGE, AND DISTRIBUTION SYSTEMS**

Estimate rural freight transportation requirements to 1985 and 1990. Estimate the optimal rural freight transportation, storage and distribution system. Evaluate the economic effects of alternative federal, state and local government policies on carriers, shippers, receivers and rural communities. Comparison of costs, rates, and services under regulated vs. unregulated conditions will provide the basis for evaluating the merits of alternative regulatory policies. A model will be constructed which will describe rural transportation systems as they would exist under alternative state and federal regulations. The likely performance of the transportation systems will be estimated as a function of intramodal competitive environment of the participating states. An economic analysis of the social costs of regulation of grain rail rates in the Upper Midwest was completed. This analysis is contained in a PhD thesis which has been approved. A manuscript summarizing this research is being prepared for publication as a technical bulletin. Considerations other than the cost of service have been primary factors in determining rail rates on grain. Social costs from the current system of rail rates result when grain traffic is misallocated to less efficient transportation modes and from the income redistribution associated with monopolistic pricing. Cost-of-service estimates for truck and rail shipments of barley and wheat from country origins define a least cost or optimal transportation bill. The actual transportation bill on wheat and barley exceeded the least cost system by a considerable margin. The social costs associated with misallocation of wheat and barley shipments for rail to less efficient trucks are estimated at between \$15 and \$19 million. The social costs from the income redistribution effect of monopoly pricing are estimated at between \$27 and \$43 million. These costs can be reduced or eliminated if railroad grain rates are shifted to a cost-of-service basis. The change in rail rates could be accomplished through an alteration of the ICC ratemaking rules. If grain rates were based on cost-of-service criteria, the social cost of traffic misallocation and eliminated or greatly reduced.

REFERENCES:

Railroads, Grain Transportation and the Interstate Commerce Commission, Martin, M; Dahl, R, Minnesota Agricultural Economist; UMN-Agr Extension Service

A Transportation Issue-Lock and Dam 26 Martin, M; Dahl, R, Minnesota Agricultural Economist; UMN-Agr Extension Service

An Economic Analysis of the Social Cost of Regulated Value-of-Serv Wheat & Barley Rail Rates in the Upper Midwest, Martin, M

PERFORMING AGENCY: Minnesota University, St Paul, Department of Agricultural and Applied Economics, CSRS MIN

INVESTIGATOR: Dahl, RP Tel (612) 376-3436

SPONSORING AGENCY: Department of Agriculture, MIN-14-043; Minnesota University, St Paul, Department of Agricultural and Applied Economics

RESPONSIBLE INDIVIDUAL: Dahl, RP Tel (612)376-3436

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$6,200

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071288), Minnesota University, St Paul

20 156604

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

The project will: estimate rural freight transportation requirements to 1985 and 1990, estimate the optimal rural freight transportation, storage and distribution system; evaluate the economic effects of alternative federal, state and local government policies on carriers, shippers, receivers and rural communities. The present rural transport system will be described. Demand for transportation services will be measured and projected to 1985 and 1990. Expected changes in the system will be identified. Cost and service levels will be compared under simulated model combinations and regulatory patterns. Merits of alternative systems and policies will be evaluated. Completed projection of transportation requirements for movement of grain and fertilizer, by Missouri counties, to 1985 and 1990. Supplied these data as Missouri contribution to regional work under NC137. Providing leadership to NC137 in description and evaluation of state transportation regulation and policy functions as they influence the economic activities of agricultural and rural areas.

PERFORMING AGENCY: Missouri University, Columbia, Department of Agricultural Economics, CSRS MO

INVESTIGATOR: Moser, DE Rudel, R

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, M000040-1

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070255)

20 164822

ONTARIO FREIGHT MODEL

The design of this model will meet the following specific objectives: The development of an understanding of commodity movements and factors influencing commodity movements to and from, through and within the Province of Ontario; assistance to the planning of capital improvements to the transportation network; the provision of data and expertise to assist in the development policy for the regulation of movements on the transportation network; the production of a tool to aid in the effective operation of the existing system. The project is divided into 8 phases: (1) Review of Data and Existing Work, (2) Selection of Commodities, (3) Determination of Functional Relationships, (4) Definition of the Network, (5) Model Development and Timing, (6) Model testing, (7) Monitoring model usage, and (8) Model review. /RTAC/

PERFORMING AGENCY: Ontario Ministry of Transportation & Communication

INVESTIGATOR: Kher, R

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication

STATUS: Active NOTICE DATE: Dec. 1976 COMPLETION DATE: Dec. 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

20 179664

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

Estimate rural freight transportation requirements to 1985 and 1990 and estimate the optimal rural freight transportation, storage and distribution system. Historical data on agricultural production and input usage by Texas subregions will be gathered. Models will be developed to provide estimates of agricultural output and input usage by subregion to 1985 and 1990. With this data, spatial and temporal flow patterns of agricultural products and inputs will be estimated. Transportation cost and rate data will be gathered by mode as it relates to projected agricultural output and input flows. With supply and demand estimates and storage, processing and transportation costs, normative spatial and temporal flows will be resolved with spatial equilibrium models. Optimal number, size and location of storage, processing and distribution facilities will be resolved. The social and economic costs and benefits with alternative configurations will be evaluated.

PERFORMING AGENCY: Texas A&M University, Department of Agricultural Economics, TEX03376

INVESTIGATOR: Fuller, SW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070225)

20 179665

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

Estimate rural freight transportation requirements to 1985 and 1990. Develop models which will provide uniform estimates of agricultural output and input usage by state to 1985 and 1990. Collect historical data on agricultural production and input usage of commodities and states. Project spatial and temporal pattern of outputs and inputs to be transported. Develop procedures for estimating and estimate elasticities and cross elasticities of demand with respect to price and service, by mode of transport and commodity group. The analysis would include the response of individual firms to price and service changes in transportation as well as aggregate response relationships. Projections of transportable surplus wheat, corn, sorghum, oats, barley, peanuts and soybeans have been made to 1984, 1989 and 1999 for four geographical regions in Oklahoma.

PERFORMING AGENCY: Oklahoma State University, Department of Agricultural Economics, OKL01648

INVESTIGATOR: Johnson, MA

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS OKL

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071995)

20 179666

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEM

To estimate rural freight transportation requirements to 1985 and 1990. To estimate the optimal rural freight transportation, storage and distribution system. To evaluate the economic effects of alternative railroad ownership and financial policies. Steering committees for each objective will be appointed from participants cooperating in each objective. The purpose of these committees will be to coordinate research methodologies and to provide for data sharing. Joint publications summarizing regional findings are planned. Production projections for corn, soybeans, wheat and oats to 1984, 1989 and 1999 have been completed by county, CRD and the state of Ohio. Two alternative projections were made. The "baseline scenario" is linked to USDA/ERS projections. Ohio grain production is projected to 494.2 million bushels in the baseline scenario and 565.0 million bushels in the trend scenario in 1985. This represents a decrease of 2% from the 1973-77 average in the baseline scenario and an increase of 12% in the trend scenario. Work has begun on the projections of livestock numbers to 1985, 1990 and 2000. Estimates of feed grain requirements by livestock class have been completed. Feed grain consumption will be subtracted from grain production to estimate the marketable surplus of grain for each CRD in Ohio.

REFERENCES:

Grain Production Projections in Ohio By Crop Reporting District and County 1984, 1989 and 1999, Larson, DW; Bedestenci, HC; Canlas, E, Ohio Agricultural R and D Center, Research Bulletin 1101, 1978

PERFORMING AGENCY: Ohio Agricultural R and D Center, Department of Agricultural Economics and Rural Sociology, OHO00572

INVESTIGATOR: Larson, DW Tel (614) 422-6731

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS OHO

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071704)

20 179667

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

Estimate rural freight transportation requirements to 1985 and 1990. Estimate the optimal grain transportation, storage, and distribution system which can maximize farmers' benefits. Evaluate the economic effects of alternative railroad ownership and financial policies. Evaluate the economic effects of alternative federal, state and local government policies on carriers, shippers, receivers and rural commodities. Objectives 1, 2, and 3 will be completed by using a multi-stage transportation model. This model is based on a combinational algorithm, which compares alternative grain distribution systems and selects the optimal configuration. Interregional mathematical programming models are applied for Objective 4. This programming model determines the amount and directional flows of grain between producing and consuming regions. Completion of cost estimation for trucking grains to market. Completion of truck-barge cost estimation for shipping Montana Grain to domestic and export markets. Completion of rail cost estimates for alternative size of train (single-car, 10-cars, 25 cars and 50 cars). Calculation of mileage matrices and rail cost matrices associated with grain transportation. Projected quantities of grain production and sales in Montana for 1984/85, 1989/90 and 1999/2000 by using a time trend regression analysis. Mathematical model for this study was developed and compiled in computer for final computation.

REFERENCES:

Shipment Patterns of Montana Wheat and Barley Under Alternative Rail and Truck-Barge Rate Structures, Koo, WW; Cramer, G, Montana State University, Staff Paper 76-26

Shipping Patterns of Montana Grain Koo, WW; Cramer, G, NOW, Agricultural Experiment Station, Montana State Univ

A Study of the Interaction of Weather with Alternative Environmental and Grain Reserve Policies, Koo, WW; Bogges, WG; Heady, EO

PERFORMING AGENCY: Montana State University, Bozeman, Department of Agricultural Economics, MONB00077

INVESTIGATOR: Koo, WW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS MONB

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-007118)

20 179671

INTERMODAL TRANSPORTATION AND DISTRIBUTION SYSTEMS FOR MOVING GRAIN AND FERTILIZER

Estimate adjustments required in facilities and operations to enable barge transportation to perform its optimal role in transportation of grain and fertilizer in the Mississippi River basin in 1985. Develop data on estimated fertilizer usage and exportable grain production in Missouri to 1985. Participate with Iowa State University and NC-137 contributors in Projection of Mississippi River basin usage of fertilizer and production of exportable grain surpluses to 1985. Develop and evaluate data on number, location and capacity of river ports, barge lines, transfer facilities and fleet and switching services for grain and fertilizer on the Mississippi River system. Determine structural and procedural adjustments needed to minimize cost of barge transportation and handling of grain and fertilizer on the Mississippi River System. Participate with Iowa State University and Louisiana State University in estimation of intermodal allocation of fertilizer and grain traffic to minimize costs of transporting quantities of these commodities expected to move through deepwater Mississippi River ports by 1985. Data is being gathered to describe the existing facilities along the Mississippi River involved in storage and transloading grain and fertilizer. The data will include capacity, handling capabilities, and ability to receive and ship by barge, rail, and truck. Particular attention will be given to the procedures used in scheduling barge movements. The data will be used in the next phase of the project to analyze structural and procedural adjustments in facilities and transportation operations to minimize the cost of transporting projected quantities of grain and fertilizer for 1985. It is too soon in the life of the project to report major findings. The research is expected to generate alternative structural configurations and procedures which will effectively increase the capacity of the grain and fertilizer storage, handling, and transportation system.

PERFORMING AGENCY: Missouri University, Columbia, Department of Agricultural Economics, MO00040-2

INVESTIGATOR: Moser, DE Rudel, R Woolverton, MW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS MO

Contract 701-15-38

STATUS: Completed NOTICE DATE: July 1979 START DATE: Apr. 1977 COMPLETION DATE: Apr. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0072803)

20 179678

ECONOMIC PROJECTIONS PROGRAM

Synthesize technical and economic data and relationships into component models of the ERS National Interregional Agricultural Projections (NIRAP) System. Coordinate ERS-wide projection teams for evaluating and making necessary modifications in the NIRAP System and resulting projections and document all components and interrelationships in a User's Manual. Generate projections and analysis of alternative futures encompassing major variables in the U.S. food and fiber system and its input supply, farm production, transportation, processing and distribution subsectors. Disseminate information via staff reports, professional papers, technical bulletins and a publication, Agriculture the Third Century. "First generation" component models for essential technical and economic relationships will be followed by additional first generation components and "second, third and more advanced generation" modified components to expand ERS's capability to simulate alternative futures more useful in economic research, public policy formulation and program planning and administration. Eleven scenarios were developed for a study for Resources for the Future. Alternative growth rates in GNP and population were combined with moderate and high trade, current trends and stringent environmental controls, and moderate and high technology growth rates to project 31 commodities at the farm level to 1985, 2000, and 2025. The most difficult case combined high population, high GNP growth, stringent environmental controls, high trade, and moderate technological growth, then environmental controls were eased, GNP and population growth slowed, technology growth slowed, technology growth accelerated, and plant protein substituted for animal protein in other scenarios to evaluate their ability to ease resource requirements. Output consisted of aggregate prices received and prices paid by farmers, gross farm income, production expenses, net farm income, indexes of total farm output, livestock & crop production, exports and imports, food use, feed use, per capita consumption, and prices. Crop yields, land use, inputs such as fertilizer and fuel, and regional distribution were also projected.

PERFORMING AGENCY: Michigan State University, East Lansing, Division of Economics and Statistical Analysis, NEA-19-165-26-01-X

INVESTIGATOR: Rosmiller, E

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed NOTICE DATE: July 1979 START DATE: Nov. 1974

ACKNOWLEDGMENT: Current Research Information Service (CRIS-004-3559)

20 179679

EVALUATION OF ALTERNATIVE TRANSPORTATION SYSTEMS AND POLICIES FOR RURAL MISSOURI

Estimate transport requirements to 1985 and 1990. Estimate economic effects of alternative rural transport systems. Assess state and federal roles in setting transport policy and planning and regulating transport systems. Study economic effects of alternative plans and policies on carriers, shippers and rural areas. Present Missouri rural transport system will be described. Demand for services will be measured and projected to 1985 and 1990. Expected changes in the system will be identified. Cost and service levels will be compared under simulated modal combinations and regulatory patterns. Merits of alternative systems and policies will be evaluated. A study of grain production and marketing in Northwest Missouri has been completed, together with a projection of transportation demand for movement of grain to 1980 and 1985, to determine a grain distribution system which would yield the highest net return to producers and marketers within the region. Study results indicate the possibility of a contribution of as much as \$2.6 million per year in farmer net income, before considering transportation and elevator upgrading costs, through adjustment of assembly and storage patterns to permit long-haul transport in larger volume shipments at lower cost. A study of the condition, capacity and impediments to efficiency in

Missouri's transportation system has been finalized for publication. The study documents the need for special attention to upgrading of rural roads and bridges; identifies segments of the railroad system with service limitations requiring attention; and highlights the possibilities for improved utilization of our underemployed inland waterway resources as a promising target for further study. Findings of this study have important implications for both public and private sector decision making. Data collection is proceeding for estimation of transportation demand for grain and fertilizer, on a state-wide basis by counties, in 1980 and 1985.

PERFORMING AGENCY: Missouri University, Columbia, Department of Agricultural Economics, MO00040
 INVESTIGATOR: Moser, DE
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1975 COMPLETION DATE: June 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0068730)

20 179692

ECONOMIC ANALYSES OF U.S. GRAIN EXPORTING SYSTEMS
 Evaluate private versus state trading systems for grain with respect to: Returns to producing, marketing and processing firms; relative market power between countries with different systems; comparative advantage; relative efficiencies of time, farm and place utilities under different systems; rate of technological change and progress including capital losses and replacement; their respect to commodity futures markets. Evaluate alternative export marketing techniques and strategies with respect to: the adequacy of the U.S. system of grades and standards; the logistics of costs of marketing and transportation. Comparative data will be collected on Canadian and U.S. grain handling costs and procedures. Structural and policy differences will be compared wherever possible. System performances will be compared on the basis of handling costs and producer returns. Analysis of capital investment decisions in the two systems will also be made. Data on price quality relationships for wheat will be collected and analyzed to determine the validity of present grading factors. North Dakota production data will be assembled on a county basis for use in a transportation model designed to analyze various rate policies for west bound shipments of wheat and barley. Existing transportation rates will be used to generate optimal flow patterns. Alternative rate policies will be compared to existing rate solutions. Work was completed on a study of North Dakota Farmers Grain marketing strategies. This study indicated the principal factors influencing farmers market selection were price and market convenience. A paper was prepared and presented at the NC-104 research symposium held in Chicago in September 1976. This presentation summarized some of the research findings of a study on grain title transfer arrangements conducted by eight states in the North Central Region. The study indicated that there are significant differences among elevators in the region with respect to business procedures and marketing practices. New work initiated under this project includes a comparative study of the U.S. and Canadian grain handling systems. This study will compare policies and marketing practices of North Dakota and Manitoba. A study was also initiated to evaluate grade standards and basic quality considerations in spring wheat. It will evaluate price quality relationships to determine economic significance of selected quality factors in spring wheat.

REFERENCES:

Grain Marketing Strategies of North Dakota Farmers Anderson, DE; Bedker, G, North Dakota Agricultural Experiment Station, Dept Agri Econ, Report No. 111, Dec. 1975

Grain Title Transfer Arrangements in the North Central Region. Presented at NC104 Grain Marketing Sem Sept 8, 1976, Anderson, DE, North Dakota Agricultural Experiment Station, Dept Agri Econ, 1976

Abstract of Research Results-NC-104-Systems Analysis of the Economics of Grain Marketing, Stroup, J, Ohio Agricultural Research and Development Center, Wooster, Sept. 1976

Analysis of Grain Title Transfer Arrangements Fisher, N, North Dakota State Univ, Dept of Agricultural Economics, MS Thesis (unpublished)

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics
 INVESTIGATOR: Anderson, DE
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1971 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0060238)

20 185240

THE INFLUENCE OF COAL TRANSPORTATION COSTS ON THE OPTIMAL DISTRIBUTION OF COAL AND THE OPTIMAL LOCATION OF ELECTRIC POWER GENERATING PLANTS

The project is a theoretical and empirical investigation of the impact of space on the movement of coal. Market area analysis will be the first step, to be followed by the adjustment due to structural changes and the locational impact of power generating plants. The final step will be to determine current and future optimal utilization and distribution of coal among regions.

PERFORMING AGENCY: West Virginia University
 INVESTIGATOR: Campbell, TC Tel (304) 293-5531 Hwang, MJ
 SPONSORING AGENCY: Department of Transportation, Research and Special Programs Administration
 RESPONSIBLE INDIVIDUAL: Nupp, B Tel (202) 426-4447

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Sept. 1978 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$40,000

ACKNOWLEDGMENT: West Virginia University

20 188659

IMPACTS OF CHANGES TO TRUCK SIZE, CONFIGURATION AND WEIGHT LIMITS

This project provides an assessment of the freight market and energy impacts of increased truck size and weight limits. Impacts on competition among highway, rail and water carriers are estimated in terms of traffic diversion as a result of changing state limits, prohibiting multiple trailer operations or having weight limits below current federal allowable levels. Estimates of changes in revenues and profitability of carrier groups as well as freight rates are also under study.

PERFORMING AGENCY: Transportation Systems Center, OP-840
 INVESTIGATOR: Maio, DJ Tel (617) 494-2418
 SPONSORING AGENCY: Office of Policy and International Affairs, Intermodal Studies Division
 RESPONSIBLE INDIVIDUAL: Swerdloff, CN

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: June 1978 COMPLETION DATE: Oct. 1980

ACKNOWLEDGMENT: DOT

20 196118

CAPACITY AND LOCATION OF GRAIN EXPORT FACILITIES IN LIGHT OF CHANGING FOREIGN DEMAND CONDITIONS

Identify and quantify those factors which affect the efficiency of the U.S. grain export system. Develop a unified multicommodity grain transshipment model linking the U.S. and foreign grain marketing systems. Determine optimum patterns of grain flows under alternative foreign demand scenarios. A mathematical programming based grain transshipment model which includes logistical constraints in grain export system, will be used to determine optimum flow of grain from U.S. producing regions to foreign demand points through the ports. The study builds upon U.S. grain transshipment models and focuses on adding a detailed export component to treat movements from U.S. ports to foreign destinations. Wheat, corn soybeans and an aggregate of other grains are analyzed simultaneously.

PERFORMING AGENCY: Purdue University, Department of Agricultural Economics, IND-801-15-46
 INVESTIGATOR: Binkley, JK Thompson, RL McCarl, BA
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS IND

Contract 801-15-46

STATUS: Active NOTICE DATE: July 1979 START DATE: May 1978 COMPLETION DATE: May 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0076421)

21 138527

CHICAGO TERMINAL PROJECT

To increase the reliability, speed and efficiency of car movements through a major existing railroad terminal so that the quality and saleability of rail transportation is improved, thereby attracting additional traffic improving employment opportunities. The improvements are to be made without capital expenditures. This objective is being achieved through a series of experiments involving changes in operating practices, labor agreements, rates, and regulations.

Co-sponsors include Railroad Labor Organizations, Association of American Railroads and Chicago Railroad Terminal Information System.

PERFORMING AGENCY: Federal Railroad Administration, Task Force on Rail Trans of Labor/Management Committee

INVESTIGATOR: Adamson, E McGuire, T

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads; Railroad Labor Organizations

RESPONSIBLE INDIVIDUAL: Collins, DM Tel (202)472-7280

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1976 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$495,000

ACKNOWLEDGMENT: FRA

21 157598

HOUSTON TERMINAL PROJECT

The purpose is to establish a cooperative railroad labor-management experimental program for the Houston Railroad Terminal. The Houston terminal continues to experience significant car delays. Therefore, the principal objective of this project is to improve the efficiency of rail terminal operations in the Houston area.

Additional funding provided by railroad labor organizations and Houston, Texas, area Railroads.

PERFORMING AGENCY: Federal Railroad Administration, Task Force on Rail Trans of Labor/Management Committee

INVESTIGATOR: Joiner, D Tel (713)224-3662 Dessens, F Tel (713)224-3662

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads; Railroad Labor Unions

RESPONSIBLE INDIVIDUAL: Collins, DM Federal Railroad Administration Tel (202)472-7280

Contract DOT-FR-75244 (CC)

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Aug. 1977 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$195,000

ACKNOWLEDGMENT: FRA

21 157902

INTERMODAL FREIGHT SERVICES EAST OF THE HUDSON RIVER

The objective is to improve rail freight connections with truck and marine operations in the New York City and Long Island areas. In addition to New York City, the Long Island counties of Nassau and Suffolk will be involved in the study.

Announcement of this study was published in Traffic World, V 171, N 1 (July 4, 1977), P 18.

REFERENCES:

- Transportation Priorities in New York State 1978
- 1978 Winter Storm Operations of the Long Island Railroad 1978

PERFORMING AGENCY: New York City Planning Commission, New York City Department of City Planning; New York State Department of Transportation, Planning Division

SPONSORING AGENCY: New York State Legislature

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1977 TOTAL FUNDS: \$400,000

21 159624

FREIGHT CAR UTILIZATION RESEARCH-DEMONSTRATION PROGRAM

As freight car utilization is a nationwide problem beyond the ability of a single railroad to solve, a cooperative research program (Phase I) between the railroad industry and the Federal Government was started in 1975 and completed in 1977. The second phase of this program established six task forces to address and overcome those critical facets of the freight car utilization problems identified in Phase I. The task forces structured case

studies, research and demonstration programs which facilitate the adoption of improvements throughout the industry. Current FCUP work is focused on promotion and implementation of five of these areas--management integration, car cycle analysis, service planning, interroad car management, and empty car distribution.

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: French, PW Tel (202) 293-4165 Muehlke, RV

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 426-2608 Taylor, CE Tel (202) 293-4084

Contract DOT-FR-771-5279

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: July 1977 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$976,000

ACKNOWLEDGMENT: AAR

21 159626

FREIGHT CAR UTILIZATION RESEARCH-DEMONSTRATION PROGRAM UTILIZATION AND SERVICE RELIABILITY IMPACTS OF OPERATING PLANS

The Program will work with its subcontractor, Massachusetts Institute of Technology, to complete documentation on the MIT operations analysis model and to assist one or more large railroads to apply this model on their own properties as part of a larger planning process which leads to the development of an improved operation/service plan, helps integrate the activities of operating and marketing departments and demonstrates to the industry as a whole the feasibility and utility of service planning. The program will also work to test any of the three terminal control and decision aids developed previously, provided that significant support from at least the operating department of a host railroad can be secured. 441b3-Taylor, CE

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: French, PW Tel (202) 293-4165 Muehlke, RV

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202)426-2920 Wooden, DG Tel (202) 293-4084

Contract DOT-FR-771-5279

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: July 1977 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$185,000

ACKNOWLEDGMENT: AAR

21 159627

FREIGHT CAR UTILIZATION RESEARCH-DEMONSTRATION PROGRAM. CAR CYCLE ANALYSIS

This program will continue to work with its subcontractor, SRI International, to modify the Car Cycle Analysis System processing logic, output formats and other characteristics to increase the system's accuracy and usefulness. It will process data on specific car types, primarily at the AAR with AAR personnel, but some processing may be done at SRI, particularly on car types on which SRI has already performed work. These and other analyses will be used to identify problems--particularly in empty car time, terminal time and customer time.

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: French, PW Tel (202) 293-4165 Muehlke, RV

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 426-2608 Taylor, CE Tel (202) 293-4084

Contract DOT-FR-771-5279

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: July 1977 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$60,000

ACKNOWLEDGMENT: AAR

21 159653

INTERMODAL SYSTEM DEMONSTRATION

Test and demonstrate new concepts in intermodal services on designated routes. The AAR will subcontract with railroads through competitive bidding and will provide management to monitor and coordinate demonstrations. It will also collect and analyze data and make a final report. Among techniques to be tested are piggyback trains providing direct origin-to-destination service without intermediate yarding; scheduled ser-

vices with two or more departures daily, increased labor productivity; improved terminal connections; and specialized information and control systems to respond to market changes.

PERFORMING AGENCY: Association of American Railroads
 INVESTIGATOR: Minger, WK Tel (202) 293-5323
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Edson, WD Tel (202) 472-1014

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: 1977 COMPLETION DATE: 1980 TOTAL FUNDS: \$1,300,000

21 160398

SYSTEMS ENGINEERING FOR INTERMODAL FREIGHT SYSTEMS-PHASE I

The findings of the initial phase of the Federal Railroad Administration's (FRA) Intermodal Systems Engineering Program are presented in five volumes. This work is intended to accelerate the rate of technological evolution in the equipment, facilities and subsystems used in intermodal rail freight transportation. The Phase I reports, entitled: "Exploratory Planning" include: (1) characterization of present intermodal equipment and operations, (2) identification of problems or opportunities where technology could be utilized to improve service, efficiency and return on investment (3) identification of improved equipment, subsystem, facility concepts having potential future application, (4) synthesis of alternate systems comprised of improved equipment in various combinations, (5) development of a methodology for assessment of the relative merit of system alternatives in quantitative terms under various operating scenarios, and (6) evaluation of synthesized systems and identification of most promising alternatives. The work reported was performed by two contractor teams working independently, each using slightly different approaches. Each contractor prepared separate reports. The findings from Phase I will be used in a more in-depth examination of the most promising alternatives during Phase II, Development Planning, scheduled for completion in October 1979.

PERFORMING AGENCY: Kearney (AT) and Company Incorporated; Peat, Marwick, Mitchell and Company
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Blanchfield, JR Tel (202) 426-0808

Contract DOT-FR-749-4273 (FFP)
 STATUS: Active NOTICE DATE: Sept. 1979 START DATE: Aug. 1977 COMPLETION DATE: 1980 TOTAL FUNDS: \$500,000

ACKNOWLEDGMENT: TRAIS

21 170596

NETWORK FREIGHT FLOW

The project has two main thrusts: (a) railcar blocking and train scheduling models and (b) traffic assignment with elastic demand. Both investigations rely on the technique of formulating a large scale problem as a number of subproblems. Under (a) above, these are formulated as a set of dynamic programming/shortest path problems, and under (b) as a set of linear complementarity problems.

PERFORMING AGENCY: Massachusetts Institute of Technology
 INVESTIGATOR: Magnanti, TL Assad, AA
 SPONSORING AGENCY: Department of Transportation
 RESPONSIBLE INDIVIDUAL: Crosby, RW Tel (202) 426-9638

Contract DOT-TSC-1058
 STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Oct. 1978 COMPLETION DATE: Oct. 1979

ACKNOWLEDGMENT: DOT

21 170620

RAILROAD CLASSIFICATION YARD DESIGN METHODOLOGY STUDY

This research is to establish a set of practical guidelines, procedures, and principles which will facilitate the process of classification yard design and engineering. Phase I includes preparation of a basic methodology in preliminary form. In Phase II these procedures will be applied to a case study involving a cooperating railroad. The third phase will comprise refinement and expansion of the preliminary methodology, and documentation in a user-oriented form.

PERFORMING AGENCY: SRI International, 6364-1
 INVESTIGATOR: Wong, PJ Tel (415) 326-6200 X2104

SPONSORING AGENCY: Transportation Systems Center; Federal Railroad Administration, Office of Research and Development
 RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr Tel (202) 426-0855

Contract DOT-TSC-1337

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Apr. 1977 COMPLETION DATE: Oct. 1980 TOTAL FUNDS: \$430,000

ACKNOWLEDGMENT: TSC, FRA

21 170622

ST. LOUIS TERMINAL PROJECT

This project is an expansion of the original St. Louis Terminal Project. The original pilot project involved the St. Louis terminal of the Missouri Pacific Railroad. With the success of this pilot, the involved parties expanded the Task Force concept of experimentation to include the entire St. Louis Terminal. The gist of the Task Force concept is to create a mechanism whereby labor and management can work in cooperation to solve mutual problems. As the original St. Louis Project has shown, significant improvements in operating efficiencies can be brought about if the proper labor-management environment is produced.

PERFORMING AGENCY: Federal Railroad Administration, Task Force on Rail Trans of Labor/Management Committee
 SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railroad Labor Organizations
 RESPONSIBLE INDIVIDUAL: Collins, DM Tel (202) 472-7280

Contract 75232

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: May 1976 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$300,000

ACKNOWLEDGMENT: FRA

21 170664

INTERNATIONAL GOVERNMENT-INDUSTRY RESEARCH PROGRAM ON TRACK TRAIN DYNAMICS: PHASE III. TASK 3--TRAIN OPERATION AIDS

This task will develop computer-assisted train operation and makeup aids to improve current system safety, and reliability, without significant hardware changes and take advantage of rapidly developing microprocessor technology. The subtasks: (3.1) Determine the manner in which an on-board computer can interface with operating personnel to assist in safe train operation; (3.2) Develop the technical requirements for reliable on-board microprocessor systems to help monitor/control conditions on locomotives and in the train; (3.3) Identify the sensor systems with the best near-term potential for use in future on-board monitoring and train signal and control systems; (3.4) Use locomotives in FAST test service at Pueblo to obtain early experience with on-board computer-assisted operations; (3.5) Develop a yardmaster's minicomputer to optimize train makeup based on delivery efficiency and dynamic stability.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Ambrose, WG Tel (312) 567-3649

SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration; Railway Progress Institute; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Hawthorne, KL Tel (312) 567-3584

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1978 COMPLETION DATE: 1980

ACKNOWLEDGMENT: AAR

21 185236

FREIGHT CAR UTILIZATION STUDY

The major effort has been to design, implement and evaluate an operating/service plan on the Boston & Maine. Major service changes implemented in the Spring of 1979 have improved service and profitability and will be monitored through 1980. The planning process and procedures for inter-departmental coordination will be documented. The next step will be to transfer the process to a larger railroad. Additional projects include a study of the relationship between power and car utilization and a test of new terminal control techniques at Southern Railway's Macon Yard.

PERFORMING AGENCY: Massachusetts Institute of Technology
 INVESTIGATOR: Sussman, JM Tel (617) 253-5326 Martland, CD
 SPONSORING AGENCY: Association of American Railroads, Freight Car Utilization Program
 RESPONSIBLE INDIVIDUAL: Wooden, DG Tel (202) 293-4165

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1977 COMPLETION DATE: July 1980 TOTAL FUNDS: \$500,000

ACKNOWLEDGMENT: Massachusetts Institute of Technology

21 185237

USRA CAR UTILIZATION STUDY

A detailed study of existing car distribution practices, procedures and organizational relationships on Conrail will be performed and comparison between Conrail and other major US railroads will be documented. Potential changes to the car distribution system will be developed; specific changes to organization, information systems and analysis procedures will be based upon a determination of those areas which offer the most potential for improvement.

PERFORMING AGENCY: Massachusetts Institute of Technology
INVESTIGATOR: Sussman, JM Philip, CE
SPONSORING AGENCY: United States Railway Association

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$24,863

ACKNOWLEDGMENT: Massachusetts Institute of Technology

21 185238

UNION PACIFIC CAR UTILIZATION STUDY

A detailed study of existing car distribution practices, procedures and organization relationships on Union Pacific will be performed and comparison between UP and other major U.S. railroads will be documented. Potential changes to the car distribution system will be developed; specific changes to the organization, information system and analysis procedures will be based upon a determination of those areas which offer the most potential for improvement.

PERFORMING AGENCY: Massachusetts Institute of Technology
INVESTIGATOR: Sussman, JM Philip, CE
SPONSORING AGENCY: Union Pacific Railroad

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$12,214

ACKNOWLEDGMENT: Massachusetts Institute of Technology

21 188662

BUFFALO TERMINAL PROJECT

The purpose is to establish a cooperative railroad labor-management experimental program in Conrail's Buffalo, New York terminal. The objective of the program to experiment with innovative operating practices that will facilitate the movement of cars through the terminal. The scope of these experiments include labor work rules, management practices and government regulations. Part of the project involves use of a computer system to monitor movement of cars and to measure factors that determine car speed and reliability.

PERFORMING AGENCY: Conrail Task Force on Rail Transportation
INVESTIGATOR: Bethge, C Tel (716) 856-5940 Morey, J
SPONSORING AGENCY: Federal Railroad Administration; State Government of New York; Consolidated Rail Corporation; Railroad Labor Unions
RESPONSIBLE INDIVIDUAL: Collins, DM Tel (202) 472-7280

Contract DOT-FR-8186

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: July 1978 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$200,000

ACKNOWLEDGMENT: FRA

21 193785

A WEIGHT VARIABLE IMPACT DEMAND ANALYSIS FOR TOFC/COFC SERVICES

This research is an extension of "An Equilibrium Analysis of selected Intercity Freight Markets" which continues the exploration of trucks with double trailers versus TOFC Shuttle trains primarily as energy conservation alternatives. All data is being updated to 1972 levels. The number of city-pair markets to be studied has more than doubled. A model of logistics choice, developed under DOT, Office of University Research and first employed in a Federal Energy Administration Study, has been extensively modified to handle this new data to produce more detailed analysis of the cost functions. Final analysis of the market consequences in a competitive rail and highway market should allow for recommendations of specific policies, particularly in the fuel-saving area.

PERFORMING AGENCY: Massachusetts Institute of Technology
INVESTIGATOR: Roberts, P
SPONSORING AGENCY: Department of Energy

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: Feb. 1978 COMPLETION DATE: Aug. 1979

ACKNOWLEDGMENT: Massachusetts Institute of Technology

21 196725

EFFECT OF FOUR ASPECT RAILWAY SIGNAL SYSTEM

To examine the effect on a typical Canadian railway subdivision of a 4th aspect signal ("slow-clear") on a) the timetabling of trains b) the need for heavy capital expenditure on double tracking. Gather information on an international (European) basis; develop a computer model of a railway timetable for a defined section; compare train capacity versus length of sidings for 3-aspect and 4-aspect signal systems. The goal is increased traffic capacity on a single line track and deferment of complete double-tracking through the management of trains in lieu of capital expenditures.

PERFORMING AGENCY: Manitoba University, Canada, U18S13030
INVESTIGATOR: Landsdown, A
SPONSORING AGENCY: Manitoba University, Canada

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1977 COMPLETION DATE: Oct. 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

21 196733

FLAT YARD INVESTIGATION

To improve the productivity of operations of flat classification yards on the CN System by the application of process control using mini-computer technology to identify locations of all cars within a typical flat classification yard.

PERFORMING AGENCY: Canadian National Railways, 111C13813
INVESTIGATOR: Rennie, R
SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1979 START DATE: June 1978 COMPLETION DATE: Dec. 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

21 196734

PROGRESSION OF COMPUTERIZED INVENTORY SYSTEM MONTREAL YARD

To improve the productivity of major classification rail yard in Montreal the application of process control using mini-computer technology will identify locations of all cars within the yard terminal areas. Technology will be adaptable to all other similar installations on CN's system.

PERFORMING AGENCY: Canadian National Railways, 111C13810
INVESTIGATOR: Rennie, R
SPONSORING AGENCY: Canadian National Railways

STATUS: Active NOTICE DATE: July 1979 START DATE: June 1978 COMPLETION DATE: Dec. 1979

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

21 196742

CHICAGO INTERMODAL TERMINAL ROADWAY PROJECT

Feasibility study of a truck roadway, on railroad right-of-way, grade separated, connecting major Chicago intermodal terminals, providing low cost trailer interchange between the railroads involved.

PERFORMING AGENCY: Barton-Aschman Associates, Incorporated; Kearney (AT) and Company, Incorporated; Murphy Engineering Incorporated; Ripley Mead
INVESTIGATOR: Powells, M Tel (312) 491-1000 Davidson, W Hartigan, M
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Brooks, WR Tel (202) 472-1014

Contract DOT-FR-8156

STATUS: Active NOTICE DATE: July 1979 START DATE: Sept. 1978 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$250,000

22 083483

ECONOMIC ANALYSIS OF THE UNITED STATES GRAIN EXPORTING SYSTEMS

Evaluate alternative inventory and export policies with respect to: Market efficiency, price stability, producer and consumer utility, their effects on private state trading systems, servicing the export markets, and the effects of export embargoes on prices and market share. Use historical data to estimate and project demand and supply imbalance in world grain trade. Calculate the variability in supply and demand and surplus and deficits under alternative assumptions of world production and consumption. Develop models that will show the effects of alternative inventory policies on the size and variability of world grain surplus or deficit. Estimate the effects of alternative inventory policies on farm income, U.S. and world grain prices, and the variability of grain marketing firms. Estimate the costs and other economic effects of alternative policies and alternative ownership arrangements for given levels of inventory. Estimate the relationship between alternative inventory policies and volume and destination of exports. Further work was done on a study of grain marketing patterns by Indiana farmers. A survey of truck shipments of grain by Indiana country elevators for the 1973-74 marketing year was tabulated and preparation of a manuscript for publication was begun. Truck shipments accounted for 64 percent of total grain handled by country elevators in 1974-75, up from 58 percent in the 1968-69 marketing year. This was a continuation of a long time trend. A manuscript was prepared summarizing the results of a study of vertical coordination in cooperative grain marketing systems.

REFERENCES:

Vertical Coordination in Cooperative Grain Marketing Systems, Schwartz, DR, Purdue University, Unpublished PhD Thesis, 1974

PERFORMING AGENCY: Purdue University, Department of Agricultural Economics, IND01732

INVESTIGATOR: Jones, BF

SPONSORING AGENCY: Department of Agriculture

STATUS: Active **NOTICE DATE:** Aug. 1977 **START DATE:** July 1971 **COMPLETION DATE:** Sept. 1981

ACKNOWLEDGMENT: Purdue University (CRIS 0060205)

22 083506

DETERMINE COSTS FOR DIFFERENT SYSTEMS FOR MARKETING POTATOES FROM THE GROWER TO THE RETAIL STORE

Develop the least cost system(s) for handling, distributing, storing, processing and packaging potatoes by improving the efficiency for each function in the marketing systems. 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. This research has been divided into three phases. This first phase is completed and results published on methods of harvesting, loading the truck, transporting from field to packing house, and unloading. The second phase included packing house operations and has been completed and published. The third phase includes movement of potatoes from the packing house, to wholesaler receiver and retail store. One of the objectives in last year's plans was to conduct research on shipping potatoes in bins from the packing house, through the distribution warehouse to retail store. Studies were conducted and completed in cooperation with the Red River Valley Potato Research Laboratory and the Market Pathology Laboratory, Chicago, Ill.

REFERENCES:

A Cost Evaluation for Two Systems of Handling Bulk Potatoes from Field to Packing Shed, Volz, MD; Anthony, JP, Jr; Mongelli, RC, Oct. 1974

PERFORMING AGENCY: Agricultural Marketing Research Institute, Marketing Operations Research Laboratory, 1104-15842-001

INVESTIGATOR: Volz, MD Anthony, JP Bouma, JC

SPONSORING AGENCY: Department of Agriculture

STATUS: Completed **NOTICE DATE:** July 1979 **START DATE:** May 1973 **COMPLETION DATE:** May 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0040246)

22 083511

IMPROVED SYSTEMS FOR SHIPPING AND HANDLING GROCERIES FROM MANUFACTURER TO WHOLESALE WAREHOUSE

Measure the cost for less-than-truckload (LTL) shipments of groceries from manufacturer to wholesaler and determine feasibility of reduced cost with a regional warehouse to store products of several manufacturers and ship full truckloads of grocery products from several manufacturers. Determine extent of less-than-truckload (LTL) receipts of grocery products at wholesale warehouses, measure labor productivity, detention charges, and other costs for LTL shipments. Develop a model based on actual productivity in receiving utilized truckloads of groceries, intermediate warehousing and transportation costs. Enlist the support and cooperation of the National American Wholesale Grocers Association, National Association of Food Chains, and Super Market Institute. The objective to develop a cost model for use of a second size unitized shipment program from manufacturer to distribution warehouse has been achieved. A report documenting findings in the study is in preparation and shows that implementation of a second size unit load is more costly than the current practice of repalletizing groceries at the distribution warehouse when a pallet size other than 48-by 40-inch is used. The objective to initiate a study on consolidation of retail store vendor deliveries in cooperation with the Food Distribution Laboratory was not initiated because of the lack of combined resources in the two laboratories. Another study was initiated on the possibility of unitizing truck transportation from manufacturer to distribution warehouse on slipsheets. Since truck transportation accounts for 70% of such deliveries, unitization of such shipments has the potential for substantial savings in marketing grocery products.

REFERENCES:

Methods for Receiving Groceries by Truck Bouma, JC, Nat American Wholesale Grocers' Assoc, Chicago, Proceedings, Mar. 1975

Six principles for developing saving in produce warehouses. Bouma, JC, Outlook Annual Report of the United Fresh Fruit and Veg Assn, Volume IV No. 1, pp 64-68, Jan. 1977

PERFORMING AGENCY: Agricultural Marketing Research Institute, Marketing Operations Research Laboratory, 1104-15864-001

INVESTIGATOR: Bouma, JC

SPONSORING AGENCY: Department of Agriculture

STATUS: Active **NOTICE DATE:** July 1979 **START DATE:** Nov. 1973 **COMPLETION DATE:** Nov. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0040668)

22 083516

CONTROL OF DAMAGE AND LOSS IN DISTRIBUTION

Find characteristics of commodities and items which are damaged in distribution, determine environment factors causing damage, propose methods of damage reduction and develop an economics of distribution loss control. 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 package including resource use and the ecological impact. Using information assembled in case by case approach, establish generalities relating to damage control. Develop sub-projects to explore specific problems in the areas of cushion properties, distribution environment, item fragility and system evaluation procedures. Field studies have been completed on the Performance of bags from NFD. A performance specification which will permit the development of alternative and possibly lower cost packages has been proposed. Basic work on the development of performance test methods continues with emphasis on the definition of failure modes as they relate to product-package combinations. Results indicate that different combinations require different test methods. This means that methods may have to be developed for each possible product-package combination.

REFERENCES:

A Critical Analysis of Vibration Measurement of the Transportation Environment, Hausch, JR, Michigan State University, School of Packaging, Tech Rpt 23, Sept. 1975

The Correlation of Shock with Free-Fall Drop Height Chatman, RL; Goff, JW, Michigan State University, School of Packaging, Technical Report 24, Aug. 1976

Investigation of the Material Properties of Corrugated Paperboard, Chatman, RL, Michigan State University, School of Packaging, Suppl to Special Rpt. 9, 69 p., 77

Moisture Protection Performance for Packages for Non-Fat Dry Milk,

Chatman, RL; Goff, JW; Gyeszly, SW, Michigan State University, School of Packaging, 3 p., 1977

Environmental Evaluation of Bags for Non-Fat Dry Milk Chatman, RL; Goff, JW, Michigan State University, School of Packaging, 51 p., 1977

PERFORMING AGENCY: Michigan State University, East Lansing, School of Packaging, MICL 03108

INVESTIGATOR: Goff, JW

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: July 1979 START DATE: Aug. 1971 COMPLETION DATE: July 1999

ACKNOWLEDGMENT: Michigan State University, East Lansing (CRIS 0060632)

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. Data collected from an experiment in a laboratory cold room indicates: (1) Use of a high volume blower to move air through a small number of palletized boxes of cherries decreases the amount of time required to cool; (2) location of the blower on top of the row of pallets or at the end of the row does not significantly change rate of cooling; (3) location of boxes within the pallet units influences the rate of cooling; and (4) moisture loss in cherries may be a problem at certain locations within the pallet load. Efforts will continue to develop techniques to properly precool packed and unitized boxes of cherries prior to shipment.

PERFORMING AGENCY: Agricultural Research Service, Western Region Oregon-Washington Area

INVESTIGATOR: Fountain, JB

SPONSORING AGENCY: Department of Agriculture, 5805-15880-001

STATUS: Completed NOTICE DATE: July 1979 START DATE: Nov. 1973

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0040669)

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. The two requirements of a successful pallet exchange system are guaranteed uniform-valued pallets and an agency to provide the guarantee to the pallet user. Pallet construction standards have been written and tested that insure that species and grades are compatible with the fastening system and that pallet production procedures assure uniform performance. The design objective is uniform performance in service, irrespective of the materials used. The grading and utility-rating standard establish uniform shock-performance classes; and account must be taken in design of the differences between the classes in order to build pallets that perform in a uniform manner. To insure equal quality in a pallet exchange program, the pallets should be produced and procured under the auspices of a third-party inspection and certification system. This third party would also be responsible for maintaining the value of the pallet during its life and managing the exchange pallet inventory. The time appears right for the establishment of a major pallet exchange program in the U.S.

REFERENCES:

Required Pallet Research: Economic Aspects Opportunities for Virginia's Pallet, Industry, Proceedings, Wallin, WB, VPI & State University, 121, pp 32-38, 1971

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, 6 pp, illus., 74

Factors Influencing the Selection of State Office Furniture Anderson, RB, USDA Forest Service Research, Paper NE-266, 6 pp, illus., 73

Factors Affecting the Use of Hardwood Flooring in Urban Rehabilitation, Nevel, RL, Jr, USDA Forest Service Research, Paper NE-273, 7 pp, illus., 1973

Design of Pallet Deckboard-Stringer Joints Part II: Reinforced Aspen Pallet Joints and Aspen Pallets, Stern, EG, VPI & State Univ, Wood Res & Wood Constr Lab, Bulletin 133, 24 pp, 1975

Recent Pallet Fastening Research can Reduce Pallet Costs, Stern, EG, VPI & State Univ., Wood Res & Wood Constr Lab, Bulletin 128, 8 pp, 1974

Tentative Nailing Standards for Warehouse and Exchange Pallets, Wallin, WB; Stern, EG, VPI & State Univ., Wood Res & Wood Constr Lab, Bulletin N129, 16 pp, 1974

PERFORMING AGENCY: Northeastern Forest Experiment Station

INVESTIGATOR: Martens, DG

SPONSORING AGENCY: Department of Agriculture, NE-4304

STATUS: Completed NOTICE DATE: July 1979 START DATE: Sept. 1967 COMPLETION DATE: Oct. 1978

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0023183)

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 reduction.

A study was initiated to compare the costs of two systems for handling prefabricated cuts of beef between the wholesale chain warehouse and retail stores. One system utilizes wire baskets stacked on a four-wheel dolly; the other utilizes cardboard boxes on pallets.

PERFORMING AGENCY: Agricultural Research Service, Agricultural Marketing Research Institute

INVESTIGATOR: Goulston, CL

SPONSORING AGENCY: Department of Agriculture, 1104-15864-005

STATUS: Active NOTICE DATE: July 1979 START DATE: Aug. 1974 COMPLETION DATE: Aug. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0041735)

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. Progress was made toward improved ability to respond effectively to requests for marketing margins and cost components information. Close working relationships were maintained with VPI on cooperative work relating to costs of crushing and manufacturing salad dressing and mayonnaise. A cost simulation model, developed at VPI

is now operational for crushing soybeans, refining soybean oil, and manufacturing margarine, cooking oil, mayonnaise, and shortening. These models along with information now in the FEDS provide a basis for estimating costs from the production of soybeans through the processing sector. The overall system can also provide information and resource use including capital, labor, energy, etc. The system was used during the year to develop a staff report on energy uses in the crushing sector.

REFERENCES:

US Situation for Oil Crops-Soybeans, Cottonseed, Peanuts, Sunflower, Safflower and Other Oilseeds, Doty, Ho, Jr, Res to Meet U.S. & World Food Needs, ARPAC Conf, Vol 1, pp 150-173, July 1975

Decision Making in Oilseed Processing Doty, Ho, Jr, Oil Mill Gazetteer, pp 20-26, Aug. 1975

A Representative and Deterministic Cost Component Model of the U.S. Vegetable Oil Industry, Lamm, RM, Jr; Johnson, JM, VPI and State Univ in Coop with Econ Res Service, Bulletin 107, 93 pp, Dec. 1975

PERFORMING AGENCY: Economic Research Service

INVESTIGATOR: Doty, HO

SPONSORING AGENCY: Department of Agriculture, CE-07-062-11-00

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1974

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0041588)

22 135001

ALTERNATIVE SYSTEMS FOR TRANSPORTING AGRICULTURAL OUTPUTS TO MARKET AND INPUTS TO PRODUCTION AREAS

OBJECTIVE: Determine the optimal transportation systems and facilities for transporting grain and fertilizer to maximize producer income. APPROACH: Estimate demand for transportation; estimate costs of alternative modes and handling facilities; estimate optimal transportation modes, system and location and types of facilities. Benefit-cost ratio were computed for upgrading all the branch lines in Iowa. A questionnaire is being developed to conduct a survey of the origins, destinations and mode of transport for all grain shipped out of Iowa. cost ratios for upgrading 71 branch rail lines in Iowa. An analysis of the impact of rail abandonment on communities and elevators, the optimal sizes of rail shipments of grain to export and the optimal locations of facilities to load the unit trains of grain has been made.

REFERENCES:

An Economics Analysis of Upgrading Branch Rail Lines: A Study of 71 Lines in Iowa, Baumel, CP, National Technical Info Service; U.S. Department of Commerce, Mar. 1976, PB-251978/AS

The Economics of Upgrading 71 Branch Rail Lines in Iowa Baumel, CP, American Journal of Agricultural Economics, Volume 59, No. 1, Feb. 1977

Executive Summary-An Economic Analysis of Upgrading Branch Rail Lines: A Study of 71 Lines in Iowa, Baumel, CP, Federal Railroad Administration; U.S. Dept of Transportation, Mar. 1976

Implications of the Local Rail Assistance Section of the Railroad Revitalization & Regulatory Reform Act of 1976, Baumel, CP; Drinka, TP; Miller, JJ, The Logistics and Transportation Review, Vol. 12 No. 5, Nov. 1977

Impact of Rail Abandonment upon Grain Elevator and Rural Community Performance Measures, Miller, JJ; Baumel, CP; Drinka, TP, American Journal of Agricultural Economics, Vol. 59 No. 4, Nov. 1977

PERFORMING AGENCY: Iowa State University, Ames, Agricultural Experiment Station

INVESTIGATOR: Baumel, CP

SPONSORING AGENCY: Department of Agriculture, Iowa Cooperative State Research Service, 0065178 IOW02016

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1974 COMPLETION DATE: June 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0065178)

22 138363

NEW AND IMPROVED SYSTEMS TO HANDLE PEANUTS AT COMMERCIAL STORAGES

Develop new or improved systems to handle peanuts as they are received, dried, stored, graded, shelled, bagged, and shipped. Presently used systems of handling peanuts will be evaluated for efficiency and cost. Where needed new or improved facility layouts, handling or flow processes, bagging and bulk handling, and sampling methods and equipment will be developed to reduce marketing cost and maintain quality as peanuts move through marketing channels. Peanuts in packages with a newer and stronger pouch

material were flushed or vacuum-backflushed with nitrogen, CO(2) and air atmospheres. Atmosphere integrity successfully maintained in both quality and shipping tests. Packages shipped 1500 miles and stacking strength determined to be 4700 pounds with 1/2-inch deformation. Results indicate a 300% safety factor above anticipated requirements. Packages were ambient atmosphere stored and grade and germination determinations were made after 3, 6, and 12 months storage periods. Nitrogen and CO(2) backflush treatments gave less kernel skrinkage and highest SMK outturn. Moisture content was not significantly different. External damage was significantly higher in air flushed packages and refrigerated controls. Significant differences in bald and split kernels were less than allowable grade tolerances. Excellent sanitation and insect protection were achieved. Nitrogen backflush atmospheres maintained germination best but CO(2) atmosphere comparable through 6 months storage. Seed treated with fungicide before storage germinated slightly lower than non-treated seed.

REFERENCES:

Dimensional Changes in Peanut Pods, Kernels, and Hulls as Moisture is Removed During Curing, Slay, WO, J Amer Peanut Res and Educ Assoc., 1974

Damage to Peanuts from Free Fall Impact Slay, WO, J Amer Peanut Res and Educ Assoc., 1975

Some Interim Results on a New Way to Package Seed Peanuts, Slay, WO; Pearson, JL; Holaday, CE, Proceedings 32nd Ga. Crop Improvement Assn, Inc Annual Mtg, p 50, 1977

Package and Storage Effects on Peanuts Pearson, JL; Slay, WO; Holaday, CE, Proceedings 32nd Ga. Crop Improvement Assn, Inc Annual Mtg, p 50, 1977

Effects of Packaging Material, Atmosphere, Moisture, Temperature and Time on Peanut Food Quality and Germination, Pearson, JL; Slay, WO; Holaday, CE, Proceedings 32nd Ga. Crop Improvement Assn, Inc Annual Mtg, 9 (1977):63, 1977

PERFORMING AGENCY: Agricultural Research Service, National Peanut Research Laboratory, 7704-15700-007

INVESTIGATOR: Slay, WO

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1979 START DATE: Nov. 1974 COMPLETION DATE: Nov. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0041935)

22 138365

TRANSPORTATION MODEL OF THE GRAIN AND FERTILIZER SECTOR OF NORTHWEST OHIO

Describe the present condition of the rural transportation system in selected areas of Ohio. Estimate probable grain and fertilizer flows, in selected areas of Ohio. Estimate the optimal flow of commodities between production and consumption points through the network. Trace the effects of alternative government transportation policies on the operation of the transportation system. Conduct cost-benefit analyses of alternative investments in the rural transportation system. Develop a transportation model to evaluate the impact of changes in the transportation system and government policy on the movement of agricultural commodities and future needs of the transport industry. The questionnaire for this project was finalized during spring quarter and data collection started in the summer quarter. Due to the detailed nature of the questionnaire, the number of completed, usable interviews (58) was less than desired but still adequate for the research. Data was obtained on number, size and location of grain elevators, monthly shipping pattern of corn, wheat and soybeans by transportation mode and by market destination for the 1974/1975 and 1975/76 crop years.

REFERENCES:

Rail Transportation Problems in Ohio Larson, DW, Ohio State University, Dept Agri Econ and Rural Soc, No. 577

The World Food Crisis: Implications for Trade and Aid Larson, DW, Ohio State University, Dept Agri Econ and Rural Soc

Recent Developments on Rail Reorganization in Ohio, Socio-Economic Information for Ohio Agri & Rural Communities, Larson, DW, No. 581, Nov. 1976

The Impact of Rail Reorganization on Grain Transfer Activities, Flow Patterns and Costs in Western Ohio, Kane, MD, MS Thesis, 1978

PERFORMING AGENCY: Ohio Agricultural R and D Center, Department of Agricultural Economics and Rural Sociology, OHO00534

INVESTIGATOR: Larson, DW
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1975 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0067954)

22 138368

IMPROVED HANDLING AND DISTRIBUTION METHODS FOR DOMESTIC MARKETING OF FRUITS AND VEGETABLES

Find more efficient and effective ways of handling and distributing perishable products from Florida to domestic markets and determine their effects on market quality and consumer preferences. Test and evaluate improved handling methods under simulated and commercial environmental conditions. Develop and test methods for filling, handling, and transporting bulk pallet bins bagged or bulk citrus. Develop and test pallets and/or slipsheets for unitized handling of citrus peppers, and celery from production areas to retail warehouses. Explore possibilities for developing methods whereby railcars can be used more effectively in transporting citrus and winter vegetables from Florida production areas. Two commercial shipments of mixed loads of fresh fruits and vegetables to Puerto Rico were monitored for product temperatures and arrival condition. Results showed the benefits of providing air channels through the load, especially where all products are not precooled to the same temperature when loaded. Results also showed the necessity of placing stronger boxes and crates in lower layers and stowing products packed in bags in upper layers so that continuous air channels can be maintained through the load.

PERFORMING AGENCY: Department of Agriculture, Horticultural Research Laboratory, 7606-20580-006

INVESTIGATOR: Hatton, TT Smoot, JJ Risse, LA

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed NOTICE DATE: July 1979 START DATE: Nov. 1975 COMPLETION DATE: Nov. 1978

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0042873)

22 138375

IMPROVED PACKAGING, HANDLING, AND TRANSPORT OF WESTERN FRUITS AND VEGETABLES

Improve efficiency of packaging palletization, handling, and transport of western fruits and vegetables to reduce marketing costs and maintain product quality. New packages and methods of palletizing or unitizing these packages will be developed for efficient handling, transport, and marketing of fruits and vegetables. Research will determine package strength, will relate design and loading patterns to cooling rates and transit temperatures, and will correlate packaging, handling, and transport systems to maintenance of product quality. Research will include studies on new packaging and handling systems compatible with mechanical produce and with efficient use of transport vehicles. Lettuce: Curtain coating both sides of lettuce cartons with wax decreased the absorption of moisture by the cartons, the number of severely damaged cartons that arrived at eastern markets, and the amount of damaged lettuce, but it slightly increased the incidence of decay in the lettuce. Stone fruits: Shipments of fruit unitized and shipped on slip sheets or wooden pallets had about the same transit temperatures. Slip sheets resulted in slightly more damage to containers.

REFERENCES:

Lettuce Temperatures in a Van Container with a Reverse Airflow Circulation, Hinsch, RT; Hinds, RH; Goddard, WR, Proceedings (27th) pp 130-33, 1975

A Mechanical Handling System for Lettuce-Can with Peaches and Nectarines, Hinsch, RT; Hinds, RH, Mktg. Res. Rpt. 1077, 7 p., 1977

Compatibility of Fruits and Vegetables during Transit in Mixed Loads, Lipton, WJ; Harvey, JM, Mktg. Res. Rpt. 1070, 7 p., 1977

PERFORMING AGENCY: Agricultural Research Service, Department of Agriculture, 5202-20580-003

INVESTIGATOR: Hinsch, RT Rij, RE Lipton, WJ

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1969 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0020846)

22 138378

ALTERNATIVE STRUCTURES FOR INCREASING EFFICIENCY IN INTER-AND INTRA-REGIONAL GRAIN MARKETING SYSTEMS

OBJECTIVES: Indicate ways to increase the economic efficiency of grain marketing, transporting and processing following dramatic changes since 1972 in marketing institutions, operational structure and policies related to industry. Evaluate the impact of alternative transportation rate structures on the organization of the grain industry. Examine alternative national grain inventory policies and their effects on market organization and performance. Based on results develop a set of recommendations for improving efficiency and/or reducing costs of inter-and intra-regional marketing of grain. APPROACH: Georgia will participate in the work of four objectives as outlined in the regional project statement. The work will include a survey of grain farms serving the Southern region to determine changes in marketing functions related to movement and storage of grain; the development of grain transfer costs for alternative modes of transportation; an analysis of grain inventory policies on storage and transportation needs; and recommendations from data obtained to guide grain firms on needed marketing facility investments under alternative situations. Work has consisted mainly in developing a questionnaire to be used in obtaining information from feed grains and soybean firms. The contents of this schedule for S-115 is being coordinated with other regional projects in other regions of the U.S. Numerous changes and revisions have been necessary to accomplish the objectives of S-115 and cooperating agencies. Sampling procedures for the survey of grain handling and marketing firms are near completion. This survey of grain and soybean firms will furnish the basic data to accomplish several objectives of the regional project. Detailed information will be collected concerning the volume, origin, destination, mode of transportation, and storage facilities for each type of grain handled in the region. Additional data on type, number, and size of grain firms in the state and region will be developed. Markets to which feed grains and soybeans are shipped will be ascertained as well as the form in which the grains are marketed.

REFERENCES:

75 Corn Crop Uncertain Bateman, WL, Farmers and Consumers Market Bulletin, Vol. 61 No. 4, Jan. 1975

Threat Posed by Soybeans from Brazil Huang, CL; Anderson, RF, Southeast Farm Press, Vol. 4 No. 2, p 48, 1977

PERFORMING AGENCY: Georgia Agricultural Experiment Station, Agricultural Economics Department, GEO01185

INVESTIGATOR: Anderson, RF

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1974 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0065175)

22 138400

REDUCING PHYSICAL AND QUALITY LOSSES OF WHOLE SOYBEANS IN TRANSPORTATION AND HANDLING

The objective is to reduce physical and quality losses, handling and transportation costs for seed, food and processing grade soybeans shipped to domestic and world markets. The type, extent, and causes of physical losses and damage and quality deterioration in the whole beans in the various handling, processing, and transport modes will be identified by shipping and handling surveys and experiments. Alternative handling techniques and improvements in transport and handling equipment and transport and storage environments which may reduce such losses will be identified and developed. This will include single mode and multi-modal transport by truck, railroad, van containers, and barge-ship-barge shipments. These innovations will be evaluated in shipping and handling experiments to develop cost and performance data and appropriate recommendations for improving the handling and transport of the products. Twenty-five shipments of soybeans to Europe and the Far East were monitored during this reporting period. From these shipments, samples were drawn upon arrival at the U.S. ports of embarkation and upon arrival at the overseas ports. The samples were graded to determine the amount of physical damage and to verify the grades of the beans upon delivery. In addition, the amount of fines in the samples was determined and analyzed

and the results give an indication of the amount of breakage in handling. The samples were also chemically analyzed to determine the oil, protein and free-fatty acid contents. Furthermore a more sensitive indicator of damage or degradation was incorporated into the analysis, that of "neutral oil," which is directly related to quality loss in the soybeans. Loss and damage data were also compared to the rate or velocities of soybean movements loading into and unloading out of the ships' holds. Cost analyses were made of the relationship between the sales price of the soybeans and the shipping costs. Comparison was also made between the cost of the soybeans (C.I.F.) and the oil, protein, and neutral-oil content. Two reports on this work have been completed and are currently in the printing process.

REFERENCES:

Transport Problems in Marketing Soybeans Overseas Nicholas, CJ; Bailey, WA, Proceedings-World Soybean Res Conference, pp 762-770, 1976

PERFORMING AGENCY: Agricultural Marketing Research Institute, Transportation and Packaging Research Laboratory, ARS 1104

INVESTIGATOR: Nicholas, CJ Bailey, WA

SPONSORING AGENCY: Department of Agriculture, 1104-20660-002

STATUS: Completed NOTICE DATE: July 1979 START DATE: Apr. 1976 COMPLETION DATE: Apr. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0043052)

22 138481

RAIL WHEAT TRANSPORT EFFICIENCY STUDY

To enhance and improve the physical efficiency of the marketing/transportation distribution system for grains in the hard winter wheat belt moving to domestic or export points, recognizing and utilizing the inherent advantages of rail transportation. Physical distribution study of alternative marketing/transportation systems.

PERFORMING AGENCY: Texas Transportation Institute, Texas Transportation Institute

INVESTIGATOR: Bridges, S Tel (713) 845-5814

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Hardesty, F Tel (202) 426-2608 Boone, JW Tel (202) 426-9682

Contract DOT-FR-65104

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Apr. 1976 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$630,000

ACKNOWLEDGMENT: FRA, TRAIS

22 153666

LASH AND OTHER INTERMODAL SERVICES IN THE PACIFIC NORTHWEST EXPORT DISTRIBUTION SYSTEM

Identify potential economies that could be obtained from movement of agricultural and forest products from the Pacific Northwest via the Columbia-Snake navigation system into overseas markets by recently innovated intermodal transportation systems such as LASH, standard intermodal containers and ocean-going barges. Identify products that would lend themselves to movement from the Pacific Northwest into foreign markets via the above transportations system and determine least cost routes and modes of moving these products. Characterize and compare efficiency and quality of service offered by existing and recently innovated transportation/cargo handling systems. Conduct studies of export potential of forest and agricultural products produced in the study region. Estimate least cost routes and modes with linear programming techniques. A least cost transshipment linear programming model was developed and run to evaluate the cost savings of shipping grass seed exports via container on barge on the Snake/Columbia Waterway. Modest savings were identified for this mode over traditional truck movements. A master's student surveyed the Pea and Lentil industry in the PNW to obtain rate data and other information for a least cost transportation study. At this time he is in the final stages of compiling data for the model. A recent decision by PFEL steamship line to convert its barge carrying vessels to full containerships has made it impossible to obtain rate data for LASH barge movements on the Snake/Columbia. However, the final fate of the barge-carrying vessel concept is still unresolved. While difficulties (particularly with steamship rate conferences and foreign port labor groups) have plagued LASH it still shows potential in the Pacific Rim trade.

REFERENCES:

The Relationship Between International Trade and Transportation: Theory and Developments, Jones, JR, Nat Symp on Transp for Agriculture and Rural Amer, Paper, Nov. 1976

Commercial Navigation on the Snake/Columbia Waterway System:

Issues and Prospects, Jones, JR; Casavant, KL, Idaho Economics, No. 2, Dec. 1977

A Transshipment Model of Container Grass Seed Exports Through PNW, Jones, JR; Bahn, HM, Transportation Forum, New York City, 40 p.

Commercial Navigation on the Snake/Columbia: Issues and Projects, Jones, JR; Casavant, K, Idaho Economics No. 2, Dec. 1977

The Relationship Between International Trade and Transportation: Theory and Developments, Jones, JR, Proc of Nat Symp Transp Agri and Rural America, New Orleans, DOT-TST-77-33, Aug. 1977

PERFORMING AGENCY: Idaho University, Moscow, Department of Agricultural Economics, CSRS IDA

INVESTIGATOR: Jones, JR

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, IDA00719

Contract 616-15-85

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1976 COMPLETION DATE: Sept. 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070665)

22 153674

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

Estimate rural freight transportation requirements to 1985 and 1990. Estimate the optimal rural freight transportation, storage, and distribution system. Historical data on production and utilization of agricultural products and inputs will be projected to 1985 and 1990, as a means of developing spatial and temporal patterns of transportation. A time-staged transshipment model will be used to identify least cost organization of the agricultural industries and the effect of changes in transport requirements, as a basis for evaluating effects of alternative public and private decisions. Identification of the relationships between transportation rates and prices of grain requires complex economic and mathematical models. These models are being developed to quantify these relationships. Illinois is coordinating base data and projections of production and livestock consumption of feed grains. Grain production and consumption for Illinois has been estimated for 1985, 1990, and 2000, as a base for estimating transportation requirements.

PERFORMING AGENCY: Illinois University, Urbana, Department of Agricultural Economics, CSRS ILLU

INVESTIGATOR: Hill, LD Tel (217) 333-2455 Hoffman, L

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, ILLU-05-0344

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070435)

22 153703

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

Estimate rural freight transportation requirements to 1985 and 1990. Estimate the optimal rural freight transportation, storage and distribution system. Evaluate the economic effects of alternative federal, state and local government policies on carriers, shippers, receivers and rural communities. Develop models, collect data and project spatial and temporal qualities of agricultural inputs and outputs to be transported. Develop models, collect data, and estimate optimal configuration of rural freight flows and number, size and location of processing and distribution facilities. Develop models, collect data and estimate impact of state and national transportation regulation on the rural transportation system. Projections have been made of the quantities of grain expected to move out of Iowa counties by 1985, 1990 and 2000. Work is continuing to project the tons of fertilizer that will be transported into each Iowa county.

PERFORMING AGENCY: Iowa State University, Ames, Department of Economics, CSRS IOW

INVESTIGATOR: Baumel, CP

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, IOWO2173

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070220)

22 153718

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

Estimate rural freight transportation requirements to 1985 and 1990, estimate the optimal rural freight transportation, storage and distribution system, evaluate the economic effects of alternate railroad ownership and financial policies. Develop models for estimates of agricultural output and input usage by state to 1985-1990. Collect historical data on agricultural production and input usage of commodities. Project spatial and temporal pattern of outputs and inputs to be transported. Develop or modify a time staged transshipment model of spatial and equilibrium using supply and demand estimates, shortage, processing and distribution costs and transportation costs and rates. Cost and rate data will be collected. Estimate the optimal configuration of rural model and intermodal freight flows. Measure social and economic costs and benefits of alternate rural transportation networks on rural communities. Inventory and describe existing ownership pattern. Estimate cost of governmental and private purchase and upgrading cost of rail lines. Use case studies to compare low volume rail line cost revenues, service, and operating characteristics under state ownership and operation alternatives. Evaluate the costs and benefits of ownership alternatives and abandonment of railroad lines. We have prepared estimates of production of grains by counties and have projected estimates to 1980, 1985, 1990, 1995 and 2000. Data have been submitted to the Illinois Station for incorporation in regional estimates. Similar estimates of livestock numbers, feed grain consumption and exportable grain surpluses by counties are being prepared. Compilation of state regulations of truckers have been carried out according to procedures established by the regional committee.

PERFORMING AGENCY: Kansas State University, Department of Agricultural Economics, CSRS KAN

INVESTIGATOR: Sorenson, LO

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, KAN00966

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1961 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070301)

22 156972

POTENTIAL IMPACTS OF CONTAINERIZATION AND INTERMODAL MOVEMENTS OF AGRICULTURAL COMMODITIES AND PRODUCTS

This study will evaluate the potential for and assess the economic impact on shippers, carriers, and receivers resulting from increased use of containerization and intermodal movements of agricultural commodities and product inputs. APPROACH: This is a basic line study directed to one area of the abandonment question (i.e. alternatives for meeting increasing freight transportation needs of rural areas). The information developed in this effort will furnish guidelines to decision makers relating to available alternatives for moving inbound and outbound freight in rural areas confronted with rail abandonment. Primary emphasis of this study will be devoted to those rural communities currently receiving rail service on light density on branch lines in Texas and will focus on potential alternatives available to users in rural areas and the benefits and costs of implementing container and intermodal plans.

PERFORMING AGENCY: Texas A&M University, Agricultural Experiment Station, Tex-616-15-90

INVESTIGATOR: Lamkin, JT Owensby, RM

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

Contract 616-15-90

STATUS: Completed NOTICE DATE: July 1979 START DATE: Apr. 1976

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070488)

22 157092

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

To estimate the optimal rural freight transportation, storage and distribution system. Evaluate the economic effects of alternative railroad ownership and

financial policies. Evaluate the economic effects of alternative federal, state and local government policies on carriers, shippers, receivers and rural communities. An extensive review will be made of new agricultural transportation techniques of operation, costs, rates, routes and policies from transportation firms and government agencies. Additional data will be obtained by interview of freight managers and policy decision makers. Specific field study will be completed on transportation problems in Wisconsin. This project is currently not funded. A new research project has been submitted for 1978-79. Research progress basically consists of the following: Representation of the Research Station on NC-137 at regional meetings. Cooperation with North Central researchers on current plans for grain movement surveys in the Midwest and river areas. Cooperation on planning future transportation research on rail movement, rate structure and current status of abandonment actions. Design of new research proposal to actively participate in the North Central research efforts.

PERFORMING AGENCY: Wisconsin University, Madison, Department of Meat and Animal Science, CSRS WIS

INVESTIGATOR: Vilstrup, RH

SPONSORING AGENCY: Department of Agriculture, WIS02268

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071499)

22 179657

ALTERNATIVE STRUCTURES FOR INCREASING EFFICIENCY IN INTER-AND INTRA-REGIONAL GRAIN MARKETING SYSTEM

Examine the interrelationships of geographic and seasonal pricing patterns and ascertain the effect of pricing patterns on structure. Seasonal and geographic price patterns will be analyzed to determine the factors causing changes in patterns over time. The current pricing patterns will be compared with programming results to determine those patterns consistent with least cost adjustments. Plans have been made to find reliable cost data, by area, for grain handling firms for use in linear programming models developed in SM-42. Survey of grain handling firms will be made in 1978 to obtain data on flows and structure for 1977. The questionnaire will have to be developed such that the data fit the needs of the linear programming models mentioned.

PERFORMING AGENCY: Tennessee University, Knoxville, Department of Agricultural Economics and Rural Sociology, TEN00486

INVESTIGATOR: Sappington, CB

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071728)

22 179658

ALTERNATIVE STRUCTURES FOR INCREASING EFFICIENCY IN INTER-AND INTRA-REGIONAL GRAIN MARKETING SYSTEM

Indicate ways to increase economic efficiency of grain marketing, transporting, and processing following recent changes in marketing institutions, operational structures and policies. Evaluate impact of alternative transportation rate structures on the organization of the grain industry. Based on results of objectives A-D, develop set of recommendations improving grain marketing efficiency. A survey will be used to ascertain recent changes in marketing firms, functions and structure. Analytical models will be used to estimate the impact on marketing structure of selected changes in costs and national policies. Considerable emphasis will be placed on the effects of changes in transportation rates. From the results of the various analyses to be made, recommendations will be made to improve marketing efficiency. Work consisted of making final plans for a survey of grain handlers. Plans are to coordinate the grain flow survey with NC 137 and NC 139 Regional Committee to obtain the data on almost a national basis. Projected grain production and utilization estimates are also being coordinated among regions. Analyses were continued from SM-42 and the first draft of a dissertation was completed analyzing the number, type, and size of grain firms needed for three areas of Mississippi under various assumed conditions.

PERFORMING AGENCY: Mississippi State University, Department of Agricultural Economics, MIS-4806

INVESTIGATOR: Phillips, TD Bateman, WL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS MIS

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071805)

22 179659

ALTERNATIVE STRUCTURES FOR INCREASING EFFICIENCY IN INTER-AND INTRA-REGIONAL GRAIN MARKETING SYSTEM

Indicate ways to increase economic efficiency in grain marketing. Evaluate impact of alternative transportation rates on grain industry. Examine interrelationships of geographic and seasonal pricing patterns and ascertain their effects on structure. Examine alternative national grain inventory policies and their effects on market organization and performance. Sample of grain firms in South will be surveyed by use of questionnaire to provide information on changes in and structure of the grain industry. Analysis of data will provide a measure of market performance. Grain transfer costs will be estimated from alternative transportation rate structures and based on rates, optimal location for grain facilities will be determined. Representative seasonal and geographic grain prices will be obtained from secondary sources to determine price patterns. These will be compared with price patterns from earlier research. Programming will be used to study grain industry adjustments and price patterns to facilitate least cost adjustments. Alternative national grain inventory policies will be analyzed from standpoint of estimated potential impact on transportation needs, market organization, existing facilities, price stabilization and costs. Work on this project during 1977 concerned mostly planning, since this was a new project last year. Three subcommittee meetings were held during the year to design and perfect a questionnaire which will be taken in the spring and summer of 1978. Work on the questionnaire was coordinated with two other Technical Committees in the U.S. and the U.S. Army Corps of Engineers in order to develop a questionnaire with common questions for the 48 contiguous United States. A draft is now ready. One subcommittee meeting also was held to develop common methodology among all 48 contiguous U.S. states for projecting feed grain and livestock numbers. In addition, work also continued in 1977 in supplying data for final publications under S-42, the project which this project replaces and overlaps.

REFERENCES:

Structure of Grain Marketing in the South Suffett, DM; Hall, HH, Southern Coop Series, Bulletin 215, 1977

The Midwestern and Southern Grain Merchandising Patterns: A Contrast, Baldwin, ED; Bateman, WL, Southern Coop Series, Bulletin 221, 1977

Grain Handling and Processing Firms in Alabama Stallings, JL; Harrison, GL, Agr. Econ Series, Series 21 (Revised), 1977

Soybeans: Problems and Possibilities Stallings, JL; Thurlow, DL, Alabama Agribusiness, Vol. 15 No. 4, 1977

PERFORMING AGENCY: Auburn University, Department of Agricultural Economics and Rural Sociology, ALA00648

INVESTIGATOR: Stallings, JL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS ALA

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071807)

22 179660

ALTERNATIVE STRUCTURES FOR INCREASING EFFICIENCY IN INTER-AND INTRA-REGIONAL GRAIN MARKETING SYSTEM

Indicate ways to increase the economic efficiency of grain marketing, transporting, and processing following dramatic changes since 1970 in marketing institutions, operational structure and policies related to industry and evaluate the impact of alternative transportation rate structures on the organization of the grain industry. A questionnaire will be developed for a survey of a sample of grain firms serving the southern region and other markets to determine changes in marketing firms and marketing functions

and information on movement and storage of grain. These data will be analyzed to measure market performance. Grain transfer costs will be estimated by modes and changes in access to modes to ascertain optimal location and structure of facilities from alternative rate structures. Data have been assembled and projections made by sub-state areas for livestock production, grain production, and feed grain surplus or deficit by area for 1985, 1990, and the year 2000. A survey schedule has been developed in cooperation with other states participating in S-115 and NC-137 regional projects. This will be used in a 1978 survey of grain handling firms.

PERFORMING AGENCY: Kentucky University, Department of Agricultural Economics, KY00050

INVESTIGATOR: Shuffett, DM Hall, HH

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS KY

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071952)

22 179661

ALTERNATIVE STRUCTURES FOR INCREASING EFFICIENCY IN INTER-AND INTRA-REGIONAL GRAIN MARKETING SYSTEM

Indicate ways to increase the economic efficiency of grain marketing, transporting and processing, following dramatic changes since 1972, in marketing institutions, operational structure and policies related to industry. Based on results of Objectives A, B, C, and D, develop a set of recommendations for improving efficiency and/or reducing costs of inter-and intra-regional marketing of grain. Program results will be used to estimate the impact on market structure of increasing costs, institutional barriers and national policies related to the grain industry. Empirical data from Objectives A through D will be used to develop guidelines firms can use in regard to operations in future facility investment for alternative market conditions and for considering national inventory policies. Cost coefficients for on-farm drying and storage of grain were estimated using a case study of an incline auger facility with storage capacity of 8,812 quintals. Initial investment was \$6.96 per quintal, with annual ownership costs of 87 cents and operating cost of 91 cents per quintal. Energy requirements were estimated for removing one percentage point of moisture from a quintal of rice at 0.53 KWH of electricity and 0.26 liters of fuel (L.P.). Estimates of the initial investment and processing costs are being assimilated for three size soybean processing plants.

PERFORMING AGENCY: Arkansas University, Fayetteville, Department of Agricultural Economics and Rural Sociology, ARK00890

INVESTIGATOR: Morrison, WR

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS ARK

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0072047)

22 179662

ALTERNATIVE STRUCTURES FOR INCREASING EFFICIENCY IN INTER-AND INTRA-REGIONAL GRAIN MARKETING SYSTEM

Indicate ways to increase the economic efficiency of grain marketing, transporting, and processing following dramatic changes since 1972 in marketing institutions; evaluate the impact of alternative transportation rate structures on the organization of the grain industry; examine the interrelationships of geographic and seasonal pricing patterns and ascertain the effect of pricing patterns on structure. Examine alternative national grain inventory policies and their effects on market organization and performance; based on results of objectives A, B, C, & D, develop a set of recommendations for improving efficiency and/or reducing costs of inter and intra regional marketing of grain. Obtain data by questionnaire from a sample of grain firms in Ohio; compare and analyze data for changes since the base period 1971; gather and analyze data on inter regional transport costs; gather and analyze data on inter regional differences in grain prices; reserve policy will be examined from two points of view, and a price stabilization tool and as a world food reserve; optimizing models will be developed in conjunction with the SM-42 macro model; improve and further develop

SM-42 macro model to assist in analysis of data from first four objectives; develop minimal cost industry solutions based on firm, transportation and storage analysis. During the first year of this project, a grain flow and structure questionnaire was designed and tested. This instrument will identify the flow of grain from CRDs in Ohio to deficit regions and will document the importance of the southern and northeastern feed deficit markets and export outlets for Ohio's grain industry and farmers. To document the importance of the grain structure in Ohio and in the southern and Midwestern United States, to market performance, structure and performance variable summary tables were designed. To estimate Ohio's 1985, 1990 and 2000 feed and processing demands, a feed ration for all species of livestock was developed and livestock numbers for the years 1960-1975 were assembled. These livestock data are partially projected using trend analysis to 1985, 1990 and 2000.

PERFORMING AGENCY: Ohio State University, Department of Agricultural Economics and Rural Sociology, OHO00596

INVESTIGATOR: Sharp, JW Baldwin, ED

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS OHO

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0072094)

22 179663

ALTERNATIVE STRUCTURES FOR INCREASING EFFICIENCY IN INTER-AND INTRA-REGIONAL GRAIN MARKETING SYSTEM

Indicate ways to increase the economic efficiency of grain marketing, transporting and processing following dramatic changes since 1972 in marketing institutions, operational structure and policies related to industry. Evaluate the impact of alternative transportation rate structures on the organization of the grain industry. Based on results develop a set of recommendations for improving efficiency and/or reducing costs of inter-and intra-regional marketing of grain. A survey of firms will be conducted to provide a description of the grain marketing industry in the mid-seventies and data for determining changes that have occurred in marketing firms, marketing functions and market structure. Transfer costs will be estimated for alternative transportation rate structures. This analysis will include intermodal rate comparisons such as relative rates between modes and changes in access to different modes of transport to ascertain the optimal location and structure of grain storage and processing facilities resulting from alternative rate structures. A quantitative model will be used to estimate the impact that changes in the transportation system will have on grain marketing. A set of recommendations will be developed for improved decisions relative to future facility investment under alternative market conditions and policies. A survey of elevators to determine grain flows by origin and destination, by mode of transport, is scheduled for summer of 1978. The questionnaire has been developed and the content coordinated with other regional committees. Cost data and coefficients have been developed for use in a national model relating policy and technological changes to number, size, and type of grain handling facilities.

REFERENCES:

Comparative Costs of Conditioning and Storing Corn Schwart, RB; Hill, LD, ILLU, Dept Agric Econ, Agricultural Experiment Station, AERR-152, 32 p., July 1977

Costs of Drying and Storing Shelled Corn, Illinois Farms Schwart, RB; Hill, LD, ILLU, College of Agriculture, Cooperative Extension Service, Circular 1141, 12 p.

PERFORMING AGENCY: Illinois University, Urbana, Department of Agricultural Economics, ILLU-05-0348

INVESTIGATOR: Hill, LD Brooks, BL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS ILLU

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0072621)

22 179668

GRAIN PRODUCER'S MARKETING STRATEGIES FOR MEETING RAPIDLY CHANGING CONDITIONS IN SOUTH DAKOTA

Analyze selected marketing conditions including "Basis" (cash-futures) relationships, changing markets, transportation and marketing costs for wheat, corn and soybeans at the country level in SD. Determine alternative grain marketing strategies for grain producers to meet rapidly changing marketing conditions and "Basis" trends as noted above. Prices (cash and futures) for wheat, corn and soybeans will be assembled and analyzed for changes since 1972 in the basis relationship in forward pricing of grains and in the storage hedge. The basis history for locations without rail transportation will be compared to those with rail service to determine any differences. The findings from Approaches 1 and 2 will be used to propose marketing strategies for producers of grain.

PERFORMING AGENCY: South Dakota State University, Department of Economics, SD00792

INVESTIGATOR: Sogn, AB

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1977 COMPLETION DATE: June 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0073070)

22 179669

ADEQUACY AND COST EFFECTIVENESS OF BULK COMMODITY TRANSPORTATION SYSTEMS

Determine the adequacy of the transportation system for out-bound shipments of grains, soybeans and soybean products and for obtaining and distributing agricultural inputs such as fertilizer and fuel. Investigate potential shifts in marketing patterns or sources of production inputs due to changes in transportation costs, government regulations and transportation facilities, terminals and ports. Recommend appropriate policy and investment changes from the private and public sectors. Determine by county the quantities of bulk commodities to be transported in 1980 and 1985. Determine by commodity seasonal transportation and storage requirements. Determine existing on and off-farm storage capacity. Identify bottlenecks in the transportation system via a series of model solutions or simulations representing different levels of commodity movements and transportation capacity. Develop policy and investment recommendations. The first commodities to be considered will be corn, soybeans and soybean products. Wheat and other small grains, fertilizers and fuels will be considered subsequently. Key logistical factors will be investigated and assessed. The marketable surplus of deficit of corn, soybeans, and small grains available in each township in Minnesota for 1970 and 1985 has been estimated along with the total fertilizer requirement. This information is required for modeling traffic potential for railroad branch lines and highway requirements if railroad branch lines are abandoned. Published rail, truck, and barge rates for grains from Minnesota to major markets have been collected. A cost minimizing transportation model for corn feed requirements in Minnesota has been completed and is currently being expanded to include areas adjacent to Minnesota. These results are an input to a transportation model being developed to analyze transportation costs and movements of corn into national and international markets. Coal requirements by Minnesota counties for 1980 and 1985 have been estimated along with the number of coal trains and barges needed to move the coal. Unit train, carload, truck and barge coal tariffs are being used to estimate an equation for unit train, multiple car and carload rail rates. This information will be used to determine whether coal and grain will compete for downstream barge capacity and whether the existing rail system and equipment are adequate to meet both agricultural and energy needs. Barge movements with origins and destinations on the Mississippi River above St. Louis for 1972 and 1975 will be used to make projections of future waterway usage.

PERFORMING AGENCY: Minnesota University, St Paul, Department of Agricultural and Applied Economics, MIN-14-045

INVESTIGATOR: Dahl, RP Easter, KW Fruin, JE

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS MIN

Contract 701-15-37

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1977 COMPLETION DATE: Oct. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0075095)

22 179670
ECONOMIC FACTORS AFFECTING NORTHEAST MARKETS FOR LOCAL FRUITS AND VEGETABLES

Determine the economic impact of changing energy utilization patterns on the Northeast fruit and vegetable industry. The distribution of Maine potatoes will be analyzed to quantify the effect of current and alternative marketing patterns on energy utilization. Initially the current product flow to various points in the Northeast will be determined. Also, a representative energy input per unit for highway and rail transport will be developed through a mathematical programming approach the cost of distribution--energy utilization tradeoff will be determined for alternative marketing patterns.

PERFORMING AGENCY: Maine University, Department of Agricultural and Resource Economics, ME08220

INVESTIGATOR: Kezis, AS

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Jan. 1978 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0074775)

22 179674
GUIDELINES FOR RURAL AND COMMUNITY DEVELOPMENT IN ECONOMIC REGIONS OF MINNESOTA

Describe the interrelationships among the various sectors of the regional economics in western and southwestern Minnesota's agricultural economies. Develop an understanding of the changes that have taken place in these economies and predict the impact on the regions' incomes and employment of changes that may occur as a result of policy decisions on resource use. Input-output, linear programming and simulation models will be used to describe flows or transactions among sectors, multipliers coefficients and the systems. Both primary and secondary data sources will be used. The computer work for the input-output model is now completed. A paper explaining the methods, the results and how to use the model has been written and will be published as a technical bulletin. This input-output analysis, along with the shift-share analysis, has provided the Region 6E commission an excellent picture of its economy and how it might change in the future. The analysis of people transportation in Meeker County found that school buses or volunteer drivers were the least expensive means to provide transportation for the rural elderly. The results of this pilot study have been widely used in Minnesota both to generate interest in rural people transportation and for planning new rural transportation systems. A benefit-cost analysis of the rehabilitation of a rail branch line showed that the total cost savings to the private sector are sufficient to make it feasible for private shippers to participate in rehabilitation. However, benefits do not accrue uniformly to shippers. It is therefore difficult to get enough shippers to participate. A study of the effects of waterway user charges on the four-county Title V area found that transportation patterns would not change substantially at the level of user charges proposed although shipping costs to the region increased. The principal effort of the Title V Land Use project is the development of Region 6W Natural Resource Data Base.

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Title V Pilot Projection in Minnesota: Transportation and Land Use Planning in Rural Regional Development, Easter, KW; Jensen, HR, University of Minnesota, Final Report, 42 p., 1977

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Issues in Rural Road Management Fruin, JE, 1977

PERFORMING AGENCY: Minnesota University, St Paul, Department of Agricultural and Applied Economics, MIN-14-084

INVESTIGATOR: Easter, KW Jensen, HR

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS MIN

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1977 COMPLETION DATE: June 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0064438)

22 179676
BIOLOGICAL AND ENVIRONMENTAL STORAGE AND TRANSPORTATION PARAMETERS THAT AFFECT GRAIN MARKETABILITY

Determine losses due to insect and microbial activity throughout the grain marketing system. Make economic analyses of physical losses, reduction in quality, and increased storage and transportation costs occurring in storage and transit as a result of identified biological activity. Reduce damage and contamination by these pests by developing control measures (chemical pesticides and generated low oxygen atmospheres). Estimate costs of control measures. Identify pest populations (insects and microbial) by monitoring commodities in transit from farm to export and by examining selected subplot samples of wheat and corn from export terminals. Characterize grain by density, composition, points of origin, and commodity grade factors. Relate these data to type of commodity, environmental factors before and during transit, prior invasion by fungi and insects, type of storage, transportation mode, and time periods in storage and transit. Develop chemical and inert atmosphere treatments for the disinfection and storage maintenance of cereal grains in storage and transit. Determine effects of the treatment on quality factors and establish cost data. An identity preserved lot (1360 metric tons) of wheat was followed from receipt at harvest through storage and transfer at the country elevator, inland terminal and port terminal. Grain samples taken after each transfer were analyzed for biological activity, grade factors and milling and baking characteristics. No insect were detected on receipt of the wheat at harvest, but several species were present after 4 months storage when the wheat was transferred from the country elevator to an inland terminal. Fumigation prior to load out at the country elevator and again prior to load out at the inland terminal failed to completely disinfest the wheat. Initial population of field fungi in the wheat gradually disappeared during the 10 month period from harvest to export. There was no significant growth of storage molds in the wheat. Preliminary data from an elevator survey of biological activity in wheat and corn exports indicates *Sitophilus* and *Cryptolestes* species are the predominate insects present. Samples containing one or more live insects following incubation ranged from 15 to 25% at Great Lakes, East Coast, and Gulf Coast export elevators to less than 10% among West Coast elevators. Corn samples had an average of 30% of the kernels internally invaded by *Aspergillus glaucus* and 2% by *A. flavus*; most wheat samples had 0 to 5% invasion by *A. glaucus* and other storage fungi.

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Effects of Storage Atmosphere and Relative Humidity on Barley and Malt Characteristics, Storey, CL; Pomeranz, Y; Lai, FS; Standridge, NN, *Brewers Digest* 52:40-43, 1977

Effect of Controlled Atmosphere on Flavor Stability of Almonds, Guadagni, DG; Soderstrom, EL; Storey, CL, *Journal of Food Sciences*, 1977

PERFORMING AGENCY: Agricultural Research Service, Grain Marketing Research Center, 3420-20620-006

INVESTIGATOR: Storey, CL Sauer, DB

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1979 START DATE: June 1976 COMPLETION DATE: Nov. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0043120)

22 179677
INFORMATION FOR ORDERLY CHANGE IN THE FEED AND GRAIN INDUSTRY

Develop an efficient grain marketing structure for small area of Indiana that can be applied state wide. Evaluate effects of DOT railway abandonment on grain terminals location and elevator structure. Analyze information on number, size, and condition of grain and feed facilities. Develop criteria for efficient structure and flow pattern for industry. Evaluate number and location of subterminals by computer program. Cash prices for corn and soybeans were gathered for a 3 year period from over 200 elevators. A computer program was developed to calculate and plot basis charts. Counties with similar basis levels were grouped together, dividing the state

into 29 areas. A computer program was developed to evaluate the various marketing alternatives available to farmers for corn and soybeans. By entering data on elevator bids, moisture content, available storage, interest rates, age of storage, commercial storage, and drying costs, the program will evaluate up to 25 different marketing alternatives. Hedging advice will be given on which futures contract to sell, and guides for lifting the hedge will be provided. Break even prices for storage are provided at quarterly dates, if the producer does not want to hedge. An evaluation of deferred pricing is also available. Data gathering on annual financial statements for over 900 Indiana elevators is underway. Data will be analyzed by computer to identify factors that influence profitability by size of business.

PERFORMING AGENCY: Purdue University, Department of Agricultural Economics, IND045040

INVESTIGATOR: Uhrig, JW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS IND

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1969 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0032426)

22 179680

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. For-hire livestock truckers were found to be principally small but quite stable businesses. Utilization of equipment was high, and rates charged were highly correlated with distance and size of truck. Little basis was found for believing that economic regulation at the interstate level would improve trucking performance. Analysis of a transshipment model of a corn-soybean producing area showed that adverse impacts from rail line abandonment are not likely to be uniformly borne. Certain local marketing firms were shown to lose substantial volumes of patronage by farmers, even though the total marketing costs for the area increased by only 0.1 percent in response to abandonments. The application of waterway user charges sufficient to cover Federal expenditures on waterways were estimated to cause a two-percent increase in marketing costs. Data were assembled for analysis of the cost of operating refrigerated trucks for hauling produce. Also, a survey of truck brokers to determine their role in exempt trucking was performed, and a number of rate, service and other proposals for change in transportation were analyzed for their impacts on agriculture.

PERFORMING AGENCY: Michigan State University, East Lansing, Transportation Economics Division, NEA-14-125-26-01-X

INVESTIGATOR: Schaffer, JD

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0043553)

22 179681

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. Methods and data used in other parts of Economic Research Service to assess outlook and situation for frequent reporting were reviewed and adopted for applicability to agricultural transportation. Periodic reports on supply, demand and price situation for agricultural transportation were released during period covered. Simulation of the flow of grain into export through Gulf and West Coast ports showed adequate capacity for further increases in exports. Congestion and delays associated with large increments in assumed exports were eased by either operating more hours per day or by investment in new facilities. Truck and rail transportation costs for food were 12 percent higher in 1975 than in 1974, due mostly to higher rates for domestic movements. However, ocean freight rates for grains were substantially lower in 1975. These lower rates reflected the increased capacity of the world's merchant fleet and the recession. Governmental spending (1967 dollars) on rural road construction and maintenance decreased substantially over the period 1970 to 1975. Stable fuel tax rates, rapid escalation of construction costs, and early completion of rural portions of the Interstate Highway System was identified as factors contributing to the trends.

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Transportation Pollock, DD, Economic Research Service Agr. Outl., AO-5 pp 12-13, Nov. 1975

PERFORMING AGENCY: Department of Agriculture, Transportation Economics Division, NEA-14-126-11-00

INVESTIGATOR: Reinsel, EI

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1974 COMPLETION DATE: July 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0041661)

22 179682

TRANSPORTATION AND DISTRIBUTION SYSTEMS FOR MOVING GRAIN AND FERTILIZER THROUGH DEEPWATER PORTS

To inventory the capacity of plants transloading grain and dry bulk fertilizer and the rail and barge facilities serving them at deepwater ports on the Mississippi River, identify bottlenecks in this intermodal configuration and obtain data on investment costs for expansion of various components of these facilities, project the configuration of transportation and plants needed to handle the volume of grain and dry bulk fertilizer expected to move through this configuration by 1985 and added investments required for it. Data on current capacity and the cost of expanding its various components will be obtained from a survey of personnel of all grain elevators, fertilizers, and railroad companies operating at deepwater ports on the Mississippi River. Appropriate sampling of records and other procedures may be used in developing some of the details needed however. Working closely with Iowa State University in a concurrent study these data will be used to develop a time staged transshipment model to estimate optimal grain, fertilizer, and transportation facilities needed in deepwater ports on the Mississippi River to handle the business projected for 1985. During the year sample data were obtained on the Mississippi River deepwater port configuration with respect to grain including (1) existing storage and handling capacity of export elevators, (2) investment costs for new elevators, (3) barge, rail, and ship movements within the configuration, (4) grain movements into, within, and out of the configuration, and (5) inventory data for the configuration. A manuscript describing the elevator facilities has been prepared and is under review. Work is now underway to develop a computer simulation model to identify the sources of bottlenecks within the configuration and to measure the potential gain to be realized from removal of these bottlenecks.

See also RRIS 22A 179683 and 20A 179671.

PERFORMING AGENCY: Louisiana State University, Baton Rouge, Department of Agricultural Economics and Agribusiness, LAB01824

INVESTIGATOR: Traylor, HD Gauthier, W

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS LAB

Contract 616-15-87

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1976 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070539)

22 179683

TRANSPORTATION AND DISTRIBUTION SYSTEMS FOR MOVING GRAIN AND FERTILIZER THROUGH DEEPWATER PORTS

Project quantities of grain and dry fertilizer to move through deepwater ports on the Mississippi River by 1980. Estimate structural adjustments needed in receiving, loadout and storage facilities to minimize cost of handling and transporting projected quantities at deepwater Mississippi Rivers ports. Estimate structural adjustments required in rail facilities at deepwater Mississippi River ports. Modify existing models, collect data and project 1980 quantities. Modify transshipment model and port simulation models, collect data and estimate required structural adjustments in grain and fertilizer facilities, and in railroad facilities at deepwater Mississippi River ports. Progress to date has been in collecting on estimated quantities of grain expected to be available in crop reporting districts. A model is being constructed to estimate the amount of grain expected to move to Deepwater Mississippi River ports in 1985 by mode of transport. Data are also being collected to estimate the amount of fertilizer moving through these ports to each crop reporting district. Finally, a model is being constructed to estimate the potential for fertilizer backhauls on grain shipments.

See also RRIS 22A 179682 and 20A 179671.

PERFORMING AGENCY: Iowa State University, Ames, Department of Economics, IOW02177

INVESTIGATOR: Baumel, CP

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS IOW

Contract 616-15-86

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1976 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070487)

22 179684

PLANNING RURAL TRANSPORTATION SYSTEMS

Identify basic rural transportation market characteristics related to production and demand of transport services for the grain and soybean, fertilizer, feed and rural manufacturing and retail industries. Analyze sensitivity of grain, fertilizer and feed flows and shipper choice of mode, to transportation price adjustments in Oklahoma. Construct and demonstrate strategies by which individual, agricultural and rural manufacturing and retail users of rail services can adjust to local rail line abandonments or service discontinuances; and construct and demonstrate a procedure for evaluating public and private group investments in rural road and railroad branch line facilities, in an intermodal context, for application to small regions. Market characteristics are determined by surveys, econometric analysis and investment analysis. C-D. Individual firm and regional planning models will be approached with mathematical programming techniques. Drafts of reports have been prepared on the following: 1) estimation of an annual cost function for operating tractor-trailer units in carriage of wheat and livestock, 2) results of a survey of Oklahoma manufacturers located in rural counties indicating dependence of rural industry groups upon railroad services, 3) a description of the railroad facilities and services, in Oklahoma including a financial analysis of each Class I railroad serving the state. 4) the existing railroad and truck rate structure for wheat moving from Oklahoma origins and 5) effects of seasonal railroad rates on wheat movements from Oklahoma. A computerized information and analysis system is operable with capabilities to measure railroad deficit on branch line operations and benefits or rail preservation projects.

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Johnson, MA; Gerloff, D, Oklahoma Current Farm Economics, Vol. 50, Dec. 1977

Effects of Seasonal Railroad Rates for Wheat Upon Wheat Storage and Transportation Markets in Oklahoma, Shouse, JC, Oklahoma State University, M.S. Thesis, 135 p., 1977

PERFORMING AGENCY: Oklahoma State University, Department of Agricultural Economics, OKL01603

INVESTIGATOR: Johnson, MA

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS OKL

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1975 COMPLETION DATE: June 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0068185)

22 179686

ALTERNATIVE RAIL RATES IN THE CORN SOYBEAN MARKETING SYSTEM

Evaluate alternative demand-sensitive rail rates on the corn, soybean marketing system. Compare impact of demand-sensitive rail rates with contract, annual volume and other types of rail rates on shippers, receivers and carriers. Collect data on monthly distribution of grain receipts, shipments, mode of transport, and destinations. Compare impact of alternative demand-sensitive rail rates with other types of rail rates on timing and mode of shipment, producer, and shipper income, and on carrier car requirements. Data were collected on rail rates from all grain origins in 2 crop reporting districts. Data were also collected on prices paid at major markets for Iowa corn and soybeans. Work has been initiated on modifying existing models to estimate the effect of demand sensitive rail rates on grain producers, grain shippers and carriers.

PERFORMING AGENCY: Iowa State University, Ames, Department of Economics, IOW02226

INVESTIGATOR: Baumel, CP

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS IOW

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1977 COMPLETION DATE: Aug. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0073201)

22 179690

INCREASING EFFICIENCY IN THE GRAIN HANDLING, STORAGE AND TRANSPORTATION SYSTEM SERVING THE SOUTH PLAINS

Develop a detailed description of spatial and temporal grain flows and alternative mode freight rates. Determine least-cost grain distribution patterns and most efficient mode use for described grain flow. Estimate least-cost number, size and location of country elevators and feed mills to serve cattle feeding industry. Develop an interregional competition model of feed grain sector with emphasis on South Plains. Via personal interview and mail questionnaires of grain handlers, transportation companies and truck brokers existing grain flows and utilized mode freight rates estimated. These data entered into a spatial model to resolve least-cost distribution patterns and modes and then contrasted with actual distribution and utilized modes. Grain elevator, feed mill and transport cost functions and feed grain production data estimated and entered into model to optimize industry organization serving area cattle feeding industry. Spatial analysis of feed grain sector accomplished by estimation of regional demand and supply functions and transport costs which are data inputs for spatial equilibrium model. Analysis required to resolve agricultural marketing/transportation system questions include numerous variables which are costly to analyze with contemporary operations research techniques. Deterministic network analysis was applied to a developed prototype problem of a grain marketing/transportation system. In general, the network approach required substantially less computer time than linear programming. The gains in computer efficiency permit investigation of larger and more constrained problems than traditional techniques. Network models can easily accommodate a multiphase problem with numerous constraints, thus simplified and unrealistic solutions are minimized. Shipments were to out-of-state elevators. Texas flour mills received 3 percent of Texas elevators' wheat shipments, while out-of-state flour mills received less than 1 percent of the elevators' shipments. On a state-wide basis, grain elevators received 59, 12 and 29 percent of their respective wheat receipts from Texas producers, other Texas

elevators and out-of-state sources. About 88, 10 and 2 percent of elevators' grain sorghum receipts originated from producers, other Texas elevators and out-of-state sources, respectively. Texas' cattle feedyards received 11, 82 and 7 percent of their grain sorghum from producers, Texas elevators and out-of-state sources, respectively.

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Texas Wheat Flows and Modes Fuller, SW; Paggi, M; Engler, D, Texas Agricultural Experiment Station, B-1180, 1977

PERFORMING AGENCY: Texas A&M University, Department of Agricultural Economics, TEX06087

INVESTIGATOR: Fuller, SW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS TEX

STATUS: Active NOTICE DATE: July 1979 START DATE: Mar. 1975 COMPLETION DATE: Mar. 1980

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0067558)

22 179693

ECONOMIC ANALYSIS OF U.S. GRAIN EXPORTING SYSTEMS

Evaluate alternative export market techniques and strategies with respect to the logistics and costs of marketing and transportation. Evaluate alternative inventory and export policies with respect to price stability and producer and consumer utility. Grain movement information will be collected from the railroad companies and the Statistical Reporting Service, U.S.D.A. Also the transportation costs of shipping grain by rail and truck-barge will be estimated. With these basic data, existing transportation models will be developed to identify least cost routings for wheat and barley from various origins in Montana to port facilities on the West Coast. The specific procedures include using historical data to estimate and project demand and supply imbalances in world grain trade, calculating the variability in supply and demand and surplus and deficits under alternative assumptions of world production and consumption; and developing models that will show the affect of alternative inventory policies on the size and variability of world grain surplus or deficits. A mathematical programming model was developed to minimize the cost of shipping Montana wheat and barley to domestic and export markets. The movement patterns of wheat and barley are sensitive to transportation rates. Price elasticities of demand for truck and rail transportation are high. For a 5% increase in rail rates over existing rates, ceteris paribus, the quantities of grain shipped by rail are reduced 40%. Also cross elasticities are large. For a 5% increase in truck rates, ceteris paribus, the increase in quantity of grain hauled by rail increases 38%. TCK smut wheat produced in parts of Montana are excluded from the P.R. China market. A feasibility study was completed to analyze the possibility of preserving the identity of non-contaminated wheat throughout the grain marketing system. The short run costs of an identity preserved system amount to about 1.2 cents per bushel while the benefits amount to about 2.8 cents per bushel. However, the longer run feasibility of such a program is questionable. The major research effort next year will be in developing a model of the entire U.S. wheat export system.

REFERENCES:

Shipment Patterns of Montana Wheat and Barley Under Alternative Rail and Truck-Barge Rate Structures, Koo, WW; Cramer, GL, Montana Agricultural Experiment Station, Bulletin 696, Mar. 1977

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PERFORMING AGENCY: Montana State University, Bozeman, Department of Agricultural Economics, MONB0078

INVESTIGATOR: Cramer, GL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Re-

search Service

STATUS: Active NOTICE DATE: July 1979 START DATE: Nov. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071923)

22 179694

ECONOMIC ANALYSES OF THE UNITED STATES GRAIN EXPORTING SYSTEMS

To evaluate alternative export marketing techniques and strategies with respect to: their effects on the structure of the domestic grain marketing firms, domestic price levels and regional price relationships, price responsiveness and uncertainty, regional exports and domestic rail rate differentials, the logistics and costs of marketing and transportation, market share and market power in world grain trade and economic incentives to producing and marketing firms. To evaluate alternative inventory and export policies with respect to: Marketing efficiency, price stability, producer and consumer utility, their effect on private and state trading systems, servicing the export markets and the effects of export embargoes on prices and market share. Information theory, models of demands and prices of product characteristics, grain users' attitudes toward product characteristics and grain samples will be used to study grades. Private and public grain prices and utilization will be estimated from information provided by recent studies on storage costs and demand characteristics. Econometric models of international production, consumption and trade will be constructed. Mathematical programming and queuing models will be used to study grain routing. To improve forecasts of U.S. grain production, supply equations are being developed in which farmers' intentions to plant and expected yields are combined with measures of market conditions and measures of price support programs. Import time series for 16 major importers were analyzed. The net import volume of wheat for 1962 through 1975 for each country was regressed on domestic supply of wheat or other domestic substitute energy foods. Extremely complete association was found for Japan, India, Iran, U.K., and South Korea indicating that these countries import wheat to offset domestic supply variation which is due mostly to weather variability. Relatively poor explanations for the variation in imports were obtained in West Germany, Poland, Pakistan, USSR, and Brazil. Work was initiated to estimate import demand equations for U.S. corn and to investigate elements in the U.S. market which can influence foreign imports of U.S. corn. The model has been formulated and some data has been collected. The model has imports of U.S. corn as a function of the domestic price of corn, domestic per capita income, domestic livestock inventory, domestic price of wheat, amount of corn shipped as food aid to the importing country, domestic price of corn in the importing country, and the exchange rate. The amount of corn shipped as food aid to the importing country also influences the domestic price of corn. Study of relation between U.S. corn grades and feeding quality of corn is underway.

PERFORMING AGENCY: Iowa State University, Ames, Department of Economics, IOW02196

INVESTIGATOR: Ladd, GW Kaldor, DR Paulsen, A

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS IOW

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ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071725)

22 179695

ECONOMIC ANALYSES OF THE UNITED STATES GRAIN EXPORTING SYSTEMS

Evaluate alternative export marketing techniques and strategies with respect to: Economic incentives to producing and marketing firms. Domestic price levels for grain. Market share and market power in world grain trade. The logistics and costs of marketing and transportation. Price responsiveness and uncertainty. Compare grading procedures and other terms of contracts used in world trade. Identify the impact of the fair average quality method of grading on all sectors of delivered quality, value, and prices. Evaluate alternative marketing procedures such as identity preserved shipments, FOB, and CIF. Through interviews and secondary data, determine the volume being moved under these alternatives for major importing countries. Use existing spatial equilibrium and transportation models to identify lease cost routings for grain from origin to port. Nebraska is evaluating the

proposed change in U.S. grade markets. The investigation is divided into two parts; corn from farm storage, and new crop corn. Collection of data for farm stored corn has been completed. Corn samples were collected from 20 country elevators and five terminal elevators. Ten incoming loads and 10 cut going shipments were sampled at each elevator. Samples were subdivided into seven particle sizes with a Carter dockage machine. The sub-samples were weighed. Test weight and percent moisture were determined. A chemical analysis and microscopic evaluation was done by sub sample. Microscopic evaluation included a determination of inert material, weed seeds, insect parts, and corn material. Samples for new crop 1977 corn have been collected from country elevators. Collection of samples from terminal elevators is in process.

PERFORMING AGENCY: Nebraska University, Lincoln, Department of Agricultural Economics, NEB-10-072
 INVESTIGATOR: Turner, MS Linsenmeyer, D
 SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS NEB

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071857)

22 179696

ECONOMIC ANALYSES OF THE UNITED STATES GRAIN EXPORTING SYSTEMS

Evaluate alternative export strategies with respect to: Structure of domestic grain marketing firms, domestic price levels and regional price arrangements, regional exports and rail rate differentials, logistics and costs of marketing, economic incentives to producing and marketing firms. Evaluate alternative inventory and export policies with respect to: Price stability, producer and consumer utility, prices and market share. Project demand and supply imbalance in world grain trade. Develop models to measure the effect of inventory and trade policies on variability of world and U.S. grain surplus or deficit, trade patterns, and economic incentives at the producer level. Use existing spatial equilibrium models to identify least cost routings from origin to port. Part I. An effort was made to obtain a complete list of all port elevators, barge loading facilities, and unit train facilities in the U.S. For these facilities and for all soybean processing plants, capacity, location and ownership were compiled and are now being published. For the 66 port facilities 251 inner barge facilities and 241 unit train facilities, market value estimates are \$3.3 billion. Replacement value is almost double this figure. These facilities were specifically designed to handle large quantities of grain exports. The report is not all inclusive of firms engaging originating grain exports but does give those who are specialized to do so. Part II. For the soybean, soy meal, and soy oil markets, import demand functions for the EEC-9 countries, Japan, Spain, Mexico, and Canada have been estimated. These countries account for at least 3/4 of the U.S. exports of these commodities during the past 15 years. Product price, substitute product price, and livestock production or personal income are the major determinants of quantity demanded. Excess supply functions for U.S. have been estimated using estimated domestic supply functions and published domestic demand elasticities. The elasticities of the excess supply functions are very elastic.

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PERFORMING AGENCY: Ohio Agricultural R and D Center, Department of Agricultural Economics and Rural Sociology, OHO000597

INVESTIGATOR: Sharp, JW Walker, FE

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS OHO

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22 179697

ECONOMIC ANALYSIS OF U.S. GRAIN EXPORTING SYSTEMS

Evaluate alternative export marketing techniques and strategies with respect to: The logistics and costs of marketing and transportation; economic incentives to producing and marketing firms. Develop a model with which

to analyze the effects of alternative marketing techniques of economic incentives and price level for grain at the producer level. Use existing spatial equilibrium and transportation models to identify least cost routings for grain from origin to port. Adapt mathematical programming models and queuing theory to reduce congestion and cost in rail yards serving grain ports.

PERFORMING AGENCY: Oklahoma State University, Department of Agricultural Economics, OKL01662

INVESTIGATOR: Oehrtman, RL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: July 1977 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0073046)

22 179698

ECONOMIC ANALYSES OF THE UNITED STATES GRAIN EXPORTING SYSTEMS

Evaluate alternative export marketing techniques and strategies with respect to: Market share and market power in World grain trade; the logistics and costs of marketing and transportation. Evaluate private versus state trading systems for grain with respect to relative market power between countries with different systems. Develop cost data--Use spatial equilibrium and transportation models. Evaluate identity preserved shipments through interviews and secondary data. Describes the marketing decisions and strategies of different marketing agencies in countries having different systems of marketing. Data will be obtained through interviews with government and private agencies in several countries. Describe domestic and foreign policies directly affecting grain export, volumes and prices in major grain exporting and importing countries. The influence of balance of payments considerations in affecting importing decisions for the centrally planned economies was analyzed. The principal investigator withdrew from contributing a chapter in the grain marketing book and is concentrating instead upon collaborating with Schmidt (Illinois), Schoonover (USDA), and Bob Jones (Purdue), on research dealing with East-West trade issues and compiling and editing that work into a publication. Mrs. Paciencia Manuel in the meantime has begun to develop a dissertation with her topic concerning the world grain trade and ocean shipping. Ocean freight rates are being compiled as inputs into this study.

REFERENCES:

The Nonmarket Economies Balance of Payments: Implications for U.S. Agricultural Exports, Jones, JR, Research Paper No. 7659

PERFORMING AGENCY: Idaho University, Moscow, Department of Agricultural Economics, IDA00725

INVESTIGATOR: Jones, JR

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS IDA

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071187)

22 179699

ECONOMIC EFFECTS ON AGRICULTURE OF THE NORTHEASTERN RAILROAD SYSTEM

Determine rail tariff rates and associated service charges levied on agricultural transportation activities in New England under plans to reorganize the Northeastern railroad system; determine financial stability and profitability of regional agri-business and farms under projected rail service cost functions; identify, describe, and quantify economic response and potential structural shifts within the agricultural industries of the region; simulate aggregate farm production levels resulting from projected changes in input prices. Synthesize rail service cost functions from reorganizational guidelines using cost budgeting techniques. Secondary data and sampling surveys will be used to identify production coefficients of farms. Linear programming techniques will simulate microeconomic response of agri-firms to adjustments in transportation costs. Aggregated response parameters will be used to identify structural and production shifts. Nov. 23, 1972 it cost \$5.25 per ton more to move corn from mid-west origins to Boston than for similar distances to Atlanta. By Jan. 1, 1977 the New England disadvantage had increased to \$8.40 per ton. New England's disadvantage will continue to grow so long as the I.C.C. continues to base rate increases on a flat

percentage of some previous rate. Unit-train rates to New England are clearly necessary in order to redress some of the disadvantage. Unit-trains are feasible provided the grain industry is willing to build 3 sub-terminals of a size sufficient to handle unit trains. Knowing the number of farm animals the derived demand for feed can be estimated. Using the direct reduced form approach New England and U.S. livestock numbers are being estimated. The supply functions are assumed to contain current prices and interact with demand functions. Preliminary results for the large model, with 26 predetermined variables, leads to excellent number predictions for seven classes of livestock. All forecast equations were significant at the 1% level except hogs which was insignificant at the 5% level. All $R(2)$ and adjusted $R(2)$ were exceedingly high ranging from 0.94 to 0.99 except for hogs where $R(2) = 0.5714$. Being able to predict accurately the number of farm animals, hence derived demand for feed, should greatly aid the grain trade in achieving greater efficiencies.

REFERENCES:

Recent Developments in Feed Transportation to New England Seaver, SK; Hanekamp, WJ, U Conn, Agricultural Experiment Station, Research Rpt. No. 48, 1977

PERFORMING AGENCY: Connecticut University, Storrs, Department of Agricultural Economics and Rural Sociology, CONS00475

INVESTIGATOR: Seaver, SK Lee, T Hanekamp, WJ

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS CONS

Contract 616-15-84

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1976 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-007664)

22 195927

IMPROVING REFRIGERATED TRANSPORTATION OF FRESH MEATS

Improve the efficiency of transporting fresh meats from packinghouses to consignee using refrigerated trailers. Studies designed to evaluate and improve the present handling procedures and equipment performance will be conducted to determine where significant improvements can be made in the distribution of fresh meat. Equipment cleaning and pretripping maintenance practices will be thoroughly reviewed to provide information where improvements in the present distribution systems need to be made, then a series of recommended procedures will be developed. Handling techniques will also be reviewed and improved. Suggestions for improvement will be applied to actual meat shipments and evaluated by a team of researchers and industry representatives. Cooperation with APHIS, Association of American Railroads, individual railroad companies, refrigeration equipment companies, and other Government Agencies will be encouraged. In addition to the information gathered through literature searches and interviews with industry representatives on equipment, practices, and procedure to properly clean and sanitize meat trailers, results of studies on the use of several types of detergents in automatic high pressure cleaning equipment have been obtained. These research results as well as the information on types of mechanical and automatic cleaning equipment, types of chemical cleaning and sanitizing compounds, cleaning practices and procedures, trailer design, and other factors are being incorporated in a manual for distribution to the meat and transportation industries. Additional studies to identify the type of debris and contamination found in meat hauling equipment after it is used for a variety of backhauls have been planned to determine effective cleaning and sanitizing programs.

REFERENCES:

Commodity Requirements and Recommendations for Transport and Storage-Fresh Meats, Hoke, KE, 2nd Nat Controlled Atmos Res Conf, Mich State Univ, Proceeding Paper, pp 300-301, 1977

Effects of Modified Atmospheres on Meat During Storage and Long-Distance Transit, Hoke, KE, 2nd Nat Controlled Atmos Res Conf, Mich State Univ, Proceeding Paper, pp 294-299, 1977

PERFORMING AGENCY: Agricultural Marketing Research Institute, Transportation and Packaging Research Laboratory

INVESTIGATOR: Hoke, KE

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: June 1979 START DATE: Nov. 1974

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0041945)

22 195928

APPLICATION OF INSECTICIDES INTO TRANSPORTATION FACILITIES TO PREVENT INSECT DAMAGE TO FOOD AND FEED

Evaluate and develop methodology for the effective use of insecticides as residual-type sprays, space treatments, and fumigation of transportation facilities such as rail cars, aircraft, truck vans, and river, lake, and ocean vessels. By using laboratory test chambers and test commodity shipments in various vehicles in cooperation with U.S. agribusiness, USDA, and other Government Action Agencies, insecticides will be evaluated as to efficacy of various application techniques. Major emphasis will be upon residues, space treatments, and fumigants. Application techniques will also be evaluated for potential hazard to persons applying the pesticide, commodity handlers within the market channels, and the consumer. Pesticide residues, bioassays, and vapor and fumigants concentrations will be monitored during testing. Specific approaches will be dependent upon commodity, packaging construction (if any), vehicle type and its construction, and length of the marketing channel involved.

PERFORMING AGENCY: Agricultural Research Service, Stored Products and Insects

INVESTIGATOR: Gillenwater, HB Zettler, JL Leesch, JG

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: June 1979 START DATE: Apr. 1978 COMPLETION DATE: Apr. 1983

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0044430)

22 196117

IMPROVING MARKET STRUCTURES FOR HORTICULTURAL CROPS

Improvement of physical and economic efficiency in the marketing system for horticultural products for development of alternate marketing strategies that serve to enhance the competitive position of growers and processors throughout the industry. Problems will be identified and procedures for evaluation established. Linear programming techniques will be used to supplement empirical and case study analyses. Regional trade advantage under alternative marketing strategies will be evaluated through use of linear programming techniques. Continued efforts to improve the market position for growers and primary handlers of vegetable crops. Industry segments targeted for assistance were fresh tomatoes, potatoes, processing tomatoes and onions. Current economic, distribution and organization trends were evaluated, and alternative programs developed. Industry implementation assistance was provided. Decentralized processing and bulk containerized transport represent significant developments from this project. These concepts enable growers and processors to ship bulk semi-processed fruit and vegetable solids from centers of production to centers of consumption in 20,000 gallon aseptic railcar units for final processing and canning near the point of ultimate consumption. Economic benefits are high. Cost-effective market development programs are in the implementation stages in the processed tomato and fruit puree segments of the industry. Direct farm marketing programs were expanded through USDA/AMS funding of a computerized market information service project. Under this project the Purdue FACTS program will be used to provide growers and direct farm marketers with current supply, price, volume and demand information on seasonal fruits and vegetables through a county computer terminal system. Upon full implementation this market information service program will substantively enhance the market position of growers and handlers of locally produced supplies, including the economic benefits that accrue from direct farm-to-consumer sales.

REFERENCES:

Onions: Production Marketing and Economic Trends Sullivan, GH, Purdue Res. Bulletin 948, 1977

Fresh Market Tomatoes: Production Trends and Industry Organization, Sullivan, GH, Purdue Res. Bulletin 945, 1977

Tomatoes for Processing: Production and Economic Trends Sullivan, GH, Purdue Res. Bulletin 947, 1977

Potatoes: Industry Trends and Outlook for Future Production Planning, Sullivan, GH, Purdue Res. Bulletin 949, 1977

Floral Trade Policy: Procrastination, Protection and Public Perspective, Sullivan, GH, Florists Review, 1977

PERFORMING AGENCY: Purdue University, Department of Horticulture, IND065026

INVESTIGATOR: Sullivan, GH

SPONSORING AGENCY: Department of Agriculture, Cooperative State Re-

search Service, CSRS IND

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1969 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0032432)

22 196119

CHARACTERISTICS OF U.S. GRAIN PORTS FOR MAXIMUM MARKETING/TRANSPORTATION EFFICIENCY

Determine the time and cost performance of U.S. grain ports under alternative stochastic conditions and evaluate how port performance is affected by altering port elevator numbers and capacities. Determine those grain port locations which maximize the export grain marketing/transportation system's efficiency and evaluate the sensitivity of a port's efficiency, advantage or disadvantage to transportation policies. Involves implicit coupling of a linear programming interregional crop competition model and a stochastic simulation model representative of ports and their operations.

PERFORMING AGENCY: Texas A&M University, Department of Agricultural Economics, TEX06365

INVESTIGATOR: Fuller, SW Harston, C Cook, M

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS TEX

Contract 801-15-40

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1978 COMPLETION DATE: Apr. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0076604)

22 196120

CORN QUALITY DURING HANDLING AND TRANSPORTING AS AFFECTED BY MOLD DEVELOPMENT

Determine: Mold deterioration of corn and conditions of transport from the midwest to SE and S U.S. Determine effects of environment, BCFM, and storage and drying history on storability; develop recommendations for managing corn during storage, handling and transportation. Corn samples will be collected prior to and after shipment by train, truck or barge from the midwest to SE and S U.S. with environment monitored in shipment. Samples will be evaluated for molds, damage, mycotoxins and other quality criteria. Corn will be stored at harvest moistures and constant temperatures and monitored for mold and mycotoxin activity. Portions will be further stored at environmental conditions simulating transport to SE and E U.S. Models will be developed employing data from storage tests and weather records that will predict storability as affected by relevant variables.

PERFORMING AGENCY: Purdue University, Department of Botany and Plant Pathology, IND055016B

INVESTIGATOR: Tuite, J Brook, RC Poster, GH

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS IND

Contract 801-15-45

STATUS: Active NOTICE DATE: July 1979 START DATE: May 1978 COMPLETION DATE: May 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0076330)

22 196121

NEW AND IMPROVED TECHNOLOGY IN HANDLING AND TRANSPORT OF FRESH FRUIT

Determination of needs for new and improved techniques, methods of multiple handling, and equipment that will reduce costs and product losses of fresh fruits. Evaluate current assembly, packaging, handling, and transport procedures (truck, rail, and air). Determine comparative handling efficiency by time studies and direct observations, obtain measures of product damage and physical loss, and determine significant problem areas. Evaluation of current handling procedures, indicate differences in the level and degree of physical injury between kinds of packinghouses and stations within a packinghouse. Data accumulation is proceeding, and layouts of all plants to be studied are being prepared. Two kinds of 50 x 30 cm containers for apples and pears are undergoing testing. Preliminary estimates indicate that labor and packaging material costs could be as much as 20 cents per box less for these new containers than for conventional tray-packs. Preliminary testing also indicates less bruising injuries during distribution in the new containers.

REFERENCES:

Metric Box for Apple Packing, Palletizing, and Transport Hovey, Rm; Fountain, JB, ASAE Tech Paper No. 786022, June 1978

PERFORMING AGENCY: Agricultural Research Service, Processing, Harvesting and Handling of Tree Fruits Division, 5803-20580-007

INVESTIGATOR: Fountain, JB Hovey, RM

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: July 1979 START DATE: Sept. 1978 COMPLETION DATE: Sept. 1979

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0044699)

22 196122

ALTERNATIVE ADJUSTMENT STRATEGIES TO THE EVOLUTION OF THE TRANSPORTATION SYSTEM

Determine alternative strategies which can be utilized by the agricultural sector both individually and collectively to adapt to the changes occurring in the transportation sector. Explore causes of the rail car shortage and determine the economic feasibility of various alternatives. Determine the long-term interest of the S.D. grain producer regarding changes in ownership of various rail lines. Consolidate the results of objectives 1 and 2 with abandonment strategies and to provide information to South Dakota transportation users on the alternative courses of action available. The causes of the equipment shortage will be reviewed and analyzed with a focus on institutional incentives and alternatives designed to alter the institutional constraints will be analyzed utilizing a microeconomic approach. The outcome of line swaps, sales and mergers between the various railroads will be simulated using a linear programming model to determine the impact upon South Dakota grain producers. And lastly the monetary cost and benefits of railroad abandonment imposed upon individual shippers and producers will be explored and adjustment strategies will be evaluated.

PERFORMING AGENCY: South Dakota State University, Department of Economics, SD00889

INVESTIGATOR: Vollmers, AC

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS SD

STATUS: Active NOTICE DATE: July 1979 START DATE: Nov. 1978 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0077403)

23 058757

METHODOLOGY FOR THE DESIGN OF URBAN TRANSPORTATION INTERFACE FACILITIES

The purpose of this research is to: 1. develop a set of flexible criteria for the evaluation of alternative station designs, with emphasis on potential implementation constraints and operational efficiency, 2. develop a standard methodology for the design of the layout of urban transportation terminals, 3. apply the methodology developed to a real world situation as a test of the procedures developed, 4. disseminate this methodology to the transit user community for application. STATUS: During the first phase of the research, emphasis was placed on developing a general station design evaluation framework. Functional components of stations, including pedestrian movement facilities, line haul access areas, and communications facilities were identified. A set of generalized terminal evaluation criteria were adopted, and for each criterion, the viewpoint of the user, the special user, and the operator was examined. These criteria include: 1) Passenger Processing Performance; 2) Environmental Conditions; 3) Fiscal Considerations. The level of satisfaction of these criteria is evaluated through the use of an interest impact matrix. Both a cost-benefit (dollar) and subjective index are used in the ranking of design alternatives. A generalized framework for the use of the impact-interest assessment matrix has been advanced, several computer based planning and design methodologies were examined and included in the framework, and a user's guide has been completed. The methodology is now being tested in two types of applications: new transit station designs and renovation of existing transit facilities.

REFERENCES:

Criteria for Evaluating Alternative Transit Station Design Hoel, LA; Demetsky, MJ; Virkler, MR, Feb. 1976

Methodology for the Design of Urban Transportation Interface Facilities, Hoel, LA; Demetsky, MJ; Virkler, MR, Dec. 1976

Design of Transportation Interface Facilities: A Procedural Guide, Demetsky, MJ; Hoel, LA; Virkler, MR, July 1977

PERFORMING AGENCY: Virginia University, Department of Civil Engineering

INVESTIGATOR: Hoel, LA Demetsky, MJ

SPONSORING AGENCY: Department of Transportation, Office of University Research

RESPONSIBLE INDIVIDUAL: Paulhus, NG, Jr Tel 202-4264208

Contract DOT-OS-50233 (CS)

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: Aug. 1975 COMPLETION DATE: Sept. 1980 TOTAL FUNDS: \$126,000

ACKNOWLEDGMENT: TRAIS, OST

23 058815

CONTINUED SUPPORT BY THE BART IMPACT ADVISORY COMMITTEE

The BART Impact Program review effort to be conducted by the Advisory Committee is an extension of the provision of advice and assistance to the Departments during the implementation phase of the program. The Committee shall review and provide consultation in all areas of the program to determine what impacts occur, which are attributable to BART, why they occur, and how this information may best be used by the Bay Area as well as by other metropolitan areas contemplating construction of a rapid transit system.

PERFORMING AGENCY: National Academy of Engineering

SPONSORING AGENCY: Office of the Secretary of Transportation; Department of Housing and Urban Development

RESPONSIBLE INDIVIDUAL: Weiner, E

Contract DOT-OS-60092

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Oct. 1973 TOTAL FUNDS: \$154,190

ACKNOWLEDGMENT: TRAIS

23 059246

URBAN TRANSIT PLAN EVALUATION

The objective is to compile and condense the materials and results of the transportation planning process in a city pertinent to an UMTA review of transportation system implementation plans. Further, UMTA is interested in determining the response of communities to the Transportation Improvement Programs (TIP) guidelines.

PERFORMING AGENCY: Peat, Marwick, Mitchell and Company

SPONSORING AGENCY: Transportation Systems Center, R6708

RESPONSIBLE INDIVIDUAL: Rubin, D Tel (617) 494-2160

Contract TSC-1253

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: June 1976 TOTAL FUNDS: \$21,628

ACKNOWLEDGMENT: TRAIS (R6708)

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 has been 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: Delousy, C Tel 202-426-0966

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1966

ACKNOWLEDGMENT: FRA

23 156666

IMPROVEMENT OF NORTHEAST CORRIDOR RAIL PASSENGER SERVICE

A continuing study of the state and federal roles in improving rail passenger service in the Northeast Corridor with particular emphasis upon the "Empire State Corridor" from New York City to Buffalo.

REFERENCES:

The Crisis in Rail Passenger Service in New York State: A Matter of Concern, New York State Senate Committee on Transportation, 1974

Transportation Priorities in New York State 1978

PERFORMING AGENCY: New York State Legislature, Senate Committee on Transportation

INVESTIGATOR: Mitchell, M Tel (518) 472-3333 Zimmerman, JF

SPONSORING AGENCY: New York State Legislature, Senate Committee on Transportation

RESPONSIBLE INDIVIDUAL: Mitchell, M Tel (518) 472-3333 Zimmerman, JF

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Jan. 1974

ACKNOWLEDGMENT: New York State Legislature

23 156668

LIGHT RAIL TECHNOLOGY

A study of the possible use of Light Rail in Nassau County: A Demonstration Project.

REFERENCES:

Transportation Priorities in New York State 1978

PERFORMING AGENCY: New York State Legislature, Senate Committee on Transportation

INVESTIGATOR: Mitchell, M Tel (518) 472-3333 Zimmerman, JF

SPONSORING AGENCY: New York State Legislature, Senate Committee on Transportation

RESPONSIBLE INDIVIDUAL: Mitchell, M Tel (518) 472-3333 Zimmerman, JF

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Jan. 1977

ACKNOWLEDGMENT: New York State Legislature

23 170597

RAIL PASSENGER SERVICE AND MARKETING COMMUNICATION

The general research objective is to provide the overall design for evaluating alternative methods for communicating the features of the VIA services to specific-market segments. A sample of 400-600 interviews is contemplated. Existing knowledge from other transportation studies was consolidated, and a preliminary model of the communications process formulated based on

these findings and those from related studies. Interviews were held with designated individuals such as CN managers, advertising agency personnel, and government officials. A principal objective of these interviews was to define the rationale for past communications programs, and to explore the range of possible alternatives. The overall design of a set of market tests for the Kingston area was specified. These are suitable for measuring the promise of selected appeals to selected market segments, using selected communications media. This research is intended to facilitate VIA management's subsequent evaluation of alternative communications strategies for rail services, by providing the designs of alternative tests for the Kingston market. The implementation of one or more of the tests may be the topic of future research.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-743

INVESTIGATOR: Turner, RE Tel (613) 547-5777 Arnold, SJ

SPONSORING AGENCY: VIA Rail Canada Limited

RESPONSIBLE INDIVIDUAL: Campbell, G

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Oct. 1977 COMPLETION DATE: Mar. 1979 TOTAL FUNDS: \$34,125

ACKNOWLEDGMENT: CIGGT

23 170626

NORTHEAST CORRIDOR RAIL SERVICE IN NEW YORK STATE

A continuing study of action needed to improve Northeast Corridor Rail Service in New York State, including improvements to the East River and other Tunnels, road bed improvements, and a possible link connecting Grand Central Station and Pennsylvania Station in New York City.

REFERENCES:

1978 Winter Storm Operations of the Long Island Railroad 1978
Transportation Priorities in New York State 1978

PERFORMING AGENCY: New York State Legislature, Senate Committee on Transportation

INVESTIGATOR: Mitchell, M Tel (518) 472-3333 Zimmerman, JF

SPONSORING AGENCY: New York State Legislature, Senate Committee on Transportation

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: May 1977

ACKNOWLEDGMENT: New York State Legislature

23 177691

PERSONAL TRANSPORTATION MODES--AN ASSESSMENT OF USE, CHOICE, AND FUTURE PREFERENCES

The objectives of the study are to: (1) evaluate the present and expected future individual preferences towards the automobile and other modes of transportation, (2) identify the factors that influence choice as reflected by current ownership or alternatives to ownership, and (3) identify use patterns of the automobile and other modes of transportation. The results of this study will provide a better understanding of the factors that now influence public preferences for the automobile and alternative modes of transportation, and an assessment of how those factors might operate under future social and economic conditions. The results also will contribute to a comprehensive assessment of automobile transportation being carried out by the Office of Technology Assessment (OTA) of the U.S. Congress. The objective of the OTA program is to assess the social, environmental, and economic impacts of prospective changes in the characteristics and use of the automobile. The study will be national in scope and consist of six major tasks. The first two tasks concern choice and use characteristics of automobile and will be accomplished using existing data sources. The next two tasks address current preferences and future choices regarding the automobile and other modes under certain conditions and will involve survey research to acquire data representative of various groups of individuals in the nation. The fifth task will be an assessment of future use patterns, and the sixth will be a synthesis of future alternatives and will serve as the integrating activity for the entire study.

PERFORMING AGENCY: Cambridge Systematics Incorporated

INVESTIGATOR: Sherman, L

SPONSORING AGENCY: National Science Foundation, ERS77-06108

Grant

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: June 1977 COMPLETION DATE: May 1978 TOTAL FUNDS: \$243,072

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CT 445)

23 178058

STUDY OF TRANSFER POLICIES AS THEY AFFECT PERFORMANCE OF AND DEMAND FOR PUBLIC TRANSPORTATION

CRA is reviewing transfer policies as they are currently practiced on transit systems nationally and is preparing a summary of current practice and of the issues relevant to improved transfer policies. Guidelines will be provided for local transit agencies on improved transit transfers and recommendations will be produced for UMTA on the planning of new demonstrations of transit transfers.

REFERENCES:

Study Design: Transfer Policies and Cost Charles River Associates; Prepared for TSC, Mar. 1978

PERFORMING AGENCY: Charles River Associates, Incorporated, 388.02

INVESTIGATOR: Brand, D Tel (617) 266-0500 Nelson, M

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Heaton, C Tel (617) 494-2000

Contract DOT-TSC-1406

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Oct. 1977 COMPLETION DATE: Sept. 1979 TOTAL FUNDS: \$92,500

ACKNOWLEDGMENT: Charles River Associates, Incorporated

23 185231

DEVELOP A DETAIL OUTLINE, FORMAT AND SCOPE OF A NATIONAL DESIGN PRACTICES MANUAL, PHASE I

The objective of the National Design Practices Manual Project is to establish minimum criteria for design and safety of Urban Rail Transit Systems. This will allow evaluation of grant (capital funding) requests and development of cost effective design standards. Phase I consists of establishment of a detailed outline of subjects. Phase II consists of supporting a contractor who will develop and utilize source documents identified in Phase I to fill out the outline.

PERFORMING AGENCY: American Public Transit Association, 7216

INVESTIGATOR: Cihak, FJ Tel (202) 331-1100

SPONSORING AGENCY: Urban Mass Transportation Administration

Contract DOT-UT-80034

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Aug. 1978 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$298,613

ACKNOWLEDGMENT: American Public Transit Association

23 185243

GUIDELINES FOR PREDICTION OF TRANSIT SYSTEM IMPACTS FOR ALTERNATIVES ANALYSIS

The purpose of this project is to offer technical guidelines in the preparation of alternatives analyses for high capital transit projects. Issues to be considered include important measures of impacts: system patronage, economic development, energy, environmental, aesthetic, social institutional, safety and security. It will also analyze community participation and impact evaluation formats.

PERFORMING AGENCY: Charles River Associates, Incorporated, 422

INVESTIGATOR: Dunbar, F Tel (617) 266-0500 Winston, B

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Spear, B Tel (617) 494-2276

Contract DOT-TSC-1572

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Aug. 1978 COMPLETION DATE: Dec. 1979 TOTAL FUNDS: \$139,077

ACKNOWLEDGMENT: Charles River Associates, Incorporated

23 185244

METHODS FOR IDENTIFICATION OF TRANSPORTATION ALTERNATIVES

Development of methods for identifying comprehensive set of alternatives to high capital transit investments for use by cities carrying out Alternatives Analyses (AA) for UMTA. The basic objective is to generate alternatives which are responsive to local and national goals while ensuring that a range of trade-offs among costs and various impact types are considered. Descriptors of the alternatives will be established for each phase of AA, and methods presented to ensure that the alternatives are operationally feasible. The descriptors will be determined to some extent by the concurrent work of other contractors concerning methodologies for estimating the costs and impacts of different alternatives.

PERFORMING AGENCY: Charles River Associates, Incorporated, 419
INVESTIGATOR: Kuzmyak, R Tel (617) 266-0500
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Bronitsky, L
Contract DOT-TSC-1565
STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Aug.
1978 COMPLETION DATE: Aug. 1979 TOTAL FUNDS: \$104,333
ACKNOWLEDGMENT: Charles River Associates, Incorporated

23 188660

HIGH SPEED RAIL PASSENGER SERVICE IN OHIO

A continuation of study of a statewide rail network with high speed trains connecting Cincinnati and Cleveland on a north-south corridor and Toledo and Youngstown on an east-west corridor. This phase will include engineering design, proposed routes, terminal location, costs of land acquisition and potential benefits of the system.

PERFORMING AGENCY: Dalton, Dalton, Newport
INVESTIGATOR: Lehr, M
SPONSORING AGENCY: Ohio Rail Transportation Authority
RESPONSIBLE INDIVIDUAL: Randall, M Tel (614) 466-5816 Butch, R
STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan.
1977 COMPLETION DATE: June 1980 TOTAL FUNDS: \$1,000,000

ACKNOWLEDGMENT: Ohio Rail Transportation Authority

23 196744

STUDY OF USER'S EVALUATION OF A TRANSPORTATION SYSTEM

This study is an investigation of the relationship among the components of consumers' evaluation of intercity transportation modes, with particular emphasis on rail. Focus groups or consumer panels will also be used to generate hypotheses about the ways in which consumers evaluate modes. A special effort will be made during this investigation to understand the nature and determinants of modal affect and its relationship to other attitudinal variables. Models of the psychological, sociological, and environmental factors which determine consumers' modal attitude toward transportation systems will be developed. Data to test these models will be collected, and structural models will be estimated.

PERFORMING AGENCY: Charles River Associates, Incorporated
INVESTIGATOR: Allaman, PM Tel (617) 266-0500
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Dumas, J

Contract DOT-TSC-1581

STATUS: Active NOTICE DATE: July 1979 START DATE: Sept.
1978 COMPLETION DATE: May 1980 TOTAL FUNDS: \$186,366

24 082106

IOWA RAILROAD STUDY

The basic goal of this study is to evaluate the economic, social and environmental impacts of alternative rural rail transportation systems in Iowa. The primary focus of this study will be the role of rural branch rail lines.

REFERENCES:

An Economic Analysis of Upgrading Branch Rail Lines: A Study of 71 Lines in Iowa, Baumel, CP, NTIS; Department of Commerce, Mar. 1976, PB-251978/AS

The Economics of Upgrading 71 Branch Rail Lines in Iowa Baumel, CP, American Journal of Agricultural Economics, Volume 59, N1, Feb. 1977

Executive Summary-An Economics Analysis of Upgrading Branch Rail Lines: A Study of 71 Lines in Iowa, Baumel, CP, Federal Railroad Administration; US DOT, Mar. 1978

Toward Optimizing the Rail Transportation and Distribution System, Baumel, CP, Proc Nat'l Symp on Transp for Agri & Rural America Nov 76

PERFORMING AGENCY: Iowa State University, Ames, 415-40-30-09-1929

INVESTIGATOR: Baumel, CP

SPONSORING AGENCY: Iowa State Highway Commission, RS-I-DOT-55045; Federal Railroad Administration

Contract DOT-FR-55045

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Oct. 1974 TOTAL FUNDS: \$257,000

ACKNOWLEDGMENT: Iowa State University, Ames

24 156651

DEVELOPMENT OF A FREIGHT ROUTE COMPETITIVE TO CONRAIL

An investigation of the establishment of a private rail system that would be competitive with CONRAIL in the Northeast in general and New York State in particular. This is a continuing study involving the Delaware and Hudson Railway.

REFERENCES:

Challenge and Decision for New York State: The Northeast Rail Crisis, New York State Senate Committee on Transportation, Jan. 1974

Abandoned Railroad Rights-of-Way New York State Senate Committee on Transportation, Mar. 1976

Transportation Priorities in New York State 1978

PERFORMING AGENCY: New York State Legislature, Senate Committee on Transportation

INVESTIGATOR: Mitchell, M Tel (518) 472-3333 Zimmerman, JF

SPONSORING AGENCY: New York State Legislature, Senate Committee on Transportation

RESPONSIBLE INDIVIDUAL: Mitchell, M Tel (518) 472-3333 Zimmerman, JF

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Jan. 1974

ACKNOWLEDGMENT: New York State Legislature

24 159629

FREIGHT CAR UTILIZATION RESEARCH-DEMONSTRATION PROGRAM. EMPTY CAR DISTRIBUTION

The Program will evaluate the feasibility of a pilot implementation by Missouri Pacific of an automated empty car distribution system. The Program will complete the Phase II Task 5 final report by including sections on automated empty car distribution, supply forecasting and fleet size forecasting. The Program Will publicize the conclusions and techniques developed by Task 5 and embodied in the final report.

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: French, PW Tel (202) 293-4165 Muehlke, RV

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 426-2608 Taylor, CE Tel (202) 293-4084

Contract DOT-FR-771-5279

STATUS: Active NOTICE DATE: Sept. 1979 START DATE: July 1977 COMPLETION DATE: Dec. 1980 TOTAL FUNDS: \$15,000

ACKNOWLEDGMENT: AAR

24 159650

AMERICAN RAILWAY SYSTEM STUDY

Under Section 901 of the Railroad Revitalization and Regulatory Act of 1976 the following tasks are being performed: (1) An examination of the current status and condition of the railroad freight industry; (2) Assessment of the effects of alternative rail corporate structures on the rail system; (3) Cost benefit analysis of electrifying high-density rail lines and improving them for high-speed passenger and freight operations; (4) Identification of rail economics that could result from improving local and terminal operations.

A preliminary report on this study effort was released in October 1978, entitled A Prospectus for Change in the Freight Railroad Industry.

PERFORMING AGENCY: Federal Railroad Administration, Office of Policy and Program Development

INVESTIGATOR: Boone, JW Tel (202)426-9682 Till, TA Tel (202) 426-0382

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Ditmeyer, SR Tel (202) 426-8254

STATUS: Completed NOTICE DATE: Sept. 1979 START DATE: Aug. 1977

ACKNOWLEDGMENT: FRA

24 170612

ANALYTICAL PROCEDURES FOR THE STUDY OF A MULTIMODAL TRANSPORTATION CORRIDOR FROM BRUNSWICK, GEORGIA TO KANSAS CITY, MISSOURI

The research will formulate workable procedures for the analysis of transportation needs in a corridor from Brunswick, Ga. to Kansas City, Mo. defined as an area roughly 100 miles wide along the corridor. The project consists in several tasks as follows: identify legislative constraints on development, develop initial transportation guidelines, develop techniques for identifying economic development opportunities, develop measures for comparing alternatives mixes of transportation services, formulate analytical models, and develop a data library.

PERFORMING AGENCY: Georgia Institute of Technology, DOT-OS-60512

INVESTIGATOR: Jones, PS Sharp, G

SPONSORING AGENCY: Office of the Secretary of Transportation

RESPONSIBLE INDIVIDUAL: Nupp, B Tel (202) 426-4447

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Aug. 1976 COMPLETION DATE: 1980

ACKNOWLEDGMENT: OST

24 179528

ECONOMIC ANALYSIS PROGRAM

This program is the ongoing effort of the Office of Economics and Operations Policy involving: (1) Competitive status of the rail industry; (2) Analysis of the regulatory environment of the rail industry; (3) Commodity service involving perishable goods, coal transit efficiency, and wheat gathering analysis; (4) Freight car management including computerized freight car scheduling and freight car utilization research; (5) Labor/management relations involving experiments with work rules agreements, worker training, strike impact analysis, economic analysis of rail labor factors, and improvement in employee communications; (6) Economic analysis involving statistics and forecasting.

PERFORMING AGENCY: Federal Railroad Administration

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Boone, JW Tel (202) 426-9682

STATUS: Active NOTICE DATE: Feb. 1979

ACKNOWLEDGMENT: FRA

24 179673

IMPACTS OF ALTERNATIVE POLICIES ON EFFICIENCIES OF TRANSPORTING AGRICULTURAL AND FOREST PRODUCTS

Estimate characteristics of demand and supply for transportation of agricultural and forest products; evaluate transportation industry marketing efficiency performance under existing institutional policies; identify effects on efficiency of transportation industry of alternative institutional policies; identify policies improving efficiency of transportation for individual commodities, especially forest products. Develop supply and demand models incorporating quality of service characteristics and competitive market variables at both the aggregate and commodity market specific levels identifying elasticity and cross elasticities and test ability of alternative institutional policies to effect parameters of supply and demand; utilize data

base on costs, revenues and demand to specify impacts of alternative policies; specify those commodities or markets whose characteristics of supply and demand for transportation are so specific that national policy alternatives do not yield efficiency increases with emphasis on forest products; evaluate alternative policies and make recommendations for local, state and national government levels. A study investigating the structure and performance of the primary haul agricultural trucking industry in Washington has been undertaken. Ninety-six trucking firms were interviewed and the data computerized. Preliminary results were sent to the truckers in October. Several manuscripts, one on operating characteristics and one on regulatory performance, are underway. Trucking activity in the Basin region is tied very closely to the agricultural production cycle. As such, trucking becomes highly seasonal, reporting only about 4 1/2 months of employment per year. Potatoes and sugar beets are the most common commodities hauled. Primary-haul truckers average 29,000 miles per year loaded and 18,600 miles empty. Over 50% of the trucks were purchased under a debt financing program averaging 3 years in duration at an average interest rate of 11.4%. A second study under the policy CSRS grant is underway with Dr. Robert Tosterud, Asso. Consultant. A manuscript on the Implications of the Quad R Act on Agriculture is currently under review. Two other manuscripts on "demand sensitive rates" and "market dominance" are also outlined. With the assistance of Walter Miklius, Asso. Consultant, we are currently designing a sample frame for extending the policy study on stability of agriculturally exempt truckers. This survey will be undertaken next year.

REFERENCES:

Stability of Motor Carriers Operating Under the Agricultural Exemption, Miklius, W; Casavant, KL, Reg of Entry & Pricing in Truck Transp; Rural Transport Symp, 29(3) 108-109, 1977

Proceedings of National Symposium on Transportation for Agriculture and Rural America, Casavant, KL, US Department of Transportation, DOT-TST-77-33, 1977

Alaska-Washington Trade: An Applied Input-Output Study Logsdon, CL; Casavant, KL, Washington State University, CARC Bulletin 848, 1977

Commercial Navigation on the Snake/Columbia Waterway System: Issues and Prospects, Jones, JR; Casavant, KL, University of Idaho, Idaho Economics No. 2, 1977

PERFORMING AGENCY: Washington State University, Department of Ag-

ricultural Economics, WNP00379

INVESTIGATOR: Casavant, KL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS WNP

Contract 701-15-39

STATUS: Active NOTICE DATE: July 1979 START DATE: Apr. 1977 COMPLETION DATE: Apr. 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0072790)

24 193779

MIDWEST RAIL SERVICE STUDY

Impacts of mergers, consolidations, coordinations and bankruptcies are both local and regional in nature. Phase I of this study addresses the state's historic and legal role, developing a document to aid states in evaluating the impact of service changes and the impact of state participation in merger, consolidation, coordination and bankruptcy proceedings. Phase II addresses impacts on a line-specific basis. The 4R Act establishes time limits for industry restructuring and this study aids state policy, decision makers in responding to such proposals and to possible future railroad bankruptcies.

REFERENCES:

Midwest Rail Service Study: The State Role in Railroad Restructuring, Ernst and Ernst

Midwest Rail Service Study: Retrospective Study of Selected Railroad Mergers, Ernst and Ernst

Midwest Rail Service Study: Manual for Assessing the Impacts of Railroad Restructuring, Ernst and Ernst

PERFORMING AGENCY:- Ernst and Ernst

INVESTIGATOR: Lutes, GS Tel (202) 862-6334

SPONSORING AGENCY: Iowa Department of Transportation, Office of Advance Planning

RESPONSIBLE INDIVIDUAL: Ward, D Tel (515) 296-1137

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: May 1978 COMPLETION DATE: May 1980 TOTAL FUNDS: \$300,000

ACKNOWLEDGMENT: Ernst and Ernst

25 058753

SCENARIOS FOR ALTERNATIVE ROLES OF THE FEDERAL GOVERNMENT IN TRANSPORTATION

The research shall evaluate the economic effects of existing and prospective Federal policies governing intercity and international freight and passenger transportation enterprises in the economy of the United States. All modes of transportation shall be encompassed intermodal coordinative institutions, and Federal policies affecting domestic intercity transportation in all phases. Economic evaluation shall include the study of efficient resource allocation and distributional effects of alternative policies together with consideration of both partial and general equilibrium effects. The research shall be interdisciplinary in scope, drawing upon engineering, economic, statistics, law, and administration.

REFERENCES:

An Integrated Policy Model for the Surface Freight Transportation Industries, Friedlaender, AF, Center for Transportation Studies, MIT, Report No. 76-12, Sept. 1976

Econometric Estimation of Cost Functions in the Transportation Industries, Spady, R; Friedlaender, AF, Center for Transportation Studies, MIT, Report No. 76-12, Sept. 1976

Information Needs and Performance Measures Center for Transportation Studies, MIT, deNeufville, R; King, C, Report 76-15, Sept. 1976

The Rationale & Scope of Federal Transportation Policy Friedlaender, AF; Simpson, RW; Frankel, EG; deNeufville; Sloss, Center for Transportation Studies, MIT, Report No. 77-4, Mar. 1977

Hedonic Costs and Economics of Scale in the Regulated Trucking Industry, Friedlaender, AF, Center for Transportation Studies, MIT, Report No. 77-5, Jan. 1977

PERFORMING AGENCY: Massachusetts Institute of Technology, Center for Transportation Studies

INVESTIGATOR: Friedlaender, AF

SPONSORING AGENCY: Office of Systems Development and Technology, Department of Transportation

RESPONSIBLE INDIVIDUAL: Nupp, B Tel (202) 426-4447

Contract OS-50239 (FFP)

STATUS: Active **NOTICE DATE:** Mar. 1979 **START DATE:** Sept. 1975 **COMPLETION DATE:** Jan. 1979 **TOTAL FUNDS:** \$400,000

ACKNOWLEDGMENT: TRAIS

25 059207

PROCEDURES FOR INSTITUTING SEPARATE ROUTES FOR DISTINCT RAIL SERVICE

Determine the elements that constitute basic railroad transportation service, identify theoretical and specific terms of those services which should be included under the rubric of distinct services. This will require identification of the characteristics which make some services distinct and analysis of whether provision of those services results in incremental costs to the railroads. Formulate guidelines to be incorporated into the Commissions rules. Describe the regulatory and institutional barriers to initiation of such pricing procedures.

PERFORMING AGENCY: Gellman Research Associates, Incorporated

INVESTIGATOR:

SPONSORING AGENCY: Office of Policy and International Affairs

RESPONSIBLE INDIVIDUAL: Bohan, FJ Tel 202-4264860

Contract DOT-OS-606167 (CPFF)

STATUS: Active **NOTICE DATE:** Feb. 1978 **START DATE:** Mar. 1976 **TOTAL FUNDS:** \$41,502

ACKNOWLEDGMENT: TRAIS

25 099365

VALUE CAPTURE POLICY

This research explores legal, financial and community design issues resulting from the introduction of mass transit station facilities in a community. Collectively termed "Value Capture", these efforts are becoming increasingly important in the evaluation of transit projects. First year efforts developed major concepts and defined and analyzed the critical issues in the 3 concern areas using Houston, Texas as an example city. Year two took Value Capture and applied it to proposed transit improvements in Los Angeles, Louisville, Kentucky and Chicago. Problems and opportunities for the application of Value Capture techniques by one or more types of public administrative agencies were identified. This included an examination and comparison of significant legal barriers, economic issues, investment opportunities, sources

and restrictions on funds, and potential community impacts related to hypothetical examples of transit stop related development. The research teams worked closely with the municipalities involved and the Urban Mass Transit Administration. **STATUS:** Results from the first year of research detailing the legal, financial and community implications of Value Capture have been published and widely distributed. Second year research has focused on three cities: Los Angeles, Louisville, and Chicago. In each case, prospects for applying Value Capture to proposed mass transit development have been thoroughly evaluated. It was found that there is significant potential for the beneficial application of Value Capture, although the most appropriate techniques for applying it are not the same in each city. In application situations in this work, potential fiscal returns were found to be widely varying depending upon the community under examination, Value Capture techniques used, and the legal basis for their application. In all, it may be summarized that Value Capture's potential success is closely related to the success of the mass transit system itself. Good transit planning will definitely support the success of Value Capture but not insure it.

Final Report, February 1979.

REFERENCES:

Value Capture Policy. 4 Vols. Introduction, Legal Element Financial Element, and Community Enhancement, DOT Publication, DOT-TST-75-85, Nov. 1974

Value Capture and Joint Development Applications Dec. 1975

How to Make Mass Transit Pay its own Fare Design and Environment Magazine, Apr. 1975

Value Capture Policy Planning Mag, Am Soc of Planning Officials, Apr. 1976

Joint Land Use and Transportation Development-Application of the Value Capture Concept, Transportation Research Board, NAS, Jan. 1975

Planning, Financing and Implementing Joint Development A National Transit Symposium, Miami, FL., Jan. 1975

PERFORMING AGENCY: Rice University, School of Architecture

INVESTIGATOR: Sharpe, CP

SPONSORING AGENCY: Office of the Secretary of Transportation

RESPONSIBLE INDIVIDUAL: Nupp, B

Contract DOT-OS-40007

STATUS: Active **NOTICE DATE:** Feb. 1979 **START DATE:** Dec. 1976 **TOTAL FUNDS:** \$175,000

ACKNOWLEDGMENT: DOT

25 128852

PRODUCTIVITY IN TRANSPORTATION AND PIECEMEAL DEREGULATION OF THE INDUSTRY

The position taken in this proposal is that technological and other changes have significantly altered the competitive situation in transportation. These changes raise the possibility of increasing productivity in transportation by returning to market forces at least partial responsibility for determining prices and outputs. Our specific area of interest is the exempt agricultural commodities. The research will provide useful results on the effects of extending these regulatory exemptions to railroads, including effects on energy consumption, car utilization, and other aspects of productivity. The research will examine the implications of deregulation on the future functioning of railroad rate bureaus and investigate the effects of user charges and subsidies on intermodal competition. A major benefit of the research will be a usable methodology for examining partial deregulation questions. The methodology will consist of a quantitative model of intermodal freight competition and a "users manual". The users' manual will consist of a series of model applications, representing the range of alternative regulatory instruments from direct regulation to subsidies and taxes. We will also publish the methodology and the results as articles in both professional and trade journals. Testimony will be presented to the appropriate committees of Congress.

PERFORMING AGENCY: Northwestern University, Evanston, Transportation Center, APR 75-16731

INVESTIGATOR: Moses, LN Tel (312) 492-7286

SPONSORING AGENCY: National Science Foundation, Division of Applied Research

RESPONSIBLE INDIVIDUAL: Rosenberg, L Tel (202) 634-1609

Contract APR-7516731

STATUS: Active **NOTICE DATE:** Feb. 1979 **START DATE:** Sept. 1975 **COMPLETION DATE:** May 1978 **TOTAL FUNDS:** \$110,000

ACKNOWLEDGMENT: Northwestern University, Evanston, Smithsonian Science Information Exchange (GSQ 1407)

25 153574

TRANSPORTATION SYSTEMS IN COLORADO: NEEDS ASSESSMENT AND ANALYSIS FOR COMPREHENSIVE STATE TRANSPORT

To describe the components of the existing transportation sector in Colorado in a systematic framework. Identify goals for Colorado's transportation system and develop measures of performance on which to estimate the achievement of such goals. Identify areas of discrepancy between the existing system and the goals for the system. Develop a set of recommended actions to achieve congruence between the state goals and the transportation system.

PERFORMING AGENCY: Colorado State University, Fort Collins, Department of Economics, CSRS COL

INVESTIGATOR: Blood, D Wagner, W

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, COLO0189

STATUS: Completed NOTICE DATE: July 1979 START DATE: July 1976

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070684)

25 156620

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION, STORAGE AND DISTRIBUTION SYSTEMS

This project will evaluate the economic effects of alternative federal, state and local government policies on shippers, carriers, receivers, and rural communities. The study will: develop an inventory of existing regulation in participating states and at the national level; Measure commodity flows into and out of case study areas in terms of commodity, origin, destination, mode, type of carriers, (regulated, exempt, and private) backhaul, service variables such as timeliness, reliability and damage incidence will be measured. Cost coefficients will be obtained and adapted to model carrier firms operating under simulated regulated and unregulated conditions as determined from survey findings. Comparison of costs and services under regulated vs. unregulated conditions will provide the basis for evaluating the merits of alternative regulatory policies. A model will be constructed which will describe rural transportation systems as they presently exist and as they would exist under alternative state and federal regulatory frameworks. The likely performance of the transportation systems will be estimated as a function of the inter-and intra-modal competitive environment. The first year of work under this project has resulted in the development of a comprehensive plan of research. Two levels of analysis of the implications of motor carrier regulation are planned: 1) a micro approach focusing on a case-study rural community and 2) a macro approach utilizing secondary, national-level data sources. An extensive literature review has been accomplished; trucking cost information has been assembled; motor carrier rate structures have been described; and plans for making a detailed case-study analysis of effects of regulation have been laid. Grain marketing projections to 1985 have been made for each Nebraska crop reporting district for inclusion in a regional optimization model. Plans are nearing completion for grain elevator survey designed to measure the patterns of grain flows from the state.

REFERENCES:

Impact of Motor Carrier Deregulation on Agriculture, Rural Shippers and Receivers, Felton, JR; Anderson, DG, Nebraska University, Lincoln, Dept of Agricultural Economics, Staff Paper 1976-15 30 pp, 1976

The Inherent Structure, Behavior and Performance of Motor Freight Industry, Felton, JR, Nebraska University, Lincoln, Dept of Agricultural Economics, Staff Paper 1976-7 18 pp, 1976

Economics of Scale in Highway Freight Transport: A Review of the Studies, Felton, JR, Nebraska University, Lincoln, Dept of Agricultural Economics, Staff Paper 1976-8 21 pp

State Economic Regulation of Motor Carriage: Research Procedures on the Law and Its Interpretation, Hutsell, RC, Jr, Nebraska University, Lincoln, Dept of Agricultural Economics, Staff Paper 1976-12 9 pp, 1976

Impacts of Motor Carrier Deregulation on Agriculture, Rural Shippers, and Receivers, Felton, JR; Anderson, DG, 1977

The Costs and Benefits of Motor Truck Regulation Felton, JR, Nebraska University, Dept of Agricultural Economics

PERFORMING AGENCY: Nebraska University, Lincoln, Department of Agricultural Economics, CSRS NEB

INVESTIGATOR: Anderson, DG

SPONSORING AGENCY: Department of Agriculture, NEB-10-071

STATUS: Active NOTICE DATE: July 1979 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070254)

25 156676

RAIL BRANCH LINE SUBSIDIES AND REHABILITATION

A study of the need for rehabilitation of rail branch lines and methods of subsidizing service on lines operating in the red.

REFERENCES:

Transportation Priorities in New York State 1978

PERFORMING AGENCY: New York State Legislature, Senate Committee on Transportation

INVESTIGATOR: Mitchell, M Tel (578)472-3333 Zimmerman, JF

SPONSORING AGENCY: New York State Legislature, Senate Committee on Transportation

RESPONSIBLE INDIVIDUAL: Mitchell, M Tel (518)472-3333 Zimmerman, JF

STATUS: Active NOTICE DATE: Aug. 1978 START DATE: Jan. 1973

ACKNOWLEDGMENT: New York State Legislature

25 156707

EVALUATION OF ALTERNATIVE RURAL FREIGHT TRANSPORTATION STORAGE AND DISTRIBUTION SYSTEMS

The project will evaluate the economic effects of alternative federal, state, and local government policies on carriers, shippers, receivers, and rural communities. An inventory of existing transportation regulations and policies will be developed. Commodity flows into and out of the state will be summarized from secondary sources. Data on origin, destination, mode, back haul, seasonality and rates will be based on surveys in case study areas. The relationship between service and the competitive structure of the transportation industry will be estimated through a survey of shippers and receivers. Service variables such as timeliness, reliability, and damage incidence will be measured. The likely performance of transportation systems will be estimated as a function of inter-and intra-modal competitive environment. An attitudinal survey of country elevator managers to ascertain if differences in railroad service to country elevators depended on whether they were located on a branch or main line, distance to an elevator on a competing railroad, and railroad was conducted. Only on one statement regarding service in general was there a significant difference between responses of elevator managers on main and branch lines. On all other comparisons there were no significant differences in the attitude of managers between the different strata toward services such as boxcar condition, roadbed and schedule maintenance as reflected in the 126 usable surveys. Elevator managers' perceptions of the relative importance of 14 service variables were also measured. The demand for transportation service by North Dakota agriculture is being projected to 1985, 1990, and 2000. The state was divided into three regions based on homogeneity of transportation flows. Demand for transportation will be estimated for each of these three regions based on projected production of wheat, feed grains, and soybeans less consumption by livestock. Production statistics by county of the crops and eight classes of livestock have been collected for 16-year period. These data will be used to develop estimating equations.

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics, CSRS ND

INVESTIGATOR: Cobia, DW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, ND01360

STATUS: Active NOTICE DATE: July 1979 START DATE: July 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070865)

25 157601

DEVELOPMENT OF A POLICY SENSITIVE MODEL FOR FORECASTING FREIGHT DEMAND

To investigate and evaluate the application of disaggregate freight demand models in examining transportation policy alternatives. Using a mathematical model previously specified at Massachusetts Institute of Technology to investigate the adequacy of existing freight shipment data as the basis for model calibration. To calibrate and test such a model on alternative Federal intercity freight policy alternatives and the effects on modal shares, revenues, level of service and other factors.

REFERENCES:

Phase I Report. Development of a Policy Sensitive Model for Forecasting

Freight Demand, Roberts, P; Terziev, M, July 1977

PERFORMING AGENCY: Massachusetts Institute of Technology, DOT-OS-70006

INVESTIGATOR: Roberts, PO Tel (617)253-1000

SPONSORING AGENCY: Department of Transportation, Office of Intermodal Studies

RESPONSIBLE INDIVIDUAL: Swerdloff, CN Office of the Secretary of Transportation Tel (202)426-4163

Contract DOT-OS-70006

STATUS: Active NOTICE DATE: Feb. 1979 START DATE: Jan. 1977 COMPLETION DATE: July 1979 TOTAL FUNDS: \$290,000

ACKNOWLEDGMENT: OST

25 160045

FEDERAL POLICY IMPLICATIONS (FPI) PROJECT

The purpose of the Federal Policy Implications (FPI) Project is to respond to the interests of the Federal Government by bringing together the BART Impact Program (BIP) impact findings and their supporting data. BIP is a five-year study of the impacts of the BART system on travel conditions, economic activity, land use, public policies, and other aspects of life in the San Francisco Bay Area.

PERFORMING AGENCY: Voorhees (Alan M) and Associates, Incorporated

SPONSORING AGENCY: Office of Policy and International Affairs

RESPONSIBLE INDIVIDUAL: Grainger, GR Tel (202) 426-4168

Contract DOT-OS-70034 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1978 START DATE: Apr. 1977 TOTAL FUNDS: \$78,650

ACKNOWLEDGMENT: TRAIS

25 179347

CONTINUATION OF MARYLAND'S OVERALL STATEWIDE ECONOMIC DEVELOPMENT PLANNING PROCESS

The grant represents a continuation of ARC support for an economic development process in the Maryland Department of Economic and Community Development since 1973 when ARC provided assistance to create an economic development planning staff. The process has evolved into one which: (1) identifies and selects specific projects for study, evaluation, and recommendation, (2) provides economic development planning assistance to counties and multi-county districts, (3) participates in multi-state economic development regional organizations, (4) participates in State inter-governmental programs of economic development significance, and (5) provides analytical support to the Maryland Department of Economic and Community Development's other divisions and the Office of the Secretary. SCOPE OF WORK: Work during the nine-month continuation period will focus mainly on specific projects of interest to the Tri-County area of western Maryland. 1. Tourism Development. This work will assist the Tri-County Council of Western Maryland prepare a regional action plan for the development of specific tourism projects, and assess the potential for a conference-recreation complex in western Maryland. Specifically, activities will include: a. An inventory of facilities and potential recreational projects; b. Liaison and participation with the TCCWM's Regional Tourism Committee and staff; c. Selection of projects based on priorities and their economic impact. 2. Rail Utilization. This work will build on the analyses of rail line utilization, operations, and service gaps that were developed under the current grant. Specifically, activities will include: a. The development of strategies to enhance the economic viability of rail lines serving western Maryland and to close gaps between present and potential volume. b. The development of a monitoring system to study the progress or deterioration of marginally profitable rail lines. c. The development of alternatives for abandoned rail rights-of-way. 3. Coal Industry. The revitalization of the coal industry will have an impact on western Maryland. REFERENCES:

An Analysis of Subsidized Rail Lines in Maryland Kling, GE

PERFORMING AGENCY: Maryland Department of Economic & Community Dev

SPONSORING AGENCY: Appalachian Regional Commission, MD-5101-77-C1-302-05

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Jan. 1978 COMPLETION DATE: Sept. 1978 TOTAL FUNDS: \$28,500

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CY 3)

25 179675

AN ASSESSMENT OF THE ECONOMIC IMPACT OF USER CHARGES FOR INLAND WATERWAY TRANSPORTATION

Evaluate the impact of alternative user charges for inland waterways upon shipping costs and consumer prices. Evaluate administration costs and revenue potential of alternative user charges. Develop information on inland waterway cost-sharing. Develop an economic model of interregional competition which emphasizes the role of transportation costs. By changing freight rates, their impacts on transportation mode, shipping patterns, and prices will be identified.

PERFORMING AGENCY: Virginia Polytechnic Institute & State University, Department of Agricultural Economics, VA-0375868-1

INVESTIGATOR: Shabman, L

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: June 1979 START DATE: Oct. 1977

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0074345)

25 185242

THE DEVELOPMENT OF DECISION CRITERIA FOR RAIL USAGE IN ARKANSAS

The objective of this study is to develop analytical procedures to allow consistency in applying decision criteria to railroad track abandonment requests. An approach will be developed to facilitate decisions on whether present and future public convenience and necessity permit discontinuance or abandonment of railroad trackage. Developed methodology will weigh economic, social, fiscal, and environmental impacts of abandonment and provide decision-makers with objective criteria and systematic procedures for evaluating abandonment proposals.

PERFORMING AGENCY: Arkansas State University

INVESTIGATOR: Kaminarides, J Tel (501) 972-3037

SPONSORING AGENCY: Arkansas State Highway & Transportation Department; Federal Highway Administration; Federal Railroad Administration

STATUS: Completed NOTICE DATE: Aug. 1979 START DATE: Feb. 1978 COMPLETION DATE: Mar. 1979 TOTAL FUNDS: \$29,651

ACKNOWLEDGMENT: Arkansas State University

25 188665

STATE RAIL PROGRAM EVALUATION

The project will evaluate the effectiveness of the Local Rail Service Assistance Program. The evaluation has three objectives: (1) to evaluate the effectiveness of the Program in meeting its objectives as established by Congress and as perceived by the State; (2) to identify problems and recommend alternative solutions to improve Program effectiveness; and (3) to develop a continuing evaluation process to be used by FRA and States. Interviews are being conducted with key officials at the Federal, State and local levels, and with shipper and railroad executives to determine the objectives, policies and problems in implementing the Program as originally intended by the Congress and modified in subsequent legislation. Information will be compiled on the affect of the implementation of the Program on railroad financial conditions, program expenditures, State obligations, and community impacts.

PERFORMING AGENCY: Ernst and Ernst

INVESTIGATOR: Tyndall, GR Tel (202) 862-6000 Taggart, RE Swartz, DJ Walker, N

SPONSORING AGENCY: Department of Transportation; Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Tusaie, W Tel (202) 426-1677

Contract DOT-FR-8211

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: Sept. 1978 COMPLETION DATE: Oct. 1979 TOTAL FUNDS: \$134,000

ACKNOWLEDGMENT: Ernst and Ernst

25 193783

PLANNING FOR REGIONAL ECONOMIC DEVELOPMENT

The purpose of the research project is to examine the regional economic development that occurs as a result of specific government policies and to assist states as they develop their state economic planning capabilities. The primary emphasis of the research is on determining how the multiregional

input-output (MRIO) model and related techniques of regional economic analysis can be used at the state level for the planning and evaluation of state economic development policies. The research is especially focused on policies related to transportation and energy and their impacts on employment and income in the regions.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Polenske, KR

SPONSORING AGENCY: Economic Development Administration; Federal Railroad Administration

STATUS: Active NOTICE DATE: Apr. 1979 START DATE: Oct. 1976 COMPLETION DATE: Mar. 1980

ACKNOWLEDGMENT: Massachusetts Institute of Technology

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, FN Tel 202-389-6611

SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development

RESPONSIBLE INDIVIDUAL: Ahmed, N Tel 202-4260955

Contract DOT-FR-74193 (CC)

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ACKNOWLEDGMENT: FRA

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) 567-3607

STATUS: Active NOTICE DATE: Aug. 1979 START DATE: 1970

ACKNOWLEDGMENT: AAR

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 page v. 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.

A

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15A 188644

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15 192051, 20 185890

ACIER/STAHL/STEEL Centre Belgo-Luxem d'Information de l'Acier; 47 rue Montoyer; B-1040 Brussels, Belgium
09 189792

ACOUSTICAL SOCIETY OF AMERICA, JOURNAL OF Acoustical Society of America; 335 East 45th Street; New York, New York, 10017
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22A 083506, 22A 083511

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03A 179688, 03A 179689, 03A 195918, 22A 138400, 22A 195927

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22A 099639

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22A 179676

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03A 136342, 04 191750, 04 191751, 04 191752, 04 191753, 04 191754

AIT-REVISTA Asociacion de Investigacion del Transporte; Alberto Alcocer 38; Madrid, Spain
05 194511, 13 194510

ALASKA UNIVERSITY, COLLEGE College, Alaska, 99701
20A 055810

ALL-UNION LABOR RED BANNER RAILWAY RESEARCH INST USSR Ministry of Railways; Moscow B-174, USSR
09 196100

ALLIED-GENERAL NUCLEAR SERVICES Barnwell, South Carolina, 29812
12 186377, 12 186378, 22 186827

AMERICAN ASSN OF STATE HWY AND TRANSP OFFICIALS 444 North Capitol Street, NW; Washington, D.C., 20001
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06 195719

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS 1290 Avenue of the Americas; New York, New York, 10019
02 196378, 03 196377

AMERICAN INSTITUTE OF INDUST ENGRS-TRANSACTIONS American Institute of Industrial Engineers; 345 East 47th Street; New York, New York, 10017
18 196374

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01A 099393

AMERICAN NUCLEAR SOCIETY TRANSACTIONS American Nuclear Society, Incorporated; 244 East Ogden Avenue; Hinsdale, Illinois, 60521
12 195097, 12 195098, 22 195096

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00A 059406, 03A 170601, 03A 170604, 03A 188652, 09A 170603, 10A 188647, 11A 170605, 12A 170780, 23A 185231

AMERICAN SOCIETY OF CIVIL ENGINEERS 345 East 47th Street; New York, New York, 10017
00 195721

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- AMERICAN SOCIETY OF LUBRICATING
ENG-TRANSACTIONS** American Society of Lubricating Engineers; 838 Busse
Highway; Park Ridge, Illinois, 60068
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- AMERICAN SOCIETY OF MECHANICAL ENGINEERS** 345 East 47th
Street; New York, New York, 10017
02 190304, 02 194640, 02 194647, 03 193761, 03 194641, 03 194642,
03 194643, 03 194644, 03 194646, 04 190278, 04 190396, 05 194645,
10 189007, 10 193764, 22 190371, 22 190372
- ANDERSON NOTTER FINEGOLD, INCORPORATED** 77 North
Washington Street; Boston, Massachusetts, 02114
24 196541, 24 196542
- ANNALES DE L'INSTITUT TECH DU BATIMENT TRAVAUX
PUB** Societe de Diffusion de Tech du Bat et de Trav Pub; 9 rue la Perouse;
Paris 16e, France
00 189757
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NW; Washington, D.C., 20235
20 185916, 20 185917, 20 185960, 20 185961, 20 185962, 20 185963,
25A 179347
- APPLIED ERGONOMICS** IPC Science and Technology Press Limited; IPC
House, 32 High Street; Guildford, Surrey, England
07 189809, 07 193762, 07 195090
- APPLIED SCIENCE PUBLISHERS LIMITED** Ripple Road; Barking, Essex,
England
09 194135
- ARCHIV FUER EISENBAHNTECHNIK** Hestra-Verlag; Holzhofallee 33; 61
Darmstadt, West Germany
02 190357, 02 190358, 02 190360, 21 194682
- AREA BULLETIN** American Railway Engineering Association; 59 East Van
Buren Street; Chicago, Illinois, 60605
01 194628
- ARGONNE NATIONAL LABORATORIES** 9700 South Cass Avenue;
Argonne, Illinois, 60439
04 191881, 16 194123, 19 194130, 20 186380, 20 191159, 20 191160,
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Economics and Rural Sociology; Fayetteville, Arkansas, 72701
22A 179661
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09 185483
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Building; Washington, D.C., 20314
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- ARMY MATERIALS AND MECHANICS RESEARCH
CENTER** Watertown, Massachusetts, 02172
09 169393
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COMMAND** Warren, Michigan
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- ASCE CIVIL ENGINEERING** American Society of Civil Engineers; 345 East
47th Street; New York, New York, 10017
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DIVISION** American Society of Civil Engineers; 345 East 47th Street; New
York, New York, 10017
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DIV** American Society of Civil Engineers; 345 East 47th Street; New York,
New York, 10017
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Vasteras, Sweden
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Mechanical Engineers; 345 East 47th Street; New York, New York, 10017
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CONTROL** American Society of Mechanical Engineers; United Engineering
Center, 345 East 47th Street; New York, New York, 10017
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Program; 1920 L Street, NW; Washington, D.C., 20036
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- ASSOCIATION OF AMERICAN RAILROADS TECHNICAL
CENTER** Safety Research and Applied Technology Division; Chicago, Illinois,
60616
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CENTER** 3140 South Federal Street; Chicago, Illinois, 60616
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24 194638, 26A 099429
- ATCHISON, TOPEKA AND SANTA FE RAILWAY** 80 East Jackson
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03A 059420
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Georgia, 30303
15A 179331
- ATOMICS INTERNATIONAL DIVISION** Rocky Flats Plant; Golden,
Colorado, 80401
12 191469, 22 186020
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22A 179659
- AUSTRALASIAN INSTITUTE OF MINING AND
METALLURGY** Illawarra Branch, 191 Royal Parade; Parkville, Victoria,
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01 197277
- AUSTRALIAN GOVERNMENT PUBLISHING SERVICE** 109 Canberra
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20 188332
- AUSTRALIAN MINING** Thomson Publications (Australia) Pty Limited; 47
Chippen Street; Chippendale, New South Wales 2008, Australia
22 190352
- AUSTRALIAN ROAD RESEARCH** Australian Road Research Board; 500
Burwood Road; Vermont South, Victoria 3133, Australia
15 190263
- AUSTRALIAN ROAD RESEARCH BOARD** 500 Burwood Road; Vermont
South, Victoria 3133, Australia
08 197278
- AUTOMATYKA KOLEJOWA** Warsaw, Poland
06 189754, 06 194503
- AVTOMATIKA, TELEMEXHANIKA I SVYAZ** USSR Ministry of Railways;
Novoryazanskaya Ulitsa Dom 12; Moscow 288, USSR
06 189753, 06 194685, 13 196392

B

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21A 196742
- BATTELLE COLUMBUS LABORATORIES** 505 King Avenue; Columbus,
Ohio, 43201
00A 138477, 01A 139163, 01 192246, 02 191535, 11 197361, 11 197362,
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01A 038974, 01A 059371, 01A 185233, 02A 099367, 12A 135719
- BATTELLE MEMORIAL INSTITUTE/PACIFIC NORTHWEST LABS** Battelle Boulevard, P.O. Box 999; Richland, Washington, 99352
 12 192168, *20A 136085*, 20 194124, 20 196108, 22 190884
- BECA, CARTER, HOLLINGS AND FERNER LIMITED** P.O. Box 6345; Auckland, New Zealand
 16 186471, 16 191921
- BECHTEL CORPORATION** 50 Beale Street; San Francisco, California, 94119
00A 185230, 01 192246
- BELL JOURNAL OF ECONOMICS** American Telephone and Telegraph Company; 195 Broadway, Room 01-1940; New York, New York, 10007
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- BIOTECHNOLOGY, INCORPORATED** 3027 Rosemary Lane; Falls Church, Virginia, 22042
 08 193730
- BLAYNEY (JOHN) ASSOCIATES** 631 Clay Street; San Francisco, California, 94111
 15 190485, 15 190486, 15 190487; 15 190582, 15 190906, 15 190968, 15 190970, 15 191029, 15 191033, 15 191659
- BOEING COMMERCIAL AIRPLANE COMPANY** Commercial Airplane Group, P.O. Box 3707; Seattle, Washington, 98124
 09 196980
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- BOEING COMPANY** P.O. Box 3999; Seattle, Washington, 98124
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- BOEING VERTOL COMPANY** P.O. Box 16858; Philadelphia, Pennsylvania, 19142
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- BOEING VERTOL COMPANY**, Surface Transportation Systems Department; Philadelphia, Pennsylvania, 19142
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05A 157901, 10A 188655
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 12-197359, 12 197371
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 15 191362, 23 191660, 25 191361
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17A 148350
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 25 193757
- BRITISH JOURNAL OF NON-DESTRUCTIVE TESTING** Non-Destructive Testing Society of Great Britain; Maitland House, Warrior Square; Southend-On-Sea, Essex SS1 2J4, England
 09 190356
- BROOKHAVEN NATIONAL LABORATORY** Associated Universities, Incorporated; Upton, New York, 11973
 16 191164, 20 185629, 20 186383, 20 191877
- BROTHERHOOD OF LOCOMOTIVE ENGINEERS** 1365 Ontario Street; Cleveland, Ohio, 44114
 07 196361
- BROWN BOVERI REVIEW** Brown Boveri and Company, Limited; Publicity Department; Baden, Switzerland
 03 190339, 03 196943, 04 190344, 04 194671, 04 196935, 04 196938, 04 196939, 04 196940, 04 196941, 04 196942, 04 196944, 13 196462, 13 196936, 13 196937
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 05 195713, 13 196995
- BULLETIN DER BUNDESREGIERUNG** Presse-und Informationsamt der Bundesregierung; Welcker Strasse
 25 195122
- BULLETIN SEV/VSE** Schweizerischer Elektrotechnischer Verein; Seefeldstrasse 301, Postfach; 8034 Zurich, Switzerland
 13 189041
- BUNDESMINISTERIUM FUER FORSCHUNG UND TECHNOLOGIE** Forschungsauftrag; Cologne, West Germany
 10 189769
- BUNDESMINISTERIUM FUER FORSCHUNG UND TECHNOLOGIE** Stresemannstrasse 2, Postfach 120370; D-5300 Bonn 12, West Germany
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 07 189058
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00A 136152, 00A 136165, 20 189805, 20 190362, 20 194663, 20 194664, 20 194665, 20 196363
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 18 189804

C

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00A 102894
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00A 102894, 12A 059864
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02A 170594
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15A 179338, 26 192099
- CALIFORNIA UNIVERSITY, BERKELEY** Lawrence Berkeley Laboratory; Berkeley, California, 94720
17A 188651, 17 193773, 20 191181
- CALIFORNIA UNIVERSITY, LIVERMORE** Lawrence Livermore Laboratory; Livermore; California, 94550
 20 192189
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 00 192188
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- CANADIAN GENERAL ELECTRIC COMPANY** 175 Richmond Road; Ottawa, Ontario, Canada
04A 196721
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01A 148355, 01A 170600, 01A 170783, 01 196106, 01 196107, 05 195070, *08A 159644, 11A 170593, 11A 196738, 11A 196739, 16A 196743, 17A 159648, 18A 080324, 18A 159635*, 20 195069, 21 195071, 21 195073, 22 195072, *23A 170597, 24 195696*

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00A 196736, 01A 148355, 01A 196723, 01A 196735, 02A 196732, 03A 050338, 18A 080324, 21A 196733, 21A 196734
- CANADIAN PACIFIC LIMITED** Windsor Station; Montreal, Quebec H3C 3E4, Canada
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- CANADIAN PACIFIC RAIL** Windsor Station; Montreal, Quebec H3C 3E4, Canada
01A 148355, 01A 170600, 17A 196731
- CANADIAN SOCIETY FOR CIVIL ENGINEERING** 2050 Mansfield Street; Montreal, Quebec, Canada
 24 196531
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 24 196531
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18A 159635
- CANAVERAL COUNCIL OF TECHNICAL SOCIETIES** Cocoa Beach, Florida, 32931
 25 196518
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12A 188664
- CARGO HANDLING ABSTRACTS** International Cargo Handling Coordination Assn; Abford House, 15 Wilton Road; London SW1V 1LX, England
 21 188757
- CARGO SYSTEMS INTERNATIONAL** Cargo Systems Publications Limited; Arun House, 201-205 High Street; New Malden KT3 4BH, Surrey, England
 12 194337, 21 193771, 21 194313, 21 195743, 22 189814, 22 190429
- CARNEGIE-MELLON UNIVERSITY** Department of Mechanical Engineering; Frew Avenue and Margaret Morrison; Pittsburgh, Pennsylvania, 15213
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- CHARTERED MECHANICAL ENGINEER** Institution of Mechanical Engineers; 1 Birdcage Walk, Westminster; London SW1H 9JJ, England
 11 194146
- CHEMICAL AND ENGINEERING NEWS** American Chemical Society; 1155 16th Street, NW; Washington, D.C., 20036
 20 196424
- CHEMINS DE FER** Association Francaise des Amis des Chemins de Fer; Gare de l'Est; Paris 10e, France
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- CIVIL ENGINEERING** Morgan-Grampian (Professional Press) Limited; Morgan-Grampian House, Calderwood Street; London SE18 6QH, England
 00 194865
- CIVIL ENGINEERING IN JAPAN** Japan Society of Civil Engineers; 1-chome, Yotsuya, Shinjuku-ku; Tokyo 160, Japan
 00 189764
- CLARKSON COLLEGE OF TECHNOLOGY** School of Engineering, Mechanical and Industrial Engineering; 51 Main Street; Potsdam, New York, 13676
02A 194540
- CLEMSON UNIVERSITY** Clemson, South Carolina, 29631
02A 059427
- CLEMSON UNIVERSITY** Department of Mechanical Engineering; Clemson, South Carolina, 29631
 02 196983
- COAL AGE** McGraw-Hill, Incorporated; 1221 Avenue of the Americas; New York, New York, 10020
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- COLORADO SCHOOL OF MINES** Golden, Colorado, 80401
 00 197445, 00 197446
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00A 153558
- COLORADO STATE UNIVERSITY, FORT COLLINS** Department of Economics; Fort Collins, Colorado, 80523
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- COMMISSION OF THE EUROPEAN COMMUNITIES** 200 rue de la Loi; B-1040 Brussels, Belgium
 18 196530
- CONNECTICUT DEPARTMENT OF TRANSPORTATION** Bureau of Planning and Research; 24 Wolcott Hill Road, P.O. Drawer A; Wethersfield, Connecticut, 06109
00A 185235
- CONNECTICUT DEPARTMENT OF TRANSPORTATION** 24 Wolcott Hill Road, P.O. Drawer A; Wethersfield, Connecticut, 06109
00A 185235
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22A 179699
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13A 179334, 21A 188662
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 21 197275
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 25 186867
- ### D
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Source Index

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Source Index

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Source Index

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04A 196748

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07A 049659, 07A 148352, 07A 170662, 08A 049658, 08A 159654, 08 191687, 08 197314, 09A 138557, 09A 138558, 11A 149463, 11A 160399, 11A 193781, 12A 099392, 12A 099428, 12A 138567, 17A 138526, 17A 148350, 17A 159625, 17A 159628, 17A 159631, 17A 160402, 17A 188651, 18A 129724, 18A 129729, 18A 138514, 21A 138527, 21A 157598, 21A 159624, 21A 159626, 21A 159627, 21A 159653, 21A 160398, 21A 170622, 21A 170664, 21A 188662, 22A 138481, 24A 082106, 24A 159629, 24A 159650, 24A 179528, 25A 185242, 25A 193783

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 00 197287

Source Index

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY 77 Massachusetts Avenue; Cambridge, Massachusetts, 02139
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03 191670

Source Index

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22 186235, 22 186333, 22 186334, 22 186335, 22 186336, 22 186337
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02A 170595, 11A 148334, 11A 148346
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00 191482
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00 191482, 00 192081, 00 192082, 00 192083, 04 192065, 16 192123, 20 190790, 21 192031, 22 185883, 26 192074, 26 192075
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09A 179345

Source Index

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00 183741, 00 183745, 00 183746, 00 183751, 00 183753, 00 183754, 00 183755, 00 183756, 00 183758, 00 183759, 00 183760, 00 183763, 00 183770, 00 183772, 00 183775, 00 183777, 00 183779, 00 183780, 00 183789, 00 183797, 00 183798, 00 183801, 00 183802, 00 183803, 00 195906, 00 195909, 00 196622, 00 196623, 00 196624, 00 196625, 00 196626, 00 196627, 00 196628, 02 183782, 17 183740, 18 196585, 18 196872, 18 196873, 20 189860, 20 189863, 20 189864, 20 189865, 24 196874, 25 196870, 25 196871, 25 196875, 25 196877

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TRANSPORTATION SYSTEMS INTERNATIONAL 175 Maple Avenue; Vienna, Virginia, 22180
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U

ULTRASYSTEMS, INCORPORATED 7926 Jones Branch Drive; McLean, Virginia, 22101
16 185817

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00 197460, 03A 165811, 04A 054561, 07A 196746, 11 186850, 11 186851, 11 197459

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10 191677, 23 190540, 23 197462

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00 191675

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ZELEZOPATEN TRANSPORT Ministry of Transport; 9-11 Levski Street; Sofia, Bulgaria
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Author and Investigator Index

The document number for each summary of ongoing research includes an *A* and is typed entirely in italics.

ABBOTT, JK
09 197422

ABBOTT, RA
01A 081797, 01 195549

ABBOTT, RK
17A 188651, 17 193773

ABE, H
10 189745

ABERLE, G
25 194138

ABLAMSKY, R
23 190540

ABUZIN, AI
06 189753

ACTON, P
23 194139

ADAMS, GG
02A 194540

ADAMSON, E
21A 138527

AGNEW, J
21 195743

AHMED, N
26A 058329

AITKEN, GJM
05 195070

AJVAZJAN, GS
01 189046

ALBACH, WC
11 190971

ALEKSEYEV, VD
03 196993

ALEXANDER, NJB
21 188757

ALEXANDRIDIS, AA
11 195087

ALICKE, G
09 189039

ALLAMAN, PM
23A 196744

ALLEN
08A 193281

ALLEN, BJ
25 189050, 25 196871

ALLEN, E
20 196114

ALLEN, G
03A 055916

ALLEN, GC
22 190887, 22 190888, 22 191465,
22 192174

ALLEN, GE
03 196981

ALLEN, PM
15 190522, 15 190959

ALLEN, WB
11 191666

ALPAUGH, R
16A 196749

ALTHAMMER, K
02 195083

AMBROSE, WG
21A 170664

AMLER, J
04 190345, 13 196382

ANAS, A
15A 192693, 15 197283

ANDERSON, DE
20A 083533, *20A 179692*

ANDERSON, DG
25A 156620

ANDERSON, GM
22 186025

ANDERSON, JE
06 190320

ANDERSON, OL
20 190790

ANDERSON, RF
22A 138378

ANDERSON, RT
12 186377, 22 186827

ANDREWS, WB
22 195096

ANTHONY, JP
22A 083506

ANUTA, PE
06 194629

ARAI, M
10 189745

ARGUELLES, J
15 186156, 15 190905

ARMSTRONG, JH
06 189060, 21 195550

ARNLUND, RC
01 192246

ARNOLD, SJ
23A 170597

ARNOLD, SN
24 195696

ARNOLD, W
20 194871

ARUTUNIAN, G
09 185481

ASHFORD, N
24 196874

ASHFORD, NJ
07 197012

ASHLEY, DB
00A 196752, 00 197460

ASKHAM, G
21 195743

ASSAD, AA
17 189818, *21A 170596*

ASSEFI, T
11 196468

ATHERTON, DL
11 190286, *11A 196738*

AUDETTE, M
11A 170593

AUER, JH
06 196379, *11A 135604*

AVETIKJAN, AA
24 194499

BALDERSTONE, RJ
21 194313

BALDWIN, ED
22A 179662

BALL, JG
09 190355

BALLINGER
00A 102894

BALZANO, M
00 189020

BALZER, LA
11 189817

BAMBERG, W
03 197453

BAMBERGER, JA
20 194124

BANGERT, RL
00A 136152, *00A 136165*

BARKER, DB
00 196623

BARKOV, NN
18 195133

BARNES, LD
12 186378

BARON, ML
00A 177845

BARON, P
16 185618

BARR, R
22 185508

BARROWS, T
11A 148347

BARSONY, SA
11A 138792

BARTHOLOW, B
11A 148334

BARTZ, WJ
16 196123

BARWELL, FT
21 195071

BASHAM, SJ
02 191535

BATCHELOR, B DEV
00 183759, 00 183760

BATDORF, SB
09 191547

B

BAECHER, GB
00 189815

BAGNAI, C
18 189789

BAILEY, AC
21 197288

BAILEY, WA
22A 138400

BAKER, WE
12 190738

BAKER, WH
00 197442

BALBACAN, IP
00 189791

Author and Investigator Index

BATEMAN, WL
22A 179658

BATTENBERGER, LB
00 196622

BAUERMEISTER, K
16 189049

BAUMEL, CP
22A 135001, 22A 153703,
22A 179683, 22A 179686,
24A 082106, 25 196870

BEACON, A
05 190307

BECHER, MC
05 194634

BECK, PE
25 196518

BECKER, K
07 190276

BEIER, FJ
20 189072

BEL'DEJ, VV
13 195124

BELL, DB
00 197414

BELL, TE
00 192083

BELLER, M
20 185629

BELYAEV, EF
11 195712

BENDER, EK
05A 157901

BENTER, WP, JR
00 195627

BERES, L
01 196389, 09 189782

BERG
08A 193282

BERGER, IM
01A 193778

BERGER, RH
00 183746

BERGLUND, MF
18 196927

BERNARD, MJ, III
16 194123, 19 194130

BERTRAM, KM
20 191870

BEST
21 192213

BETHGE, C
21A 188662

BEVANS, JP
11 196459

BEVILACQUA, OM
16 189040

BEXON, HJ
03A 050338, 03 194643

BHAGAT, N
20 185629

BIERI, P
04 196940

BINION, ML
07 189058

BINKLEY, JK
20A 196118

BINNEWIES, H
13 190334, 13 196372

BINSWANGER, M
04 195084

BIRENBAUM, L
11A 149463

BIRKMYER, AJ
00 189006

BIRNFELD, B
11 189812

BITTS, MK
11A 170621

BJAERESTEN, NA
02 195115

BLACK, J
15 190263

BLAKE, JH
13 196947

BLANC, P
01 196934

BLANCHFIELD, JR
03A 059420, 21A 160398

BLANK, W
03 189748

BLANKENHORN, PR
00 183763

BLENNEMAN, F
10 189025

BLENNEMANN, F
10 189769

BLOCH, AJ
15 193618

BLOOD, D
25A 153574

BLOOM, SG
20 191275

BOCHNER, A
17A 159631

BOEHM, G
01 189043

BOHAN, FJ
25A 059207

BOISSONNADE, P
13 195089

BOLGER, PH
09A 148320, 12A 058838

BONAVIA, MR
24 189071

BONDARENKO, EM
04 195105

BONHAM-CARTER, R
01 193745

BOON, CJ
01 196107, 11A 170593,
18A 159635

BOON, F
15 190522, 15 190959

BOONE, JW
20 188532, 22A 138481,
24A 159650, 24A 179528

BORG, IY
20 192189

BOTER, HL
12 185742

BOTWRIGHT, K
02 194508

BOUMA, JC
22A 083506, 22A 083511

BOUTANQUOI, J
23 197003

BOUTONNIER, J
00 195120

BOVA
10A 193280

BOWERS, DG
00A 185235

BOYD, JW
20 185651

BOYES, RGH
00 194865

BRABAND, LA
10A 179685

BRAEUTIGAM, R
25 196875

BRAND, D
23A 178058

BRANTMAN, R
02 196989

BRANTON, P
07 196527

BRAUN, C
16 191164

BRAUN, MJ
16 194690

BRAY, DE
09 193750

BRAY, GR
22 192170

BREAKIRON, PL
03A 148336, 03A 195918

BREUR, MWKA
06 197286

BRIDGES, S
22A 138481

BRIGGS, WR
22 186020

BRIGHAM, R
09A 196724

BRITT
21 196982

BRODOWSKI, E
13 189739

BROERSEN, PMT
02 190290

BRONITSKY, L
23A 185244

BROOK, RC
22A 196120

BROOKS, BL
22A 179663

BROOKS, WR
17A 196741, 21A 196742

BROWN, HJ
13 194654

BROWN, J
10 197007

BROWN, RE
00 196626

BROWN, RJ
09 186484

BRUCE, RN, JR
00 183775

BRUGGISSER, WL
13 196936

BRUMBERGER, NA
05 194645

BRUMMER, SB
04 192065

BRYANT, JFM
08 197278

BRYCE, JS
17A 159648, 24 195696

BRZOWSKI, A
01 190346

BUCHOLZ, KH
02 190360

BUCHUS, RC
10 191677

BUCKNER, CD
00 183999

BUCKO, NA
00 189756

BUDDE, U
01 194650

BUIKOV, VG
04 190365

BUJANOV, W
21 197014

BULLOCH, R
03A 081798

BULLOCK, RL
03A 138796

BUNKER, AR
20A 099647

BUNTING, M
11 194687

BUNTING, PM
18A 159635

BURGER, TN
22 186826

BURKE, AC
15A 188646

BURLAKOV, VA
22 185665

BURNETT, RA
22 195096

BURNETT, WC
00A 135658

BURNS, DR
01 183907, 01 189066

BURNS, JP
00 194878

BUSHMIN, AI
13 195103

BUTCH, R
23A 188660

BUTLER, GL
00A 059406, 00A 138532,
00A 196750, 00A 196751,
00A 196752, 10A 196753

BYKOV, J
06 194685

C

CABOS, HP
03 195106

CADY, PD
00 183763

CAIRE, D
03 197004

CAKEBREAD, RJ
13 194654

CAMERON, J
01A 170600

CAMPBELL, G
23A 170597

CAMPBELL, IM
18 194666

CAMPBELL, TC
20A 185240, 22 190372

CAMPOSANO, P
03 196538, 04 196368

CANIONI, J-P
01 196934

CANTILLI, EJ
12A 058838

CANTOR, T
00 195909

CANYN, V
26 190335

CAPPEL, K
02A 138469

CARBONELL ROMERO, A
15 189029

CARDANI, AA
06 196539

CARDINI, E
03 194677

CARRE, JF
01 189044

CARRIKER, AW
12A 196740

CARRIKER, W
12A 188664

CARSKADDAN, PS
00 183772

CARTER, CS
09 196980

CARTWRIGHT, DJ
09 169393

CASAVANT, KL
20A 099645, 20A 138370,
24A 179673

CASEBOURNE, M
00 197287

CASTEL, GH
15 190486

CATALANO, SB
09 191093

CATALDI, GR
01A 188648

CATON, RG
09 196980

CAUDILL, RJ
11 196467

Author and Investigator Index

CAVAGNARO, DM
10 185707, 22 185690, 22 185691

CAVAGNARO, M
04 196404

CECCON, H
01A 058458, 01A 059227,
01A 059371, 01A 099369

CECCON, HL
01 191483

CEREPASENEC, RG
02 189755

CERVINSKAJA, OP
00 189791

CHAMBERLAIN, C
17A 059062

CHAMBLISS, A
11 197459

CHAN, Y
23 195077

CHANG, EH
01 196450

CHANG, IC
01 196450

CHEANEY, ES
12 186852

CHELYSHEV, NA
09 189747

CHERCHAS, D
08A 159644

CHERNIAVSKY, EA
20 191877

CHERRY, RC
18 190909

CHESNAIS, M
24 197006

CHEUNG, THW
02 196448

CHIANG, YS
20 186407

CHIELLO, V
18 189806

CHILENSKAS, AA
04 191881

CHITWOOD, PB
12A 135594

CHIU, HK
11 196464

CHU, KH
02 183782

CIHAK, FJ
23A 185231

CIRILLO, B
06 195080

CLARK, J
20 191278

CLOUGH, GGW
00 197442

COBB, WN
10 197522

COBIA, DW
25A 156707

COGET, G
04 196537

COLAVINCENZO, O
02A 128041

COLEMAN
06A 193284, 08A 193281,
08A 193282, 08A 194539

COLEMAN, J
08 196471

COLIJN, H
22 189814

COLLEY, BE
01A 139165

COLLINS, DM
07A 148352, 17A 148350,
21A 138527, 21A 157598,
21A 170622, 21A 188662

COLLINS, RJ
01 194509

CONOVER, HH
06A 136338

COOK, J
24 193752

COOK, LM
04 191751, 04 191752, 04 191753,
04 191754

COOK, M
22A 196119

COOKE, FAF
03 197453, 11 197330

COOLEY, WL
13 195709

COOPER, HBH, JR
10 196113

COOPERRIDER, NK
02 196983

COPE, GW
03A 050338

COPELAND, CW, JR
20 186574

CORNS, JB
13 189802

COSTELLO, JM, JR
24 194855

COULTER, JS
16 194819

CRACKER, WF, JR
04A 099377, 06A 159656,
06A 159657, 21A 170620

CRAFT, WJ
02 194640

CRAIN, JL
07A 196746

CRAMER, GL
22A 179693

CRANE, CR
09 197422

CROSBY, RW
21A 170596

CROW, RT
20 185651

CROWELL, WH
15 193618, 18A 059894

CSAGOLY, P
00 183759, 00 183760, 00 183801

CUNNEY, E
01A 179328

CURL, ML
22 191465

CURMI, RA
10A 148341

CURTIS, E
23 191660

CURTIS, RD
03 194641

CZAPLINSKI, R
03 195111

D

DAHL, RP
20A 156591, 22A 179669

DALLAIRE, G
00 156837

DALLY, JW
00 196623

DALTON, PM
04 197285

DAMM, D
15 192212

DAMPIER, FW
04 192065

DANCER, DM
02A 058257, 09A 058267,
12A 138567

DANG-VAN
01 194652

DANZER, J
04 196517

DARIEN, NJ
02A 081803

DARR, DG
22 186827

DAUGHETY, AF
18A 177624, 20 189863

DAUMAS, J
21 194662

DAUPER, H
11 194657

DAVIDSON, CA
12A 135594, 12A 135596,
12 192180

DAVIDSON, N
18 192228

DAVIDSON, R
10 197007

DAVIDSON, W
21A 196742

DAVIES, GK
20 196922

DAVIS, DK
12 192168

DAVIS, RE
00A 102894

DAWKINS, RB
13 194654

DAWSON, GE
11A 196738, 11A 196739

DAWSON, WR
04 197285

DE BENEDET, D
02A 058263, 02A 138469

DE BRUYNE, P
04 194671

DE PATER, AD
02 190296

DEAN, FE
01 194497

DECKER, HD
13 191730

DECLAIRE
21 196982

DEGENKOLB, OH
00 183777

DEGENNARO, RE
13A 179334

DELANEY, RV
24 194853

DELAVERGNE, R
06 189000

DELONG, CP
13 195709

DELOUSY, C
03A 188657, 23A 099391

DEMETSKY, MJ
23A 058757

DEMORO, HE
12 195677

DENEUBOURG, JL
15 190522, 15 190959

DENNIS, AW
12 179826

DEPALMA, A
15 190522, 15 190959

DEPPISCH, G
04 195085

DERUCHER, KN
00 188833

DESAL, SA
20 188532, 22 190912

DESCAMPS, G
06 195117

DESSENS, F
21A 157598

DESTESE, JG
20A 136085, 20 188532,
20 194124, 22 190884

DEVOE, DB
07A 049659

DHAR, CL
02 183782

DI MASI, FP
02 196524, 03A 170608

DIEFENHARDT, P
03 196943

DILON, R
01A 170600

DINES, KA
00 192188

DITMEYER, SR
24A 159650

DMITRIER, VA
13 190368

DODDS, DJ
00 196628

DOEHER, LW
12 191469

DONELAN, JF
25 194639

DONNELLY, R
15 186156, 15 190905

DONNELLY, WJ
02 194647

DOOLEY, DM
20 190768

DOOLEY, IM
03 194646

DOOLEY, T
11 196456

DOREAU, R
02 194880

DORLAND, WD
02 196378

DORNBUSCH, DM
15 190906

DOTY, HO
22A 099642

DOUGAN, CE
00A 185235

DOVEY, RF
22 196528

DOWDING, CH
00 190056

DOWELL, EH
11 195087

DOWNEY, PJ
03 197441

DOYLE, GR, JR
03 194642

DRAFFIN, C
20 188532

DREIMANN, K
04 194655

DREISSEL, E
18 194675

DRENNAN, M
16 192123

DREW, JN
24 194879

DRINKA, TP
25 196870

DUDZINSKI, J
01 196396

DUECK, GE
04 190278

DUFFEK, W
11 190281

DUMAS, J
23A 196744

DUNBAR, F
11 194658, 15A 188656,
23A 185243

DUNFORD, JE
25 189798

DUNLAP, E
00 185578

DUNPHY, R
15A 129701

DUPREE, SA
22 190887, 22 190888, 22 192174

DUPUY, J
13 189068

Author and Investigator Index

DURHAM, LA, JR
01 193748
DYETT, MV
15 190486, 15 190906, 15 190970,
15 191029
DYSKO, A
01 195109
DZIEKAN, MW
00 197460

E

EALY, C
00 185258
EASTER, KW
22A 179669, 22A 179674
EASTHAM, AR
11A 170593, 11 190286,
11A 196738, 11A 196739
EASTMAN, S
20 188532
EASTWOOD, JC
04 190396
EAVES, JL
00 183803
EBERLEIN, D
11 190330
EBIHARA, K
23 189785
ECHENIQUE, MH
25 189797
ECKHARDT, H
00 189776
EDESKUTY, FJ
12 191914
EDLING, DA
22 186466
EDSON, WD
21A 159653
EDWARDS, EF
22 190371
EGGLETON, PL
16A 196743
EGLE, DM
09 193750
EHRENBECK, R
02A 058465
EINSTEIN, HH
00A 179332, 00 189815,
00 196624
EISENHAURE, D
04 193775
EISENMANN, J
01 189026
EL-AINI, YM
01 189010
ELA, RE
20 189805
ELAM, J
22 185508
ELDER, HK
12 195097
ELIAS, SEG
11A 058375
ELIASOVA, J
24 189030
ELKHEIM, D
01A 188648
ELKINS, JA
02 190300
ELLERT, JC
18A 159635
ELLIS, RH
23 195077
ELMARAGHY, WH
03 194643
ELMS, CP
03 197453, 11 197330
ELWOOD, JH
10 192346
EMMETT, RC
26 190327

ENDECOTT, BR
09 197422
ENDO, K
00 189764
ENGEL, PK
10 193764
ENGEL, RL
22 195096
ENGELMEN, P
20 190768
ENGLISH, GW
08A 159644, 21 195073
ENGLISH, JM
18 185810, 18 185811
ENSELEIT, E
08 195141
ENSER, H
06 189741
EPHRAIM, M, JR
04 190306
ERADZE, DG
01 189046
ERICSSON, AM
12 192294
ERIEAU, J
01 194637
ERNST, A
13 196995
ERSKOV, OP
02 195123
ESHELMAN, L
18 196455
ESVELD, C
01 053318
EVANS, AR
20 191159
EVANS, FE, JR
20 186574
EVANS, RA
03A 081787
EVEILLEAU, R
22 197276

F

FADDICK, RR
00 197445, 00 197446
FAIR, ML
25 196112
FAJANS, MH
15 190906, 15 191029
FALCKE, CO
15 190485, 15 190968, 15 191033,
15 191659
FAN, H
23 191758
FAN, HSL
15 197485
FARLEY, P
03 196376
FARLEY, PG
09 190356
FASTENRATH, F
01 189015
FASTYKOVSKII, AR
09 189747
FEIST, WC
09A 136093, 09 190664
FELDHAUS, LB
16 196516
FELS, MF
16 189811
FELTON, JR
18 196109
FERGUSON, J
05A 159634
FERREIRA, IW
03 194646
FERRELL, GC
20 191181
FERRERA-BOZA, RA
00 191405

FERTEL, AI
16 194498
FEWS, JH
06 189807
FIELDS, JM
10 189743, 10 189744
FIELDS, SR
02 191290, 02 191481
FILONOV, SP
04 190364
FINDLEY, LB
20 185890
FINITZKIJ, S
01 189045
FINLAY, P
21 186994
FINZI, L
00 183789
FINZI, V
13 189021
FISCHER, HJ
03 195106
FISCHER, R
09 185793
FISH, R
11 190280
FISHER, JW
00 183753
FLASSIG, A
02 189063
FLAUW, J
21 189752
FLEMING, LD
09 196452
FLEMING, TF, JR
07 189058
FOLEY, JT
12A 130946, 12A 135594,
12A 135596, 12 192180
FOLEY, JT, JR
12 179826
FONDAHL, JW
00 195078
FORTIN, JP
01 189758
FOSTER, EL
00 197344
FOUNTAIN, JB
22A 099624, 22A 196121
FOURNEY, WL
00 196623
FRANKLIN, AL
20 194124
FRANZ, PM
03 194646
FRAREY, JL
02A 058465, 03 196984
FRECH, W
04 196942
FREDRICKSON, V
17A 196741
FREDMAN, JM
22 190887, 22 190888, 22 191465,
22 192174
FREEMAN, JM
12A 193283
FREITAG, DB
06 196380
FRENCH, PW
17A 159625, 17A 159628,
21A 159624, 21A 159626,
21A 159627, 24A 159629
FRERK, HW
04 195088, 10 195095
FRIANT, JE
00 190271
FRICK, SW
20 189072
FRICKE, H
11 194657

FRIEDLAENDER, AF
18A 193786, 25A 058753,
25 197335
FRILEY, JR
12 192168
FRONTCZAK, F
13 195108
FRUH, EG
10 196113
FRUIN, J
11A 170589
FRUIN, JE
22A 179669
FRULLINI, R
02 195143
FRYE, HT
15 197340
FUKUOKA, K
17 190272
FULLER, D
20 188532
FULLER, RV
18 196585
FULLER, SW
20A 179664, 22A 179690,
22A 196119

G

GAISER, JA
03 194643
GALE, K
09 189034
GALEV, NP
04 195105
GALIHAR, RD
03A 148336
GARANDEL, F
21 194662
GARG, DP
11A 156700
GARG, VK
01A 099393, 01A 099394,
01A 099396, 02A 099390,
02 183782, 02 189062, 02 190333,
02 196447, 02 196448, 02 196451,
02 196454, 03 189064, 03 189065
GARNIER, JP
04 196394, 04 196940
GARRARD, WL
11 194659, 11 196457, 11 196520
GARRETT, MF
03 193761
GARRETT, V
10A 196753
GASCH, R
02 190292
GAUTHIER, W
22A 179682
GAY, WF
12A 148348
GEFFEN, CA
12 192168, 12 195098
GEIMER, RL
01A 138568
GELB, PM
15 197340
GELBSTEIN, E
06A 170631, 06A 170650,
12A 170651
GENCE, P
01 194652, 09 194495
GERALD, JO
20A 099646
GERBER, M
04 190338
GERHART, GR
09 185481
GHABOUSSI, J
00 197418
GIBBS, AG
24 194144

Author and Investigator Index

GIBSON, P
24 193751
GILES, PB
25 191361
GILES, R
11 190284
GILLENWATER, HB
22A 195928
GILMOUR, P
18 195722
GILROY, J
23 197462
GIOVACHINI, JL
11 195091
GIOVANARDI, G
04 195137
GIROUD, JP
00 189759
GJOVIK, LR
09A 136093
GLERUM, A
00 197279
GLOVER, F
22 185508
GLUECK, H
02 190336
GNAM, PR
17A 196731
GOBLE, GG
00 183798
GODFREY, KA, JR
00 188990
GODFREY, WL
22 186827
GOEPFERT, E
13 194505
GOETTLE, EJ, IV
20 186383
GOFF, JW
22A 083516
GOHMANN, JW
24 196362
GOLDSBY, EF
00 197280
GOODPASTURE, DW
00 183770
GORDIENKO, AA
00 189790
GORDON, IR
17 197289
GORDON, RL
20 186689
GORDON, S
00 183746
GORDON, TS
03A 188652, 10A 188647
GORI, S
21 196381
GORSUCH, L
20A 055810
GOSTLING, RJ
02 190300
GOTSKALO, BL
04 193763
GOULSTON, CL
22A 099639
GRAEBNER, LS
23 191660, 25 191361
GRAF, CR
12 190881
GRAINGER, GR
25A 160045
GRAJNERT, J
13 189017
GRAY, D
17A 160402
GRAY, R
24 196985
GREEK, BF
20 196424

GREENE, R
20 188532
GREIF, R
02 196989
GRENEKER, EF
00 183803
GRESCHKE, KH
04 189024
GRIES, JP
20 194663
GRIFFIN, MJ
07 195090
GRIFFITH, J
00 185578
GRINNDAL, L
21 189766
GROS, E
10 190273
GROSS, A
01A 188649, 01A 188650,
02A 058263
GROSS, K
10 189769
GROTH, RH
10 192346
GRUSS, W
12 190268
GUANDOLO, J
25 196112
GUARINO, M, JR
04A 058270, 11A 058273,
11A 149463, 13A 170609
GUCKO, VA
00 189775
GUELDPENNING, AUW
04 195132
GUILBERT, EA
17A 188645
GUILFOY, RF, JR
03A 179689
GUILLAUMIN, J-C
03 194644
GUNWALDSEN, D
20 185629, 20 193765
GUSEMAN, PK
23 197455
GUSSMAN, V
15 190485, 15 191033
GUTHRIE, JL
09 196980

H

HAAIJER, G
00 183772
HAAN, FJ DE
04 196998
HAAS, H
04 196941
HABERCOM, GE, JR
00 185674, 00 185675, 00 185677,
04 185714, 04 185715, 06 185686,
09 191957, 11 191958, 11 191959,
11 191960
HABERT, J
00 195120
HABIB, P
23 190540
HACAR RODRIGUEZ, F
10 197018
HADDEN, JA
02 191535
HADEN, RB
12A 188661
HAEBNER, LE
15 185781
HAFTER, GH
04 196929
HAIBACH, E
09 185796
HAINES, AF
16 189014

HAINES, GA
11A 159659
HAKAMADA, T
04 196461
HALL, HH
22A 179660
HALL, KG
09 190356
HALL, VW
11 190971
HALL, WB
20 189805
HALLAUER, WLJ
09 190741
HALLER, TR
11 196399
HAMILTON, AB
02A 170663
HAMILTON, JS
20 191279
HAMM, W
25 194138
HAMPTON, D
00A 188671
HANEKAMP, WJ
22A 179699
HANEL, JJ
10 195707
HANKE, M
03 196406
HANKS, WG
01A 148355
HANNA, AN
01A 170607
HANOCQ, R
04 196929
HANSEN, JT
13 189739
HANSEN, TB
11 197367
HANSON, NW
00 183758
HANSON, RE
16 194819
HAQUE, I
02 196983
HARADA, Y
00 196933
HARBINSON, H
24 189788
HARDESTY, F
22A 138481
HARE
00A 102894
HARMAN, JE
18A 193780, 20 189865
HARMATUCK, DJ
20 189073
HARRIS, ND
22 196528
HARRIS, RG
18 196873
HARRISON, EA
07 191932
HARSTON, C
22A 196119
HARTIGAN, M
21A 196742
HARTIKAINEN, J
00 189767
HARTKOPF, G
10 196387
HARTLEY, PM
24 189799
HARTMAN, WF
12A 130946, 12 179826
HARTMANN, PW
02 196447, 02 196454
HARTMARK, H
00 190361

HASAN, SE
26 192074
HASSLER, FL
15 194862, 20 194857, 20 194858,
24 194861
HATFIELD, NJ
23 197455
HATTON, TT
22A 138368
HAUCK, G
10 189773
HAUN, HG
03 196406
HAUNOLD, F
01 189012
HAUSAMMAN, H
00 183753
HAUSCHILD, W
02 190292
HAUSLER, U
25 196976
HAVENS, JH
00 183756
HAWKES, DL
11 197358
HAWTHORNE, KL
01A 081797, 02A 058257,
02A 081796, 02A 081799,
02A 081803, 02A 081805,
02A 170661, 02A 170663,
02A 170666, 02A 188663,
03A 081798, 03A 081800,
03A 081801, 03A 170665,
05A 081802, 07A 170662,
12A 099392, 21A 170664
HAYASHI, Y
06 195719
HAZARD, HR
20 191275
HAZEL, ME
02 186848
HEACOCK, RH
20 190208
HEATON, C
23A 178058
HEATON, MW
06 196948
HEAVER, TD
25 193757
HEDRICK, JK
02 190304, 03A 170617,
11A 148347
HEIL, R
00A 153558
HEILMAN, H
02 196990, 02 196991
HEIMERL, G
20 194871
HEINS, CP
00 188833
HEISKELL, MM
22 186389
HEISS, P
09 189035
HELLER, G
05 197015
HELMS, H
02 190295
HENDRICKSON, PL
20 194124
HENDRON, AJ, JR
00 197418
HENN, W
02 190357
HERON, D
02 189063
HERR, JC
07 190283
HERR, LA
00 183802

Author and Investigator Index

HERSHKOWITZ, H
04 197273
HETTENA, R
20 188532
HEUER
21 196982
HEWITT, BE
00 183759, 00 183760
HIGGINS, T
23 191660
HIGTON, JA
03 197010
HILL, LD
22A 153674, 22A 179663
HILL, RJ
06 189772
HILL, SG
20 189052
HILTON, ML
20 191160, 20 191872
HINSCH, RT
22A 138375
HINTERKEUSER, EG
10 191428, 10 191429, 10 191431
HIROTA, Y
03 190314, 03 195686
HIRT, MA
00 183751
HITZ, JS
08 191455
HOCHSTRASSER, C
06 195117
HOEL, LA
23A 058757
HOESS, JA
12 186852
HOFFMAN, L
22A 153674
HOFMANN, G
13 195711
HOKE, KE
22A 195927
HOLLINGBERG, PL
07 197009
HOLLOWAY, C
24 189033
HOLMES, PF
13 196946
HOLMES, SR
18 186641
HOLOWKA, M
00 183760
HOLT, R
01A 196737
HOLZINGER, R
21 197000
HOOD
21 196982
HOPE, R
20 189781
HOPKINS, DR
22 186466
HOPKINS, JB
08A 049658, 16A 148321
HOPPE, F
00A 188670
HOPPE, S
03A 170638, 03A 170647,
06A 170635
HOPWOOD, T
00 183756
HORIYAMA, A
11 194679
HOROSZKO, E
01 196521
HORVATH, K
02 190289
HOSTETTLER, F
09A 179345
HOUSER, FN
03 196540, 17 193722, 26A 058329

HOVEY, RM
22A 196121
HOWARD, D
23 194143
HOWE, JP
01A 179687
HOYLER, RC
11A 059924, 11A 159660,
11A 170621
HSIONG, W
00 183754
HUANG, EY
00 193886
HUB, KA
20 191159
HUBER, M
13 194874
HUDGENS, RD
16 196516
HUEBNER, H
03 194660
HUET, J
06 189000
HUIE, JS
00A 135514
HULDT, A
21 196373
HULME, WN
13A 179334
HUME, HR
26 192074
HUNT, HW
00 183797
HUNT, M
00 194141, 00 194142
HUNTER, L
16 194819
HUSS, MF
10 191440
HUSSAIN, SMA
02 189800
HUTCHINSON, BG
15 190263
HUTCHINSON, TQ
20A 099646
HUTTON, TM
23 190265
HWANG, MJ
20A 185240
HYMSON, EB
20 189864
HYNES, JP
21 196364

I

IFFLAND, JSB
00 196627
IHARA, H
17 190272
IJIMA, K
09 196536
ILLINGWORTH, R
02 190294
IMPERIAL, JF
22 186247
INABA, FS
20 189863
INGLES, OG
00 190266
INTERRANTE, CG
09A 058267
ISACOWITZ, DA
24 196930
ISAEV, KS
01 195679
IVANAUSKAS, J
03 189810
IZUMI, G
11A 159659, 11A 160276,
11A 170589

J

JACKSON, D
22 195102
JACKSON, E
22 186235, 22 186333, 22 186334,
22 186335, 22 186336, 22 186337
JACKSON, EA
16 190354
JACKSON, KL
03A 188657, 03 194646
JACOBS, PA
17A 179340
JACOBSON, ID
07 189809
JACQUES, RB
22 190325
JAECKLIN, AA
04 194671
JAKOBI, F
01 196401
JALOCHA-KOCH, H
22 189038
JANIN, G
01 189042
JANSEN, G
10 190273
JANSSEN, RJ
03 196405
JASPER, N
18A 059897
JAWORSKI, R
01 196397
JAYAWANT, BV
11 190279
JEBRAM, W
06 194503
JEFFERSON, RM
12A 193283
JELAVICH, MS
20 189860
JENSEN, HR
22A 179674
JENTSCH, W
06 194681
JINES, RH
12 190536
JOHNSON, BR
09A 136093
JOHNSON, JB
00 197414
JOHNSON, JF
12 192168, 12 195098
JOHNSON, JH
04 194816, 10 190350
JOHNSON, LD
00 185258
JOHNSON, MA
20A 179665, 22A 179684
JOHNSTON, AR
11 196468
JOHNSTONE, B
03A 170608
JOHNSTONE, T
11A 059365
JOINER, D
21A 157598
JOINER, TJ
20 186574
JONASH, RS
15 191362, 25 191361
JONES, BF
22A 083483
JONES, C
23 190540
JONES, JR
22A 153666, 22A 179698
JONES, JS
00 196626
JONES, PS
24A 170612

JORGENSEN, JL
17 194689
JOY, DS
22 186389
JOYCE, J
23 197011
JUDD, WR
26 192074
JUDOV, AZ
16 189768
JULIAN, EL
20 186689
JULIAN, LC
20 186689
JUNG, V
11 191913
JUSTER, RD
24 196985
JUTARD, M
02A 170657, 03A 170639,
13A 170653
JUTIER, J
05 197008
JUTTE, H
02A 170644, 03A 170654,
03A 172456

K

KAAR, PH
00 183775
KACENBOGEN, RA
00 190348
KACHADOURIAN, G
02 194877
KAGAMI, M
01 195688
KAHN, D
12 194859, 12 194860, 12 194863
KAHRS, C
02 196990, 02 196991
KAISER, R
09A 179346
KAISER, WD
01A 038974, 01 194632
KALDOR, DR
22A 179694
KALKBRENNER, E
03 194673
KALKER, J
02 190349
KALRA, PS
06 196714
KAMALIAN, N
04A 179335, 11A 160399
KAMINARIDES, J
25A 185242
KANEDA, H
04 188997
KANGAS, R
07A 196747
KAPER, HP
13 189777
KARL, W
06 194688
KARLSRUD, K
00 195721
KARNEY, D
17 185591
KARWALA, K
09 189001
KATZ, JS
24 196930
KATZ, RM
11A 148334, 11A 196738
KAWAMATA, J
00 196933
KEALE, MJ
24 196930
KEANE, MJ
04 196522

Author and Investigator Index

KEELY, RB
 22 186827
KEEN, PA
 23 195678
KEENAN, B
 20 191474
KENNA, J
 22 186235, 22 186333, 22 186334,
 22 186335, 22 186336, 22 186337
KENNEDY, JC
 01 192246
KENNEDY, WD
 10A 188673
KENTON, E
 23 191936, 26 191943, 26 191952
KENWORTHY, M
 01A 188649
KERR, AD
 01A 179337
KERR, CN
 18A 159635
KERRINGAN, J
 11 191666
KEZIS, AS
 22A 179670
KHATRI, NJ
 10 190350
KHER, R
 20A 164822
KIEPFER, HH
 02 195082
KIGAWA, T
 09 196536
KIK, W
 02 190292
KILMER, RD
 10A 179325, 10 186613
KILSHAW, NC
 03 194668
KIMURA, K
 04 196460
KINDYA, WG
 03A 179688, 03A 195918
KING, C
 00 197287
KING, J
 11 197367
KIPP, RM
 03A 046502, 03 193767
KIRSTEN, FA
 17 193773
KISH, AE
 01 194497
KISHIMOTO, T
 06 190316
KITAYAMA, T
 04 188997
KLAAS, EE
 10A 179685
KLINE, DE
 00 183763
KLINGER, FL
 20 195104
KLINGMAN, D
 17 185591, 22 185508
KLOSS
 21 196982
KLOSS, G
 04 190351
KLOTZINGER, E
 01 189758
KLUGAR, K
 01 194648
KLUK
 21 196982
KNAPP, P
 04 196939
KNEAFSEY, JT
 18 186406, 22 186405
KNEETER, C
 00 195909
KNIGHT, CG
 20 185916, 20 185917
KNOBLAUCH, K
 08 197314
KNOTHE, K
 02 190292
KOC, W
 01 190346
KOCH, VR
 04 192065
KOHAMA, Y
 22 190270
KOISS, I
 00 189787
KOJIMA, S
 06 196525
KOLOTIJ, AI
 16 195135
KONING, JW, JR
 09A 179691
KOO, WW
 20A 179667
KOOL, KL
 16 193758
KOONCE, BL
 11 190971
KOPEC, B
 09 196375
KOPER, JM
 02A 170594, 02A 170595,
 04A 196748, 17A 188651
KOPYLOV, IP
 11 195712
KORDI, I
 16 194868
KORETZKY, HP
 00 183745
KORNHAUSER, AL
 11 196467
KORTUEM, W
 11 190281
KOSAREV, YA
 22 185665
KOSHAL, RK
 16 193758
KOSTRO, J
 02 189018
KOTEL'NIKOV, AV
 13 196392
KOTTENHAHN, V
 13 194672, 13 194874
KOYAMA, S
 16 190353
KOYANAGI, S
 02 190297
KOZIOL, JS, JR
 08 196471
KOZLOV, VE
 24 196977
KRAFT, K-H
 11 196390
KRAMERS, M
 00 195075
KRASKA, IR
 03 195099
KRAUTER, AI
 01A 185232
KREITNER, JD
 20 190768
KRETTEK, O
 02 190298, 03 189813
KREYLING, EG, JR
 18 195552
KRICK, RL
 01A 138562, 01A 138563,
 01A 138564
KRISHNAMOORTHY, G
 00 183779
KRIZEK, RJ
 00 193486
KRUGER, JA
 24 196985
KRUMMES, DC
 26 192099
KUBO, Y
 17 190272
KUHLBAUER, S
 01 194674
KUHLTHAU, AR
 07 189809
KUHN, H
 06 195142
KULESZ, JJ
 12 190738
KULIKOWSKI, H
 09 189001
KUNZ, EL
 03 189070, 03 194636
KURAMOTO, T
 00 190347
KUROSAWA, H
 17 193759
KUROYANAGI, K
 09 196536
KURZMANN, E
 00 195727
KURZWEIL, LG
 10A 058675, 10A 188647,
 10A 188654, 10A 188655,
 10 197435, 10 197522
KUSAMA, H
 00 196932
KUZMYAK, R
 23A 185244
KYDES, AS
 20 191877

L
LABELLE, SJ
 16 194123
LABRECHE, DA
 00 189815
LACHAPELLE, ER
 00 197414
LADD, GW
 22A 179694
LAFLEUR, P
 20 195708
LAGE, HH
 03A 170641, 03A 170646
LAGER, DL
 00 192188
LAGO, AM
 00 196622
LAHS, W
 02A 157664
LAI, JY
 11 196468
LAINE, EF
 00 192188
LAKE, RW
 01A 148355, 01 196107,
 11A 170593, 18A 159635,
 18 196374
LAMBERTON, CE
 15A 179672
LAMBIN, E
 05 195713
LAMKIN, JT
 22A 156972
LAMOND, J
 00A 179327, 00A 188669
LAMPROS, AF
 03A 160405
LANDES, W
 06 189048
LANDSDOWN, A
 21A 196725
LANG, M
 03A 170643
LANG, RP
 06 196380
LANGLEY, CJ, JR
 18 196101, 18 196872
LANZARA, G
 23 196469
LANZAVECCHIA, L
 04 190332
LARSEN, K
 01A 188648
LARSON, DW
 12 179826, 20A 179666,
 22A 138365
LARSSON, NO
 00 197290
LARSSON, U
 21 196373
LATIMER, RR
 24 195551
LAURENCEAU, JN
 13 188999
LAUTKASKI, R
 12 192391
LAVE, CA
 16 189011
LAW, CE
 17A 159648
LAW, EH
 02 196983
LAWLER, JD
 18A 129724, 18A 129729,
 18A 138514
LAWLER, KA
 16 194504
LAWNICZAK, M
 01 196396
LAWSON, LJ
 04 190277, 04 191751, 04 191752,
 04 191753, 04 191754
LAYFIELD, P
 00 197287
LEAKE, GR
 23 194140, 23 194867
LEE, HS
 02A 148358
LEE, PYN
 10 191435
LEE, RB
 11 190993
LEE, SL
 00 183780
LEE, T
 22A 179699
LEECH, DJ
 21 195071
LEESCH, JG
 22A 195928
LEHR, M
 23A 188660
LEIGH, C
 00 194145
LEIS, RD
 11 197362, 11 197363, 11 197364
LEON, GB
 05 194645
LEPICH, S
 06 189754
LERMAN, S
 17A 192818
LERMAN, SR
 15 192212, 18 186406
LERNER-LAMM, E
 15 192212
LEVI, E
 11A 058273, 11A 149463
LEVINE, D
 03A 099439, 03A 138565,
 07A 049659, 08A 049658,
 12A 099389
LEVINSON, HS
 23 197440, 25 191689

Author and Investigator Index

LEVITT, RE
00A 196752, 00 197460
LEWIS, LR
22 174305
LIANG, RT
01A 059295
LIBA, CJ
24 196930
LIBBY, JR
00 183779
LIFSON, MW
18 185810, 18 185811
LIMPert, SB
03A 185234
LIND, EF
02A 099390, 24 196104
LINDQVIST, B
02 195116
LINDSAY, RW
00 197414
LINEV, SA
01 196400
LINHARES, AB
15A 188646
LINSENMEYER, D
22A 179695
LINZER, E
23 190540
LIPMAN
21 196982
LIPPEK, HE
20 188532, 20 194124
LIPTON, WJ
22A 138375
LIST, HA
03A 050338
LIU, TC
00 191772
LOBANOVA, LS
04 195105
LOCKHART, M
17A 159648
LOCKLIN, DW
20 191275
LOCKWOOD, M
04 193768
LOGCHER, RD
00A 196752, 00 197460
LOSCUTOFF, WV
20 194124
LOTZ, R
10 197435
LOVE, RB
02 189800
LOW, EM
02 189062, 02 196451
LOWE, TJ
22 196473
LUCAS, JR
03 196981
LUCCIONI, X
24 189031
LUEDER, H
22 196395
LUKASIEWICZ, J
24 196531
LUNA, RE
10 186805, 22 186392
LUNDBERG, AS
16 196979
LUNDGREN, JR
01A 170783
LUNDIEN, JR
00 186243
LURE, MV
22 195714
LUSK, EC
22 186827
LUTES, GS
18A 193780, 24A 193779

LUTZ, C
20A 129727
LYTLE, RJ
00 192188

M

MABBITT, PT
12 189770
MACDONALD, JA
18 196374
MACIE, TW
13A 170609
MACKAY, WBF
01A 170600
MACKINNON, D
11A 159662
MACPHERSON, HH
00 190212
MADDOX, SR, JR
00 195548
MAEDA, Y
00 183755
MAFFEI, G
04 196367
MAGNANTI, TL
21A 170596
MAGNUSON, CF
02A 157664, 02A 179333
MAIER, A
04 194500
MAINO, R
09 193747
MAIO, DJ
16 197342, 20A 188659
MAJTENYI, SI
00 190056
MAJUMDAR, J
18 189796
MAKI, H
11 194679
MALINA, I
24 195126
MALONE, F
21 194133, 22 195062, 24 193756,
24 196358
MALTBY, D
16 194504
MAMOSHIN, RR
13 195103
MANCILL, RT, JR
00 188833
MANHEIM, ML
18A 193784
MANKAMO, T
12 192391
MANLOW, TV
00 188993
MANNELO, T
07A 148352
MANOS, WP
02A 188663
MANULA, CB
20 185916, 20 185917
MANZINI, V
06 195080
MARCIN, TC
20A 138367
MARGRAVE, JL
09A 148320
MARKHAM
21 196982
MARKOVIN, AP
22 185665
MARKOW, MJ
00 189815, 00 192081, 00 192082,
00 192083
MARKOWSKI, R
06 194502
MARQUES, M
00 191675

MARSDEN, MB
12 194337
MARSH, GL
07 190283
MARSHALL, JJ
05 190307
MARTENS, DG
22A 099636
MARTIN MARTIN, J
05 194511
MARTIN, D
00 195145
MARTIN, GC
01 196450, 02 196447, 02 196448,
02 196449
MARTIN, JW
00 197445, 00 197446
MARTIN, MV
24 196103
MARTINEK, K
00 194667
MARTLAND, CD
21A 185236, 24 196985
MARVIN, R
03A 050338
MASER, K
00A 179329
MASI, E
04 194875
MASON, D
00 190267
MASUKO, Y
06 196525
MATHER, B
09A 135495
MATICHUK, D
09 191093
MATSUHASHI, T
04 196384
MATSUHISA, H
10 195717
MATSUI, N
02 190288
MATSUO, S
00 189764
MATZZIE, DE
20 189865
MAY, GW
02A 179333
MAYNORD, ST
00 186293
MAZZONE, R
21 194686
MCCARL, BA
20A 196118
MCCAUL, C
00 188993
MCCLAREN, W
02A 196722, 08A 196720
MCCLURE, JD
12A 130946, 12A 135594,
12 192180
MCCONNELL, DP
01A 139163, 01A 185233
MCCOWN, RJ
10A 179325
MCDERMOTT, RJ
00 185286
MCDONALD, G
12A 148348
MCDONALD, JE
00 191772
MCDONALD, R
00 197344
MCFADDEN, D
15A 179338
MCFARLAND, WF
18 186641
MCGEAN, TJ
03 197453, 11 197330

MCGEE, HW
08 193730
MCGEE, MC
00 183803
MCGINLEY, PJ
24 196542
MCGOVERN, WR
02A 081805
MCGUIRE, T
21A 138527
MCILROY, P
00 197287
MCINERNEY, T
07A 196747
MCKENNA, D
24 189760
MCNEAL, C
04 197438
MC SHANE, WR
10 191406, 10 191407, 10 191440,
15 193618, 23 197462
MEACHAM, HC
01A 185233
MECH, SJ
02 191290, 02 191481
MEGYERI, J
02 190358
MEISSNER, H
00 189776
MEISSNER, K
09 189780
MELAMUT, DL
00 196470
MENAKER, PJ
23 197462
MENGERT, PH
08 196471
MENSAH-DWUMAH, F
00 197442
MENTE, LJ
01A 188667
MERCHANT, JP
15 190487, 15 190582, 15 191033
MERLINI, RJ
22 186020
MERRICK, F
18 192228
MERRITT, HW
11 197330
METZLER, JM
03 195129
MEYER, E
13 189041
MEYER, LE
09 197421
MICHAELS, L
24 196985
MICHELS, W
01 194650
MIKHAILOV, VM
22 195714
MIKSAD, RW
10 196113
MILES, C
20 188532
MILLAR, M
16 194123, 19 194130
MILLER-CRANKO, G
12 196383
MILLER, CJ
07A 170662
MILLER, JJ
25 196870
MILLER, JT
06 190309
MILLER, TC
15A 179338
MILLS, RR
00A 135516, 00A 135518
MILNER, JL
11A 148346

Author and Investigator Index

MILNOR, RC
06 195720
MILOJEVIC, AV
03 197017
MINDE, G
00 196402
MINGER, WK
21A 159653
MINKES, S
03A 170630, 03A 170658,
03A 170659
MINKUS, D
15 197340
MIRABELLA, J
02 196989
MIRCEV, M
03 196393
MIRSCHING, G
18 195140
MISCHLER, WR
11 196399
MISHLER, HW
00A 138477
MISNER, GR
05A 081802
MITCHELL, M
23A 156666, 23A 156668,
23A 170626, 24A 156651,
25A 156676
MIYA, H
04 196461
MIYAGUCHI, K
00 195684
MIYAMOTO, K
22 190270
MOAVENZADEH, F
00 192081, 00 192082
MOCALOV, VA
01 195130
MODRANSKY, J
02 194647
MOEN, R
21 195113
MONTEATH, IG
16 194504
MONTFORT, JG
22 190325
MOODY, HG
01A 038973
MOON, FC
11 195087
MOORE, AD
08 195680
MORA, J
03A 138537, 03A 165811,
04A 054561, 07A 196746
MORELLA, NA
02 189801, 03A 081786, 09- 193747
MOREY, J
21A 188662
MORGAN, PH
11 193901
MORINO, A
00 190341
MORLEY, GR
16 189014
MOROZ, VI
04 193763
MORRIS, DW
20 194127
MORRIS, RE
03A 165811
MORRISON, WR
22A 179661
MORROW, D
02A 160409
MOSER, DE
20A 138364, 20A 156604,
20A 179671, 20A 179679
MOSER, R
04 190344

MOSES, LN
25A 128852
MOSYAGIN, KG
05 195100
MOULD, JC
01A 179330
MOYER, JW
22 186800
MRAZ, EA
09 190664
MUEHLKE, RV
17A 159625, 17A 159628,
21A 159624, 21A 159626,
21A 159627, 24A 159629
MUELLER, S
11 196366
MUHLENBERG, JD
02A 170595
MUKASA, Y
23 195685
MULLEN, DR
17 193773
MULLENS, MA
17 197510
MULLER, L
00 194137
MULRENAN, CF
08 194852
MUNDO, J
00A 196750
MUNDY, JR
22 196528
MURATA, I
22 190270
MURPHY, RD
20A 129727
MURRAY, FX
20 196116
MUSAKA, Y
09 196388
MUSHAL, FC
22 186247
MUTO, R
13 195687
MYERS, B
11A 196716
MYERS, ET
00 189067
MYERS, MG
00 196622

N

NAGAMORI, N
22 190270
NAKASHIMA, H
11 196532
NARAHARA, T
04 196461
NASON, R
23 190540
NAUCHI, T
06 195719
NAUE, KH
01 196401
NAUMOV, AV
13 196392
NECK, H
20 191275
NEDDERMAN, RM
22 193760
NEDJALKOV, G
03 196393
NEHRING, R
20 186684
NELSON, JC
25 193757
NELSON, M
23A 178058
NELSON, PA
04 191881

NELSON, RN
00A 185230
NESTEROV, NG
04 195125
NEVEUX, Y
04 196940
NEWBOURNE, MJ
20 189803
NICARICO, TJ
11 193900
NICHOLAS, CJ
22A 138400
NICKLES, JE
01A 059681, 01A 193778
NICOLAS, C
03 190285
NIELSEN, G
20 195710
NILSON, AH
09 193769
NIMITYONGSKUL, P
00 183780
NISHIMURA, M
17 193759
NISONGER, RL
11 196466
NOEDING, M
13 195086
NONOUE, T
22 190270
NORRIS
00A 135658
NOUVION, FF
02 194630
NOVAK, SP
02 194647
NUPP, B
20A 153650, 20A 185240,
24A 170612, 25A 058753,
25A 099365, 25 196877
NYQUIST
21 196982

O

O'BRIEN, T
03A 025403, 03A 136342,
03A 138539
O'BRIEN, TO
11 197367
O'DEA, S
04 193775
O'NEAL, AD
25 195064
O'NEIL, EF
00 191772
O'REGAN, HJ
22 190262
O'REILLY, MP
00 194136
O'REILLY, P
00 188994
O'STEEN, JK
03A 099439
O'SULLIVAN, WB
01A 038974, 01A 139165
OBERBECK, G
04 193775
OBEROSLER, T
21 194683
OEHRMAN, RL
22A 179697
OHBA, Y
04 190315
OHORI, Y
04 196370
OKADA, K
00 196933
OKADA, N
03 189794
OKAMOTO, K
04 196370

OLIVER, DC
25 189051
OLSON, CL
11 186851
OLSON, DE
11 196457
OLSON, LL
03 189070, 03 194636
OOSTHUIZEN, PH
22 195072
ORLOV, EP
00 189790
ORTH, CL
01A 188648, 02A 160409
ORTNER, J
25 195057
OSUCH, K
05A 170652, 05A 170656
OWENSBY, RM
22A 156972
OZDEMIR, L
00 196625

P

PAHL, Z
04 194501
PAHOMOV, EA
16 197013
PALIK, F
04 197005
PALLETT, DS
10 186613
PAMA, RP
00 183780
PANDIT, SM
04 194816
PARKER, HW
00 195078
PARKHURST, MA
20 196108
PARR, VB
12 190738
PATADIA, S
02 194640
PATEL, S
06A 138529
PATRICK, DM
00 185258
PATRICK, LM
12 190537
PATTON, EP
18 196872
PATTON, RJ
11 193899
PAUL, SL
00A 179326, 00 191405
PAULHUS, NG, JR
23A 058757
PAULSEN, A
22A 179694
PAULSON, BC, JR
00 195078
PAVESE, O
21 196381
PAYNE, HJ
22 186025
PAYNE, JN
11 190971
PEACOCK, RD
12 192146
PELLINI, WS
09 196453
PELLS, PJN
00 185892
PEMBERTON, AW
22 196528
PENSE, AW
00 183753
PEPLER, RD
11A 159658

Author and Investigator Index

PEREZ MORALES, G
13 194510
PERKINSON, D
20 196115, 20 196922, 20 196923
PETERNICK, J
17A 196741
PETERSON, LA
01A 099378
PETERSON, R
00 185578
PETRIE, DM
06 195720
PETRY, SF
02A 179333
PETTELAT, A
02A 170648, 02A 170660
PFEIFFER, H
04 189742
PFISTER, F
04 195084
PFLUGRAD, A
17A 196741
PHILIP, CE
21A 185237, 21A 185238
PHILLIPS, EA
03A 099426, 12A 081788,
12A 099424, 12A 099428,
12A 099436, 26A 099429
PHILLIPS, PJ
20 186423
PHILLIPS, TD
22A 179658
PHIPPS, PL
01A 179330
PHYTLA, MV
09 191093
PIATEK, B
13 189778
PICASSO, M
13 189021
PIEPOLI, G
01 189019
PIERICK, K
06 197002
PIGNATARO, LJ
12A 058838, 15 193618
PILKEY, WD
02A 188653
PIOTROWSKI, J
02 189018
PITFIELD, DE
22 195744
PIXTON, CE
21 196523
POIRIER, PJ
01 191266
POLENSKE, KR
25A 193783
POLLARD, MC
02 190287
PONCHON, B
06 195119, 13 195131
PONTIUS, PE
12 191469
POPE, RB
22 191465
PORTER, CA
06 189013
POSNER, M
18 194676
POSTER, GH
22A 196120
POTRATZ, JT
21 190826
POTTER, RS
20 191737
POULTER, DA
26 192074
POWELLS, M
21A 196742

POWER, SRD
23 196945
PRASAD, B
02 190333, 03 189065
PRAUSE, RH
01 192246
PRESTON, E
25 196518
PRESTON, OH, III
11 190971
PRIBADI, DZ
00 183780
PRICE, RD
11 193898
PRICE, WL
22 190324
PRIDDY, TG
12A 135596
PRIEMER, R
10 191677
PRIEST, WC
08 197314
PRIGMORE, BJ
23 197011
PRIVER, AS
11 196456
PROELL, F
01 189761
PROLYGIN, AP
05 195100
PRUD'HOMME, A
00 189069, 01 194637
PRUDHOE, J
21 197288
PRUITT, GK
06 190309
PRZYBYLINSKI, P
03A 170608
PUE, AJ
11 196458
PUNWANI, SK
02 189801, 03A 081801,
03A 170665, 18 196455
PURYEAR, D
18A 059897
PUTMAN, SH
15A 179339
PUTUKIAN, J
01A 188658
PYSKADLO, RM
00A 135658

QUARMBY, DA
18 196526
QUINDRY, TL
10 186613
QUINLAN, HG
20 190261

R

RABBAT, BG
00 183758, 00 183775
RAMSEY, WE
22 186826
RAMSEY, WJ
20 192189
RANDALL, M
23A 188660
RANEY, EM
00A 179344
RANKEN, RE
00 197418
RAONKY, P
03 196997
RAPOSA, FL
04A 058270, 04A 058280
RAPPENGLUECK, W
04 194669
RASMUSSEN, PG
07 186143

RAUH, RD
04 192065
RAUSCHE, F
00 183798
RAVEN, RR
11 193899
RAVERA, RJ
01A 170618, 03A 170617,
11A 059435, 11A 148346,
11A 156700, 12A 148324,
18A 177624
RAWLINGS, RD
09 190355
RAYMOND, GP
01A 170783, 01 196106,
01 196107, 09 190305
READ, M
23 194867
REASON, J
07 193762
REDLINGER, JF
00A 135550
REEBIE, RS
24 196930, 24 196986
REID, RE
02A 188653
REID, WH
20A 138367
REILLY, MJ
12 190536, 12 190537, 12 190538,
12 190539
REILLY, RJ
00A 138477
REIMHERR, GW
11 186476, 26 186473
REINSEL, EI
22A 179681
REINSEL, RE
11 197367
REISE, TF
04 192065
RENFREW, WW
00A 135658
RENKEN, JH
22 190887, 22 192174
RENNIE, R
00A 196736, 01A 170600,
01A 196723, 01A 196735,
02A 196732, 21A 196733,
21A 196734
REVELS, J
00 183779
RHOADS, RE
12 195098, 22 190884
RICH, TP
09 169393
RICHARDS, BL
17 183740
RICHARDS, LG
07 189809
RICHARDSON, G
02A 160409
RICHARDSON, HB
11A 193781
RICHARDSON, HH
03A 170617, 11A 148347,
11 190280
RICHEZ, G
01 194494
RICKER, RE
12 190738
RICKLEY, EJ
10A 058621
RICKS, R
12A 196740
RIDHALGH, JL
22 192170
RIEBER, M
20 188532
RIEMENS, S
10 189746

RIESSBERGER, K
01 190293
RIJ, RE
22A 138375
RINGER, TR
00 193896, 01A 196728, 11 193898
RISSE, LA
22A 138368
RITOSSA, E
03 196369
RIZZOTTI, S
06 195079
ROBERTS, AW
12 190881
ROBERTS, P
21A 193785
ROBERTS, PO
18 186406, 20A 058467,
20A 059960, 20 186407,
22 186402, 22 186405, 25A 157601
ROBERTS, R
24 193743
ROBERTS, W
20 194631
ROBERTSON, AC
24 196930, 24 196986
ROBERTSON, DJ
10 192346
ROBERTSON, HM
06 195066
ROBICHAUD, RH
03A 185234, 03A 188652
ROBERTSON, RA
02 191535, 12A 135719
RODRIGUES NAVARRO, G
04 196940
ROESS, RP
18A 059894, 23 197462
ROGERS, A
10 197274
ROGERS, KW
07 189058
ROGICH, DG
00A 136152, 00A 136165
ROGOZEN, MB
20 190790
ROHLFING, G
04 196994
ROLLINS, J
12 194128
RONEY, MD
01A 148355, 01 196106,
18A 159635
ROOS, D
16A 193782
ROSE, DC
00A 188666
ROSEMAN, D
20 188532
ROSENBERG, L
25A 128852
ROSMILLER, E
20A 179678
ROSS, BA
12 192168
ROTTER, T
07 189779
ROUGAS, M
01 193753
ROWAN, WG
01A 170783
ROWELL, RM
09A 136093
RUBIN, B
20 192189
RUBIN, D
11A 058375, 23A 059246
RUDBACK, NE
04A 196717, 06A 196718,
06A 196719, 11A 196729,
17A 196726

Author and Investigator Index

RUDEL, R
 20A 138364, 20A 156604,
 20A 179671
 RUDEN
 08A 194539
 RUDIS, RP
 01 191483
 RUS, L
 02 190291
 RUSHTON, RJ
 22 186020
 RUSSELL, DD
 20 186574
 RUSSELL, FM
 11 193772
 RUSSELL, HG
 00 183775
 RUSSELL, MF
 10 197157
 RUSSER, P
 06 189771
 RUTHERFORD, GS
 18 196585
 RYNDERS, B
 17A 196741

S

SACKETT, EM
 00 197414
 SACKS, IJ
 23 196463
 SAJDUROV, PS
 06 194685
 SAKAGUCHI, T
 13 189783
 SALLBERG
 00A 135658
 SALLET, DW
 12A 138567
 SALZANO, FJ
 16 191164
 SAMMON, JP
 03A 170665
 SAMPATH, S
 01A 139163
 SAMSA, ME
 20 191159
 SAMUELSON, RD
 18 186406
 SANDER, L
 00 195721
 SANDERS, DC
 09 197422
 SANDERS, JH
 08 193730
 SANGLIER, M
 15 190522, 15 190959
 SANTANERA, O
 02 195144
 SAPP, CD
 20 186574
 SAPPINGTON, CB
 22A 179657
 SATO, S
 10 195717
 SAUER, DB
 22A 179676
 SAULNIER, G
 00A 179326, 00A 179329,
 01A 179328
 SAUNDERS, R
 24 195542
 SAURENMAN, HJ
 10 190503, 10 191435
 SAUVAGE, G
 01 196934, 02 194880, 04 195118
 SAUVAGE, R
 01 194494
 SAUVAIN, H
 05 195713

SAVARIT, R
 02A 170645, 06A 170629
 SAWADA, T
 01 196535
 SAWYER, LM
 09 186569
 SCANLAN, J
 18A 138514
 SCARDIA, U
 23 194129
 SCHAAF, HL
 00 196353
 SCHAEFER, H-H
 13 196403
 SCHAFER, JD
 22A 179680
 SCHEIBER, EG
 13 194873, 13 196371
 SCHIEHLEN, WO
 02 190282
 SCHILD, GH
 11 194657
 SCHILLING, CG
 00 195627
 SCHILLING, MG
 00 191675
 SCHIMPELER, CC
 18 196585
 SCHMIDT, P
 13 195711
 SCHMIDT, RA
 12 193879
 SCHMITT, B
 13 194670
 SCHNEIDER, AL
 12 194578
 SCHNEIDER, F
 03 189749
 SCHNETLAGE, T
 15 190485, 15 190582, 15 190968
 SCHOTT, W
 05 195138
 SCHRADER, U
 06 190329
 SCHREIBER, DB
 25 189059
 SCHROETER, D
 00 189793
 SCHULTZ, TJ
 10 188991
 SCHUMACHER, PJ
 11A 159660
 SCHUSTER, RL
 00 193486
 SCHWALM, CL
 11A 196738, 11A 196739
 SCHWANHAEUSSER, W
 21 194682
 SCHWARTZ, CW
 00 196624
 SCHWARTZ, GG
 15 192051
 SCHWERDTFEGER, H
 13 195718
 SCHWIER, C
 18A 080324, 18A 159635,
 21 195073
 SCOFIELD, R
 05 191446
 SCOTLAND, R
 24 196978
 SCOTT, MA
 02 189801
 SEAGREN, RD
 12 191882
 SEAVER, SK
 22A 179699
 SEBELIEN, KB
 20 196108
 SEEGER, T
 10 195707

SEIDENFUSS, HS
 25 189751
 SEIFERT
 04 194864
 SEIFFERT, K
 13 194876
 SEKI, E
 17 196534
 SELIG, ET
 01A 170618
 SEMIOLI, WJ
 00 195683, 24 189061
 SEN, A
 16 197272
 SENAC, G
 04 189032, 04 194512
 SEPHTON, B
 03 190359
 SEROCKI, J
 05 191446
 SHABMAN, L
 25A 179675
 SHAMBERGER, RC
 03A 159630, 17A 138526,
 17A 159625, 17A 159628,
 17A 159631, 21A 159624,
 21A 159626, 21A 159627,
 24A 159629
 SHAPPERT, LB
 22 186389
 SHARP, G
 24A 170612
 SHARP, GP
 17 197510
 SHARP, GS
 20A 153650
 SHARP, JW
 22A 179662, 22A 179696
 SHARPE, CP
 25A 099365
 SHAW, RB
 23 195545
 SHEDD, T
 24 193744
 SHEFRIN, J
 12 190537
 SHERFY, MA
 01A 059295
 SHERMAN, L
 23A 177691
 SHERRET, A
 15 197485, 18 192228, 23 191758,
 23 192230, 24 197420
 SHIMIZU, Y
 12 189784
 SHINOJIMA, K
 09 190342
 SHIOYA, A
 03 190343
 SHIPLEY, RL
 01A 188650, 10 190503
 SHLADOVER, SE
 11A 059924, 11 190280,
 11 190301
 SHOKOTOV, NK
 04 193763
 SHONYO, CA
 26 186492
 SHORE, M
 20 188532
 SHUFFETT, DM
 22A 179660
 SHUM, KL
 02 189801, 03 189064
 SIEMENS, WH
 13 194635
 SIKORA, R
 01 195110
 SILVA, LP
 00A 179332

SILVER, ML
 10 191677
 SILVESTRINI, R
 10 193764
 SILVIA, PJ
 03A 185234
 SIMON, R
 00A 179327
 SIMONS, DB
 00A 153558
 SIMPSON, R
 25 197335
 SINES, G
 09 191547
 SINES, GS
 17A 138526
 SINGER, L
 24 196930
 SINGH, B
 01 196450
 SINHA, PK
 02 190304
 SISLER, JA
 12A 135596, 12A 135599,
 12A 135719, 20A 136085
 SJOESTEDT, L
 02 195115, 02 195116
 SJOSTROM, O
 00 195075
 SKELTON, AG
 00 185578
 SKLAR, SJ
 11 196459
 SKULTIN, IV
 17 189027
 SLAY, WO
 22A 138363
 SLOCKBOWER, E
 00 183753
 SLUTSKY, S
 10 191406, 10 191407, 10 191440
 SMARDO, P
 22 190322
 SMITH, AB
 23 190265
 SMITH, AD
 12 189770
 SMITH, DR
 10 186805, 12 186463, 22 186392
 SMITH, JA, JR
 20A 153650
 SMITH, JL
 18 185810, 18 185811
 SMITH, KR
 02 194647
 SMITH, RA
 01A 185232
 SMITH, RL
 03 196984
 SMITH, VL
 04 195544
 SMITH, WR
 13 189738
 SMOOT, JJ
 22A 138368
 SNETHEN, DR
 00 185258
 SO, W
 01 196450, 01A 196745
 SOEDERBERG, J
 25 197292
 SOGN, AB
 22A 179668
 SOHST, D
 04 189024
 SOLF, W
 04 189742
 SOMMERER, J
 11 189816
 SONNIER, CS
 22 186800

Author and Investigator Index

SOOT, S
16 197272
SOOTS, V
16A 128051
SORENSEN, LO
22A 153718
SOUDER, P
20 188532
SOUDER, PS, JR
22 186247
SOZIO, LE
00 188995
SPANTON, DL
02A 139178, 04 196988
SPARKS, GR
20 195069
SPATNY, W
13 196937
SPAULDING, D
05A 159634
SPEAR, B
15A 188656, 23A 185243
SPENCER, PR
10A 138534, 12A 138531
SPENCER, RH
10 191428, 10 191429, 10 191431
SPENCER, RW
00A 188669
SPERL, H
13 195718
SPINDEL, JE
09 185796
SPINK, CD
22 193760
SPIVEY, M
00 185578
SPOONER, E
04 189808
SPRIGGS, JO
04A 179335
STABLES, JR
03 194668
STACY, DM
22 193774
STALLINGS, JL
22A 179659
STALLKAMP, JA
04 195693
STANTON, W
04 193775
STARACE, JJ
10 191406
STAROSSEL'SKIJ, AA
01 189047
STARR, JT
24 189074
STEARNS, MD
11A 058375
STEIN, G
11 196459
STEINBORN, H
02 190292
STEINERT, J
01 189786
STEINMANN, R
15A 129701, 15A 179331
STEMMLER, H
13 196462
STEPANOV, VR
04 196992
STEUNENBERG, RK
04 191881
STEVENS, RD
11A 160276, 11 193900
STEWART
08A 153623, 08A 178037
STEWART, C
12A 059864
STEWART, G
08 193730

STOKES, RW
04 189795
STONE, J
15A 179331
STONE, PV
24 196930
STONE, RN
20A 138367
STOREY, CL
22A 179676
STORMENT, JO
16A 196749
STOWASSER, WF
20 190362
STRATTON, J
18A 059894
STRECKER, H
06 189048
STROTHMANN, W
02 190295, 02 195121
STRUB, P
03 190339
STUKEL, JJ
20 191474
STUPKA, RC
22 174305
SUGIMOTO, T
04 196370
SUGIYAMA, S
04 196370
SULLIVAN, GH
22A 196117
SULLIVAN, P
20 188532
SUMMERS-SMITH, D
09 194661
SURH, DS
21 192031
SUSSMAN, ED
11A 159658, 11 197417
SUSSMAN, JM
21A 185236, 21A 185237,
21A 185238, 24 196985
SUTCLIFFE, H
00A 185230
SUTHERLAND, SH
22 190888, 22 191465, 22 192174
SUTTON, RM
20 191737
SVEHLA, RL
12 186852
SWARD, JD
22 190323
SWARTZ, DJ
25A 188665
SWEENEY, RAP
00 195906, 01 194628
SWEET, LM
02A 148358, 04 196522
SWERDLOFF, CN
20A 055810, 20A 059960,
20A 188659, 25A 157601
SWINNEY, B
16 194819
SYMEONIDES, XP
21 195071
SZABO, MF
10 186686
SZEKELY, J
20 191278

T

TAGGART, RE
25A 188665
TAKAGI, N
00 197281
TAKANO, N
16 190353
TAKAOKA, T
06 195081

TAKESHITA, S
00 196932
TALAVAGE, JJ
21 192031
TAMAI, Y
16 190353
TANNER, AE
12 190536
TAPAVICA, K
04 196944
TAUBER, H
20 188532
TAYLOR, AM
09 197421
TAYLOR, CE
17A 159625, 17A 159628,
21A 159624, 21A 159627,
24A 159629
TAYLOR, DS
13 196947
TAYLOR, G
00 197287
TAYLOR, JM
10 186805, 22 186392
TAYLOR, RJ
00 183801
TELLEZ GUTIERREZ, R
01 194637
TENA BERNAL, M
01 194637
THEOFILOS, LG
00A 196751
THIELE, W
00A 170632, 00A 170633,
01A 170636, 10A 170655
THOMAS, JT
12 186463
THOMAS, K
11 191667
THOMAS, R
00 191675
THOMPSON, DE
00A 188643
THOMPSON, J
11A 159662
THOMPSON, MR
01A 038973
THOMPSON, RE
10 193764, 12 186852
THOMPSON, RL
20A 196118
THOMPSON, SR
20A 156542
THOMPSON, W, III
03A 055916
THORNTON, EA
09 186569
TILL, TA
24A 159650
TYSSIER, P
09 189792
TITJUNIK, NA
01 195130
TOBIAS, L
22 186247
TOEPFER, K
03 194653
TOMBERLIN, TJ
10 189744
TOMLINSON, FH
03 196981
TONG, P
02 196989
TOPOROFF, I
00 197344
TOYBEE, PA
22 190352
TRACHSEL, P
25 189762
TRAIN, K
23 188992

TRAYLOR, HD
22A 179682
TREAT, N
20 196114
TSAI, N
02A 059427, 02A 138469,
02A 188653
TSAI, NT
02 194877, 05A 157901
TSCHIRKOW, NS
01 189037
TSE, YH
02 196449
TSVIGUN, VN
09 189747
TUCK, B
20 190768
TUCKER, HL
03A 025403, 03A 136342,
03A 138539, 04A 193777,
16 190303
TUFTS, LD
01A 170600, 06A 196730
TUIITE, J
22A 196120
TULECKI, A
09 189001
TURCOT, MC
01A 148355, 18A 159635
TURKE, DJ
01A 170783
TURNER, DB
17 193773
TURNER, DW
22 186389
TURNER, HT
00 183999
TURNER, MS
22A 179695
TURNER, RE
23A 170597
TURNQUIST, M
18A 177624
TUSAIE, W
25A 188665
TYNDALL, GR
25A 188665

U

UENO, T
00 196932
UHER, RA
04 194633, 16A 148321
UHRIG, JW
22A 179677
UNDERWOOD, JR
23 194140
UNDERWOOD, LB
00A 135550
UNGAR, E
10A 188655
UNGER, VE
18 196585
UNKELBACH, W
00 189023
URBA, CE
24 196930
URBANIK, TJ
22 195076

V

VACCARI, JA
09 196472
VAJDA, J
05 197015
VAN, D
09 194495
VANBUIJTENEN, CJP
12 185742
VARDY, AE
00 196931, 10 189007, 10 190302

Author and Investigator Index

VARYZGIN, ES
01 195134
VASS, TJ
07A 170590
VAUGHAN, JA
07 186143
VEKSLER, MI
13 196386
VELIKANOV, DP
25 195107
VERWEIJ, A
12 185742
VILSTRUP, RH
22A 157092
VINATORU, M
02A 160409
VINOOG, L
00 190361
VOKAC, P
04A 170637, 06A 170628
VOLLMERS, AC
22A 196122
VOLODIN, VI
04 190369
VOLZ, MD
22A 083506
VON FRESE, R
26 192074
VON MOELLENDORFF, H
04 188996

W

WACHS, M
25 195057
WADA, K
03 190343
WAGNER, R
04 188996, 06 194656
WAGNER, W
25A 153574
WAKAMIYA, W
20 196108
WALABAYASHI, J
00 189008
WALBRIDGE, EW
16 194123
WALDSTAETTEN, WV
03 189750
WALKER, FE
22A 179696
WALKER, JG
10 189743
WALKER, N
25A 188665
WALLACE, A
11A 196739
WALLACE, J
09 193747
WALLRAPP, O
11 190281
WALLS, HC
22 186466
WALMSLEY, DA
23 197282
WANG, FD
00 196625
WARD, D
24A 193779
WARD, EJ
17 193722
WARNER, JA
11 191665, 11 191668
WATANABE, K
01 190318
WATANABE, M
01 196535
WATANABE, O
00 197281
WATT, RG
21 196529

WATTECAMPS, A
01A 170625, 01A 170649
WEBB, JS
22 196528
WEBER, MB
24 196542
WEBER, PJ
11 190330
WEHNER, L
06 190337
WEHRLI, R
10 186613
WEHRLIN, M
04 196935
WEIGERT, E
13 194670
WEINBLATT, H
20 189865
WEINER, E
23A 058815
WEINSTOCK, H
01A 059223, 02A 099367,
02 196524
WEITZ, DW
20 191737
WELLS, PD
25 185585
WELSH, KW
07 186143
WELTY, G
01 195063, 03 196359, 20 189053,
21 194851, 24 195541, 24 195682
WENDT, U
09 185793
WENGERT, NI
00A 153558
WERDER, J
04 196938
WEST, G
00 188993, 00 188994
WESTINE, PS
12 190738
WESTPHAL, J
15 195139
WETENKAMP, HR
03A 046502
WHARTON, J
20 186684
WHETSTONE, JR
12 191469
WHITE, JH, JR
19 195697
WHITE, K
00 183741
WHITE, RA
12A 148324
WHITE, SJ
21 196364
WHITELAW, RL
02A 170591
WHITHAM, EM
07 195090
WHITLEY, RL
22 196528
WHITTEN, RP
11 196465
WICHANSKY, AM
11 197417
WICKENS, AH
02 195092
WIDMAYER, E
03 196377
WIENER, AJ
15 193618
WIERZBICK, W
22 197016
WIGGLESWORTH, EC
08 190274
WIGHTMAN, W
00 197344

WILD, J
20 196923
WILLIAMS, G
02 196990, 02 196991
WILLIAMS, IN
25 189797
WILLIAMS, LJ
20 185651
WILLIAMSON, BF
11A 196739
WILLIAMSON, GR
09 185483
WILSON, CL
20 194124
WILSON, G
10A 188654
WILSON, HG
18 196102
WILSON, JF
11A 156700, 11 186863,
11 197319
WILSON, LB
22 186405
WINN, JB
01A 138560, 01A 138561,
03A 138559, 09A 138557,
09A 138558
WINSTON, B
15A 188656, 23A 185243
WINTER, P
04 190338
WITKIEWICZ, P
01A 170607
WITTEN, JM
22 190912
WITTGENSTEIN, M
02 194869
WOJCIECHOWSKI, BW
16A 196743
WOLFE, SL
10 191435
WOLFF, PC
15A 188644
WONG, PJ
21A 170620
WOO
10A 193280
WOOD, RK
00 196622
WOOD, WR
18 196101
WOODBURY, D
04A 196721
WOODEN, DG
03A 159630, 21A 159626,
21A 185236
WOODS, RO
04 193776
WOODWARD, FH
24 196996
WOOLVERTON, MW
20A 179671
WORMLEY, DN
02 190304, 03A 170617,
11A 059435, 11A 148347,
11 190280, 11 196466
WORRELL, JS
11 197367
WRIGHT, DG
20A 058467
WROBLE, JR
11 196467
WULF, WF
09 191093
WURM, A
16 189774

YAGI, M
06 190317

YAMAGUCHI, T
06 196525, 17 193759
YAMAYA, T
17 193759
YASUKAWA, S
04 188997
YAU, JF
03 189065
YEN, AM
11 186150, 11 186162
YEWELL, J
22 193766
YOH, P
11A 059365
YOKOSE, K
03 196385
YOKOTA, H
23 196533
YOKOTA, S
06 195719, 17 190272
YOO, CS
08 193730
YORK, JA
09 197421
YOSHIDA, Y
10 190328
YOSHIKOSHI, W
00 197281
YOSHIMURA, HR
10 186798, 12A 135599
YOSHIMURA, T
09 196536
YOUNG, DE
22 194856
YOUNG, J
15 192212
YOUNGQUIST, JA
01A 138568
YOUNGS, RL
01A 138568, 09A 136093
YOUNKIN, C
11 191667
YOUSRY, M
04 194816
YU, AT
22 195716
YUZURIHARA, S
04 196460

Z

ZABAR, Z
11A 149463
ZABELOVA, LF
13 195103
ZACHARIAS, F
04 190269
ZACHARIASON, RA
22 190371
ZAHRADKA, J
02 190299
ZANDI, I
11 191665
ZAREMBSKI, AM
01A 038973, 01A 170616,
01A 188658, 03A 081800,
03 189065
ZEMLIN, H
11 194657
ZETTLER, JL
22A 195928
ZIELINSKI, S
01 190331
ZIENERT, S
13 195086
ZIMMERMAN, JF
23A 156666, 23A 156668,
23A 170626, 24A 156651,
25A 156676
ZIMMERMAN, MB
20 195068

Y

Author and Investigator Index

ZODER, E

21 196391

ZOTTI, RF

07A 170662

ZOUFAL, K

05 195138

ZWARTS, CMG

02 195101

ZYCHER, B

20 186684

Subject Term Index

The document number for each summary of ongoing research includes an *A* and is typed entirely in italics.

A

ABANDONMENTS

01 195681, *10A 179685*, *15A 179672*, 18 196873, *20A 099645*, *20A 099646*, *20A 099647*, *20A 138370*, *20A 156542*, 20 189865, *22A 138365*, *22A 153718*, *22A 156972*, *22A 157092*, *22A 179668*, *22A 179677*, *22A 179680*, *22A 179684*, *22A 196122*, 23 193770, *24A 159650*, 24 193743, *24A 193779*, 24 194144, 24 194879, 24 196541, 24 196542, 24 196986, *25A 179347*, *25A 185242*, 25 188152, 25 189051, 25 190310, 25 190311, 25 195543, 25 196870, 25 196871

AC ELECTRIFICATION

04 196517, 13 195103, 13 196382

AC TRACTION MOTORS

02 190298, *03A 138539*, 04 189795, 04 189808, 04 190332, *04A 193777*, 04 194655, 04 195061, 04 195127, 04 195132, 04 195137, 04 195693, 04 195694, *04A 196717*, 04 196929, 04 196988, 13 196372, 13 196382, *16A 128051*

ACCELERATION

00 053332, *02A 170645*, 04 197285, 07 190276, 07 197009

ACCEPTANCE TESTS

03 053307, 03 053308, *03A 170641*, *03A 170643*, *03A 170659*, 04 195118, 05 053309

ACCESSIBILITY

03 191670, *07A 196746*, *07A 196747*, 11 197367, 15 197485, *23A 170626*

ACCIDENT ANALYSIS

03 196984, *12A 148348*, 12 190308, 12 193746, 12 196681

ACCIDENT CAUSES

01A 138563, *08A 159644*, *12A 081788*, *12A 148324*

ACCIDENT INVESTIGATIONS

02A 058465, *08A 178037*, 09 190355, 12 185875, 12 190535, 12 190536, 12 190537, 12 190538, 12 190539, 12 192094, 12 192347, 12 195704

ACCIDENT POTENTIAL

03A 138565, 03 196984, *08A 178037*, *08A 196720*, 10 186798, *12A 135594*, *12A 135596*, *12A 135599*, *12A 135719*, *12A 148324*, 12 179826, 12 190308, 12 192168, 12 194859, 12 194860, 12 194863

ACCIDENT PREVENTION

02A 170663, *03A 099439*, 03 196984, *07A 170662*, *08A 153623*, 08 191687, *08A 193282*, 08 197314, *12A 099389*, 12 186852, 12 189770, 12 189784, 13 194876

ACCIDENT REPORTING SYSTEMS

12A 135596

ACCIDENT REPORTS

07 192096, 08 195702, 12 195703

ACCIDENT STATISTICS

08 195702, *12A 148348*, 12 186377, *12A 188661*, 12 190268, 12 190901, 12 193741, 12 193746, 12 194859, 12 194860, 12 195703, 12 195704

ACCIDENTS

00A 138477, *02A 099390*, *03A 099426*, *12A 099424*, *12A 099436*, *12A 188664*, *12A 196740*, *26A 099429*

ACCOUNTING

18A 138514, 25 196870, 25 196871

ACOUSTIC EMISSION TESTS

00 183756, 00 195909, *10A 148341*

ACOUSTIC EMISSIONS

03 194660, *10A 058621*

ACOUSTIC MEASUREMENT

00 189791, *01A 170625*, 09 185481, *10A 058621*, *10A 170655*, *10A 179325*, 10 186613, *10A 188654*, 10 189743, 10 189746, 10 189769, 10 190503, 10 191406, 10 191407, 10 191428, 10 191429, 10 191431, 10 191435, 10 191440, 10 191677, 10 195707

ACOUSTIC WARNING SYSTEMS

12A 170651

ACTIVE SUSPENSIONS

02 190304, *03A 170617*, 03 194643, 03 196538

ADDITIVES

09 194661, 16 189014, 16 190353, 16 194819, 16 196123, 16 196516

ADHESION

02 053315, *02A 170591*, 02 189018, 02 189755, 02 190298, 02 190299, 02 190336, 02 194508, 02 194630, 03 194646, 04 190332, 05 191446, 05 194645, 11 193772, 13 195058

ADHESION COEFFICIENT

02 053315

ADHESIVES

09 186484

ADVANCED CONCEPT TRAIN

03A 025403, *03A 170604*

ADVANCED PASSENGER TRAINS

03 190359, 05 190307, 23 195678

ADVANCED SYSTEMS

09A 179346, *11A 058273*, *11A 058375*, *11A 059365*, *11A 059435*, *11A 059924*, *11A 138792*, *11A 148334*, *11A 148346*, *11A 148347*, *11A 149463*, *11A 156700*, *11A 159658*, *11A 159659*, *11A 159660*, *11A 159662*, *11A 160276*, *11A 160399*, *11A 170589*, *11A 170593*, *11A 170605*, 11 186476, 11 186863, 11 189816, 11 190286, 11 190330, 11 191664, 11 191913, 11 191958, 11 191959, 11 191960, 11 193772, *11A 193781*, 11 193898, 11 194146, 11 194679, 11 194687, 11 195091, 11 195712, 11 196366, 11 196390, 11 196399, 11 196532, *11A 196716*, *11A 196738*, *11A 196739*, 26 185409

ADVANCED TECHNOLOGY

03A 136342, *11A 160399*

AERIAL PHOTOGRAPHY

00 191675, 00 195684

AERODYNAMIC DRAG

02A 128041, *02A 170594*, *02A 170595*, 10 189007

Subject Term Index

- AERODYNAMIC EFFECTS**
10 190302
- AERODYNAMICS**
02 190336
- AEROSPACE TECHNOLOGY**
00 195548, 25 196518
- AGE OF EQUIPMENT**
04 190315
- AGGREGATES**
01 196106, 01 197277
- AGGREGATES TRAFFIC**
21 195550, 22 197276
- AGRICULTURAL EXEMPTION**
20A 099645, 20 189052, 20 189053, 22A 179680, 24A 179673, 25A 156620
- AGRICULTURAL TRAFFIC**
20A 138370, 20A 156542, 20A 156604, 20A 179664, 20A 179665, 20A 179666, 20A 179667, 20A 179678, 20A 179679, 20 190362, 20 191279, 20 191589, 21 194851, 22A 083483, 22A 099624, 22A 135001, 22A 138363, 22A 153666, 22A 153674, 22A 153703, 22A 153718, 22A 156972, 22A 157092, 22A 179669, 22A 179670, 22A 179674, 22A 179680, 22A 179681, 22A 179684, 22A 179699, 22 189054, 22A 196117, 24A 179673, 25A 128852, 25 189051
- AIR BRAKES**
03 196993, 03 197453, 04 195544, 05 189036
- AIR CONDITIONING**
03A 170638, 03 190339, 03 190359, 03 196943, 04A 193777, 10A 188673, 10A 196753
- AIR CUSHION SUSPENSIONS**
00 190348
- AIR CUSHION VEHICLES**
11A 148347
- AIR DISTRIBUTION**
03A 179688
- AIR FLOW**
00 190361, 00 193896, 00 196931, 01A 196728, 03A 179688, 03A 195918, 04 190396, 10 189007, 10 190302, 10A 196753
- AIR POLLUTION**
10 053314, 10 185707, 10 186657, 10 186686, 10 189773, 13 195089, 22 174305
- AIR POLLUTION CONTROL**
10 196387, 20 196114, 22 189002, 22 189055
- AIR POLLUTION FORECASTING**
12 196681, 15A 179339
- AIR POLLUTION SOURCES**
10 190350, 10 192346, 10 193764
- AIR PRESSURES**
00 196931
- AIR RESISTANCE**
02A 170594, 02A 170595
- AIR TRANSPORT**
23 194140, 23 194870, 23 196469
- AIRPORT ACCESS**
11 190971, 11 194146, 11A 196729
- AIRPORTS**
10A 193280, 11A 170621, 11 186150, 11 197330, 11 197358, 23 196469
- ALABAMA**
20 186574
- ALASKA**
20A 055810, 20 190768, 20 192189
- ALCOHOLISM**
07A 148352
- ALCOHOLS**
07 192096, 20 196108
- ALGORITHMS**
22 185508
- ALIGNMENT**
13 189778
- ALIGNMENT CONTROL**
02 196989
- ALLOY STEELS**
01A 099393, 01A 170600, 09 053312, 09A 058267, 09 190319, 09 196452, 09 196453, 09 196536, 09A 196724
- ALLOYS**
09 193747
- ALTERNATIVES ANALYSIS**
11 190993, 18 193742, 23A 185243, 23A 185244, 23 186869, 23 186870
- ALTERNATORS**
04 195125, 04 195544
- ALUMINUM**
03 189750, 03 194641
- ALUMINUM ALLOYS**
03 189749, 03 190285
- AMSTERDAM, NETHERLANDS**
06 197286
- AMTRAK**
00 195548, 01A 099378, 01A 188648, 02 196989, 05 191446, 07 192096, 23A 099391, 23 189057, 23 193770, 23 195701, 24 196541, 24 196542, 25 195543
- ANALYTICAL TECHNIQUES**
03 189810, 04 194816, 09 191547, 12 190308, 12 190539, 13 190368, 15 190970, 16 189049, 16 189774, 16 189811, 16 194868, 17 197289, 18A 177624, 18 189796, 18 193742, 18 194666, 18 195722, 18 196101, 18 196102, 18 196526, 18 196873, 20 194858, 20 195069, 21A 185236, 21A 185237, 21A 185238, 21 194682, 21 196381, 21 196982, 23A 185244, 23 193770, 23 195077, 23 195685, 24 189799, 24 194861, 24 194879, 24 196978, 24 196985, 25A 185242, 25 190313
- ANNUAL**
08 195702, 12 195703, 18 195700, 20 195705, 23 195701, 24 195696, 24 195731
- APPALACHIA**
21 196364
- APPRENTICES**
07 196361
- ARTICULATED CARS**
03 197453
- ARTICULATED TRAINS**
02 195092, 04 196942, 05 190307
- ARTICULATED TRUCKS**
03A 050338, 03A 170617, 03 194642
- ASSOCIATION OF AMERICAN RAILROADS**
09 196453, 24 19638, 24 196104
- ASYNCHRONOUS TRACTION MOTORS**
04 190338, 04 194500
- ATCHISON, TOPEKA AND SANTA FE RAILWAY**
04 191751, 04 191752, 04 191754, 04 197273, 20 189053, 24 189061
- AUDIBLE WARNINGS**
00 183803, 08 193342
- AUDIO FREQUENCY TRACK CIRCUITS**
06A 138529
- AUSTRALIA**
00 185892, 00 190266, 00 190267, 10 190264, 15 190263, 20 188332, 20 190208, 20 190261, 22 190262, 24 194144
- AUSTRIAN FEDERAL RAILWAYS**
01 189758, 01 196397
- AUSTRIAN TECHNOLOGY**
01 189012
- AUTOMATED GUIDEWAY SYSTEMS**
11A 135604, 11A 156700, 11A 159658, 11A 159659, 11A 159660, 11A 159662
- AUTOMATED GUIDEWAY TRANSIT**
06 196380, 11A 059365, 11A 059924, 11A 160276, 11A 170605, 11A 170621, 11 186150, 11 186162, 11 186850, 11 186851, 11 186863, 11 189812, 11 190275, 11 190280, 11 190284, 11 190301, 11 190971, 11 190993, 11 193899, 11 193900, 11 193901, 11 194657, 11 194658, 11 194659, 11 196366, 11 196456, 11 196457, 11 196458, 11 196459, 11 196464, 11 196465, 11 196466, 11 196467, 11 196468, 11 196520, 11 197319, 11 197330, 11 197358, 11 197361, 11 197362, 11 197363, 11 197364, 11 197417, 11 197459, 23 196463
- AUTOMATIC CAR CONTROL**
17A 138526
- AUTOMATIC CAR IDENTIFICATION**
06 190309, 06 194629, 06 197286
- AUTOMATIC CONTROL**
06A 136338, 06 196407, 09 189034, 11A 159659, 11A 159660, 22 196395
- AUTOMATIC CONTROL SYSTEMS**
04 196394, 06 189013, 11A 135604, 11 189812
- AUTOMATIC COUPLERS**
03 053307, 03 053308, 03A 170643, 03A 172456, 05A 157901, 18 196455
- AUTOMATIC COUPLING**
03 053307, 03 053308, 03A 170643, 04A 170637
- AUTOMATIC FARE COLLECTION**
23 194131, 23 195546, 23 197003
- AUTOMATIC MONITORING**
01A 138561, 03A 138559, 09A 138557
- AUTOMATIC TRAIN CONTROL**
04A 170637, 04A 193777, 05 194634, 06 189048, 06 190317, 06 190320, 06 190337, 06 195142, 06 195719, 06 196525, 11A 159660
- AUTOMATIC TRAIN OPERATION**
04A 170637, 04 188997, 04 190315, 06 190316, 06 190320, 06 196380, 06 196539, 06 196714, 11 189812, 11 196366, 13 189802
- AUTOMATIC TRAIN PROTECTION**
06 195081, 06 195720, 06 196714, 12 197371
- AUTOMATIC TRAIN STOP**
03A 099439, 06 190317

Subject Term Index

AUTOMATIC TRAIN SUPERVISION
06 196714

AUTOMATIC WARNING SYSTEMS
12A 170651

AUTOMATION
06 189060, 06 190320, 06 190337, 06 195117, 06 196714, 06 196999,
21 195071, 21 197014, 23 195546

AUTOMOBILES
23A 177691

AUTOTRANSFORMERS
13 196403

AUXILIARY POWER
04A 193777, 04 196370, 04 196944

AVAILABILITY
03A 159630, 03A 165811, 11 197361, 11 197362, 11 197363, 11 197364,
12 197371, 13 196519

AVALANCHES
00 197414

AXLE BOXES
03 053323, 03 053327

AXLE COUNTING
06 053306

AXLE DEFECTS
03A 170659, 03 196376, 09 190356, 09 196980

AXLE DETECTORS
02 195101, 06A 159657

AXLE DRIVES
02 190298, 02 190299, 04 190351

AXLE FAILURES
03 196981

AXLE FATIGUE
09 196980

AXLE LOADINGS
00 053319, 00A 170633, 01A 138563, 01A 170616, 02A 099367, 02A 170657,
02A 170663, 02 190357, 02 190360, 03 053322, 03A 170639, 03A 170654,
03 196369, 03 196540

AXLES
03A 170630, 09 189034

B

BALLAST
01A 038973, 01 183907, 01A 188667, 01 194648

BALLAST CLEANING
01 183907, 01 189066, 01 190331, 01 193753, 01 195067, 01 195679

BALLAST COMPACTION
01A 170649, 01 189042, 01 189758, 01 196106

BALLAST CRIBS
02 190333

BALLAST DECK BRIDGES
02A 170645

BALLAST DEPTH
01 189026

BALLAST MATERIALS
01A 138564, 01 183907, 01 189019, 01 195134, 01 196106, 01 196107,
01A 196745, 01 197277, 02 196357, 09 190305

BALLAST MECHANICS
00A 179327, 01A 170618, 01A 170783, 01 189026, 01 190331, 01 196450,
01A 196735, 02 190333, 02 190357

BALLAST QUALITY
01A 196745

BALLAST STABILIZATION
01 189042, 01 189758, 01 195067

BALLASTLESS BRIDGES
10 189745

BALLASTLESS TRACK
00 053332, 01 194674, 01 195688, 02A 170645

BALTIMORE
16 186430

BALTIMORE REGION RAPID TRANSIT
00A 188670, 00 189009

BANKRUPTCIES
23 195545, 24A 193779, 24 195542

BARGE OPERATIONS
00 183803, 18 189804, 20A 138364, 20 185655, 20 185960, 20 185961,
20 185962, 20 185963, 21 196364, 22A 138400, 22A 179696, 22 186247,
22 189055, 22 190324, 22 190371, 22 190372, 22 190912, 22 193766

BARLEY TRAFFIC
24 196103

BATTERIES
03A 170647, 04 191881, 04 192065, 04 194872, 04 196944, 09 196472

BAY AREA RAPID TRANSIT
05 194645, 10 191435, 12 195677, 13 191730, 15A 160469, 15 186156,
15 190485, 15 190486, 15 190487, 15 190582, 15 190905, 15 190906,
15 190968, 15 190970, 15 191029, 15 191033, 15 191362, 15 191659,
15 197340, 15 197485, 16 197420, 18 192228, 23A 058815, 23 188992,
23 191660, 23 191758, 23 192230, 25A 160045, 25 191361, 25 195057

BEARINGS
00 183754, 00 185286

BELGIAN NATIONAL RAILWAYS
01A 170636

BENEFIT COST ANALYSIS
01A 081797, 01A 179328, 02A 081796, 02A 081799, 02A 081805, 02A 138469,
02A 196722, 03A 081800, 03A 081801, 03A 099426, 03 196984, 05A 081802,
07 196361, 10A 058675, 10 191407, 18 189804, 18 194666, 18 196455,
18 196526, 20 194871, 22A 138365, 22A 156972, 22A 196122, 23A 188660,
23 195685, 24 194879, 25 196976

BESSEMER AND LAKE ERIE RAILROAD
01 193753

BIBLIOGRAPHIES
00 185578, 00 185674, 00 185675, 00 185677, 00 194298, 04 185714,
04 185715, 06A 138529, 06 185686, 09 186484, 09 191957, 11 186476,
11 191958, 11 191959, 11 191960, 11 197363, 17 189818, 20 185890,
22 185690, 22 185691, 23 191936, 23 197431, 25 191587, 26A 058329,
26 186473, 26 186492, 26 189056, 26 190327, 26 191943, 26 191952,
26 192099

BLACK MESA AND LAKE POWELL RAILROAD
04 191751, 04 191752, 04 191754

BLOCK SYSTEMS
05 194634, 05 194645, 06 195720, 06A 196718, 11 194659, 11 196458,
11 196459

BLOCKING
21A 170596, 22 186235, 22 186333, 22 186334, 22 186336, 22 186337

BODY MOUNTED
04 195118

BOLSTERS
03A 081787

BOLT HOLES
01A 139163

BOLTED JOINTS
00 183758

BONDED JOINTS
13 195709

BOSTON AND MAINE RAILROAD
24A 156651

BOTTOM FITTINGS
03 189070, 03 194636

BOUNCE
02 189800, 02 196449, 03A 081798

BOX CARS
03A 148336, 03 189748, 22A 083511, 22A 099636, 22A 138363, 22A 179676,
22A 195928

BOX GIRDER BRIDGES
00A 170632

BRAKE APPLICATIONS
02 189062, 05A 157901, 05 190307, 05 195070, 12 192094, 12 192347

BRAKE DESIGN
02A 081796

BRAKE SHOES
03A 170630, 05 053309, 05A 157901, 05A 170652, 05A 170656, 05 194511,
05 197015, 09 196100

BRAKE SYSTEMS
05A 157901, 05 189036, 05 196949

BRAKE TESTS
00 053332, 05 053309

BRAKING
00 053332

BRAKING DISTANCE
05 190307, 05 194634, 05 194645

BRAKING FORCES
02A 170645

BRAKING LEVELS
03A 046502

BRAKING NOISE
10A 170655

BRAKING PERFORMANCE
00 053332, 02A 170591, 02 196398, 03A 138539, 04 191750, 04 191751,
04 191752, 04 191753, 04 191754, 05A 081802, 05A 159634, 05A 170652,
05 191446, 05 194634, 05 194645, 05 197015

BRAKING SYSTEMS
02A 058257, 03A 138539, 03A 170665, 03 197453, 05 053309, 05A 081802,
05A 170656, 05 190307, 05 191446, 05 194511, 23A 099391

Subject Term Index

BRAKING TESTS

03 053322, 05A 170652

BRANCH LINES

15A 179672, 18 196873, 20A 138370, 20A 156542, 22A 138365, 22A 153718, 22A 156972, 22A 179684, 22A 196122, 24A 082106, 24 194144, 25A 156676, 25A 156707, 25A 179347, 25A 185242, 25 186650, 25A 188665, 25 189051, 25 190310, 25 190311, 25 190312, 25 190313, 25 195543, 25 196870, 25 196871

BRAZIL

13 196937, 25 189797, 25 189798

BRAZILIAN RAILWAYS

04 196940

BRIDGE BEARINGS

00 053332, 00 183754, 00 185286

BRIDGE CONSTRUCTION

00 183802, 00 190348

BRIDGE DECKS

00 183758, 00 183759, 00 183760, 00 183763, 00 183801, 00 190348, 02A 170645

BRIDGE DESIGN

00A 102894, 00 183751, 00 183777, 00 183779, 00 183789, 00 183802, 00 183803, 00 183999, 00 185286, 00 189069, 00 189757, 00 189793, 00 191675, 00 193721, 00 193749, 00 194145, 00 195906, 00 196933, 00 197287, 09 193769

BRIDGE FAILURES

00 183756

BRIDGE MAINTENANCE

00 183741, 00 183802, 00A 196736, 01 193753

BRIDGE NOISE

10A 170655, 10 189745, 10 189746, 10 195707

BRIDGE PILING

00 183999

BRIDGE RECONSTRUCTION

00 183777, 00 188833, 00A 196736

BRIDGE REPAIRS

00A 138477, 00 183745, 00 183746, 00 183753, 00 188833, 00 193749, 00 195906

BRIDGE SETTLEMENT STUDIES

00 189023, 00 195120

BRIDGE STRESSES

00 053319, 00A 102894, 00A 170632, 00A 170633, 00 183754, 00 183770, 00 183779, 00 183780, 00 189787, 00 189793, 02 183782, 11A 156700

BRIDGE STRUCTURES

00A 138477, 00A 170632

BRIDGE TESTS

00 053319, 00 189023

BRIDGES

00 053319, 00 053332, 00A 170632, 00A 170633, 00 183746, 00 183755, 00 195120, 17 183740

BRITISH COLUMBIA RAILWAY

06 189060

BRITISH RAILWAYS

00 194145, 00 197291, 01 194509, 03 053311, 03 190359, 03 196376, 06 196539, 13 189738, 13 196519, 13 196946, 18 194676, 23 195546, 23 195678, 23 196945, 24 189071, 24 196874

BRITISH TECHNOLOGY

00 195074, 05 190307, 09 169393, 09 189034, 09 196452

BRITTLE FRACTURES

09 196453, 12 191914

BUFFALO

20 191278, 20 191279, 21A 188662, 23A 156666

BUFFERS

03A 170641, 03 195111

BULK HANDLING

03A 179689, 21 188757, 21 196529, 22A 138363, 22A 138400, 22A 179677, 22 186247, 22 189814, 22 190270, 22 190322, 22 190352, 22 190429, 22 195716

BULK MATERIALS

21 195743, 22 195072, 22 197016

BULK TRAFFIC

20 180409, 20 189805, 20 191160, 20 195104, 21 194662, 22A 138481, 24 189074

BULK UNLOADING SYSTEMS

22 193760, 22 193766

BURLINGTON NORTHERN

01 194496, 08A 185241, 10A 058621, 10 196113, 20 196922

BUSES

23 194870

BUSWAYS

15A 179339

C

CAB SIGNALS

04 188997

CABLE LAYING TRAINS

06 189016

CABLE STAYED BRIDGES

00 183789, 00 194145, 11A 156700

CABLE SUSPENSION GUIDEWAYS

11 186863, 11 197319

CABLES

06 189075, 06 189771, 06 190316, 09A 170603, 09 195695, 09 197421, 09 197422

CABOOSES

12 190537

CALIFORNIA

15 190486, 15 190487, 20 192189

CANADA

02A 196722, 11A 148334, 11A 170593, 20A 083533, 20A 129727, 20A 164822, 20A 179692, 20 195069, 20 195708, 21 195073, 23A 170597, 24 195551, 24 195696, 24 196531, 25 193757

CANADIAN NATIONAL RAILWAYS

01 194628, 21 195073

CANADIAN PACIFIC

01 196105, 21 195073, 24 193756

CANADIAN TECHNOLOGY

00 183801, 03 194643, 09A 196724, 11 186850, 16 194819, 25 191247

CAPACITORS

13 195103

CAPITAL INVESTMENT

18A 129724, 18 195133

CAPITAL REQUIREMENTS

11 197330, 11 197459, 15A 188656, 18 189806, 18 192228, 18A 193780, 18 195722, 18 196101, 18 196585, 20 196116, 20 196922, 20 196923, 21A 196725, 23A 185243, 23A 185244, 24 193751, 24 194855, 24 196977, 24 196978, 24 196986, 25 186632, 25 186635, 25 195057, 25 196570, 25 196571, 25 196976

CAPSULE PIPELINES

11 191664, 11 191665, 11 191667, 11 191668

CAR BODY

04 196460

CAR CLASSIFICATION

03A 159630, 17A 159628

CAR CLEANING

03A 159630

CAR COMPONENT DESIGN

02A 148358, 03A 046502, 03A 138565, 03A 160405, 03A 170604, 03A 170630, 03A 170654, 12A 099389

CAR COMPONENT PERFORMANCE ANALYSIS

02A 170666, 03 053307, 03 053308, 03 053311, 03 053321, 03 053322, 03 053326, 03 053327, 03A 170638, 03A 170641, 03A 170643, 03A 170654, 03A 185234, 03A 188652, 09 196100, 17A 160402, 18 196455, 20 195555

CAR COMPONENTS

03A 138559, 09A 138558, 09 189039

CAR CONSTRUCTION

03 190285

CAR CYCLES

18 196455, 21A 159626, 21A 159627

CAR DESIGN

02A 170661, 03A 059420, 03A 081800, 03A 138565, 03A 170608, 03 193761, 12A 099389, 20 195554, 21 192213

CAR DISTRIBUTION

17A 196731, 21A 185236, 21A 185237, 21A 185238

CAR DUMPERS

20 194631, 22 190322, 22 193766, 22 195062

CAR INSPECTION

03A 138559

CAR LOCATION MESSAGES

17 193722, 17A 196731, 21A 196734

CAR MAINTENANCE

03A 170659, 05 053309

CAR MOVERS

21 196373

CAR POOLS

18 196109, 21A 159627

CAR REPAIR

03A 159630

CAR ROCKING

02 196449

CAR ROOFS

03 189750

Subject Term Index

CAR SCHEDULING
17A 138526

CAR SERVICE RULES
17A 159628, 18 196109, 21 194851

CAR SHORTAGE
 22 195689, 22 195690, 22 195691, *22A 196122*

CAR SUPPLY
17A 159628, 18 196109, *21A 159624*, *24A 159629*, 24 194855

CAR TRUCKS
03A 172456

CAR UTILIZATION
 18 195552, 18 196109, 18 196455, *21A 159624*, *21A 159626*, 21 190826,
22A 138368, *22A 138400*, *22A 138481*, 24 189028, 24 193756, 24 196985,
 26 191943

CARBODY
03A 081800, 03 190359, 03 196993, 04 190363, 04 190364, 04 190365,
 04 195544

CARBON MONOXIDE
 10 193764

CARBON STEELS
 09 196980

CARBUILDERS
 03 195099, 20 194598, 24 193751

CARDAN SHAFTS
 02 190298, 04 190351, 04 195118

CARGO SECURITY
 26 186492

CARGO THEFT
 26 186492

CARGO TRANSPORTATION
 11 191664, 11 191668

CARLOADINGS
17A 196731, 18 195700, 22 195691

CASH FLOW
 01 189066, 18 193742, 18 196101, 18 196585

CAST STEEL
 09 193747, 09 196452, 09 196453

CAST STEEL WHEELS
 12 192347

CASTINGS
 09 053312, 09 191093, 09 193747, 20 195730

CASUALTIES
 07 192096, 08 195702, 12 189784, 12 190901, 12 192347, 12 194860,
 12 195677, 12 195703, 12 195704, 12 196681, 24 195682

CATENARY DESIGN
13A 179334, 13 194505

CATENARY INSPECTION CAR
 13 194672, 13 194874, 13 195131, 13 195687

CATENARY SYSTEMS
 04 191751, 04 191752, 04 191754, 06 053331, 13 053316, *13A 170653*,
 13 189738, 13 189777, 13 189778, 13 189783, 13 191355, 13 194505,
 13 194510, 13 194635, 13 194654, 13 194874, 13 194876, 13 195086,
 13 195089, 13 195108, 13 195124, 13 196382

CEMENT TRAFFIC
 20 189805, 22 189002

CEMENTS
 00 185578

CENSUS DATA
 20 194858, 20 195730

CENTER BINDING
01A 196735

CENTER BUFFER COUPLERS
 03 053307, 03 053308

CENTER BUFFERS
03A 170641

CENTER PLATE WEAR
03A 081787, 03 195111

CENTRALIZED CONTROL SYSTEMS
 06 194688, 06 195079

CENTRALIZED DISPATCHING
06A 136338, 06 189060, 06 195079, 06 196539

CENTRALIZED SUBSTATION CONTROL
 13 188999, 13 189739, 13 195718, 13 196946, 13 196947

CENTRALIZED TRAFFIC CONTROL
06A 160400, 06 188998, 06 189060, 06 191738, 06 195719, 06 196539,
 06 196948, 06 197002, 09 196388, 11 196467, 13 195718, 17 190272,
 23 189785

CHANNEL TUNNEL
 00 197291

CHEMICAL ANALYSIS
 09 190355

CHEMICAL COMPOSITION
 09 053312

CHEMICAL GROUTING
 00 185578, 01 189042

CHEMICALS
 00 189020, 09 190664, 22 189038, *22A 195928*

CHEMICALS TRAFFIC
 20 194857, 20 196424

CHESSIE SYSTEM
 02 196989, 06 189060

CHICAGO
 11 191664, 11 191665, *15A 192693*, 16 186430, 16 197272, *21A 196742*

CHICAGO SOUTH SHORE AND SOUTH BEND RAILROAD
 08 194852

CHICAGO TERMINAL AREA
21A 138527

CHICAGO TRANSIT AUTHORITY
 00 193749, 10 191677, 12 197359, 12 197371

CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC RAILROAD
03A 148336

CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD
 01 189004

CHINESE PEOPLE'S REPUBLIC RAILWAYS
 23 186458, 24 189031, 24 195094, 25 191587

CHOPPER CONTROL
 06 194502

CHOPPERS
 03 194132, 04 188996, 04 194671, 04 195059, 04 196460, 04 196929,
 04 196938, 04 196940, 04 196944, 09 196388

CIRCUIT BREAKERS
 13 194876

CIRCUIT DESIGN
 06 053328, 06 053329, 06 191738

CIRCUIT PROTECTION
 13 194876

CLASSIFICATION YARDS
 00 190347, *02A 179333*, 05 197008, *06A 159656*, *06A 159657*, *06A 170629*,
17A 196726, *21A 170620*, 21 193755, *21A 196734*, 21 197014, 24 196978

CLAW-POLE MOTORS
11A 058273

CLAYS
 00 188990, 00 189767, 00 197281

CLEANING
 13 194654, *22A 195927*

CLEARANCES
 01 194674, 13 195086

CLEVELAND TRANSIT SYSTEM
 03 194132, 10 191431

COAL
 16 185817, *16A 196743*, 22 190352

COAL MINING
 20 191286, 20 191901, 20 195710, 21 196529

COAL RESOURCES
 20 185866, 20 185916, 20 185917, 20 186574, 20 186684, 20 186689

COAL TRAFFIC
08A 185241, 10 186686, 10 196113, *20A 136085*, *20A 185240*, 20 185629,
 20 185651, 20 185655, 20 185866, 20 185960, 20 185961, 20 185962,
 20 185963, 20 186380, 20 186383, 20 186423, 20 186684, 20 188532,
 20 190164, 20 190768, 20 190790, 20 191159, 20 191160, 20 191181,
 20 191275, 20 191286, 20 191474, 20 191867, 20 191870, 20 191872,
 20 191877, 20 191901, 20 192118, 20 192189, 20 193765, 20 194124,
 20 194127, 20 194631, 20 195068, 20 195553, 20 195554, 20 195555,
 20 195556, 20 195708, 20 195710, 20 195728, 20 195729, 20 196108,
 20 196114, 20 196115, 20 196116, 20 196363, 20 196922, 20 196923,
 20 196926, 21 190826, 21 196364, 21 196523, 22 174305, 22 189038,
 22 189055, 22 190322, 22 190323, 22 190324, 22 190325, 22 190371,
 22 190372, 22 190912, 22 193766, 22 193774, 22 195062, 22 195072,
 22 195102, 22 196395, *24A 179528*, 24 189074, *25A 179347*, 26 190327

COATINGS
 04 190278, *09A 136093*, 09 190664, 22 186335

COAXIAL CABLE
 06 189075, 06 190309, 06 190316, 06 195066

COLD WEATHER OPERATIONS
 00 193845, 00 197414, 01 194494, 01 194628, 12 193879, 22 189038,
 22 195072

COLLECTIVE BARGAINING
 24 196362

COLLISION AVOIDANCE
 06 185686

Subject Term Index

COLLISIONS

00 183803, 00 188833, 03 196377, 12 190535, 12 190536, 12 190537,
12 190538, 12 190539, 12 195703, 12 195704

COLOMBIA

24 194879

COLOR PERCEPTION

07 186143

COLORADO

25A 153574

COMBUSTION PROCESSES

04 190269, 04 190396, 04 194816

COMMAND AND CONTROL SYSTEMS

06A 196719, 11A 059365, 11A 135604, 12A 099389

COMMODITY FLOW PATTERNS

17A 059062, 17 189818, 20 186407, 20 194602, 20 194857, 20 194858,
20 195069, 22 186405

COMMODITY STATISTICS

11 191666, 18 186406, 18 195698, 18 195700, 20A 058467, 20A 059960,
20A 129727, 20A 164822, 20A 179664, 20A 179665, 20A 179666, 20A 179667,
20A 179678, 20A 179692, 20 180409, 20 194597, 20 194602, 20 195705,
22A 179669, 22A 179680, 22A 179686, 22A 179690, 22A 179693, 22A 179694,
22A 179695, 22A 179696, 22A 179697, 22A 179698, 24A 179528, 24A 179673,
25A 156707, 25A 157601

COMMUNICATION SYSTEMS

06A 170635, 11A 059365

COMMUNICATIONS

06 194503, 06 194656, 06 196539

COMMUTATORS

04 196941

COMMUTER CARS

03A 138537, 03 189794, 03 191670, 03 194641, 04 196940

COMMUTER RAILROADS

07A 196746, 07A 196747, 12 190881, 13 191730

COMMUTER SERVICES

03 194677, 06 190317, 15 190263, 16 186430, 16 197272, 23 191936,
23 194131, 23 194867, 23 197003, 24 194144, 25 191689, 26 185409

COMPETITION

18 189789, 20 189053, 20 189072, 20 189864, 20 191737, 20 192189,
20 195068, 21A 193785, 24A 156651, 24A 179528, 24 189074, 24 193752,
24 195541, 24 195551, 24 196103, 25 193757, 25 196875

COMPETITIVE MODES

10 186686, 11 191664, 11 191665, 11 191666, 11 191667, 11 191668,
11 197459, 12A 148324, 12 195704, 15 197485, 16 189011, 16 189049,
16 189774, 16 191921, 16 193758, 16A 193782, 16 194868, 16A 196727,
16 196979, 16 197272, 16 197420, 18 185783, 18 185784, 18 185810,
18 185811, 18 189804, 18 190909, 18 195706, 18 196530, 19 194130,
20A 179679, 20 180409, 20 185655, 20 185960, 20 185961, 20 185962,
20 185963, 20 188332, 20 188532, 20A 188659, 20 189865, 20 190208,
20 190261, 20 194871, 20 196108, 20 196424, 20 196923, 21 196523,
22A 135001, 22A 153666, 22A 179670, 22A 179674, 22A 179680, 22A 179693,
22 186247, 22 186402, 22 190912, 22 193774, 23A 177691, 23 191758,
23 194870, 23 195678, 23 196469, 23A 196744, 23 197282, 24A 170612,
24A 179673, 24 189030, 24 194144, 24 194853, 24 194861, 24 196930,
24 197006, 25A 156707, 25A 157601, 25 188152, 25 189050, 25 189051,
25 189762, 25 189798, 25 190769, 25 191629, 25 191689, 25 192039,
25 196112, 25 196570, 25 196571, 25 196976, 25 197292, 26 190327

COMPOSITE MATERIALS

09A 179345, 09A 179346, 13 191730

COMPOSITION BRAKE SHOES

05 053309, 05A 170652, 05 194511, 12 192347

COMPRESSED GASES

12 190321, 12 190738, 12 191914

COMPUTER ANALYSIS

11A 159662, 12A 138531

COMPUTER APPLICATIONS

01A 179330, 03 189810, 03 197441, 06A 170650, 06 189013, 06 189060,
06 195080, 06 195117, 06 196407, 06 196539, 06 196714, 06 197002,
06 197286, 13 189739, 17A 159631, 17 190272, 17A 192818, 17 193722,
17 194689, 17A 196731, 17 196928, 21A 188662, 21 189752, 21 194133,
21A 196733, 26 189839, 21A 196734

COMPUTER GRAPHICS

09 186569

COMPUTER MODELS

02A 099390, 20A 164822

COMPUTER PROGRAMS

00 183741, 00 183798, 00 192083, 01A 170783, 02A 081803, 02 183782,
02 186848, 02A 188653, 02 189062, 02 190292, 02 194877, 02 196447,
02 196448, 02 196449, 02 196451, 02 196454, 02 196983, 02 196990,
02 196991, 03 189064, 03 189065, 03 196377, 03 197441, 08A 159644,

09 185793, 09 185796, 10A 188673, 13A 170609, 17A 059062, 17A 159648,
17 185591, 17A 192818, 17A 196741, 17 197510, 21 189752, 21 192031,
21 195113, 22 195076, 24 196985, 26 186473

COMPUTER SYSTEMS

26A 058329

COMPUTERIZED CONTROL SYSTEMS

02A 058263, 06A 136338, 06 189753, 11A 135604, 17A 138526

COMPUTERIZED SIMULATION

00 192081, 00 192082, 00 192083, 02 189800, 02 190295, 02 190296,
02 195083, 02 195116, 02 195143, 03A 170665, 04 193768, 04 194633,
06 196380, 08A 159644, 10A 196753, 11A 148346, 11 189816, 11 189817,
11 190281, 12 190536, 13 189783, 13 195711, 16A 148321, 20A 179678,
21 192031, 21 196381, 21A 196725, 21 196982, 22 195072, 23 189785

COMPUTERIZED TRAFFIC CONTROL

06A 196718, 06A 196719, 06 197002

CONCRETE BEAMS

09 185483

CONCRETE BRIDGES

00 183745, 00 183746, 00 183777, 00 185578, 00 191772, 00 193721

CONCRETE CROSS TIES

01A 139165, 01A 170607, 01 189003, 01 189047, 01 190318, 01 192246,
01 193745, 01 194628, 01 194637, 01 195109, 01 196397, 01 196535,
01A 196735

CONCRETE GIRDER BRIDGES

00 183775, 00 183780, 00A 188668

CONCRETE PILES

00 183797

CONCRETE SLAB TRACK

01A 139165, 01A 170625, 01 194674, 01 195688, 01 196535, 10 197007

CONCRETE SLABS

00 183758, 00 183759, 00 183760, 00 183763, 00 190348

CONCRETE STRUCTURES

00 191772, 09A 135495, 13 194505

CONCRETE TUNNEL LINERS

00A 179326, 00A 179329, 00A 188666, 00A 188670, 00 191405, 00 194136,
00 195074, 00 197280

CONCRETES

01 194637

CONDUCTOR COLLECTOR DYNAMICS

13 053316, 13A 170653, 13 189738, 13 189783

CONGLOMERATES

24 196358

CONNECTICUT

00A 185235

CONNECTORS

18 196455

CONRAIL

01A 188649, 01 195681, 04 191751, 04 191752, 04 191754, 13A 179334,
21A 185237, 21A 188662, 24A 156651, 24 190771, 24 192061, 24 193744,
24 194853, 24 195542, 25A 156676

CONSOLIDATIONS

24 193743, 24A 193779

CONSTRUCTION

00 190348, 06 194503

CONSTRUCTION PROJECTS

00A 138532, 00 189069, 00 189764, 00 189815, 00 190267, 00 192081,
00 192082, 00 195078, 00 196355, 00 196622, 00A 196752, 00 197344,
00 197460, 15A 129701, 15A 179331, 15A 188644, 15 190485, 17A 159648,
18 192228

CONTACT WIRES

13 194510, 13 195089, 13 195108, 13 195124, 13 195687

CONTAINER CARS

03A 172456, 21A 160398, 22 053313, 22 186466

CONTAINER DESIGN

03A 179689, 03A 195918, 21 186994

CONTAINER HANDLING

12 194337, 21 193771, 21 194313, 21 195743, 21 197275, 21 197288,
22 194678

CONTAINER INVENTORY CONTROL

17 189027, 17A 196741, 21 192888

CONTAINER ON FLAT CAR

03A 059420, 03A 179689, 03 196369, 12 194337, 21 186994, 21 189766,
21 192213, 22 194678

CONTAINER PORTS

21 193771

CONTAINER STANDARDIZATION

22 053313

CONTAINERIZATION

20 180409, 21A 160398, 21 186994, 21 189766, 21 192213, 21 195743,
21 197275, 22A 099624, 22A 138400, 22A 153666, 22A 156972, 22 190262,
22 191106, 22 196528, 24 189760

Subject Term Index

- CONTAINERS
03A 172456
- CONTAMINANTS
16 197013
- CONTAMINATION
22A 179676
- CONTRACT RATES
20 189052
- CONTRACTORS
00 197460, 24 192061
- CONTROL AND COMMUNICATIONS
11A 135604, 23A 099391, 24 195696
- CONTROL EQUIPMENT
04 196992
- CONTROL SYSTEMS
04 190315, 06A 160400, 06 190320, 06 194681, 06 194688, 06 195719, 06 196379, 06 196714, 11 190280, 11 194659, 11 196457, 11 196458, 11 196459, 11 196464, 11 196465, 11 196466, 11 196468, 11 196520, 13 195718, 17 190272, 21A 170664
- CONVERTERS
04 190332, 04 190338, 04 194671, 04 195084, 04 196939, 13 196462, 13 196936
- CONVEYORS
11 194687
- COOLING SYSTEMS
04 190396, 04 195544
- CORN TRAFFIC
22A 179668, 22A 179669, 22A 179686, 22A 196120
- CORRIDORS
00 189069, 00 189757, 00 194878, 02 196990, 02 196991, 11A 170593, 11A 193781, 20A 153650, 23A 188660, 24A 170612, 25 195543
- CORROSION
01 189047, 09 189792, 13 189021
- CORROSION PROTECTION
00 183763, 13 196392
- COST ACCOUNTING
17A 159648
- COST ANALYSIS
00 185674, 00 185675, 00 185677, 00 192081, 00 192082, 01A 148355, 01 189066, 03A 165811, 11 190330, 11 191665, 11 191666, 11 191668, 11 197330, 17A 196741, 18A 129724, 18A 129729, 18A 138514, 18A 159635, 18A 177624, 18A 193786, 18 194675, 18 195700, 18 195706, 18 196872, 18 196873, 20A 083533, 20A 156591, 20A 179667, 20 190790, 20 191181, 20 191275, 21A 159626, 21 196364, 21 196523, 21 196982, 22A 083506, 22A 083511, 22A 099639, 22A 099642, 22A 153674, 22 185883, 22 185948, 22 186466, 22 186827, 24 194879, 24 196103, 24 196985, 24 196986, 24 196996, 25A 059207, 25 196877
- COST CONTROL
00 189006, 00 194155, 00 195078, 01 196105, 01 196401, 03 197453
- COST EFFECTIVENESS
00A 135550, 01 195093, 02A 081805, 06A 159657, 06 190329, 08A 153623, 08A 193281, 15A 188656, 23 186869, 23 186870, 25A 188665
- COST ESTIMATES
00 189815, 00 192081, 00 192082, 00 192083, 00 195727, 00 197344, 01A 148355, 11 194687, 11 197459, 18 192228
- COST FINDING
01 183907, 01 195547, 18 190909, 18 196102, 18 196374, 21A 193785, 23 195545, 24 195551
- COSTS
11A 058375
- COUPLER DESIGN
02A 081796, 03 053307, 03 053308, 03A 081786, 03A 081801, 03A 170643, 03A 170665, 05A 157901
- COUPLER FAILURE
03A 081786
- COUPLER FORCES
02A 157664, 02A 179333, 02A 188653, 02 189062, 02 189063, 02 189801, 02 190289, 02 191481, 02 196451
- COUPLER SAFETY RESEARCH AND TEST PROJECT
03A 081786, 03A 081801
- COUPLERS
02A 058257, 03A 170643, 03 196984, 03 196993
- COVERED HOPPER CARS
03A 148336, 21 194851, 22A 179676, 22 189002
- CRACK PROPAGATION
00 183753, 00 183754, 00 183755, 00 193749, 00 195906, 01 196389, 03 193767, 09 169393, 09 191528, 09 191957, 09 193747, 12 192347
- CRANKSHAFTS
04 197273
- CRASHWORTHINESS
03A 138565, 03 189070, 03 196377, 12A 059864, 12A 099392, 12A 138531, 12 190535, 12 190536, 12 190537, 12 190538, 12 190539, 12 194859, 12 194860
- CREEP
02 053315
- CREEP COEFFICIENT
02 053320
- CREOSOTING
09A 136093
- CRIME PREVENTION
12 190881, 26 186492
- CRITICAL PATH METHOD
17A 159648
- CRITICAL SPEED
02 053320, 02 189800, 02 190292, 02 196447, 02 196448, 02 196454
- CROSS LEVEL
02 196524
- CROSS TIE DESIGN
01A 138568, 01A 179687, 01 194637, 01 194648, 01 195109, 02 190333, 09A 179691
- CROSS TIE DETERIORATION
01 195549, 01 196396
- CROSS TIE DISPOSAL
01A 138568, 09A 179691
- CROSS TIE PRESERVATION
01 196396
- CROSS TIE REPLACEMENT
01A 188648, 01 189005, 01 189037, 01 195549, 01 196356
- CROSS TIE SPACING
01 196106, 02 190333
- CROSS TIES
01A 138564, 01A 188667, 01 189004, 01 189047, 01 190318, 01 192246, 01 196106, 01 196450, 20A 138367
- CROSSINGS
00 195065
- CROSSOVERS
01 053324, 01A 170636
- CRT TERMINALS
17A 196731
- CRYOGENICS
11 196532, 12 191914
- CULVERTS
00 196626, 00 196932, 01 193753
- CURVE NEGOTIATION MECHANICS
02A 170644, 02A 188653, 02 189018, 02 190287, 02 190300, 02 190304, 02 190358, 02 190360, 02 194869, 02 195092, 02 195136, 03A 138796, 03A 170617, 03 189813, 03 194642, 11 196466
- CURVED TRACK
01 193748, 01 195549, 02A 170644, 02 190300, 02 196357, 12 192094
- CURVES
02 191066, 02 196989
- CUSHIONING
02A 081796, 02 189801, 02 190289, 03A 081801, 03A 170641
- CUT AND COVER TUNNELING
00 189006, 00 189009, 00A 196750, 15 190485
- CYLINDER LINERS
09 195715
- CYLINDRICAL WHEELS
02 190297, 02 191335
- CZECHOSLOVAK STATE RAILWAYS
04 197005, 24 195126

D

- DALLAS-FORT WORTH AIRPORT
11 190971, 11 193899, 11 197330, 11 197358
- DAMAGE ANALYSIS
00A 138477, 22A 083516
- DAMPERS
03 194660, 04 197273
- DAMPING
02 189800, 02 190288, 02 190289, 02 190297, 10 190503, 10 195707, 10 197157, 11 190279, 11 195087
- DANISH TECHNOLOGY
13 189739
- DATA ACQUISITION
25A 153574
- DATA BASES
20 194602
- DATA COLLECTION
00A 153558, 00A 185235, 01A 058458, 01A 059295, 01A 099378, 01A 185232, 01A 185233, 01A 188649, 01A 193778, 01 194650, 02A 058465, 02A 099367, 02A 157664, 02 194647, 02 195101, 03A 099382, 03A 185234, 03A 188652,

Subject Term Index

- 03 195111, 04 194816, 11A 196738, 11A 196739, 12A 135596, 12A 138531, 12 190536, 12 193741, 15A 179331, 15 197340, 17A 159631, 17 183740, 17A 188645, 17A 188651, 17 193759, 17 193773, 20A 058467, 20 186574, 24A 159629, 25 190313, 26 189839
- DATA COMMUNICATION**
06 053328, 06 053329
- DATA EXCHANGE**
06 053328
- DATA MODEMS**
06 053328, 06 053329, 06A 170628
- DATA PROCESSING**
01A 138560, 01A 179330, 01A 188658, 01A 193778, 01A 196737, 02 191066, 02 194647, 02 195114, 06A 170628, 09 185793, 10 189743, 12 190535, 12 190536, 12 190537, 12 190538, 12 190539, 13 195718, 17A 160402, 17A 188651, 17 193722, 17 193773, 17 196534, 17A 196726, 17A 196731, 17 196928, 23 197455, 26 192074, 26 192075
- DATA SERVICES**
17A 160402
- DATA TRANSMISSION**
05 195070, 06 053306, 06 053328, 06 053329, 06A 170628, 06A 170635, 06 189075, 06 189771, 06 190309, 06 195066, 06 195080, 06 195119, 06 195720, 06A 196719, 09 189035, 13 196946, 17A 138526, 17A 159631
- DC ELECTRIFICATION**
04 194875, 04 197005, 06 194656, 13 188999, 13 189021, 13 196947
- DC TRACTION MOTORS**
04A 193777, 04 196941, 16A 128051
- DECARBURIZATION**
09 193747
- DECAY**
06A 196730, 22A 179676, 22A 196120
- DECELERATION**
04 197285, 05A 081802, 05 191446, 07 197009
- DECISION MAKING**
18A 138514, 22A 153674, 25A 185242, 25 186867, 25 191689
- DECK GIRDER BRIDGES**
00 183758, 00 183759, 00 183760
- DEFERRED MAINTENANCE**
24A 159650
- DEFICITS**
23 193770, 24 190771, 25A 179347, 25 189765, 25 196870, 25 196871
- DEFORMATION**
09 191902
- DEICING**
11 193899, 11 193900, 11 193901, 13 191730
- DELAWARE AND HUDSON RAILWAY**
24A 156651
- DELAYS**
22 195689, 22 195690
- DEMAND CHARGE**
18 196927, 22A 179686
- DEMURRAGE**
21A 159627
- DEPARTMENT OF TRANSPORTATION**
25 196112
- DEPRECIATION**
18 194675, 18 196101
- DERAILMENT PREVENTION**
02A 170644, 02A 170660, 05 196949, 07A 170662
- DERAILMENT QUOTIENT**
01A 059223, 02A 148358, 02A 170660, 02 189062, 02 196451
- DERAILMENTS**
01A 138563, 02A 058465, 02A 099390, 02 196989, 03A 099439, 03 189070, 03 196984, 08A 159644, 08A 196720, 09 190342, 10 186798, 12A 099424, 12A 099436, 12A 135599, 12 185875, 12 190535, 12 190536, 12 190537, 12 190538, 12 190539, 12 192094, 12 192347, 12 193741, 12 195703, 12 195704, 24 192061, 24 195682
- DEREGULATION**
20A 156591, 20 189052, 20 191870, 20 196424, 24A 179528, 24 189074, 24 193743, 24 194861, 24 195551, 25A 128852, 25 185585, 25 189050, 25 189051, 25 189751, 25 193757, 25 194639, 25 195064, 25 196570, 25 196571, 25 196875, 25 197335
- DESIGN**
06 194503
- DESIGN CRITERIA**
00A 059406, 00A 138532, 00A 179326, 00 183751, 00 183772, 00A 188671, 02A 170661, 02A 170663, 02A 170666, 03A 159630, 03A 160405, 03A 165811, 03A 170601, 03A 170630, 03 194673, 04 190306, 04 194501, 06 189754, 09 191528, 09 193769, 09 194135, 09 196388, 10A 188673, 11A 159659, 11A 170605, 11 197417, 12 190535, 12 190536, 12 190537, 12 190538, 12 190539, 12 192146, 21A 170620, 22 190270, 23A 058757, 23A 185231
- DETECTOR CARS**
01A 099394
- DETECTOR SYSTEMS**
02A 058465, 06A 159657
- DETECTORS**
00 183803, 00 193486, 03A 055916, 03A 099439, 03A 138559, 03 190343, 03 196984, 06 185686, 06 190329, 09A 138557, 09 195695
- DETROIT, TOLEDO AND IRONTON RAILROAD**
21 190826
- DEVELOPING NATIONS**
06 189807, 18 189796, 18 189806, 24 189799, 24 194879, 25 189797, 25 189798
- DIAGNOSTIC TECHNIQUES**
04A 193777, 04 196994, 06A 196719, 11A 170621, 17 193759
- DICTIONARIES**
26 185409, 26 196111
- DIESEL ELECTRIC LOCOMOTIVES**
02 190299, 02 190360, 02 194630, 03 196359, 04A 099377, 04 190344, 04 190363, 04 190364, 04 190365, 04 190367, 04 191750, 04 191753, 04 191754, 04 194501, 04 195125, 04 195544, 04 196537, 04A 196721, 04A 196748, 04 196988, 04 196992, 09 196100, 13 190368
- DIESEL ENGINE DIAGNOSTICS**
04 197273
- DIESEL ENGINE EXHAUST EMISSIONS**
04A 099377, 04 190306, 10 053314, 10 193764
- DIESEL ENGINE MAINTENANCE**
04 190306, 04 197273, 16 194819, 16 196516
- DIESEL ENGINE NOISE**
10 197157, 10 197274
- DIESEL ENGINE REBUILD SHOPS**
04 190367
- DIESEL ENGINES**
04A 179335, 04 190278, 04 190306, 04 190363, 04 190364, 04 190369, 04 190396, 04 193763, 04 194816, 04 194864, 04 195544, 04 196935, 04 196992, 04 197273, 09 195715, 10 053314, 16 189014, 16 190353, 16 194819, 16 196123
- DIESEL EXHAUST EMISSIONS**
10 185707, 10 190350, 16A 196749
- DIESEL FUELS**
10 193764, 16 190354, 16 195135, 16A 196743, 16A 196749, 16 197013
- DIESEL LOCOMOTIVE MAINTENANCE**
04 190367
- DIESEL LOCOMOTIVE MAINTENANCE COSTS**
16 190354
- DIESEL LOCOMOTIVES**
04 190363, 04 190365, 04 190369, 04 194501, 04 194872, 04 196935
- DINING CARS**
19 195697
- DIODES**
04 194671
- DISASTER PREVENTION SYSTEMS**
00 195684
- DISC BRAKES**
03A 170630, 05 053309, 05A 170652, 05 191446
- DISPATCHING**
06 189060, 06A 196718, 06A 196719, 06 197002, 21 192031, 21 194686, 23 189785, 23 196533
- DOCUMENTATION**
02 196451, 06A 138529, 12 190539, 21 196982, 26A 099429, 26 190335
- DOOR OPERATING MECHANISMS**
03 189794, 04A 193777
- DOUBLE TRACK**
00 196931, 00 197290, 21A 196725, 21 197000, 23 196533
- DOWTY RETARDERS**
21 193755
- DRAFT GEARS**
02A 058257, 02A 081796, 02A 170666, 02 189801, 02 190289, 03A 081801
- DRAINAGE**
00 189067, 00 189759, 00 191675, 00 194865, 00 196353, 00 196354
- DREDGING**
22 186247
- DRUGS**
07A 148352
- DUAL POWERED COMMUTER CARS**
03A 138537
- DUAL POWERED LOCOMOTIVES**
04 191750, 04 191751, 04 191752, 04 191753, 04 191754, 04A 196748
- DUAL VOLTAGE**
04 196942
- DUAL VOLTAGE LOCOMOTIVES**
04 195060, 13 194635

Subject Term Index

DUNNAGE
03 189748, 22 186235, 22 186333, 22 186334, 22 186335, 22 186336

DUTCH TECHNOLOGY
00 195145

DYNAMIC ANALYSIS
00 185286, 00 189793, 02A 059427, 02A 160409, 02A 170660, 02A 170666,
02 183782, 02A 188653, 02 189800, 02 190282, 02 190296, 02 191290,
02 195092, 02 195115, 02 195123, 02 195143, 02 195692, 02 196378,
02 196447, 02 196449, 02 196454, 03A 170617, 03 189065, 09 169393,
11 186863, 11 190281, 11 195087, 11 197319, 12A 135719, 13 189783

DYNAMIC BRAKING
11A 196739

DYNAMIC LOADING
00A 170633

DYNAMIC STRUCTURAL ANALYSIS
09 190741

DYNAMIC TESTS
03 053326, 13 189738

DYNAMICS
03A 081798, 24 194638

DYNAMOMETERS
02 195082, 02 195083, 05 053309, 05 197015

E

EARTH PRESSURE
00A 135658, 00 189776

EARTHQUAKE RESISTANT STRUCTURES
00A 177845

EARTHQUAKES
00 183777, 00 191482

EASTERN STATES
20 185960, 20 185961, 20 185962, 20 185963, 20 195553

ECOLOGY
10A 179685

ECONOMETRIC MODELS
20 185651, 20 195069

ECONOMIC ANALYSIS
01A 185232, 02A 081805, 04 191750, 04 191751, 04 191752, 04 191753,
04 191754, 11A 170593, 13A 179334, 13 189068, 13 190334, 13 190368,
15 190906, 18A 138514, 18A 159635, 18 185783, 18 185784, 18 185810,
18 185811, 18 186641, 18 189804, 18 190909, 18 193742, 18A 193780,
18A 193786, 18 194666, 18 194675, 18 194676, 18 195133, 18 195140,
18 196101, 18 196102, 18 196455, 18 196530, 18 196927, 20A 136085,
20 185890, 20 188532, 21 192213, 22A 083516, 22A 156972, 22A 157092,
22A 179686, 22 185690, 22 185691, 22 186247, 22 195689, 22 195690,
23 197282, 24A 179528, 24 194879, 24 195696, 24 196986, 25A 058753,
25A 099365, 25A 185242, 25 186632, 25 186635, 25 190313, 25 196870,
25 196871, 25 197335, 26 191943

ECONOMIC DEVELOPMENT
18A 080324, 18 189796, 20 191278, 20 191279, 24A 170612, 25A 193783

ECONOMIC FACTORS
18A 080324

ECONOMIC IMPACT
08 197314

ECONOMICS
18A 080324, 26 190327

EDDY CURRENT BRAKES
05 191446

EDDY CURRENT INSPECTION
01 189043

EDUCATION
17A 192818, 24 195682

EFFICIENCY
04 189032, 05 195100, 11A 058273, 16A 148321, 18A 129729

EIGHT AXLE LOCOMOTIVES
02 190360

ELASTIC PROPERTIES
01A 196723, 01A 196735, 02 195092, 09 191902

ELASTOMERS
03A 170641, 09 189039

ELECTRIC ARCS
02 053315

ELECTRIC BRAKES
04 196942, 05 195100

ELECTRIC CARS
04 189742, 04 195088, 04 195127, 04 196537, 05 195138

ELECTRIC HEATING
11 193900, 22 189038

ELECTRIC LOCOMOTIVES
02 189755, 02 194630, 02 196398, 03 194646, 04 189024, 04 189740,
04 189742, 04 190344, 04 190366, 04 191751, 04 191752, 04 191754,
04 194500, 04 194872, 04 194875, 04 195060, 04 195085, 04 195105,
04 195132, 04 196367, 04 196368, 04 196384, 04 196404, 04 196517,
04 196537, 04A 196748, 04 196988, 04 197005, 06 188998, 09 196100,
13A 170609, 13 189068, 13 195058, 13 196372, 13 196519, 16 189768

ELECTRIC MOTORS
04A 196717, 06 189754

ELECTRIC MULTIPLE UNIT CARS
04 195084, 04 195693, 04 195694, 04 196460, 04 196938, 04 196940,
09 196100

ELECTRIC MULTIPLE UNIT TRAINS
13 196371

ELECTRIC POWER COLLECTION
04 195105, 11 193901, 13A 170653, 13 189017, 13 189738, 13 189777,
13 189783

ELECTRIC POWER GENERATION
20A 185240, 20 185651, 20 186423, 20 186684, 20 186689, 20 191181,
20 191275, 20 191474, 20 191867, 20 191877, 20 195555, 20 195556,
22 195062

ELECTRIC POWER SUPPLY
03A 170647, 04A 058280, 04 196370, 04 196944, 05 195100, 05 195713,
13 053316, 13 053325, 13A 179334, 13 188999, 13 189022, 13 189739,
13 191730, 13 194670, 13 194873, 13 195103, 13 195711, 13 195718,
13 196365, 13 196371, 13 196386, 13 196403, 13 196462, 13 196936,
13 196937, 13 196946, 13 196947

ELECTRIC PROPULSION
03A 138537, 04A 058270, 06 194502, 11A 058273, 16A 148321

ELECTRIC RELAYS
03A 170647

ELECTRIC TRACTION
04 194500, 06 194502, 13A 170609, 16 192123

ELECTRIC TRAINS
03 196538, 04 196998, 17 193759

ELECTRIC TRANSMISSION LINES
13 196365, 13 196403

ELECTRICAL CONTROLS
04A 196717, 04 196994

ELECTRICAL EQUIPMENT HAZARDS
09A 170603

ELECTRICAL INSULATIONS
04 196461, 09A 170603, 09 195695, 09 197421, 09 197422

ELECTRICAL INTERFERENCE
04 196384, 06A 170635, 06A 170650, 06 194502, 06 195119, 06 195720,
13 053325, 13 189022, 13 196382, 13 196403

ELECTRICAL POWER CONDITIONING
02 194630, 03 196538, 04A 054561, 04A 058270, 04 189740, 04 190332,
04 190338, 04 190344, 04 190345, 04 193768, 04 194655, 04 194671,
04 195059, 04 195061, 04 195084, 04 195085, 04 195105, 04 195125,
04 195127, 04 195132, 04 195544, 04 195693, 04 195694, 04 196404,
04 196517, 04 196537, 04A 196717, 04A 196721, 04 196938, 04 196939,
04 196940, 04 197005, 05 195100, 10 190328, 11A 196738, 11A 196739,
13 195058, 16A 128051

ELECTRICAL SYSTEMS
03A 170647

ELECTRICAL TRANSIENTS
13 196403

ELECTRIFICATION
01 194674, 04A 058270, 06 188998, 06 189016, 06 195720, 13 053316,
13 053325, 13A 170609, 13A 170653, 13A 179334, 13 189021, 13 189022,
13 189802, 13 191355, 13 191730, 13 194505, 13 194510, 13 194670,
13 194672, 13 194873, 13 194876, 13 195058, 13 195103, 13 195108,
13 195709, 13 195718, 13 196365, 13 196371, 13 196382, 13 196386,
13 196392, 13 196462, 13 196936, 13 196946, 13 196947, 13 196995,
16A 148321, 16 194498, 22 194678, 24A 159650, 24 196531, 25 195107

ELECTRIFICATION PLANNING
13 189041, 13 189068, 13 190334, 13 190368, 13 194635, 13 195711,
13 196372, 13 196519

ELECTROLYTIC CORROSION
13 189021, 13 196392

ELECTROMAGNETIC ACCELERATORS
11 195091

ELECTROMAGNETIC BRAKING
11 195091

ELECTROMAGNETIC INDUCTION
06 189772

ELECTROMAGNETIC INTERFERENCE
06 189016, 06 194656, 10 190328, 13A 179334

ELECTROMAGNETIC RADIATION
00 192188

ELECTRONIC COMPONENTS
04 195084

Subject Term Index

ELECTRONIC CONTROL

03 190339, 03 196943, 04 190315, 04 196370, 04 196394, 04 196942,
05 195138, 06 194681, 06 195081, 06 195142, 06 195720, 06 196539,
06A 196719, 13 194876

ELECTRONIC DATA PROCESSING

06 053329, 17A 159631

ELECTRONIC SAFETY DEVICES

06 053329, 06A 170650

ELECTRONIC SYSTEMS

06 053306, 06 053329, 06A 170650

ELECTRONICS

12 193879

ELECTROPNEUMATIC BRAKES

05A 157901, 06A 196719

ELEVATED GUIDEWAYS

11A 059435, 11 197319

ELEVATED RAILROADS

10 189025, 10 197522

ELEVATED STRUCTURES

00A 138532, 00 183758, 00A 188668, 00 193749, 00 196715, 10A 188647,
10A 188655, 10 191407

EMBANKMENT FAILURES

00 190341

EMBANKMENTS

00A 135658, 00 186243, 00 189757

EMERGENCY PROCEDURES

06 189000, 10A 188673, 11A 159658, 12 186628, 12A 188664, 12 190583,
12 192094, 12 192146, 12 192347, 12 193741, 12 195677, 12 196681,
12A 196740

EMISSION CONTROL EQUIPMENT

04A 099377

EMPLOYMENT GUIDELINES

07 189058

EMPTY CARS

24A 159629

EMPTY-LOAD BRAKES

05A 157901

ENERGY

16 194504, 16 194506

ENERGY CONSERVATION

04A 099377, 04 188996, 04 193763, 04 194633, 04 195059, 04 196394,
04 196522, 04A 196748, 04 196929, 11A 193781, 13 196519, 16A 148321,
16 185618, 16 186430, 16 186471, 16 189040, 16 189768, 16 190303,
16 194498, 16 194504, 16 194506, 16 195135, 16 196979, 16 197342,
18 189796, 20 191870, 22A 179670, 25 192039, 25 197292

ENERGY CONSUMPTION

02A 170594, 02A 170595, 02 196990, 02 196991, 04 195059, 04 195693,
04 196929, 04 197438, 11 197459, 16A 128051, 16 185817, 16 189049,
16 189774, 16 189811, 16 191921, 16 192123, 16 193758, 16 194123,
16 194498, 16 194504, 16 197420, 20 185651, 20 189865, 25 196570,
25 196571

ENERGY CONVERSION

04A 179335, 09A 179346

ENERGY CRISIS

13 189068, 16 194123, 16 194506

ENERGY INTENSIVENESS

04 194864, 04 196929, 10 186686, 11 190330, 15 194862, 16 185618,
16 189011, 16 189040, 16 189049, 16 189774, 16 189811, 16 191921,
16 193758, 16 194868, 16A 196727, 16 196979, 16 197272, 18 185783,
18 185784, 20A 188659, 22 190372

ENERGY POLICY

16 194498, 16 194504, 16 194506

ENERGY REQUIREMENTS

02A 128041, 11 186851, 11 190301, 16A 128051, 16A 148321, 16 194123,
16 194504, 23A 099391

ENERGY RESOURCES

16 191164

ENERGY SHORTAGE

15 193618, 16 186430, 16A 193782, 16A 196743, 16A 196749, 20 195068,
20 196116

ENERGY STORAGE

03A 136342, 04A 054561, 04 185714, 04 185715, 04 190277, 04 191750,
04 191751, 04 191752, 04 191753, 04 191754, 04 191881, 04 192065,
04 193775, 04 193776, 04 196522, 04A 196748, 04 196929, 04 196998,
09A 179346, 09 196472, 16A 128051

ENERGY SUPPLY

16 194690

ENERGY TRANSPORTATION

26 190327

ENGINEERING ECONOMICS

24 194638

ENGINEMEN

07 196361

ENVIRONMENTAL EFFECTS

08A 185241, 09A 136093, 10 053314, 10A 138534, 10A 179685, 10 186613,
10 186657, 10A 188647, 10A 188654, 10A 188655, 10A 188673, 10 189743,
10 189744, 10 189773, 10 190302, 10 191677, 10A 193280, 10 194866,
10 195095, 10 195128, 10 197018, 10 197435, 11 186851, 12A 135594,
16 185618, 18 185783, 18 185784, 18 185810, 18 185811, 20 191867,
20 192118, 20 194127, 22 185883, 22 186392, 22 195716, 22A 196120,
25A 185242

ENVIRONMENTAL IMPACT

00A 136152, 10 186805, 10 190264, 10 196113, 15A 188644, 15A 188656,
15 195139, 20 191159, 20 191160, 20 191181, 20 191275, 20 191870,
20 196923, 22 174305, 22 189055, 23A 185243, 24 196874, 25 196877

ENVIRONMENTAL PROTECTION

00 196402, 02 191535, 03 189070, 04A 054561, 10 195095, 10 196387,
20 191872, 20 193765, 20 195554, 20 195555, 20 195556, 20 196114,
20 196116, 24 194638, 25 192039

EPOXY RESINS

00 183745, 04 196461

EQUATIONS OF MOTION

02 183782, 02 191481, 02 195092

EROSION

00 186293

ESTIMATING

00 192081, 00 192082, 00 192083, 00 195727, 01A 148355, 18A 129729,
18 186406

EUROFIMA STANDARD COACHES

03A 170638

EUROPE

16 194506, 20 194871, 23 194870

EUROPEAN INFRASTRUCTURE MASTER PLAN

24 197001

EUROPEAN RAILWAYS

18 196530, 24 189030, 24 189760, 24 195126, 24 197001, 25 189751,
25 194138

EUROPEAN TECHNOLOGY

01A 188648, 03A 160405, 03A 170643, 03 194132, 03 194644, 03 196369,
11 186850, 13 196462, 21 193755, 25 191247

EXCAVATION TECHNOLOGY

00A 059406, 00A 135516, 00A 135518, 00A 136165, 00A 138532, 00 196625,
00 197344, 00 197445, 00 197446

EXHAUST EMISSIONS

10 186657, 10 192346, 10 193764

EXPANSION JOINTS

00 185286

EXPERIMENTAL DESIGN

06 194503

EXPLOSIONS

00A 135516, 00A 135518, 12A 099424, 12A 099436, 12 185742, 12 190738,
12 194578

EXPLOSIVE EXCAVATION

00A 188643, 00 195075, 00 196623

F

FABRICATION

01 194637, 03 190285

FABRICS

00 189759, 00 194298, 00 194865, 00 195065, 00 196353, 00 196354,
00 196355, 01A 170649, 01A 196745, 02 196357

FAIL SAFE SYSTEMS

06A 138529, 06A 170650, 06 189772, 06 194681, 06 195720, 06 196525,
11 194657, 17 190272

FAILURE ANALYSIS

00 183802, 01 192246, 09 190355

FAILURE MECHANICS

01A 099393, 01A 139165, 03A 055916

FARE COLLECTION

04A 193777

FARES

23 190540

FAST FACILITY

02A 139178, 17A 160402, 21A 170664

FAST TRACK

01A 185233, 01 194497, 02 196357, 24 196104

FASTENINGS

01A 170625, 22 186235, 22 186333, 22 186334, 22 186335

FATALITIES

12 185875, 12 194859, 12 194860

FATIGUE

00 183751, 00 183759, 00 195906, 03 196393, 09 194495, 13 195089

Subject Term Index

- FATIGUE ANALYSIS**
 00 053319, 00 193721, *O1A 139163*, *O3A 081800*, 09 053317, *O9A 138558*,
 09 185793, 09 185796, 09 194495
- FATIGUE CRACK PROPAGATION**
 00 195627, 09 189782, 09 196980
- FATIGUE CRACKS**
 00 183753, 00 183755, 00 183756, 00 193749, 09 169393
- FATIGUE LIFE**
 00 183770, 00 196715, *00A 196736*, *O2A 170666*, 03 189065, 09 193747
- FATIGUE LOADING**
 00 053319
- FATIGUE STRENGTH**
O2A 170663, *O3A 170639*, *O3A 172456*, 09 053317, 09 190319, 09 194495,
 09 196536
- FATIGUE TESTS**
00A 170632, 00 183775, *00A 188668*, 03 053307, 03 053308, *O3A 170639*,
 03 194636, 09 053317, 09 169393
- FAULT CURRENTS**
 13 194876
- FAULT TREE ANALYSIS**
 08 197314, *12A 148324*, 12 190308, 12 192168
- FEASIBILITY STUDIES**
18A 059894
- FEDERAL GOVERNMENT**
 08 194852, 18 193742, 20 191870, 22 185838, 22 185948, 25 191247,
 25 197335, -26 189056
- FEDERAL RAILROAD ADMINISTRATION**
 12 193741, 12 193746
- FEEDER BUSES**
 23 191660, 23 194867
- FERTILIZER**
20A 179664, *20A 179665*, *20A 179666*, *20A 179667*, *20A 179671*, 20 190362,
 20 194664, 21 195550, *22A 138365*, *22A 179669*, *22A 179682*, *22A 179683*,
22A 179684
- FIBER REINFORCED CONCRETES**
00A 188666, 00 191405, 09 185483
- FIBERGLASS REINFORCED PLASTICS**
09A 179345
- FILTER FABRIC**
 00 156837, 00 189067, 00 189759, 00 193754, 00 194298, 00 194865,
 00 195065, 00 196353, 00 196354, 00 196355, 01 195110
- FILTER MATERIALS**
 16 190354
- FILTERS**
 02 196357
- FILTRATION**
 16 190354, 16 196516
- FINANCIAL ANALYSIS**
 24 196930
- FINANCIAL MANAGEMENT**
18A 193780, 18 196101, 18 196585
- FINANCING**
13A 179334, *18A 059894*, *18A 059897*, 23 186869, 23 186870, 24 190771,
 24 193751, 25 191473, 25 192039
- FINITE ELEMENT ANALYSIS**
 00 183779, 00 185674, 00 185675, 00 185677, 00 185892, 00 191405,
00A 196750, 00 197418, *O1A 170783*, 01 194648, *O3A 099382*, 03 189064,
 03 189065, 03 193767, 03 194644, 09 186569
- FINNISH STATE RAILWAYS**
 12 192391
- FINNISH TECHNOLOGY**
 00 189767
- FIRE DETECTORS**
 12 192146
- FIRE FIGHTING**
10A 188673, 12 195677
- FIRE HAZARDS**
 09 195695
- FIRE PREVENTION**
09A 170603, 12 192146
- FIRE RESISTANT MATERIALS**
 09 197421, 09 197422, 22 191465
- FIRE TESTS**
09A 148320
- FIRES**
 10 186798, *12A 099424*, *12A 099428*, *12A 099436*, *12A 135594*, *12A 135599*,
12A 138567, 12 185742, 12 185875, 12 186377, 12 194578, 12 195677
- FLAMMABILITY**
09A 170603, 09 195695, 09 197421, 09 197422, 12 185742, 12 192146
- FLAT CARS**
O2A 160409, 03 189065, 03 194134, 03 196369, 03 196406, 20 189803,
 21 192213, 22 186336, 22 186337
- FLAT WHEELS**
 03 190343, 05 195138
- FLAT YARDS**
 21 195071, *21A 196733*
- FLAW DETECTION**
 09 191093
- FLEET PLANNING**
O3A 159630, *17A 159628*, 18 189789, 18 195722, 18 196101, 18 196109,
 20 191872, *21A 159624*, *21A 159627*, 23 195678, 23 197282, 24 196978
- FLOOD PLAINS**
10A 179685
- FLOODING**
 00 189764
- FLOODS**
00A 153558, 00 195684
- FLORIDA**
 11 186162, *20A 153650*, *22A 138368*
- FLOW DISTRIBUTION**
 22 193760
- FLUID DYNAMICS**
 22 195714
- FLYWHEELS**
O3A 136342, *O4A 054561*, *O4A 058280*, *O4A 099377*, 04 185714, 04 185715,
 04 190277, 04 191750, 04 191751, 04 191752, 04 191753, 04 191754,
 04 193775, 04 193776, 04 196522, 04 196998, *O9A 179346*, 09 196472,
 11 190301, *16A 128051*
- FORECASTING**
00A 153558, 00 196622, *O1A 170618*, *O3A 170665*, 04 194864, 04 195105,
 06 196999, 07 196361, *11A 170593*, 11 194658, 12 194859, 12 194860,
 12 194863, 13 195058, *15A 188656*, 15 190959, 15 193618, 15 194862,
 16 191164, 16 192123, 16 194123, 16 194690, *16A 196743*, 16 197342,
 17 194689, 17 197289, 18 186641, *20A 058467*, *20A 156604*, *20A 179664*,
20A 179665, *20A 179666*, *20A 179667*, *20A 179671*, *20A 179678*, 20 185651,
 20 185916, 20 185917, 20 185960, 20 185961, 20 185962, 20 185963,
 20 186383, 20 186407, 20 186409, 20 186689, 20 189781, 20 189805,
 20 190164, 20 190362, 20 190768, 20 191159, 20 191181, 20 191275,
 20 191278, 20 191286, 20 191474, 20 191589, 20 191877, 20 192118,
 20 192189, 20 193765, 20 194124, 20 194127, 20 194664, 20 194665,
 20 195069, 20 195104, 20 195710, 20 195729, 20 196108, 20 196926,
 21 196364, *22A 135001*, *22A 179657*, *22A 179658*, *22A 179659*, *22A 179660*,
22A 179661, *22A 179662*, *22A 179663*, *22A 179681*, *22A 179683*, *22A 179699*,
 22 186405, 22 189054, 22 195716, *23A 058815*, *23A 177691*, 23 190265,
 23 192058, 23 196945, *24A 159629*, *24A 179528*, 24 189033, 24 190771,
 24 194861, 24 195541, 24 196874, 24 196930, 24 197006, *25A 193783*,
 25 196570, 25 196571, 25 197335, 26 191952
- FOREST PRODUCTS TRAFFIC**
20A 138367, *22A 153666*, *24A 179673*
- FORGINGS**
 09 189034
- FORMULA**
 01 194652, 02 053305, 13 189778
- FORTAN IV**
 02 196983
- FOUNDATIONS**
00A 185230, 00 196470
- FOUR AXLE CARS**
 02 190292, 02 195121
- FOUR AXLE LOCOMOTIVES**
 04 189740
- FOUR WHEEL TRUCKS**
O2A 099390
- FRACTURE ANALYSIS**
 09 190355
- FRACTURE MECHANICS**
O2A 170663, *O3A 099382*, 03 193761, 09 169393, 09 190319, 09 191547,
 09 191957, 09 196453
- FRACTURE TOUGHNESS**
 09 196980
- FREEZE THAW DURABILITY**
09A 135495
- FREEZE THAW EFFECTS**
 01 196107
- FREEZING**
 00 189008, 00 189756, 00 189767, 00 189776, 00 190361, 00 196626,
 01 189047, 01 194494, 22 189038, 22 195072, 22 197016, 24 195696
- FREIGHT CAR CAPACITY**
O3A 170665

Subject Term Index

FREIGHT CAR CLEANING

22A 179676, 22A 195927, 22A 195928

FREIGHT CAR COMPONENT PERFORMANCE ANALYSIS

02A 139178

FREIGHT CAR COMPONENTS

03A 170665, 03A 172456, 03 196993, 07A 170662

FREIGHT CAR DESIGN

02A 081796, 02A 170594, 02A 170595, 02A 170644, 02A 170661, 02A 170666,
02A 188663, 02 196448, 02 196449, 03A 148336, 03A 159630, 03A 170608,
03A 170639, 03A-170665, 03A 172456, 03 189749, 03 189750, 03 193761,
03 196359, 03 196369, 03 196406, 03 196540, 03 196993, 09 053312,
17A 160402, 21A 159624, 24 196104, 26 191943

FREIGHT CAR DISTRIBUTION

17A 159628, 21A 159624, 24A 159629

FREIGHT CAR DOORS

22A 138363

FREIGHT CAR DYNAMICS

02A 059427, 02A 170644, 02A 170663, 02A 188653, 02A 188663, 02 191066,
02 191290, 02 191335, 02 194877, 02 195115, 02 195116, 02 195123,
02 195692, 02 196378, 02 196448, 02 196449, 03A 059420, 03 197017

FREIGHT CAR INSPECTION

03A 055916

FREIGHT CAR INVESTMENT

24 194855

FREIGHT CAR LOADING

03A 170608, 22A 099636, 22A 138363, 22 186235, 22 186333, 22 186334,
22 186335, 22 186336, 22 186337

FREIGHT CAR MAINTENANCE

03 196993, 18 196455, 20 195554, 20 195556

FREIGHT CAR ORDERS

24 193751

FREIGHT CAR OWNERSHIP

18 189789, 18 195552, 18 195698, 18 196109, 20 191872, 20 195553,
24 193751, 24 194853, 24 194855

FREIGHT CAR REPAIRS

03 196993

FREIGHT CAR SHORTAGE

03A 148336, 22A 196122

FREIGHT CAR SUPPLY

03A 148336, 20 185655, 20 185960, 20 185961, 20 185962, 20 185963,
21A 159627, 22 195689, 22 195690, 22 195691

FREIGHT CAR TRUCKS

02A 138469, 03A 138796, 03 194644

FREIGHT CAR UTILIZATION

03A 148336, 03A 159630, 03 196359, 17A 159625, 17A 159628, 17A 159631,
17 193722, 17A 196731, 17 196928, 18 196927, 21A 159624, 21A 159626,
21A 159627, 21A 185236, 21A 185237, 21A 185238, 24A 179528, 24 189074,
24 193744, 24 194853

FREIGHT CARS

02A 059427, 03A 050338, 03 053321, 03 053322, 03 053323, 03A 138559,
03A 170639, 03A 170643, 03 194668, 03 195106, 06 190309, 06 194629,
12A 188661, 18A 129724, 21 196373

FREIGHT OPERATIONS

15 189029

FREIGHT RATES

17A 188645, 18A 080324, 20A 083533, 20A 099645, 20A 099646, 20A 099647,
22A 138378, 22 195689, 22 195690, 25A 059207, 25A 128852, 25A 179675

FREIGHT SERVICE QUALITY

20A 164822, 20 185655, 20 191737, 24 196986

FREIGHT SERVICES

18A 177624, 21 195550, 25A 059207, 25 195543

FREIGHT TRAFFIC

18 195698, 20A 138370, 20 194127, 20 195705, 22A 099639, 23 195545,
24 189028, 24 193744

FREIGHT TRAFFIC FORECASTING

11 191666, 18 189804, 20A 055810, 20A 058467, 20A 136085, 20A 138364,
20A 138367, 20A 156542, 20A 156591, 20A 156604, 20A 164822, 20A 179664,
20A 179665, 20A 179666, 20A 179667, 20A 179671, 20A 179678, 20A 179679,
20A 179692, 20 180409, 20A 185240, 20 185629, 20 185651, 20 185655,
20 185866, 20 185890, 20 185916, 20 185917, 20 185960, 20 185961,
20 185962, 20 185963, 20 186380, 20 186383, 20 186407, 20 186409,
20 186423, 20 186574, 20 186684, 20 186689, 20 188332, 20 188532,
20A 188659, 20 189052, 20 189072, 20 189073, 20 189781, 20 189803,
20 189805, 20 189860, 20 189863, 20 189864, 20 189865, 20 190164,
20 190362, 20 190768, 20 190790, 20 191160, 20 191275, 20 191278,
20 191279, 20 191286, 20 191474, 20 191589, 20 191867, 20 191872,
20 191877, 20 191901, 20 192118, 20 192189, 20 193765, 20 194124,
20 194127, 20 194663, 20 194664, 20 194665, 20 194871, 20 195104,
20 195553, 20 195554, 20 195555, 20 195556, 20 195708, 20 195710,
20 195728, 20 195729, 20 195730, 20 196108, 20 196114, 20 196115,
20 196116, 20A 196118, 20 196363, 20 196424, 20 196922, 20 196923,

20 196926, 21A 159627, 21 190826, 21 194851, 22A 083483, 22A 083511,
22A 099642, 22A 135001, 22A 138481, 22A 153674, 22A 153703, 22A 153718,
22A 157092, 22 174305, 22A 179657, 22A 179658, 22A 179659, 22A 179660,
22A 179661, 22A 179662, 22A 179663, 22A 179669, 22A 179674, 22A 179681,
22A 179682, 22A 179683, 22A 179693, 22A 179694, 22A 179695, 22A 179696,
22A 179697, 22A 179698, 22A 179699, 22 185838, 22 185948, 22 189054,
22 190429, 22 190912, 22 195689, 22 195690, 22A 196117, 24 189030,
24 189799, 24 195541, 24 196531, 24 196874, 24 196930, 24 196978,
25A 156620, 25A 157601, 25A 179347, 25A 193783, 25 194138, 25 196570,
25 196571, 26 191952

FREIGHT TRAIN OPERATIONS

21A 170596

FREIGHT TRAINS

00 189787, 02 196451, 03 196997, 10 197435, 11 191668, 17A 196726

FREIGHT TRANSPORT DEMAND ANALYSIS

17A 059062, 18 196927, 20A 055810, 20A 059960, 20A 129727, 20 194124,
20 194127, 20 195069

FREIGHT TRANSPORTATION

06 196999, 11 191664, 11 191665, 11 191666, 11 191667, 15 194862,
16 189040, 16 193758, 16 194868, 16 196979, 16 197342, 17A 138526,
17 197289, 17 197510, 18 185783, 18 185784, 18 185810, 18 185811,
18 186406, 18 186641, 18 189804, 18 190909, 18 195706, 19 194130,
20A 153650, 20 190208, 20 190261, 20 194597, 20 194602, 20 194858,
21A 159653, 21 188757, 21 192213, 21A 193785, 21 194662, 22A 156972,
22A 157092, 22 185838, 22 186402, 22 186405, 22 195076,
22 195744, 24A 156651, 24 194144, 24 195731, 24 196996, 25A 058753,
25A 153574, 25A 156707, 25A 157601, 25 189797, 25 190311, 25 190769,
25 195107, 25 197292, 25 197335, 26 191943, 26 196111

FREIGHTLINERS

12 194337

FRENCH NATIONAL RAILWAYS

00-189069, 00 189757, 00 197291, 01A 170636, 01 189042, 01 189758,
01 194637, 01 196934, 03 195129, 04A 170637, 04 195118, 06 189000,
06 196999, 13 188999, 13 189068, 13 195131, 21 194662, 22 197276,
23 194131, 23 197003, 24 197006

FRENCH TECHNOLOGY

02 194880, 03 197004, 04 189032, 05 189036, 05 197008, 06 195119,
21 197275

FREQUENCY CONVERTERS

13 196462, 13 196936

FREQUENCY MODULATION

06 195119

FRETING

09 189001

FRICITION

02 053315

FRICITIONAL COEFFICIENT

00 185286, 02A 170591, 02 189755, 05 197008, 05 197015

FROGS

01 195688, 01 196397

FROST

00 189791

FROST HEAVING

01A 196735

FRUITS TRAFFIC

03A 179688, 22A 196117, 22A 196121

FUEL CELLS

04 194864

FUEL CONSERVATION

04 189032, 04 193763, 13 196519, 16A 193782, 16 194498, 16 195135,
21A 193785

FUEL CONSUMPTION

02 186848, 04A 099377, 04 193763, 04 194816, 16 194498, 16 197342,
18 190909

FUEL SOURCES

04A 179335, 04 194864, 16 191164, 16 194690, 16A 196743, 16A 196749

FUEL SPECIFICATIONS

16A 196749

FUELS

16 190354

FUNDING

08 193342, 18A 059894

G

GAS TURBINE EXHAUST EMISSIONS

10 192346

GAS TURBINE LOCOMOTIVES

04 190369, 04 194512

GAS TURBINES

03A 138537, 04A 179335, 04 189032, 04 190369, 04 194512, 04 194864,
04 196537

Subject Term Index

GASIFICATION

20 191159, 20 191867

GAUGE WIDENING

01 193748, 02 189063, 02 196989

GEARS

04 195544, 09 196536

GENERATORS

04 190364, 04 190365, 04 190366, 04 195125, 04 195544

GEOLOGICAL CONDITIONS

00A 136152, 00A 179332, 00A 185230, 00 185674, 00 185675, 00 185677, 00 189006, 00 189009, 00 189069, 00 189764, 00 189767, 00 189815, 00 190056, 00 190267, 00 192188, 00 195727, 00 196625, 00A 196750, 00A 196752, 26 192074, 26 192075

GEORGIA

22A 138378, 24A 170612

GEOTEXTILES

00 189759, 00 193754, 00 194298, 00 194865, 00 195065, 00 196353, 00 196354, 00 196355, 01 195110, 01A 196745, 02 196357

GERMAN FEDERAL RAILWAY

00 196402, 01A 170636, 01 195067, 02 195082, 02 195083, 03 053311, 03 195106, 03 196406, 04A 170637, 04 194500, 04 195088, 06 189741, 06 190337, 06 194688, 13 190334, 13 194505, 13 194672, 13 194873, 13 194874, 13 196371, 18 195140, 21 194683, 21 196391, 24 196978, 25 195122, 25 196976

GERMAN STATE RAILWAY

01A 170636, 01 189786

GERMAN TECHNOLOGY

00 194667, 04 188996, 04 195061, 04 195085, 05 195138, 06 189048, 06 194681, 11A 148346, 11 189812, 13 195086, 22 196395

GERMANY

00 194141, 00 194142, 10 190273, 10 196387, 20 189781, 21 197000

GIRDER BRIDGES

00 183755, 00 183770, 00 183772

GLASGOW

10 197007

GONDOLA CARS

01 189004, 22 190323

GOVERNMENT FINANCING

18A 059897, 18 189804, 18 196530, 23A 156666, 25A 160045, 25 191361

GOVERNMENT FINANCING OF TRANSIT

15A 188656, 18 192228, 23A 185243, 23A 185244, 23 191660

GOVERNMENT FUNDING

08 194852, 18 193742, 18A 193780, 18 196585, 23 186869, 23 186870, 24 189788, 24 190771, 24 196541, 24 196542, 25 186632, 25 186635, 25 186650, 25 188152, 25A 188665, 25 190769, 25 191247, 25 191473, 25 195057, 25 195122, 25 196570, 25 196571, 25 196976

GOVERNMENT PLANNING

01A 059295, 25 186867, 25 191689, 25 196976

GOVERNMENT POLICIES

12 180235, 12 193746, 13 196519, 15A 179339, 15 191362, 16A 193782, 16 197342, 18 190909, 20A 059960, 20A 099645, 20A 099646, 20A 099647, 20A 156604, 20A 179679, 20 191870, 20 195554, 20 195555, 20 196115, 20 196116, 22A 083483, 22A 153674, 22A 153703, 22A 157092, 22 186402, 23A 156666, 23 190540, 23 191660, 24A 179673, 24 189071, 24 193743, 24 193752, 24A 193779, 24 194144, 24 195542, 24 196531, 24 196930, 25A 058753, 25A 128852, 25A 156620, 25A 157601, 25A 160045, 25A 179675, 25A 185242, 25 186632, 25 186635, 25 186650, 25 188152, 25A 188665, 25 189762, 25 190769, 25 191361, 25 191473, 25 191629, 25 192039, 25A 193783, 25 195057, 25 195064, 25 195122, 25 196112, 25 196570, 25 196571, 25 197335

GOVERNMENT REGULATIONS

01 195063, 03 191670, 03 196405, 08 194852, 08 197314, 12A 130946, 12 186377, 12 186463, 12 186628, 12 190321, 12 190538, 12 190583, 12 191914, 12 192347, 12 193741, 12 196110, 18A 193786, 18 196109, 18 196927, 20A 059960, 20A 156591, 20A 156604, 20A 164822, 20 186684, 20 188332, 20A 188659, 20 189052, 20 189053, 20 191870, 20 195068, 20 196923, 21A 138527, 21A 157598, 21 192213, 21 194851, 22A 153703, 22A 179680, 22 186827, 22 190262, 22 190884, 22 193774, 24A 170612, 24A 179528, 24 193752, 24 194861, 24 195542, 25A 058753, 25A 059207, 25A 128852, 25A 156620, 25A 156707, 25A 157601, 25 185585, 25 188152, 25 189050, 25 189051, 25 189751, 25 191587, 25 191629, 25 192039, 25 193757, 25 194639, 25 196112, 25 196570, 25 196571, 25 196875, 25 196877

GRADE CROSSING ACCIDENTS

07 192096, 08A 159644, 08A 178037, 08 195702, 10 186798, 12A 130946, 12A 135599, 12 185875, 12A 188661, 12 195704

GRADE CROSSING ELIMINATION

08 194852

GRADE CROSSING PROTECTION

06A 193284, 07 192096, 08A 049658, 08A 153623, 08A 159654, 08A 178037, 08A 185241, 08 190274, 08 191455, 08 191687, 08A 193281, 08A 193282,

08 193342, 08 193730, 08A 194539, 08 195141, 08 196471, 08A 196720, 08 197278

GRADE CROSSING SAFETY

08 191687, 08 193342, 08 197314, 12A 099389, 25 186650

GRADE CROSSING SURFACES

08 195680

GRADE CROSSINGS

08A 049658, 08 191455, 08 195680, 12A 188661

GRADE OPERATIONS

04 191750, 04 191751, 04 191752, 04 191753, 04 191754

GRAIN ELEVATORS

03A 179689, 20A 138364, 20 189863, 22A 138365, 22A 196119, 25A 156707

GRAIN TRAFFIC

03A 179689, 18A 177624, 20A 083533, 20A 099645, 20A 099646, 20A 099647, 20A 138364, 20A 156591, 20A 179664, 20A 179665, 20A 179666, 20A 179667, 20A 179671, 20A 179679, 20A 179692, 20 191279, 20A 196118, 21 194851, 21 195550, 22A 083483, 22A 099642, 22A 138363, 22A 138365, 22A 138378, 22A 138400, 22A 138481, 22A 153718, 22A 179657, 22A 179658, 22A 179659, 22A 179660, 22A 179661, 22A 179662, 22A 179663, 22A 179668, 22A 179669, 22A 179674, 22A 179676, 22A 179677, 22A 179681, 22A 179682, 22A 179683, 22A 179684, 22A 179690, 22A 179693, 22A 179694, 22A 179695, 22A 179696, 22A 179697, 22A 179698, 22A 179699, 22 195689, 22 195690, 22 195691, 22A 195928, 22A 196119, 22A 196120, 22A 196122, 24A 082106, 24A 179528, 24 196103, 25A 128852, 25A 156707

GRAPHICS

09 186569

GRAVITY AUGMENTATION

11 191913

GREAT BRITAIN

10 189743, 10 189744, 12 190321, 16 194504, 18 194676, 21 196529, 22 195744, 23 194140, 25 189765

GREAT LAKES

00 193886, 20 185890, 20 188532, 20 196115, 20 196922, 22 190324, 22 190912

GREAT LAKES OPERATIONS

21 196364, 22 174305

GROCERY TRAFFIC

22A 083511, 22A 195928, 22A 196117

GROUND CURRENTS

13 053325, 13 189021, 13 196392

GROUTING

00 183758, 00 185578, 00 188995, 00 197442

GUARD RAILS

01 053324

GUIDEWAY DESIGN

11A 059435, 11A 156700, 11A 160276, 11 193898, 11 193899, 11 193900, 11 193901, 11 194680

GUIDEWAY DYNAMICS

11A 148346, 11 186863, 11 190281, 11 195087, 11 197319

GUIDEWAY ROUGHNESS

11A 148346, 11 189817

GUIDEWAY SWITCHING

11A 059435

GUIDEWAY SYSTEMS

11A 170589

GUIDEWAYS

11A 159659, 11 196366

H

HANDBOOKS

06A 138529, 10A 138534, 10A 188647, 10A 188654, 10A 196753, 21 186994, 22 190322, 22 190323, 22 190324, 22 190325, 22 190326, 25 191689

HANDBRAKE

12 192347

HANDICAPPED

07A 196746, 07A 196747

HANDICAPPED PERSONS

03 191670, 07 190995, 07 197012, 11 197367, 11 197417, 12A 059864, 15 186156, 15A 188646, 15 190905, 23 191936, 26 192099

HARMONIC ROLL

02 189800, 02 191335, 02 196449

HARMONICS

04 194655, 04 196384, 04 196517, 05 195713, 13 053325, 13 189022, 13 196382, 13 196403

HAZARD ANALYSIS

00A 153558, 08 193342, 12A 135594, 12A 135596

HAZARDOUS MATERIALS

02A 179333, 02 191290, 02 191481, 02 191535, 03A 138565, 03 189070, 03 196405, 09A 058267, 10 186805, 12A 099389, 12A 099424, 12A 099428, 12A 099436, 12A 130946, 12A 135594, 12A 135596, 12A 135599, 12A 135719, 12A 138567, 12 179826, 12 180235, 12 185742, 12 185875,

Subject Term Index

12 186377, 12 186463, 12 186628, *12A 188661*, 12 189770, 12 190308,
12 190321, 12 190583, 12 190738, 12 190901, 12 191469, 12 191517,
12 191882, 12 191914, 12 192094, 12 192168, 12 192294, 12 192347,
12 192391, *12A 193283*, 12 193741, 12 194125, 12 194126, 12 194128,
12 194578, 12 194863, 12 195097, 12 195098, 12 196110, 12 196383,
12 196681, *12A 196740*, *20A 136085*, 20 194857, 20 196108, 22 186392,
22 186466, 22 186800, 22 186826, 22 186827, 22 190326, 22 190884,
22 190887, 22 190888, 22 191465, 22 192170, 22 192174, 22 195096,
26A 099429

HAZARDOUS MATERIALS INFORMATION

12 194125, 12 194126, 12 194128

HEAD SHIELDS

12 193741

HEADWAY

06 196379, *11A 135604*, 11 194659, 11 196390, 11 196457, 11 196458,
11 196459, 23 186871

HEAT TREATMENT

03 193761, 09 053312, 09 190319, 09 193747, 09 195715, 09 196452,
09 196453, 09 196536, *09A 196724*, 09 196980

HEATING SYSTEMS

01 196521, 03 196943, 11 193899, 11 193901

HEATING-VENTILATING-AIR CONDITIONING SYSTEMS

03A 170638, 19 195697, 03 196943

HELICOPTERS

12 190881

HERBICIDES

00 196402

HIGH ALTITUDE

10 186657

HIGH AXLE LOADS

01 193753, 01 196106, *02A 170657*, *02A 170663*, 03 053326, *03A 170639*,
03A 170665, 09 196100

HIGH CAPACITY CARS

02A 170663, *03A 170665*, 03 196540

HIGH CUBE CARS

03 196540

HIGH SPEED CARS

02 190304, 02 195114, *03A 188657*, 03 190314, 03 190359, 03 195686

HIGH SPEED GROUND TRANSPORTATION

11A 148334, *11A 170593*, 11 189817, 11 190286, *11A 193781*, 11 196390,
11 196399, *11A 196716*

HIGH SPEED LINES

01 194509

HIGH SPEED ROUTES

01 194509

HIGH SPEED TRACK

00 189020, 00 189069, 00 189757, *01A 170625*, 01 189026, 01 189761,
01 190293, 01 194509, 01 194628, 01 195067, 02 190358, 24 197001

HIGH SPEED TRAINS

00A 170633, 00 189787, 01 053324, *01A 170636*, *01A 170649*, 01 194509,
01 194628, 01 196934, 02 190336, 02 190357, 02 195143, 02 195144,
02 196398, *03A 050338*, 03 053311, *03A 160405*, 03 194642, 03 194643,
03 195129, 03 196538, 03 197004, 04 188997, 04 189032, 04 190315,
04 194501, 04 194669, 04 194875, 04 195060, 04 195105, 04 195118,
04 195693, 04 195694, 04 196537, *04A 196721*, 04 197005, 05 189036,
05 190307, 05 191446, *06A 160400*, 06 189048, 06 190316, 06 190317,
06 190337, 06 191738, 06 195081, 06 195142, *06A 196718*, *08A 196720*,
09 190342, 10 189745, 10 190328, 13 053316, *13A 170609*, *13A 170653*,
13 189017, 13 189738, 13 189777, 13 194510, 18 194666, *23A 170626*,
23A 188660, 23 189785, 23 194870, 23 195678, 23 195685, 23 196469,
23 196945, *24A 159650*, 24 196531, 25 195122, 25 195543

HIGH STRENGTH STEELS

09 196536

HIGH TEMPERATURE

01 189010, 01 190346, 03 196981, 04 194816, 04 196461, 09 193750,
09 196453

HIGH VOLTAGE AC ELECTRIFICATION

04 190366, 04 195085, 13 053316, 13 189041, 13 191355, 13 194635,
13 195058

HIGH VOLTAGE DC ELECTRIFICATION

04 194875, 13 053316, 13 189041, 13 194635, 13 195058

HIGH VOLTAGE ELECTRIFICATION

13A 170653

HIGHWAYS

10A 193280, 10 195128, 18 196530, *21A 196742*

HISTORY

12 194859, 12 194860, 13 196995, 19 194130, 19 195697, 24 195542,
24 196930, 25 190311

HOLOGRAPHY

09 185481

HOMOPOLAR MOTORS

11A 058273

HONG KONG

06 196407

HOPPER CARS

03 189749, 20 194631, 21 190826, 22 190323, 22 193760, 22 196395

HOT BOX DETECTOR LOCATION

06 190329

HOT BOX DETECTORS

03A 099439, *03A 138559*, 03 196981, 06 194685

HOT BOXES

03 196981, 03 196984

HOUSTON

11 186150, *21A 157598*

HUMAN FACTORS

05 194634, *07A 049659*, *07A 148352*, *07A 170590*, 07 189779, 07 189809,
07 190276, 07 190283, 07 190995, 07 191932, 07 192096, 07 193762,
07 195090, 07 196360, 07 196527, 07 197009, 07 197012, 08 190274,
08 193342, 08 193730, 08 196471, *10A 179325*, 10 188991, 10 189743,
10 189744, 10 190273, 11 197417, *12A 099389*, *12A 099392*, *12A 148324*,
12 190268, 12 197371, 15 186156, *15A 188646*, 24 195682, 24 195696

HUMP CONTROL COMPUTERS

06 189753

HUMP YARDS

02 191481, *06A 159656*, *06A 170629*, 06 195117, *10A 058621*, *21A 196734*

HUMPING SPEED

06 189753

HUNGARIAN STATE RAILWAYS

03 196997, 05 197015

HYDRAULIC RETARDERS

21 193755

HYDROCARBONS

10 192346, *16A 196743*, *16A 196749*

HYDRODYNAMIC BRAKES

05 190307

HYDROGEN

12 191914, 20 196108

HYDROGEN FUELS

04 194864, 16 191164, 16 194690

HYDROKINETIC BRAKES

05 191446

I

IBM 370

00 192083

ICE

00 193845, 00 193886, 01 196521, *01A 196728*

ICICLES

00 195112

ICING

11 193899, 11 193900, 13 191730

IDAHO

22A 153666

ILLINOIS

12 186628, 20 191474

ILLUMINATION

21 194683

IMPACT

02A 179333, 02 191290, 02 191481, 12 186377

IMPACT PROTECTION

02A 160409, *03A 081801*, *03A 170641*, 03 189070, 03 189748, 03 194636,
12 190538, 22 191106

IMPACT TESTS

02A 157664, 02 191535, 12 179826, 12 191882, 22 186235, 22 186333,
22 186334, 22 186336, 22 186337, 22 194856

IMPACT VULNERABILITY

02 191535, *12A 135594*, *12A 135599*, 22 191465

IMPEDANCE

13 195709

IMPROVED PASSENGER TRAINS

23A 099391

INDIANA

20 191474, *22A 179677*, 24 192061

INDUCTION HEATING

01 196521

INDUCTION MOTORS

04 189795, 04 189808, 04 193768, 04 195693, 04 195694

INDUCTIVE COMMUNICATION

11A 059365

Subject Term Index

- INDUCTIVE COUPLING**
05 195070
- INDUCTIVE SIGNALING**
- 06 195720, 11A 059365
- INDUSTRIAL DEVELOPMENT**
15 190487, 18 189806, 20 191278, 20 191279, 25A 193783
- INDUSTRIAL ENGINEERING**
01 195547, 24 189061
- INDUSTRIAL RAILROADS**
05 196949, 13 189802, 13 195718, 21 192031, 21 197000
- INDUSTRY STRUCTURE**
17A 159625, 17A 159628, 18A 193780, 20A 156542, 20A 179666, 21A 159624,
22A 196122, 23 189057, 23 195545, 24A 082106, 24A 156651, 24A 159650,
24A 179673, 24 189031, 24 189074, 24 189788, 24 193743, 24 193751,
24 193752, 24A 193779, 24 194638, 24 194853, 24 194855, 24 194861,
24 195094, 24 195541, 24 195542, 24 195731, 24 196103, 24 196362,
24 196531, 24 196930, 24 196977, 24 196978, 24 196985, 24 196986,
24 197006, 25 186867, 25 190311
- INERTIA**
00 195548, 00 195683
- INFLATION**
18 192228, 18 196102
- INFORMATION STORAGE**
00A 185235
- INFORMATION STORAGE AND RETRIEVAL**
00A 153558, 01 196105, 03A 185234, 03A 188652, 03 197441, 09 185793,
12A 130946, 12A 135596, 12 192180, 17A 148350, 17A 159631, 17 183740,
17A 196731, 21A 185237, 21A 185238, 26A 058329, 26 189839, 26 192074,
26 192075
- INFORMATION SYSTEMS**
02A 081803, 03 190314, 06 190309, 08A 178037, 12A 138531, 12A 148348,
12 192180, 17A 159625, 17A 159631, 17A 188645, 17 189027, 17 193759,
17 194689, 17A 196731, 17A 196741, 21A 196733, 21A 196734, 25 196518,
26A 058329, 26A 099429, 26 190335, 26 192074, 26 192075
- INFRARED**
06 190309
- INJURIES**
12 190536, 12 190537
- INLAND WATERWAYS**
00 183803, 00 188833, 18 189804, 18 196530, 20A 179671, 20A 179679,
20 188532, 20A 188659, 20 194871, 21 196523, 22A 153666, 22A 179684,
22 189055, 22 190324, 22 190371, 22 190912, 24 189030, 25A 128852,
25A 179675
- INSECTS**
22A 179676, 22A 195928
- INSPECTION**
01 195093, 03 194668, 09 189780
- INSPECTION CARS**
01A 099369, 01A 099378
- INSPECTION SYSTEMS**
03 195686
- INSPECTIONS**
00 183741, 00A 196751, 01A 138560, 01A 138561, 02A 058465, 02A 170666,
03A 055916, 03A 138559, 03 190314, 03 195099, 03 196376, 04 190315,
05A 159634, 06A 196730, 07A 170662, 07 190283, 09A 138557, 12A 188661,
13 195131, 13 195709
- INSTRUMENTATION**
00A 135658, 00A 185230, 00 189067, 00 193754, 00 194136, 00A 196736,
01A 139165, 01A 170616, 01A 185233, 01A 196723, 02A 099367, 02 189063,
02 189801, 02 194647, 02 195082, 02 195101, 02A 196732, 03A 138559,
03 195129, 04 197438, 05 194645, 09A 138558, 09 189747, 09 193750,
10 185707, 11A 170621, 12 193879, 13 195709, 17A 188651, 17 193773
- INSULATED JOINTS**
01 193753
- INSULATION**
00 195112, 03 189810, 03 194653, 04 196461
- INSULATORS**
13 194635, 13 194654
- INSURANCE**
25 189059
- INTERACTIVE GRAPHICS**
02A 170663, 02 190296
- INTERCHANGE**
17A 138526, 21A 196742
- INTERCITY FREIGHT TRANSPORTATION**
20A 059960
- INTERCITY PASSENGER TRANSPORTATION**
11A 148334
- INTERCITY SERVICES**
03 194677, 03 196538, 23A 188660, 25 194138
- INTERCITY TRANSPORTATION**
11 190286, 11 191664, 11 191665, 11 191668, 11A 193781, 15 194862,
16 189040, 16 194868, 18 185783, 18 185784, 18 185810, 18 185811,
18 194666, 21A 193785, 22 186402, 23 196469, 24 196531
- INTERCITY TRAVEL**
11A 196729, 16A 196727, 23A 156666, 23A 177691, 23 194140, 23 194870,
23A 196744, 23 196945, 23 197282, 26 191952
- INTERCONTAINER**
24 189760
- INTERFERENCE**
06 053328, 06 053329, 06 053330, 06 053331, 06 194656
- INTERLOCKING**
06A 136338, 06A 160400, 06 195079, 06 196948
- INTERMEDIATE RAPID TRANSIT**
11 190284
- INTERMODAL FACILITIES**
12 194337, 21A 160398, 21 186994, 21 189766, 21 192213, 21A 196742
- INTERMODAL FREIGHT SERVICES**
21A 157902, 21A 159653
- INTERMODAL INFORMATION SYSTEMS**
17 189027, 17A 196731, 17A 196741
- INTERMODAL OPERATIONS**
03 194134, 21 196982
- INTERMODAL SERVICES**
16 197342, 20 189052, 20 189803, 21A 193785, 22A 099624, 22A 153666,
22A 156972
- INTERMODAL SYSTEMS**
21A 160398, 21 192213, 25A 058753
- INTERMODAL TERMINALS**
21 193771, 21 194313, 21 196982, 21 197275, 21 197288, 22 194678,
24 196541, 24 196542
- INTERMODAL TRAFFIC**
24A 179528
- INTERMODAL TRANSPORTATION**
03A 179689, 03 196369, 20A 129727, 20 189053, 20 190208, 21 189766,
21 197275, 22A 138400, 24A 170612, 24 189760, 25 194639, 25 197292,
26 191943
- INTERNAL COMBUSTION ENGINES**
04 190369
- INTERNATIONAL COOPERATION**
24 189760, 24 195126
- INTERNATIONAL STANDARDS ORGANIZATION**
21 195743
- INTERNATIONAL TRADE**
20A 129727, 20A 179692, 20 180409, 20 186409, 20 188532, 20 194665,
20 195708, 20A 196118, 21 186994, 21 194851, 22A 083483, 22A 099624,
22A 179693, 22A 179694, 22A 179695, 22A 179696, 22A 179697, 22A 179699,
22 190429, 22A 196119, 25 191587, 25 194639
- INTERNATIONAL TRAFFIC**
24 189030
- INTERNATIONAL UNION OF RAILWAYS**
09 196452, 24 197001, 26 190335
- INTERSTATE COMMERCE COMMISSION**
18A 193786, 18 196109, 20A 156591, 20 189052, 20 195068, 22A 179680,
24 193743, 24 193752, 24 196103, 25A 059207, 25A 128852, 25A 156620,
25 185585, 25 189050, 25 189051, 25 194639, 25 195064, 25 196112,
25 196875
- INTOXICANTS**
07A 148352
- INVENTORIES**
08 191455, 17 183740
- INVERTERS**
04 193768, 13 196937
- INVESTMENT REQUIREMENTS**
15 185781, 18 189789, 18 189796, 18A 193780, 18 196526, 24 189071
- INVESTMENTS**
18A 129729, 18 189806, 18 193742, 18 194666, 18 194676, 24 189788,
24 194855
- IOWA**
01A 059295, 10A 179685, 24A 082106, 24A 179528, 25 196870, 25 196871
- IRAQ**
24 189799
- IRON ORE TRAFFIC**
20 194663, 20 194664, 20 195104, 20 196363, 22 189038, 22 190429,
22 195716
- ITALIAN STATE RAILWAYS**
01 189019, 03 194677, 04A 170637, 04 194875, 04 196367, 04 196368,
04 196404, 06 195079, 06 195080, 23 194129
- ITALIAN TECHNOLOGY**
03 194132, 03 196538, 03 197004

Subject Term Index

- ITALY**
00 183789
- J**
- JAPAN**
20 195708
- JAPANESE NATIONAL RAILWAYS**
00 189764, 00 190347, 00 196932, 01 190318, 06 190317, 09 196388,
10 189745, 12 189784
- JAPANESE TECHNOLOGY**
03A 160405, 04 196370, 04 196461, 06 195081, 06 196525, 11 194679,
11 194680, 25 191247
- JERK**
07 197009, 11 196520
- JOINTED TRACK**
02 196449
- JOINTLESS TRACK CIRCUITS**
06 053306
- JOURNAL BEARINGS**
03 196981, 03 196984, 03 196993
- JOURNAL BOXES**
03A 055916
- JUNCTIONS**
21 194682
- JUSTIFICATION**
02A 196722, 03 197453, *08A 153623*, 08 191455; 08 191687, *08A 193282*,
08 193342, 13 190368, 18 196927
- K**
- KANSAS**
20A 138370, *22A 153718*, 25 191629
- KANSAS CITY SOUTHERN RAILWAY**
12 185875, 24 196358
- KANSAS TEST TRACK**
01A 139165
- KENTUCKY**
20 191474, 22 193766
- L**
- L/V RATIO**
02 053305, *02A 170660*, 02 189062, 02 189063, 02 194640, 02 196451,
02 196524, 02 196989
- LABOR AGREEMENTS**
24 195541, 24 196985
- LABOR LEGISLATION**
24 196362, 25 189059
- LABOR RELATIONS**
24A 179528, 24 196362
- LABOR REQUIREMENTS**
18 190909
- LABOR UNIONS**
07A 148352, 07 189058, *17A 148350*, *21A 138527*, *21A 157598*, *21A 170622*,
24 195541, 24 196930, 24 196986
- LABORATORIES**
01 189047
- LADING LOSS**
03 189070
- LADING PROTECTION**
02A 179333, *03A 170641*, 03 189748, 03 196406, 21 195071, 22 186235,
22 186333, 22 186334, 22 186335, 22 186336, 22 186337, 22 186826,
22 191106
- LAMINATED CROSS TIES**
01A 138568, *01A 179687*
- LAND BRIDGE**
25 194639
- LAND USE**
00A 153558, *15A 160469*, *15A 179339*, 15 190263, 15 190485, 15 190486,
15 190487, 15 190582, 15 190905, 15 190906, 15 190968, 15 190970,
15 191029, 15 191033, 15 191362, 15 191659, 15 192212, *15A 192693*,
15 197283, 18 189796, 20 190768, *25A 099365*, *25A 160045*
- LANDSLIDES**
00A 153558, 00 190341, 00 193486, 00 195684
- LASERS**
00 194878, 02 195101, 09 185481, 09 195715, 13 195687
- LATERAL DYNAMICS**
02 053320, *02A 188653*, 02 190288, 02 190290, 02 190291, 02 190294,
02 190304, *02A 196732*
- LATERAL LOADING**
02 053305, *02A 099367*, 02 194640, 02 194647, 02 195121, 02 196989
- LATERAL STABILITY**
01A 179337, 01 189042, 01 189046, 02 190292, 02 190295
- LAW**
18A 138514, 26 186492
- LEASING**
18 195552, 18 196101, 20 195553, 24 193751, 24 194855
- LEGAL ASPECTS**
08 193342, 08 194852, 08 195680, 12 193746, 22 193774, 24 195682
- LEGISLATION**
12 186628, 16 194506, 23 189057, 25 185585, *25A 188665*, 25 189050,
25 189059, 25 191247, 25 193757, 25 195057
- LESS CARLOAD TRAFFIC**
23 195545
- LEVERAGE LEASING**
18 195552, 24 193751, 24 194855
- LIABILITY**
00A 196752, 00 197460, 25 196877
- LIFE CYCLE**
01A 139163, *01A 170618*, *02A 139178*
- LIFE CYCLE COSTING**
01A 179328, *01A 185232*, *03A 165811*, *09A 138557*, *09A 138558*, *18A 129724*,
18 185810, 18 185811, 18 194675, 18 196585
- LIFT BRIDGES**
00 188833
- LIGHT DENSITY LINES**
18 196872, 18 196873, 20 189865, *24A 082106*, *25A 179347*, *25A 185242*,
25A 188665, 25 190312, 25 190313
- LIGHT RAIL TRANSIT SYSTEMS**
00 197287, 04 188996, 04 194633, 06 197286, *07A 196746*, *07A 196747*,
10 190264, 10 197522, 11 197459, *23A 156668*, 23 186871, 23 197011,
26 185409
- LIGHT RAIL VEHICLES**
02 194869, 03 189813, 03 194132, 03 197441, 03 197453, 04 195061,
04 196939, 04 196941, 04 196942, 04 197285, *07A 196747*, 10 189769,
19 194130, 23 197011
- LIGHT RAPID COMFORTABLE**
03 194643, *04A 196721*
- LIGHT SIGNALS**
07 186143
- LIGHT SOURCES**
01 191266, 08 197278, 08 197314
- LIGHTING EQUIPMENT**
03A 170647, 21 194683
- LIGHTWEIGHT**
09A 179345, *09A 179346*
- LIGHTWEIGHT CARS**
03A 059420, 03 189749, 03 189750, 03 190285, 03 193761
- LIGNITE TRAFFIC**
20 191159, 21 197000
- LINDENWOLD LINE**
04 197438, 10 191428
- LINE CAPACITY**
06A 136338, 06 196379, 18 196873, 20 185655, 20 185960, 20 185961,
20 185962, 20 185963, 20 191872, 20 196116, 21 189752, 21 194682,
21 194686, 21 195073, 21 195113, 21 196364, *21A 196725*, 22 193774,
23 196533, *24A 159650*, 24 189799, 24 196977, 24 196978, 24 196985,
25 189798
- LINE CONSTRUCTION**
00 189069, 00 189757, 24 194879
- LINE HAUL**
11 191668, 18 195698, 21 196982
- LINE LOCATION**
00 195548, 00 195683, 15 195139, 21 189752, 21 197000, 24 189799,
24 197001
- LINEAR ELECTRIC MOTORS**
04A 058270, *04A 058280*, *11A 058273*, 11 191913, 11 195091
- LINEAR INDUCTION MOTORS**
11A 058273, *11A 148334*, *11A 149463*, 11 191958, 11 191959, 11 191960,
11 195087, 11 195712, 11 196399, *11A 196738*, *11A 196739*, 21 195071
- LINEAR MOTOR BOOSTER RETARDERS**
21 195071
- LINEAR MOTORS**
11 194146
- LINEAR PROGRAMMING**
01A 170783, 01 196934, 17 197289, 20 185916, 20 185917, *21A 170596*,
22A 138365, *22A 179694*, *22A 179699*, *22A 196119*, *22A 196122*
- LINEAR SYNCHRONOUS MOTORS**
04A 058280, *04A 196717*, *11A 058273*, *11A 149463*, *11A 170593*, 11 196399,
11A 196729
- LIQUEFIED NATURAL GAS**
04 194864, 12 180235, 12 185742, 12 189770, 12 194578, 18 196374,
20 191159

Subject Term Index

LIQUEFIED PETROLEUM GAS

03 196405, 12A 099428, 12A 138567, 12 180235, 12 185875, 12 189770,
12 190321, 12 192347, 16 185817, 20 194857, 20 196108, 22 190326,
26 190327

LIQUID HYDROGEN

12 190738

LIQUID NITROGEN

00 189756

LIQUID OXYGEN

12 190738

LIVESTOCK TRANSPORTATION

20A 099645, 20A 099646, 20A 099647

LOAD DIVIDERS

03 189748

LOAD FACTOR

13 195711

LOADING

02A 160409, 03A 179688, 09A 179691, 22A 083511, 22A 099624, 22A 099636,
22 186235, 22 186333, 22 186334, 22 186337, 22 191106, 22A 195927

LOADING AND UNLOADING OPERATIONS

03 196405, 10 186686, 13 189802, 20 194631, 20 195553, 21 188757,
21 194662, 21 195743, 22 053313, 22 189038, 22 190270, 22 190323,
22 190324, 22 190326, 22 190429, 22 193760, 22 195716, 22 197276

LOADING FACILITIES

20 185655, 22A 179677, 22A 179696, 22 189814, 22 190322, 22 190352,
22 195102

LOADING PROCESSES

22 053313

LOADING RULES

22 053313

LOCAL GOVERNMENTS

08 194852, 08 195680, 15 191362, 25 189765, 25 191361

LOCOMOTIVE BUILDERS

04 196988, 20 194598

LOCOMOTIVE CAB CRASHWORTHINESS

12A 099392

LOCOMOTIVE CAB DESIGN

03 196377, 07 186143, 07 196527, 21 194133

LOCOMOTIVE CAB NOISE

10A 179325

LOCOMOTIVE CAB SAFETY

12A 099392, 12 190537

LOCOMOTIVE CABS

03 194641, 07A 049659, 12 192094

LOCOMOTIVE CARBODY DESIGN

03A 081800

LOCOMOTIVE CONTROLS

03 194641, 04 188997, 04 195544, 04 196394, 04 196988, 07 196527,
21A 170664, 21 194133

LOCOMOTIVE DESIGN

01A 185233, 02A 099390, 02 190299, 02 190360, 02 195692, 02 196378,
02 196447, 02 196454, 03A 138565, 03A 170608, 03 194646, 03 196359,
04A 099377, 04 190338, 04 190344, 04 190363, 04 194501, 04 194872,
04 196368, 04 196404, 04A 196748, 04 196935, 04 196988, 04 196992,
04 197005, 12A 099392

LOCOMOTIVE ENGINEER'S TASKS

07 189779, 07 196361, 07 196527, 12 192094, 21A 170664, 21 194133

LOCOMOTIVE ENGINEERS

10A 179325

LOCOMOTIVE ENGINES

04A 179335

LOCOMOTIVE HAULED

03 189794

LOCOMOTIVE MAINTENANCE

04 190366, 04 190367, 04 196367, 16 196516, 24 189061

LOCOMOTIVE OPERATION

04 196988, 17A 188651, 17 193773

LOCOMOTIVE PERFORMANCE

02 194630

LOCOMOTIVE REPAIR SHOPS

04 196367

LOCOMOTIVE SHOPS

04 189024, 04 189742, 04 196988

LOCOMOTIVE SIMULATORS

07 196527, 12A 099389

LOCOMOTIVE TRUCKS

02 189018, 03 194646

LOCOMOTIVE UTILIZATION

04 196367, 04 196368, 13 196372, 21A 185236, 24 189028

LOCOMOTIVES

02 053315, 03A 138559, 03 194668, 08 197314, 12A 188661, 18A 129724,
18 195698

LOGISTICS

20A 083533, 20A 156591, 20A 179692, 20 196108, 20A 196118, 21A 193785,
22A 083506, 22A 099639, 22A 099642, 22A 179669, 22A 179686, 22A 179693,
22A 179694, 22A 179695, 22A 179696, 22A 179697, 22A 179698, 22 185665,
22 185690, 22 185691, 22 185883, 22 185948, 22 186020, 22 186025,
22 186389, 22 186392, 22 186466, 22 186800, 22 186827, 22 190262,
22 190884, 22 190887, 22 190888, 22 192174, 22 193774, 22 195062,
22 195096, 22A 196117, 22 196528, 26 196111

LONDON TRANSPORT

06 196407, 06 196948, 13 196947, 18 196526

LONG CARS

06A 170629

LONG RANGE PLANNING

16 194123, 19 194130

LONG SPAN BRIDGES

00 183789

LONGITUDINAL FORCES

02A 157664, 02 189063, 11 196520, 12 186377, 22 186235

LONGITUDINAL OSCILLATIONS

02 190289

LOS ANGELES

11 186851

LOSS AND DAMAGE

22A 179676, 22 186235, 22 186405, 22 194856, 22A 196120, 22A 196121,
24 195682, 26 186492

LOSS AND DAMAGE CONTROLS

22A 083516

LOUISVILLE AND NASHVILLE RAILROAD

06 189060, 12 192347, 21 195550

LOW SMOKE CABLES

09 195695

LOW TEMPERATURE

04 189740, 09 196453
00 193845, 11 196532, 16 194819

LUBRICANTS

09 189001, 13 195124, 16 189014

LUBRICATING OILS

09 194661, 16 190353, 16 190354, 16 194819, 16 196123, 16 196516

LUBRICATION

03 196981, 04 195544

LUMBER TRAFFIC

03 196406, 22 195689, 22 195690, 22 195691

M

MACHINE TOOLS

09 189034, 09 189039

MAGNETIC FIELDS

11 186476

MAGNETIC FLAW DETECTION

01A 059371

MAGNETIC FLUX INSPECTION

01A 058458, 01A 099394, 03A 170659

MAGNETIC INSPECTION

07 190283

MAGNETIC LEVITATION

11A 148334, 11A 148346, 11A 148347, 11A 156700, 11A 170593, 11 186476,
11 189816, 11 190279, 11 190281, 11 190286, 11 190330, 11 191958,
11 191959, 11 191960, 11 193772, 11 194146, 11 194679, 11 194680,
11 196390, 11 196532, 11A 196729, 24 195696

MAGNETIZATION

01 189005

MAINE

22A 179670

MAINTAINABILITY

03A 170604, 03A 188652, 03A 188657, 04 190306, 11 197361, 11 197362,
11 197363, 11 197364, 12 197371, 21A 159624

MAINTENANCE

03 053323, 03A 170630, 13 191730, 13 194510

MAINTENANCE COSTS

03A 165811, 11 197330, 13 196519, 18A 129724, 18 194675, 25 195057

MAINTENANCE EQUIPMENT

01A 059295, 03A 055916

MAINTENANCE MANAGEMENT

01 194496, 03 196359

MAINTENANCE METHODS

03 053323

Subject Term Index

MAINTENANCE PLANNING

00A 059406, 00 183741, 00 193886, 00 196715, 00A 196736, 01A 170618, 01A 188648, 01A 188649, 01A 188650, 01 189045, 01 189066, 01 195547, 01 195549, 01 196401, 03A 136342, 03A 159630, 03A 185234, 03 190314, 03 195686, 04 189024, 04 189742, 04 190315, 04 190366, 04 195088, 04 196367, 08 195680, 10 191406, 11A 170621, 13 191355, 16 196516, 17 183740, 17 193759, 20 195553, 23 196945

MAINTENANCE POLICIES

01 196356

MAINTENANCE PRACTICES

01 194496, 01 195067, 01A 196737, 03 053323, 03 196993, 04 190366, 04 190367, 04 195544, 11 197358, 13 194874, 13 195089, 22A 195927

MAINTENANCE PROCEDURES

03 197441

MAINTENANCE PROGRAMS

01 194496

MAINTENANCE SHOPS

02 195082, 03 053323, 04 190366, 04 190367

MAINTENANCE VEHICLES

13 194874

MANAGEMENT

18A 138514, 24 196996

MANAGEMENT DEVELOPMENT

07 196360

MANAGEMENT INFORMATION SYSTEMS

01 196105, 17A 148350, 17A 159625, 17A 159628, 17A 159648, 17 193722, 17A 196741, 17 196928, 18A 138514, 21A 159624, 21A 159653, 21A 185236, 21A 185237, 21A 185238, 24 193756

MANAGEMENT METHODS

00 194155, 00 195078, 12 197371, 24 196986

MANAGEMENT PLANNING

03 196359, 17A 159628, 18A 193780, 18 195140, 21A 170622, 21A 188662, 24A 159629, 24 189033, 24 189061, 24 195696, 24 196874, 26 191943

MANAGEMENT POLICIES

01 193753, 01 195063, 03 196359, 08 195680, 12A 170780, 18A 193786, 21A 157598, 24 189061, 24 190771, 24 192061, 24 193756, 24 195542, 24 196358, 24 196930, 24 196985, 25 196877

MANAGEMENT PRACTICES

12 197359

MANAGEMENT TRAINING

07 196360

MANGANESE STEELS

09 053312

MANUALS

02 196990, 02 196991, 04 196992, 09 191093, 10A 193280, 12A 196740, 23A 185231

MANUFACTURERS

20 186407, 20 191279

MAPS

00 194878, 12 196681

MARINE BORERS

09A 136093

MARINE TERMINALS

12 194337, 21A 157902

MARINE TRANSPORTATION

20 180409

MARKET DOMINANCE

24A 179673

MARKET RESEARCH

23 197455, 23 197462

MARKETING

03 194677, 18A 138514, 18 189789, 20 189072, 20 189803, 20 194871, 20 196116, 21A 159653, 21 190826, 21 192213, 21 195550, 22 197276, 23A 170597, 23 186871, 23 190540, 23 195545, 23 195678, 23A 196744, 23 197431, 24A 179673, 24 189074, 24 193744, 24 193756, 24 195541, 24 195551, 24 196874, 24 196978, 24 196986

MARKOV PROCESS

15 185781

MARYLAND

25A 179347

MASONRY

00 195909

MASS TRANSPORTATION

07 189058, 07 190995, 12 186852, 18A 059897, 23A 059246, 23 190265, 25 186632, 25 186635

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

00A 188643, 03 194641, 03 197441, 04 197438, 07 189058

MATERIALS HANDLING

00A 138532, 00 196470, 01 189004, 01 189005, 01 195681, 21 196529, 22 196528

MATERIALS SCIENCE

09 190355

MATHEMATICAL MODELS

00A 170633, 00 196931, 00 197281, 01A 139163, 01A 148355, 01A 170618, 01A 179337, 01A 188658, 01A 188667, 01 189010, 01 196450, 01 196934, 02 053320, 02A 059427, 02A 148358, 02A 160409, 02A 170648, 02 186848, 02 190282, 02 190288, 02 190290, 02 190291, 02 190299, 02 190300, 02 191481, 02A 194540, 02 194640, 02 195115, 02 195116, 02 195121, 02 195143, 02 196524, 04 193763, 05 194634, 06A 138529, 09 190741, 10A 188655, 10 195717, 11 195091, 11 195712, 11 196456, 11 196457, 11 196466, 13 053325, 13A 170653, 15A 179338, 15A 179339, 15 190522, 15 190959, 15A 192693, 15 197283, 16A 148321, 17A 179340, 17 189818, 18 186406, 18 190909, 18 196101, 20A 058467, 20A 138367, 20A 156542, 20A 156591, 20 185916, 20 185917, 20 186383, 20 189073, 20 195069, 20A 196118, 21 195073, 21 196364, 22A 179681, 22A 179682, 22A 179683, 22A 179693, 22A 179696, 22A 179697, 22 186389, 22 186405, 22 195072, 22 195076, 22 195744, 22 196473, 23 188992, 23 194140, 23 196463, 23 197282, 25A 157601, 25 189798, 25A 193783

MEASUREMENTS

00 053332

MEASURING DEVICES

00 186243, 00 195120, 01A 059681, 01A 138561, 01 190293, 01 191266, 01A 193778, 02 194647, 05A 159634, 09A 138557, 09A 138558, 09 190342, 13 195131, 13 195687

MEASURING EQUIPMENT

03 195111, 10 190350

MEAT TRAFFIC

22A 099639, 22A 195927

MECHANICAL PROPERTIES

09 053312

MECHANICAL REFRIGERATOR CARS

03A 179688

MERGERS

18 196109, 22A 196122, 24A 159650, 24 193743, 24 193752, 24A 193779, 24 194853, 24 195542

METALLOGRAPHIC OBSERVATIONS

09 189782, 09 190355, 09 193747

METALLURGY

00 195627, 01A 099393, 02A 081799, 09A 058267, 09 190319, 09 195715, 09 196375, 09 196452, 09 196453, 09 196536, 09A 196724, 09 196980, 24 194638

METROLINERS

04 195693, 04 195694, 05 191446, 09 169393

METROPOLITAN ATLANTA RAPID TRANSIT AUTHORITY

00 183758, 00A 188666, 06 196407, 15A 179331

MEXICO

20A 129727, 20 186409

MIAMI

00A 188668

MIAMI METRO

18 196585, 25 196518

MICHIGAN

03 191670

MICROPROCESSOR

04 188997, 04 195105, 06 189013, 06 189060, 06 190337, 06 195117, 06 196380, 06 196539, 06 196714, 17 193759, 17 193773

MICROWAVE

06A 193284, 06 195066

MIDDLE ATLANTIC

20 185890

MIDWEST

00 193886, 20 185890, 20 186380, 20 186383, 20 191867, 20 191872, 20 196114, 24A 193779

MILITARY TRAFFIC

22 186336, 22 186337, 22 191106

MINE HAULAGE

04 194872, 05 196949, 13 189802, 13 195709, 21 196529

MINERAL TRAFFIC

20 194664, 20 194665, 20 196363, 22 195716

MINIBRIDGE

25 194639

MINICOMPUTERS

02 195114, 06 189060, 06 195117, 17A 159631, 21A 170664, 21 194133, 21A 196733, 21A 196734

MINING

20 196363

MINNESOTA

08A 185241, 20 192118, 22A 179669, 22A 179674

MINORITIES

15 186156, 15 190905, 15 190906, 15 197340

Subject Term Index

- MISSISSIPPI RIVER**
 - 20A 179671, 22A 179682, 22A 179683
- MISSOURI**
 - 20A 153650, 20A 179671, 20A 179679, 24A 170612
- MISSOURI PACIFIC RAILROAD**
 - 00 195065, 00 196354, 17 193722, 17 196928
- MODAL CHOICE**
 - 16 189040, 16 192123, 20A 055810, 20A 138370, 20 189072, 22 185883, 23 190265, 23 191936, 23 195077, 23A 196744, 25A 128852, 25A 160045
- MODAL SPLIT ANALYSIS**
 - 11 191666, 12A 148348, 15A 179339, 15 185781, 20A 164822, 20A 179671, 20A 188659, 20 189073, 20 189860, 20 189863, 20 189864, 20 189865, 20 190261, 20 194602, 20 194871, 22A 179690, 23 188992, 23 191758, 23 192230, 23 194140, 23 194870, 23A 196744, 23 197282, 24 196103, 25A 157601, 25 189762, 25 189798, 25 194138
- MODEL TESTS**
 - 00 183780, 00 186293, 02 191535, 11 186863
- MODELS**
 - 02A 148358, 02A 170594, 02 190294, 20A 059960, 25A 156620
- MODEMS**
 - 06 053328, 06 053329
- MOISTURE CONTENT**
 - 22A 196120
- MONITORING SYSTEMS**
 - 03A 099439, 12A 099389, 17 193759
- MONOMOTOR TRUCKS**
 - 03A 138539
- MONORAIL RAILWAYS**
 - 11A 059435
- MONTANA**
 - 20 186684
- MONTHLY**
 - 18 195706
- MONTREAL**
 - 21A 196734
- MORGANTOWN PROJECT**
 - 11A 058375, 11A 059365, 11A 138792, 11 193901, 11 197330
- MOTOR CARRIERS**
 - 11 191667, 15A 179672, 16 189040, 16 197342, 18 189796, 18 190909, 18A 193786, 20A 083533, 20A 099645, 20A 099646, 20A 099647, 20 185655, 20A 188659, 20 189052, 20 189053, 20 189072, 20 189073, 20 189860, 20 189863, 20 189864, 20 191737, 20 194871, 21A 157902, 21A 193785, 22A 083483, 22A 138400, 22A 153718, 22A 179670, 22A 179680, 22A 179690, 22 185883, 22 186247, 24A 179673, 24 189030, 24 196103, 25A 128852, 25 189051, 25 189798
- MUCK TUNNELING**
 - 00 197445, 00 197446
- MUD PUMPING**
 - 00 189067, 00 193754, 00 195065, 00 196353, 00 196354, 01 190331, 01A 196745
- MULTIMODAL TRANSPORTATION SYSTEMS**
 - 18A 059894, 18A 193784, 20A 153650, 24A 170612, 24 193756
- MULTIPLE TRACK**
 - 08 195141
- MULTIREGIONAL INPUT OUTPUT MODEL**
 - 25A 193783
- MUSKINGUM ELECTRIC RAILROAD**
 - 13 189802
- N**
- NAILS**
 - 22 186235, 22 186333, 22 186334, 22 186335
- NARROW GAUGE**
 - 03 194646
- NATIONAL MEDIATION BOARD**
 - 24 196362
- NATIONAL RAILWAYS OF MEXICO**
 - 01 194637
- NATIONAL TRANSPORTATION POLICIES**
 - 13 190334, 16 186471, 16 196979, 18 189796, 18 189806, 18 194676, 18 196530, 20 196116, 22 190262, 23 196543, 24 189071, 24 189788, 24 193752, 24 194879, 24 195551, 24 196986, 24 197006, 25A 058753, 25 188152, 25 189751, 25 189762, 25 189765, 25 189798, 25 190769, 25 192039, 25 193757, 25 194138, 25 195057, 25 195122, 25 196570, 25 196571, 25 196976, 25 197292, 25 197335, 25 189797
- NATIONAL TRANSPORTATION SAFETY BOARD**
 - 12 193746
- NATURAL GAS**
 - 20 191159, 21 196523
- NETHERLANDS RAILWAYS**
 - 01 053318, 01 193745, 03 053311, 04 196998, 22 194678, 23 196543
- NETWORK ANALYSIS**
 - 23A 188660
- NETWORK FLOW ANALYSIS**
 - 11A 159662, 11 196456, 17A 179340, 17 185591, 17 196534, 17 197289, 17 197510, 18 196873, 20A 164822, 20 194858, 21A 170596, 21 194682, 21 195073, 21 196364, 22A 138365, 22A 179690, 22 185508, 22 186402, 22 195744, 22 196473, 24 194879, 26 186473
- NETWORK FLOWS**
 - 15 197485, 22A 153703, 25A 153574
- NETWORK SIMULATION MODELS**
 - 17 189818, 17A 192818
- NEW AUSTRIAN TUNNELING METHOD**
 - 00 194137, 00 194141, 00 195727, 00A 196750
- NEW ENGLAND**
 - 22A 179699, 24 194853
- NEW JERSEY**
 - 12 190881
- NEW YORK**
 - 23A 156666
- NEW YORK CITY**
 - 16 192123, 21A 157902, 23A 170626
- NEW YORK CITY TRANSIT AUTHORITY**
 - 00 196715, 01A 193778, 04 197438, 10 191406, 10 191407, 10 191440, 23 197462
- NEW YORK STATE**
 - 21A 157902, 22 185883, 23A 156666, 23A 156668, 24A 156651, 25A 156676
- NEW ZEALAND**
 - 16 186471
- NEW ZEALAND GOVERNMENT RAILWAYS**
 - 16 191921
- NIGHT**
 - 07 189779, 07 191932
- NITROGEN OXIDES**
 - 10 185707, 10 193764, 10 194866
- NOISE**
 - 10A 170655
- NOISE ABATEMENT**
 - 03 189810, 10A 138534, 10A 170655, 10 186613, 10A 188647, 10 189025, 10 189745, 10 189746, 10 190503, 10 191407, 10 191428, 10 191429, 10 191431, 10 191435, 10 191440, 10 191677, 10 195095, 10 195707, 10 196387, 10 197007, 10 197157, 10 197274, 10 197522
- NOISE ATTENUATION**
 - 03 194660, 10A 058675
- NOISE BARRIERS**
 - 10A 058621, 10A 170655
- NOISE CONTROL**
 - 04A 099377, 10A 058675, 10A 188654, 10A 188655
- NOISE LEVELS**
 - 02 196398, 04 197438, 10A 138534, 10A 170655, 10A 179325, 10 186613, 10 186686, 10 188991, 10 189743, 10 189744, 10 189769, 10 189773, 10 190273, 10 191406, 10 191428, 10 191429, 10 191431, 10 191435, 10 191440, 10 191677, 10A 193280, 10 195128, 10 197007, 10 197274, 10 197522, 11 191667
- NOISE MEASUREMENT**
 - 01A 170625, 10A 148341
- NOISE RECORDING EQUIPMENT**
 - 10 189743
- NOISE SOURCES**
 - 10A 148341, 10A 170655, 10A 188655, 10 189025, 10 189746, 10 190302, 10 190503, 10 191406, 10 195128, 10 195717, 10 197435, 11 191664
- NONDESTRUCTIVE TESTING**
 - 00 195909, 00A 196751, 01A 099369, 01A 138561, 01A 170616, 01 189043, 01 191483, 01 194632, 03A 138559, 03A 170659, 03 196376, 07 190283, 09 189780, 09 190356, 09 191093, 09 193750, 09 196375
- NORFOLK AND WESTERN RAILWAY**
 - 01 193748
- NORTH DAKOTA**
 - 08A 185241, 20A 083533, 20A 179692, 20 186684
- NORTHEAST**
 - 20 186383, 22A 179670
- NORTHEAST CORRIDOR**
 - 00 194878, 00 195548, 00 195683, 01A 099378, 01A 188648, 01 189003, 04 195060, 06 191738, 13A 170609, 13 191355, 23A 099391, 23A 156666, 23A 170626
- NORTHEAST RAILROAD PROBLEM**
 - 22A 179699, 24A 156651, 24 194853
- NORWAY**
 - 00 197290

Subject Term Index

NORWEGIAN STATE RAILWAYS

00 190361, 00 195112, 00 195721, 04 189740, 21 195113

NUCLEAR MATERIALS

02A 157664, 02A 179333, 12A 135594, 12A 135596, 12A 135599, 12A 135719,
12 186378, 12 191469, 12 191882, 12 192168, 12A 193283, 20A 136085,
22 185665, 22 186020, 22 186025, 22 190884, 22 191465

O

OBSTACLE DETECTION

08A 196720, 12A 138531

OHIO

20 191474, 22A 138365, 23A 188660, 24 192061, 25 186650, 25 195543

OILS

00 183763

OKLAHOMA

22A 179684, 25 190310, 25 190311, 25 190312, 25 190313

ON BOARD ENERGY STORAGE

04A 054561

ONTARIO

20A 164822

OPEN TOP CARS

03 189749, 20 195553, 20 195554, 20 195555, 20 195556, 22 189038,
22 190323, 22 195072, 22 197016, 24 195696

OPERATING COSTS

11 191664, 11 191665, 11 191668, 11 197330, 18A 129724, 18A 129729,
18A 159635, 18A 177624, 18A 193786, 18 195552, 18 195698, 18 195699,
18 196530, 18 196585, 18 196872, 18 196873, 21 196523, 23 190540,
23 195685, 24 193752, 25A 156676, 25 195057

OPERATING RULES

12 190268

OPERATING STRATEGIES

02 186848, 06A 160400, 11 190301, 13 196372, 16A 148321, 16 189768,
16 195135, 20 190208, 21A 138527, 21A 157598, 21A 159626, 21A 170596,
21A 170622, 21A 188662, 21 192031, 21 194686, 21 194851, 21 195113,
23 189785, 24 189074, 24 196358, 24 196986, 25 190313

OPERATIONS

12A 188661, 18 195698

OPERATIONS PLANNING

03A 170665, 06 195079, 11A 159662, 11A 170605, 11 186850, 13A 179334,
13 189068, 15 189029, 17A 159625, 18 193742, 18A 193784, 21A 157902,
21A 159624, 21A 159626, 21A 170620, 21 188757, 21 192213, 21 194662,
21 195550, 21 196364, 21A 196725, 21 197000, 22 185508, 23 186871,
23 195685, 24 189799, 24 196977, 24 196985, 24 196996, 26 191943

OPERATIONS RESEARCH

01 196934, 20A 136085, 24 195696

OPTICAL CHARACTER RECOGNITION

06 190309, 06 194629

OPTICAL FIBER CABLES

06 189075, 06 189771, 06 190309, 06 195066

OPTICS

01 191266, 02 195101

ORE TRAFFIC

03 189749, 20 194663, 20 194664, 20 194665, 20 196363

OREGON

25 191473

ORIGIN DESTINATION ANALYSIS

18 186406, 20A 179664, 20A 179665, 20A 179666, 20A 179667, 20A 179692,
20 194602, 20 194857, 20 194858, 21A 193785, 22A 179690, 22A 179693,
22 186402, 22 195691, 22A 196119, 23 194870

ORIGIN DESTINATION SURVEYS

23 192230, 23 197462

ORIGIN DESTINATION TABLES

20A 164822, 20 180409, 20 194597, 25A 157601

OVERHEATING

03 196981

OVERPASSES

00A 102894, 00 194145

OVERSPEED

12 185875, 12 192094

OVERTURNING

12 192094

P

PACKAGING

02A 157664, 02A 160409, 02 191290, 02 191481, 03A 179688, 09A 179691,
12 194126, 12 194128, 22A 083506, 22A 083516, 22A 099624, 22A 138375,
22 186235, 22 186466, 22 194856, 22 195076, 22A 196121

PALLETIZING

02A 160409, 03A 179688, 22A 083506, 22A 083511, 22A 099636, 22A 138368,
22A 138375

PALLETS

09A 179691

PANEL TRACK

01 195679

PANTOGRAPH DESIGN

04 195105, 13 053316, 13 189017, 13 189777

PANTOGRAPHS

03 195686, 13A 170653, 13 189738, 13 189783, 13 195124

PARIS

23 194131, 23 197003

PARIS METRO

06 196407

PARK AND RIDE

23 191936, 23 196543

PARKING BRAKE

05 189036

PARKING FACILITIES

23 191936

PASSENGER CAR DESIGN

03A 025403, 03A 136342, 03A 138537, 03A 138539, 03A 160405, 03A 165811,
03A 170601, 03A 170604, 03A 170608, 03A 170617, 03A 170638, 03A 170646,
03A 188652, 03A 188657, 03 189794, 03 189810, 03 190359, 03 191670,
03 194132, 03 194641, 03 194653, 03 194673, 03 194677, 03 196538,
03 196943, 03 197004, 03 197010, 03 197453, 04 196940, 04 196944,
05 191446, 07A 196746, 07A 196747, 07 197012, 09A 148320, 09 197421,
09 197422, 12 190535, 12 190536, 12 190537, 12 190538, 12 190539,
12 195677, 19 195697, 23A 099391

PASSENGER CAR DYNAMICS

02 195692, 02 196524

PASSENGER CAR MAINTENANCE

03A 185234, 03 190314, 03 197441

PASSENGER CAR TRUCKS

03 194642, 03 194643

PASSENGER CARS

02 196398, 03A 138559, 03A 170643, 03A 170646, 03A 170647, 03A 170658,
03 190285, 03 190339, 03 194668, 03 195106, 04 196370, 04 196460,
04 196994, 18 194675, 25 191247

PASSENGER COMFORT

02A 170648, 02 190295, 03A 025403, 03A 136342, 03A 160405, 03A 170617,
03 189810, 03 190339, 03 190359, 03 194643, 03 194673, 03 194677,
07 189809, 07 190276, 07 193762, 07 195090, 07 197009, 10A 188673,
10A 196753, 10 197435, 11A 170605, 19 195697, 23A 099391

PASSENGER FLOW

23 194131

PASSENGER OPERATIONS

15 189029

PASSENGER SAFETY

03A 138565, 11A 159658, 12 190268, 12 190535, 12 190536, 12 190537,
12 190538, 12 190539, 12 194859, 12 194860, 12 197359

PASSENGER SECURITY

11A 159658, 11 186850, 12 190881, 26 186492

PASSENGER SERVICE EFFECTIVENESS

11 197361, 11 197362, 11 197363, 11 197364, 23A 178058, 23 195546,
23 195678, 23 195685, 23 195701

PASSENGER SERVICE QUALITY

23 196463

PASSENGER SERVICES

11A 170605, 16 189011, 23A 099391, 23A 170597, 23 186458, 23A 188660,
23 189057, 23 193770, 24 196541, 24 196542, 24 196930, 25 186650,
25 189765, 25 195543

PASSENGER STATION DESIGN

00A 059406, 06 053330, 07 197012

PASSENGER STATIONS

03 191670, 06 195079, 07A 196746, 23A 170626, 23 194129, 24 196541,
24 196542

PASSENGER TERMINALS

23 194129

PASSENGER TRAFFIC

24 189028

PASSENGER TRAINS

00 189787, 02 196989, 02 196990, 02 196991, 03A 170638, 10 197435,
12 194859, 12 194860, 23 195545, 23 196533

PASSENGER TRANSPORTATION

04 194501, 06 196999, 11A 193781, 15 194862, 16 185618, 16 193758,
16 194504, 16 194868, 16A 196727, 16 196979, 18 185783, 18 185784,
18 185810, 18 185811, 18 186641, 18 195706, 19 194130, 20A 153650,
20 194597, 22 186402, 23 194129, 23 196469, 24 195731, 24 196996,
25A 058753, 25 189797, 25 190311, 25 190769, 25 195107

PASSENGER TRAVEL DEMAND

07 190995, 11A 058375, 11 194658, 15A 179338, 15A 192693, 15 197340,
15 197485, 16 192123, 20 189781, 23A 177691, 23A 178058, 23A 185243,

Subject Term Index

- 23A 188660, 23 190265, 23 190540, 23 192058, 23 192230, 23 194129,
23 194140, 23 194867, 23 194870, 23 195077, 23 195678, 23 196463,
23A 196744, 23 196945, 23 197282, 23 197431, 23 197455, 23 197462,
24 196531, 24 196874, 24 196978, 25A 160045, 25 194138, 25 196570,
25 196571, 26 191952
- PATENTS**
01 191266, 01 191483
- PEAK CAPACITIES**
13 195711, 13 196937, 18 196927, 23 195678
- PEDESTRIANS**
08 195141
- PENN CENTRAL TRANSPORTATION COMPANY**
24 195542
- PENNSYLVANIA**
12 194126, 20 185916, 20 185917, 20 191901
- PENSIONS**
25 189059
- PEOPLE MOVERS**
06 196379, 11A 159658, 11A 159659, 11A 159660, 11A 159662, 11A 170589,
11A 170605, 11A 170621, 11 190275, 11 194658, 11 194687, 12 192146
- PER DIEM**
18 195552, 18 196109, 21A 159626
- PERFORMANCE SPECIFICATIONS**
02A 170666, 02A 188663, 03A 081786, 03A 165811, 03 194668
- PERFORMANCE STANDARDS**
01A 188650, 04 197285, 17 196928, 24 196985
- PERFORMANCE TESTS**
01 194637, 03A 059420, 04 197438
- PERISHABLES**
03A 179688, 20 189052, 22A 179670, 22A 196117
- PERISHABLES TRAFFIC**
03A 195918, 20 189053, 20 191589, 22A 083506, 22A 083516, 22A 138368,
22A 138375, 22A 196121, 24A 179528, 25 195064
- PERMAFROST**
00 189790, 00 189791
- PERSONAL RAPID TRANSIT SYSTEMS**
11A 058375, 11A 135604, 11A 138792, 11 186150, 11 186162, 11 186851,
11 190301
- PERSONNEL**
07A 148352, 25 189059
- PERSONNEL DEVELOPMENT**
07 196360, 07 196361, 24 189061
- PERSONNEL MANAGEMENT**
18A 138514
- PERSONNEL PRACTICES**
07 189058
- PERSONNEL TRAINING**
12A 188664, 12 189784, 17A 159625
- PETROLEUM**
16 185817, 22 195714
- PETROLEUM TRAFFIC**
03 196405, 18 196374, 20A 136085, 20 196108, 21 196523, 22 190326,
26 190327
- PHILADELPHIA**
11 191664, 11 191665
- PHILADELPHIA TRANSIT SYSTEM**
10 191429
- PHOTOGRAMMETRY**
00 189023, 00 191675
- PHOTOGRAPHIC DATA COLLECTION**
00A 185235, 06 194629
- PHYSICAL DISTRIBUTION**
17 197510, 20A 156542, 20A 156591, 20A 179664, 20A 179665, 20A 179666,
20A 179667, 20A 179679, 20A 179692, 20 196424, 22A 135001, 22A 138375,
22A 138378, 22A 138400, 22A 138481, 22A 153674, 22A 153703, 22A 153718,
22A 156972, 22A 157092, 22A 179657, 22A 179658, 22A 179659, 22A 179660,
22A 179661, 22A 179662, 22A 179663, 22A 179668, 22A 179669, 22A 179670,
22A 179676, 22A 179677, 22A 179680, 22A 179681, 22A 179682, 22A 179683,
22A 179684, 22A 179690, 22A 179699, 22 185508, 22 185838, 22 186247,
22 189002, 22 190323, 22 190326, 22 190372, 22 194856, 22 195689,
22 195690, 22 195691, 22A 195927, 22A 196119, 22A 196120, 22A 196121,
22A 196122, 22 196473, 22 197276, 24 195551
- PHYSIOLOGICAL FACTORS**
07A 049659, 07 191932, 07 193762, 10 194866
- PIERS**
00 188833, 00 196933, 00 197287
- PIGGYBACK**
02A 160409, 02 194877, 11 191667, 20 189053, 20 189072, 20 189803,
20 189865, 21A 159653, 21A 160398, 21 192213, 21A 193785, 21 196982,
22A 083511
- PIGGYBACK CARS**
03A 059420, 03 189065, 03 194134
- PILE CAPS**
00 183999
- PILE DRIVING**
00 183797, 00 183798
- PILES**
00 183797, 09A 136093
- PILING**
00A 135658
- PIPELINES**
00 197445, 00 197446, 11 191664, 11 191665, 11 191666, 11 191667,
20 185960, 20 185961, 20 185962, 20 185963, 21 196523
- PISTON RINGS**
04 190278
- PITTSBURGH TRANSIT SYSTEM**
04 194633
- PLANNING**
12 186852, 15A 129701, 23 197440, 24 189033, 24 196874
- PLASMA TORCH**
04 190278
- PLASTICS**
00 195112, 01A 138568, 03 195106, 09A 148320, 09 196472, 20 194664
- PNEUMATIC SYSTEMS**
00 197445, 00 197446
- POLE LINES**
06A 196730
- POLICY MAKING**
15A 179339, 15 195139, 18A 193786, 20A 138364, 20A 138370, 20 191870,
22A 179669, 23 190540, 24A 193779, 24 194144, 24 196104, 25A 153574,
25A 157601, 25 189762, 25 190769, 25 194138, 25 196570, 25 196571,
25 197335
- POLISH STATE RAILWAYS**
01 196396, 04A 170637, 06 194503, 13 189017, 22 189038
- POLISH TECHNOLOGY**
01 190346, 01 195109, 06 189754, 06 194503
- POLLUTION**
13 194654
- POLLUTION CONTROL**
10 053314
- POLYETHYLENE**
00 195112
- POLYMERS**
00 053332, 00 194298, 00 194865, 00 195112, 00 196353, 00 196354,
00 196355, 01 195110, 01A 196745, 03 195106, 09A 148320, 09A 170603,
09A 179345, 09 189039, 09 195695, 10 195707, 12 195677
- POREWATER PRESSURE**
00 195721
- PORT AUTHORITY TRANS HUDSON**
10 191440
- PORT AUTHORITY TRANSIT CORPORATION**
04 194633, 04 197438, 10 191428
- PORT FACILITIES**
12 194337, 20A 179671, 20A 196118, 21 186994, 21 188757, 22 174305,
22A 179681, 22A 179682, 22A 179683, 22A 179696, 22 189055, 22 190270,
22 190429, 22A 196119, 25 186650
- PORTLAND CEMENTS**
00 185578, 20 189805
- POTATO TRAFFIC**
22A 179670
- POWER BRAKE LAW**
12 192094, 12 192347
- POWER COLLECTION**
04A 058270
- POWER DISTRIBUTION**
13 053325
- POWER FACTOR**
04 194655, 11A 058273, 13 195103, 13 196371
- POWER SPECTRAL DENSITIES**
01A 059223, 02 190290, 02 194640, 02 196524
- PRECAST CONCRETE**
00 197279, 09 193769
- PRECAST CONCRETE CAPS**
00 183999
- PRECAST CONCRETE SEGMENTED TUNNEL LININGS**
00A 179326, 00A 188669, 00A 188670, 00 195074, 00 197280
- PREDICTIONS**
00A 185230, 01A 139163, 08A 178037
- PREFABRICATED**
00 197279

Subject Term Index

PRESENCE DETECTORS

06A 159657, 06 189753, 06A 193284, 08A 193281

PRESERVATION

09A 136093, 24 196541, 24 196542

PRESSURE CONTROL VALVES

12A 099389, 12A 099428

PRESSURE WAVE PROPAGATION

00 196931

PRESSURIZATION

22 189002

PRESTRESSED CONCRETE

09 193769, 09 194135

PRESTRESSED CONCRETE BEAMS

00 183775, 00 183779, 00 183999, 00A 188668

PRESTRESSED CONCRETE BRIDGES

00A 102894, 00 183745, 00 189069

PRESTRESSED CONCRETE CROSS TIES

01 195109

PREVENTIVE MAINTENANCE

03 197441, 04 189742, 04 190367, 04 196988, 04 197273, 11 197358

PRICING

18 196927, 20 196116, 24 196986, 25A 059207, 25 196875

PRIME MOVERS

04A 179335, 04 190269, 04 194864, 25 195107

PRIVATE CAR LINES

24 193751

PRIVATE CARRIAGE

20 191737

PROBABILITY

12 186377, 12 194859, 17A 179340

PRODUCTIVITY

00 195078, 01A 188650, 01 195547, 01 195679, 01 196105, 03 196359,
04 195088, 07 196361, 17A 148350, 18A 129729, 18A 193784, 18 195699,
18 195706, 18 196455, 20 196116, 21A 138527, 21A 157598, 21A 159653,
21A 170622, 21A 185236, 21A 196733, 24A 179528, 24 189028, 24 189061,
24 194853, 24 195541, 24 195542, 24 196358, 24 196930, 24 196985,
24 196986, 25A 128852, 25 186632, 25 186635

PROFITABILITY

17A 196741, 18 195133, 18 195698, 18 196873, 20A 188659, 24 190771,
24 193744, 24 193752, 24 193756, 24 195541, 24 195551, 24 196358,
24 196930, 24 196985, 24 196986, 25A 156676, 25A 179347

PROJECT ANALYSIS

00 194155, 18 193742

PROPANE

12 189770, 22 190326, 26 190327

PROPERTY VALUES

15 191659, 15 192212, 24 196541, 24 196542

PROPULSION CONTROLS

04A 054561

PROPULSION SYSTEMS

02A 128041, 03A 138539, 04A 058270, 04A 058280, 04A 099377, 04 190338,
04 190344, 04 190345, 04 190351, 04 190364, 04 190365, 04A 193777,
04 194669, 04A 196721, 04 196941, 04 196992, 04 197285, 11A 058273,
11A 148347, 11A 149463, 11 193772, 16A 128051, 23A 099391

PROTECTIVE COATINGS

09 189001, 09 190664

PROTECTIVE DEVICES

00 188833, 03 194636, 04 194671, 13 194873

PROTOTYPES

03A 148336

PSYCHOLOGICAL FACTORS

07A 049659, 07 189779, 23A 196744

PUBLIC OPINION

08 195680, 11A 058375, 11A 159658, 23A 196744, 23 197455

PUBLIC OWNERSHIP

18 194676, 24A 159650, 24 189071, 24 189788, 24 195542, 24 196541,
24 196542

PUBLIC RELATIONS

23A 170597, 24 195682

PUEBLO TEST CENTER

01A 185233, 01 194497, 02A 139178, 02A 170663, 02 195692, 02 196357,
02 196378, 17A 160402

PULSE CODE MODULATION

06 053328

PULSE MODULATED CONTROL

04 196517, 04 196939

PULSE WIDTH MODULATION

11A 196738

PURCHASES AND STORES

25 191247

PUSH-PULL TRAINS

03 194641

Q

QUALITY CONTROL

01A 099396, 03A 179688, 03 195099, 09 191093

QUESTION AZ32

06 053329

QUESTION A103

04A 170637

QUESTION A118

06A 170650

QUESTION A122

06A 170635

QUESTION A124

12A 170651

QUESTION A129

13 053316, 13A 170653

QUESTION A133

06 053330, 06 053331, 06A 170631

QUESTION A145

06 053328, 06A 170628

QUESTION B106

03A 170646

QUESTION B107

03A 170638

QUESTION B108

03A 170647

QUESTION B112

22 053313

QUESTION B12

03A 172456, 09 053312

QUESTION B126

05 053309, 05A 170652

QUESTION B13

10 053314

QUESTION B134

03 053311, 03 053321, 03A 170654

QUESTION B136

03 053323, 03 053327, 03A 170630

QUESTION B140

03A 170658

QUESTION B142

03 053322, 03 053326, 03A 170639

QUESTION B146

05A 170656

QUESTION B36

03 053307, 03 053308, 03A 170641

QUESTION B44

02 053315

QUESTION B51

03A 170643

QUESTION B55

02A 170644

QUESTION C116

02 053320, 02A 170648

QUESTION C137

10A 170655

QUESTION C138

02 053305, 02A 170660

QUESTION C53

01 194652

QUESTION DT70 (D130)

09 053317

QUESTION DT72 (A122)

13 053325

QUESTION DT77 (D117)

01 053318

QUESTION DT86 (A118)

06 053306

QUESTION D101

00 053332, 02A 170645

QUESTION D117

01 053310, 01A 170649

QUESTION D121

01 053324, 01A 170636

QUESTION D128

00 053319, 00A 170633

QUESTION D130

00A 170632

Subject Term Index

QUESTION D141
02A 170657
 QUESTION D147
06A 170629
 QUESTION D87
01A 170625
 QUESTION E139
03A 170659
 QUESTIONNAIRES
 23 197455, 23 197462
 QUEUING MODELS
17A 179340

R

RADAR
 00 183803, 00 186243, 00 195909, *01A 196745, 06A 159657, 06A 193284*
 RADCLIFFE-ON-TRENT TEST TRACK
01A 170625
 RADIAL TRUCKS
03A 188657, 03 194642
 RADIATION
 12 194126, 12 194128
 RADIO COMMUNICATIONS
 06 053330, 06 053331, *06A 170631*, 06 189000, 06 189741, 06 195066,
 11 190275, 12 190881
 RADIO TRANSMISSION
06A 170631, 06A 196718, 06A 196719, 09 189035
 RADIO TRANSMITTERS
 03 196981
 RADIOACTIVE MATERIALS
 02 191290, 02 191481, 02 191535, 10 186798, 10 186805, 12 179826,
 12 186377, 12 186463, *12A 188664*, 12 191517, 12 191882, 12 192168,
 12 192180, 12 192294, *12A 193283*, 12 194125, 12 194126, 12 194128,
 12 195097, 12 195098, *12A 196740*, 22 186389, 22 186392, 22 186466,
 22 186800, 22 186826, 22 186827, 22 190884, 22 190887, 22 190888,
 22 192170, 22 192174, 22 195096
 RADIOGRAPHY
 03 195099, 09 189780, 09 191093
 RAIL
 01 189015
 RAIL BONDING
 13 195709
 RAIL CORRUGATION
02A 081799
 RAIL CRACKS
 01 196389, 01 196400, 03 196393
 RAIL DEFECTS
01A 099393, 01A 099394, 01A 139163, 01A 179330, 01 189043, 01 195093,
 01 196389, 02 194508, 09 189782, 09 190319, 09 190356, *12A 148324*
 RAIL DEFLECTION
 02 189063
 RAIL DESIGN
 01 189015, *02A 081799*
 RAIL DYNAMICS
 02 195121
 RAIL DYNAMICS SIMULATOR
02A 058263, 02A 170663, 02 194880, 02 195692, 02 196378, *02A 196722*,
03A 170665, 03 189065
 RAIL FAILURE
01A 058458, 01A 099393, 01 195093, 01 196400, 09 169393
 RAIL FASTENERS
01A 188667, 01 192246, 01 193745, 01 194637, 01 195109, 01 196450,
 01 196535
 RAIL FATIGUE
 01 194652, 09 189747, 09 189782, 09 190319, 09 194495
 RAIL FISSURES
01A 139163, 09 189782
 RAIL FLAW DETECTION
01A 058458, 01A 059371, 01A 099369, 01A 099394, 01A 138561, 01A 179330,
 01 191483, 01 194632, 01 196400
 RAIL FLAW INSPECTION
 01 189043
 RAIL FLAW PROPAGATION
01A 139163, 03 196393
 RAIL FRACTURE
 09 190319
 RAIL GRINDING
10A 058675, 10 190503
 RAIL HEAD
01A 058458, 01 196389, 09 189747

RAIL HEAD PROFILE
 01 189015
 RAIL INSPECTION
01A 059227, 01A 059371, 01A 099369, 01A 099394, 01 195093
 RAIL JOINTS
01A 059227
 RAIL LAYING
 01 189005, 01 193745
 RAIL MAINTENANCE
01A 059227
 RAIL OVERTURNING
 02 189063, 02 196989, 12 192094
 RAIL SECTIONS
 01 189015, 02 190333
 RAIL SHELLING
 09 189747
 RAIL STEEL METALLURGY
01A 099393, 01A 138564, 01A 139163, 01A 170600, 01 189015, 01 194652,
02A 081799, 02 196357, 09 169393, 09 189782, 09 190319, 09 194495,
 09 196452, *09A 196724*
 RAIL STEELS
 09 194495
 RAIL STRESS
01A 139163, 01 189015, 01 189046, 01 194652, 01 196450, 02 053305,
02A 081799, 02A 099367, 02 194508, *02A 194540*, 09 189747, 09 193750,
 09 194495
 RAIL THERMAL STRESSES
 01 190346, *01A 196735*, 02 053305
 RAIL WEAR
 01 193748, *02A 139178, 03A 138796, 03A 170665, 09A 138558*, 09 196100,
09A 196724, 17A 160402
 RAIL WELDING
01A 099396, 01A 170600, 01 189012, 01 189015, 01 189043, 09 189780,
 13 191730
 RAILROAD INDUSTRY
 24 194499
 RAILROAD RETIREMENT SYSTEM
 25 189059
 RAILROAD REVITALIZATION AND REGULATORY REFORM ACT
13A 179334, 18 193742, 18 196872, 20 189052, *24A 159650, 24A 179673*,
24A 193779, 24 196930, 24 196985, 24 196986, 25 186867, *25A 188665*,
 25 189050, 25 190310, 25 190311, 25 190312, 25 195064, 25 196870,
 25 196871
 RAILS
 01 195681
 RAILWAY LABOR ACT
 24 196362
 RAILWAY TO THE ARCTIC
 18 196374
 RAIN
 00 190341, 00 195684, 05 194645
 RANDOM PROCESSES
 00 053319, 01 053318, *17A 179340*
 RAPID TRANSIT CARS
03A 025403, 03A 136342, 03A 138539, 03A 165811, 03A 170601, 03A 170604,
03A 185234, 03A 188652, 03 189813, 03 190285, 03 197010, 04 190345,
04A 193777, 04 195059, 04 195061, 04 195084, 04 195127, 04 196460,
 04 196929, 04 196994, 04 197285, 04 197438, 06 196380, 07 197009,
 09 197421, 09 197422, 10 189769, 10 191406, 10 191407, 10 191428,
 10 191429, 10 191431, 10 191435, 10 191440, *12A 138531*, 12 195677,
 25 191247
 RAPID TRANSIT FACILITIES
00A 138532, 00 183758, *00A 188668, 01A 188667, 04A 193777, 09A 170603*,
12A 058838, 13 195086, 15 186156
 RAPID TRANSIT NOISE
10A 138534, 10A 188647, 10A 188654, 10A 188655, 10 189025, 10 190503,
 10 197435
 RAPID TRANSIT STATIONS
00A 179344, 04A 193777, 04 196929, 07 197012, 10A 188673, 10 191428,
 10 191429, 10 191431, 10 191435, 10 191440, 10 191677, *10A 196753*,
 11 197367, 15 190582, 15 191362, 15 191659, 15 192212, 18 196526,
23A 058757
 RAPID TRANSIT SYSTEMS
 00 194141, 00 194142, 00 196622, 00 196715, 00 197460, *01A 170607*,
01A 179328, 01A 193778, 02A 128041, 04A 054561, 04 188996, 04 194633,
 04 196522, 04 196929, 05 194645, 06 190320, 06 194656, 06 196379,
 06 196407, 06 196714, 06 196948, 07 189058, *10A 058675*, 10 191407,
 10 191428, 10 191429, 10 191431, 10 191435, 10 191440, 10 191677,
 10 197522, 11 197459, *12A 059864*, 12 186852, 12 190881, 12 195677,
 12 197359, 12 197371, 13 189739, 13 191730, 13 196937, 13 196947,
15A 160469, 15A 179331, 15A 179339, 15A 188656, 15 190263, 15 190485,

Subject Term Index

- 15 190486, 15 190487, 15 190905, 15 190906, 15 190968, 15 190970,
15 191029, 15 191033, 15 191362, 15 191659, 15 192212, 15 197283,
15 197340, 16A 128051, 16A 148321, 16 186430, 16 189811, 16 190303,
16 197272, 16 197420, 18 192228, 18 196585, 23A 058815, 23A 185231,
23A 185243, 23A 185244, 23 186869, 23 186870, 23 191660, 23 191758,
23 191936, 23 192230, 23 194131, 23 194139, 23 194143, 23 195077,
23 196463, 23 197440, 23 197462, 25A 099365, 25A 160045, 25 186632,
25 186635, 25 191361, 25 195057, 25 196518, 26 185409, 26 191952
- RATE MAKING**
10 196113, 18 186406, 18 196374, 18 196927, 20A 156591, 20A 179667,
20A 185240, 20 188532, 20 189052, 20 189073, 20 195068, 20 195554,
20 195555, 20 195556, 20 196424, 21 195550, 22 197276, 24 194853,
24 195551, 24 196103, 25 189050, 25 193757, 25 195064, 25 196875
- RATE OF RETURN**
18 194676
- RATES**
18A 080324, 18 189804, 20 189072, 20 189860, 22A 179657, 22A 179658,
22A 179659, 22A 179660, 22A 179661, 22A 179662, 22A 179663, 22A 179686,
22 186466, 24A 179673
- REACTION RAILS**
11 195087, 11A 196738
- RECLAMATION**
01 195681
- RECTIFIERS**
04 196384, 04 196517, 05 195713, 13 188999
- RECYCLING**
01A 138568, 22 185690, 22 185691, 24 196541, 24 196542
- REDUNDANCY**
17 190272
- REFRIGERATED CONTAINERS**
03A 195918
- REFRIGERATED TRAILERS**
03A 195918, 20 189053, 22A 083506, 22A 099639, 22A 195927
- REFRIGERATION**
03A 179688, 03A 195918, 11 196532
- REFRIGERATOR CARS**
22A 083506, 22A 099639, 22A 138368, 22A 138375, 22A 195928
- REGENERATIVE BRAKING**
03 194132, 04 188996, 04 190277, 04 191750, 04 191751, 04 191752,
04 191753, 04 191754, 04A 193777, 04 194633, 04 194655, 04 195059,
04 195127, 04 196460, 04 196522, 04A 196748, 04 196929, 05 195100,
05 195713, 13 188999, 13 196937, 16A 128051
- REGIONAL PLANNING**
15A 160469, 15A 179338, 15 185781, 15 189029, 15A 192693, 15 195139,
16 186471, 20A 179666, 20 185890, 20 186407, 20 191278, 23A 058815,
23A 188660, 23 194139, 23 194143, 24A 193779, 25A 099365, 25A 160045,
25A 179347, 25 189765, 25 189797, 25 189798, 25A 193783
- REGIONAL RAIL REORGANIZATION ACT OF 1973**
20A 099645, 20A 099646, 20A 099647, 20A 138370, 24 195542, 25 186650,
25 186867
- REGIONAL STUDIES**
20 194598
- REGIONAL TRANSPORTATION**
18A 059897
- REGRESSION ANALYSIS**
18 196102, 18 196872, 20 189860, 20 189863
- REGULATIONS**
12 194125, 12 194128, 25 191629, 25 196112
- REINFORCED CONCRETE**
00A 179326, 00A 188666
- REINFORCED CONCRETE BEAMS**
09 185483
- REINFORCING MATERIALS**
00 183763
- RELIABILITY**
01A 099369, 01A 188650, 01A 193778, 02A 170661, 03A 025403, 03A 055916,
03A 136342, 03A 138565, 03A 165811, 03A 170604, 03A 185234, 03A 188652,
04 190306, 05 195070, 06A 159657, 06 194629, 06 194681, 06 194685,
06 195119, 06 195142, 06A 196718, 06A 196730, 07 190283, 09A 138558,
11A 159660, 11A 170621, 11 186850, 11 197361, 11 197362, 11 197363,
11 197364, 12A 058838, 12A 138531, 12A 170780, 12 197371, 13 196386,
13 196519, 17A 138526, 17A 188651, 17 190272, 20A 138370, 21A 138527,
21A 157598, 21A 159626, 21A 188662, 22 195689, 22 195690, 24 196104
- REMOTE CONTROL**
06 190337, 06 194688, 06 195079
- REPAIR SHOPS**
03 053323, 04 190367
- REPAIRS**
00 183745, 00 183753, 13 194510
- RESEARCH AND DEVELOPMENT**
01A 081797, 01A 179328, 01 195063, 02A 058257, 02A 059427, 02A 081796,
02A 081799, 02A 081803, 02A 081805, 02A 170661, 03A 081786, 03A 081787,
03A 081798, 07A 170662, 08 193342, 11 186851, 12A 081788, 18 195140,
24 195696, 24 196104, 26A 058329
- RESEARCH FACILITIES**
02A 196722, 10 197274
- RESEARCH PROGRAMS**
01 190346, 02 190336, 11A 160399, 24 189033, 24 194638, 24 195126,
24 196104
- RESIDUAL STRESS**
03A 046502, 03 193767
- RESILIENT WHEELS**
03A 136342, 10A 058675, 10A 188647, 10 190503, 10 191407
- RESONANT SPEED**
02 189800
- RESOURCE MANAGEMENT**
18 196102
- RETAINING WALLS**
00A 135658, 00 196627, 09A 135495
- RETARDER CONTROL**
06A 159656, 06A 170629, 06 189753, 06 195117
- RETARDER NOISE**
10A 058621
- RETARDERS**
05 196949, 05 197008, 21 193755
- RETIREMENT**
25 189059
- RETURN ON INVESTMENT**
04 191751, 04 191752, 04 191753, 04 191754, 18 189789, 18 193742,
18A 193780, 18 194676, 18 195133, 18 195552, 24 193744, 24 193756,
24 196930, 24 196977, 25A 099365
- REVENUE ACCOUNTING**
23 195546
- REVENUES**
11A 058375, 18A 059897, 18A 193780, 18 195698, 18 195706, 18 196585,
24 194861, 24 195731
- RIDE QUALITY**
02A 148358, 02A 160409, 02A 170648, 02A 188663, 02 190282, 02 190295,
02 190304, 02 190358, 02 194640, 02 194869, 02 194880, 02 196378,
03A 059420, 03A 136342, 03A 160405, 03A 170617, 03A 188657, 03 189813,
03 190359, 03 194642, 03 197004, 03 197010, 04 197438, 07 189809,
07 190276, 07 195090, 11A 160276, 11 189817, 11 196520
- RIDERSHIP**
11 186162, 11 194658, 15 186156, 23A 185243, 23 190540
- RIDING STABILITY**
03 053311, 03A 170643
- RIGHT OF WAY**
00A 185235, 10A 179685, 21A 196742, 25A 179347
- RIPRAP**
00 186293
- RISK ANALYSIS**
00A 177845, 00 183802, 00A 196752, 00 197460, 03A 099426, 08A 178037,
12A 099424, 12A 099436, 12A 130946, 12A 148324, 12 179826, 12 180235,
12 185742, 12 186852, 12 190268, 12 190308, 12 191517, 12 191914,
12 192168, 12 192180, 12 192391, 12A 193283, 12 193741, 12 194863,
12 195097, 12 195098, 22 186392
- ROAD TEST**
03 194644, 09 189035
- ROADBEDS**
01 194494
- ROCHESTER**
22 185883
- ROCK AND ROLL**
02 189800, 02 196449
- ROCK BOLTING**
00A 188666, 00 194136, 00 195075, 00 196628, 00 197284
- ROCK FALL HAZARDS**
00 190361
- ROCK FRACTURE**
00A 135514, 00 196623
- ROCK MECHANICS**
00A 135516, 00A 136165, 00 191482, 00 193486, 00 196625,
00 196628, 26 192074, 26 192075
- ROCK PROPERTIES**
00 185892, 00 191482
- ROCK TUNNELING**
00A 135514, 00A 188643, 00 194136, 00 194137, 00 195727, 00 196623,
00 196625, 00 197284
- ROLLER BEARINGS**
03 053327, 03A 055916, 03A 170630, 03 196981, 09 196536
- ROLLING STOCK**
19 194130

Subject Term Index

ROME
23 194129

ROTARY CONVERTERS
03A 170647

ROUTING
06A 136338, 23 186871, 25A 059207

RUNNING TIME
02 186848

RURAL AREAS
15A 179672, 20A 156604, 20A 179679, 20 191737, 22A 156972, 22A 157092, 22 189054, 25A 156620, 25 189051

RUSSIAN TECHNOLOGY
00 189775, 01 195130, 04 190363, 04 190364, 04 190365, 04 190366, 04 190367, 04 190369, 04 193763, 04 195105, 04 196988, 06 194685, 09 189747, 13 190368, 24 194499, 25 195107

S

SAFETY
00 183746, 00 183802, 00 183803, 01A 059295, 01A 099378, 01A 138560, 02A 058465, 02A 081805, 02A 170661, 02A 179333, 02 191535, 03A 081786, 03A 099426, 03A 099439, 03A 138565, 03 189070, 03 190314, 03 194636, 03 196377, 03 196405, 03 196984, 05 194634, 06 053306, 06A 160400, 06 185686, 06 190317, 06 194681, 06 195081, 06 195119, 06 195142, 06 196379, 06 196539, 06A 196718, 07A 049659, 07A 170662, 07 196361, 07 196527, 08A 153623, 08A 159654, 08A 185241, 08 191455, 08A 193281, 08A 193282, 08 193342, 08 193730, 08A 194539, 08 194852, 08 195702, 08A 196720, 08 197314, 09A 138557, 09A 138558, 09A 148320, 09 197421, 09 197422, 10 186805, 10A 188673, 10 189773, 11A 135604, 11A 159660, 11 186850, 11 189812, 11 190330, 11 194657, 11 194659, 11 196366, 11 196458, 11 196459, 11 197417, 12A 058838, 12A 059864, 12A 099392, 12A 099424, 12A 099428, 12A 099436, 12A 135594, 12A 135599, 12A 135719, 12A 138531, 12A 148324, 12A 148348, 12A 170651, 12A 170780, 12 179826, 12 180235, 12 185742, 12 186377, 12 186378, 12 186463, 12 186852, 12A 188661, 12A 188664, 12 189770, 12 189784, 12 190268, 12 190308, 12 190321, 12 190583, 12 190738, 12 190901, 12 191469, 12 191517, 12 191882, 12 191914, 12 192146, 12 192168, 12 192180, 12 192294, 12 192391, 12A 193283, 12 193741, 12 194125, 12 194126, 12 194128, 12 194578, 12 194859, 12 194860, 12 194863, 12 195097, 12 195098, 12 195677, 12 195703, 12 195704, 12 196110, 12 196383, 12 196681, 12A 196740, 12 197359, 12 197371, 13 189802, 13 194876, 20A 136085, 20 194857, 21A 170664, 22 053313, 22 185665, 22 186020, 22 186025, 22 186392, 22 186466, 22 186800, 22 186827, 22 190884, 22 191465, 22 192170, 22 192174, 23A 185231, 23 195685, 24 194638, 24 196104, 25 186650, 25 188152, 25 192039, 25 196877, 26 190327

SAFETY ENGINEERING
12A 059864, 12 190535, 12 190536, 12 190537, 12 190538, 12 190539

SAFETY STANDARDS
01A 185232, 12 193746

SAFETY VALVES
12A 138567

SALESMEN
24 193744

SAN FRANCISCO MUNICIPAL RAILWAY
23 186871

SANDING
02 053315, 02 196989

SANITARY ENGINEERING
03A 170658

SANITATION
03A 170658

SCALES
22 189814, 22 195102

SCHEDULING
02 196451, 03 197441, 04 195060, 11A 135604, 11 196390, 13 196372, 17A 138526, 17 193722, 17 196928, 21A 159653, 21A 170596, 21 195113, 21A 196725, 21 197288, 23 186871, 23 195678, 23 196533

SEABOARD COAST LINE RAILROAD
07 192096, 21 195550

SEALING COMPOUNDS
00A 188669

SEATING
03 194673

SEATTLE
11A 170621, 11 197330

SECTIONING
13 194635, 13 194670

SECURITY
20 188532

SECURITY PROGRAMS
12 190881

SEISMIC SURVEYS
00A 177845, 00 190056

SEMIANNUAL
18 195698, 18 195699

SENSORS
01A 193778, 01 194632, 03A 099439, 03 194643, 03 196981, 03 196984, 04 197273, 06 185686, 06 189772, 11A 170621, 11 196468, 21A 170664

SERVICE LIFE
00 183746, 00 183751, 00 183770, 00A 188668, 00A 196736, 01A 148355, 01 194637, 01 194652, 01 195549, 03 193761, 06A 196730, 17A 160402, 18 194675

SERVICE QUALITY
16 193758, 17A 138526, 17 196928, 20A 138370, 20 189072, 20 189073, 21A 138527, 21A 157598, 21A 159626, 21A 159627, 21A 159653, 21 197288, 22A 179681, 24A 179673, 24 190771, 24 196930, 24 196985, 25A 156620, 25A 156707

SHALE OIL TRAFFIC
20 196108

SHCHERBINKA TEST TRACK
09 196100

SHELF COUPLERS
12 193741

SHIN KANSEN
00 189764, 03 190314, 03 195686, 04 188997, 04 190315, 06 190316, 06 195719, 09 190342, 10 189745, 10 190328, 17 190272, 23 189785

SHIPPERS
03A 159630, 12 191469, 15A 179672, 17A 159628, 17A 188645, 17 197510, 18 189804, 18 196109, 20A 138364, 20A 179692, 20 186407, 20 189863, 20 191737, 20 194597, 20 194598, 21A 159624, 21A 159627, 21 197275, 22A 153674, 22A 156972, 22A 157092, 22A 179668, 22A 179677, 22A 179686, 22A 179690, 22A 179693, 22A 179694, 22A 179695, 22A 179696, 22A 179697, 22A 179698, 22 185508, 22 185948, 22 189002, 22 190262, 22 194856, 22 195689, 22 195690, 22 195691, 22A 196117, 22 196528, 24 193751, 24 195541, 24 196103, 25A 156707, 25A 188665, 25 189050, 25 190313, 25 196871, 26 196111

SHIPPING CONTAINERS
02A 157664, 02A 179333, 02 191290, 02 191535, 10 186798, 12A 135594, 12A 135599, 12A 135719, 12 190738, 12 191882, 12 192168, 12A 193283, 12 194126, 12 194128, 22 185665, 22 186020, 22 186025, 22 186466, 22 186826, 22 190887, 22 190888, 22 191465, 22 192170, 22 192174, 22 194856

SHOCK
22 194856

SHOCK ABSORBERS
03A 170641

SHOPS
03 195686, 03 197441, 04 189742, 04 195088, 04 196367

SHORT LINES
17A 159631, 18 196872, 24 193751, 24 194855, 25 190311

SHORT TRAINS
24 196358

SHOTCRETE
00 185578, 00A 188666, 00 194136, 00 195075, 00 197284, 09A 135495

SHUTTLE SERVICES
18A 177624

SIDE BEARINGS
02 191066

SIDE BUFFERS
03 053307, 03 053308, 03A 170641

SIDE FRAMES
03A 081787

SIDINGS
23 196533

SIGNAL ASPECTS
21A 196725

SIGNAL CIRCUITS
06 195119, 06A 196730

SIGNAL DEVICES
06A 160400, 06 195119, 08 195141, 13 195131

SIGNAL LIGHTS
21 194683

SIGNAL RECOGNITION
07 186143

SIGNAL SYSTEMS
06 053306, 06A 136338, 06A 138529, 06A 160400, 06A 196718, 06A 196719, 11A 159660, 23A 099391

SIGNALING
06 053306, 06A 170629, 06A 170635, 06A 170650, 06 188998, 06 189807, 06 190317, 06 190337, 06 191738, 06 194656, 06 195079, 06 195081, 06 195142, 06 196379, 06 196539, 06 196714, 08A 193281, 12A 148324, 12A 188661, 21A 196725

Subject Term Index

SIMULATION
22 190270

SIMULATION MODELS
02A 170657, 13 053316

SIMULATORS
02A 058263, 09 190741

SINGLE SIDED LINEAR INDUCTION MOTORS
11A 148334, 11A 196738, 11A 196739

SINGLE TRACK
00 196931, 00 197290, 00 197291, 06 189060, 21A 196725

SIX AXLE LOCOMOTIVES
02 190298, 02 190360, 02 194640, 02 196989, 04 194875

SIX WHEEL TRUCKS
02A 099390, 03 189749

SLACK ACTION
02A 170666, 02A 188653, 02 189062, 02 189063, 02 189801, 02 190289, 02 196451, 05A 157901, 21A 170664

SLAG
01 197277

SLAVE LOCOMOTIVE CONTROL
05 195070

SLEEPING CARS
19 195697

SLIDING SILLS
02 189801

SLOPE FAILURE
00 190341

SLOPE STABILIZATION
00 193486

SLURRY PIPELINES
10 186686, 20 188532, 20 190790, 20 191160, 20 195554, 20 195556, 22 186247, 22 190325, 22 190372

SMALL DIAMETER WHEELS
03A 170630

SMALL SHIPMENTS
23 195545

SMOKE
09A 148320, 09A 170603, 09 195695, 09 197421, 09 197422, 10 186657, 10 193764, 12 192146, 12 195677

SMOOTHING REACTORS
04 196517

SNOW
01 196521, 01A 196728, 09 190342, 11 193898, 12 193879

SNOW REMOVAL
00 190347, 00 193845, 00 193886, 00 193896, 00 197414, 11 193899, 11 193900, 11 193901

SNUBBERS
02A 170666, 02 189800, 02 190288, 02 191335

SOCIAL COSTS
18 189796

SOCIOECONOMIC FACTORS
08A 185241, 11A 058375, 11 186850, 15A 129701, 15A 160469, 15A 179331, 15A 179338, 15A 179339, 15A 179672, 15 185781, 15A 188644, 15A 188646, 15A 188656, 15 189029, 15 190263, 15 190522, 15 190582, 15 190905, 15 190906, 15 190959, 15 190968, 15 190970, 15 191033, 15 191659, 15 192051, 15A 192693, 15 193618, 15 194862, 15 195139, 15 197283, 18 185810, 18 185811, 18 189796, 18 194666, 18 196873, 19 194130, 20A 138370, 20 189781, 20 191159, 20 191160, 20 191867, 20 192118, 23A 058815, 23A 177691, 23A 196744, 24A 082106, 24 194879, 24 196874, 25A 058753, 25A 099365, 25A 160045, 25A 185242, 25 190311, 25 196870, 25 196871, 25 196877, 26 190327

SOFTWARE
17A 059062

SOIL CLASSIFICATION
00 185258

SOIL MECHANICS
00A 135516, 00A 135658, 00A 179332, 00 188990, 00 188995, 00 189790, 00 190212, 00 193486, 00 196624, 00 196627, 00 196933, 00 197418, 01A 038973, 01 190331, 01 194494, 26 192074, 26 192075

SOIL MOISTURE
00 185258, 00 188993, 00 188994

SOIL PRESSURE MEASUREMENTS
00 189776

SOIL PROPERTIES
00 183798, 00 190056

SOIL SETTLEMENT STUDIES
00 186243, 00 188995, 00 190212, 00 196624, 00 197281, 00 197442, 13 189778

SOIL STABILIZATION
00 156837, 00 185578, 00 188990, 00 188994, 00 188995, 00 189008, 00 189020, 00 189756, 00 189759, 00 190266, 00 193754, 00 194865, 00 195065, 00 195721, 00 196353, 00 196354, 00 196355, 00 196626, 00 197442, 01A 138564, 02 196357

SOIL STRUCTURE INTERACTION
00A 185230

SOIL TAXONOMY
00 189790

SOIL TESTS
00 185258, 00 189790, 00 189791, 01 196106

SOLAR ENERGY
06 194685, 07 186143

SOLID STATE PROPULSION SYSTEMS
04 194671, 04 195059, 04 195085, 04 195105, 04 195127, 04 195693, 04 195694, 04 196384, 04 196404, 04 196537, 04A 196721, 04 196938, 04 196939, 13 195058, 13 196382

SOLID WASTE DISPOSAL
22 185690, 22 185691, 22 185883

SOUND ATTENUATION
03 194653

SOUTH AFRICAN RAILWAYS
03 194646, 04 195085

SOUTH AFRICAN TECHNOLOGY
03A 138796

SOUTH DAKOTA
15A 179672, 22A 135001, 22A 179668, 22A 196122

SOUTHEASTERN PENNSYLVANIA TRANSIT AUTHORITY
10 191429

SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY
10 190503

SOUTHEASTERN STATES
20 186383

SOUTHERN PACIFIC TRANSPORTATION COMPANY
00 193754

SOUTHERN RAILWAY
00 196355

SOUTHWESTERN UNITED STATES
20 190790

SOYBEAN TRAFFIC
03A 148336, 22A 099642, 22A 138400, 22A 179668, 22A 179669, 22A 179684, 22A 179686

SPANISH NATIONAL RAILWAYS
15 189029

SPECIAL TRAINS
22 186392

SPECIFICATIONS
00 195627, 00 196353, 01A 081797, 01A 170607, 01 192246, 01 194637, 01 195134, 01 196107, 02A 081796, 02A 081799, 02A 138469, 02A 188663, 02 195692, 03A 081798, 03A 081800, 03A 081801, 03A 160405, 03A 165811, 03A 170601, 03A 172456, 03 197453, 05A 081802, 06 191738, 09 190305, 09 193747, 09 196452, 09 196453, 09 197421, 09 197422, 11 197364, 12A 170780, 12 190535, 12 190536, 12 190537, 12 190538, 12 190539, 22 190326

SPECTROGRAPHIC ANALYSIS
16 197013

SPECTRUM ANALYSIS
01 053318

SPEED CONTROL
06A 159656, 06 189753, 06 190317, 06 195142, 21 193755

SPEED LIMITS
00 189787, 01A 138563, 02A 148358, 02 194640, 02 196524, 02 196989, 05 194645, 06 196525, 12 192094, 16 189768

SPEED MEASURING DEVICES
06 189772

SPEED UP ON CURVES
03 194643, 23 195685

SPRINGS
03 196993, 03 197017

ST. LOUIS SOUTHWESTERN RAILWAY
12 192094

ST. LOUIS TERMINAL
21A 170622

ST. LOUIS-SAN FRANCISCO RAILWAY
06 189060

STABILITY
00 186243, 02 190292, 02 190296, 02 190297, 02 195092, 02 195144, 03 194642, 11 190279

STABILIZATION
00 156837, 00 186293, 00 193754, 00 194298, 01 195110

STANDARDIZATION
00A 188671, 00 189006, 00 189069, 03 053327, 03A 159630, 03A 165811, 03A 170601, 03A 170630, 03A 170646, 03A 170647, 03A 170659, 03A 172456, 04 196994, 05A 170656, 09 053312, 09 196388, 17A 188645, 23A 185231

Subject Term Index

STANDARDS

06 189807, 06 191738, 12 190538

STARTING FORCES

00 053332

STATE DEPARTMENTS OF TRANSPORTATION

00A 185235, 01A 059295, 25 186867, 25 191473, 26 189839

STATE GOVERNMENT

08 194852, 08 195680, 12 186628, 12 193741, 18 196872, *20A 138364, 20A 156591, 20A 188659, 20 191870, 22A 153718, 22A 157092, 23A 156666, 23A 156668, 24A 082106, 24A 193779, 25A 153574, 25A 185242, 25 186650, 25 186867, 25A 188665, 25 190310, 25 190311, 25 190312, 25 190313, 25 191473, 25 191629, 25A 193783, 25 195543, 25 196870, 25 196871*

STATE OF THE ART

02 053315, 04 194512, 24 194499

STATE OF THE ART CARS

03A 025403, 04 197438

STATE RAIL PLAN

18 196872, *22A 179684, 25 190310, 25 190311, 25 190312, 25 190313, 25 195543, 25 196870, 25 196871*

STATIC CONVERTERS

03A 170647

STATIC TESTS

02A 170660, 03 053326

STATION DESIGN

11A 160276, 12A 059864

STATION SPACING

11 196390

STATIONS

11 196464, 11 196465, *23A 058757*

STATISTICAL ANALYSIS

02A 099367, 02 190291, 08A 178037, 09 185796, 09 191547, 10 189744, 12 190268, 12 190308, 12 194859, 12 194860, 12 194863, 18A 177624, 18 186641, 18 196872, 22A 138365, 23 197455, 23 197462, 24 196986, 25 196570, 25 196571, 25 197335

STATISTICS

08 191455, 08 195702, *12A 148348, 12A 188661, 12 190901, 12 195703, 12 195704, 16 185817, 17A 148350, 18 195698, 18 195699, 18 195700, 18 195706, 20A 058467, 20 180409, 20 185916, 20 185917, 20 194597, 20 194598, 20 194602, 20 195705, 20 195728, 20 195730, 20 196363, 21 196982, 23 195701, 23 197440, 24A 179528, 24 189028, 24 195731, 24 196930, 25 195107, 25 196571*

STEAM HEATING

22 189038

STEEL BRIDGES

00A 138477, 00 183746, 00 183756, 00 183759, 00 183760, 00 183770, 00 183772, 00 193721, 02A 170645, 10 189745, 10 195707

STEEL CASTINGS

09 191093, 09 196453

STEEL CONSTRUCTION

00 195074

STEEL CROSS TIES

01 192246

STEEL FORGINGS

09 053312

STEEL METALLURGY

09 053312, 09 194495

STEEL PILES

00 183797

STEEL PLANTS

01 197277, 09 189034, *09A 196724, 20 191278, 20 195730, 21 192031*

STEEL STRUCTURES

00A 188670, 00 197280, 09 189792

STEEL TRAFFIC

03 196406

STEEL WHEELS

03 053322

STEELS

01A 099393, 03 193761, 09 053312, 09 053317, 09A 058267, 09 193747, 09 194495

STEERING

02 190287, 02 195092, 02 195115, 03 194642, 11 190280, 11 196466, 11 196468

STIRLING ENGINES

04 190269, 04 194864

STORAGE BATTERIES

04 191881, 04 192065, 04 196944, 09 196472

STRAIN GAUGES

00 053332, 00 183754, 02 194647

STRAY CURRENTS

03A 170630

STREETCARS

10 189769, 23 186871, 26 185409

STRESS ANALYSIS

00 183754, 00 183772, 00 183779, *00A 196736, 01A 099393, 01 194652, 01 196450, 02 053305, 03 053326, 03A 081798, 03A 081800, 03A 099382, 03A 170646, 03 189064, 03 189065, 03 193767, 03 194644, 09 185796, 09 189747, 09 191528, 09 191547, 09 191902, 09 191957*

STRESS CONCENTRATIONS

09 191528, 09 191957

STRESS DISTRIBUTION

01 194648, 09 193750

STRIKES

24A 179528, 24 196362

STRUCTURAL ANALYSIS

00A 102894, 00 183746, 00 183772, 00 189023, 00 191405, 00A 196751, 00 197418, 02A 081796, 02A 188663, 02 194877, 09 186569, 09 190741, 11 186863, 11 195087

STRUCTURAL DESIGN

00 183751, 00 195906, *02A 170663, 03A 081800, 03 190359, 09A 179345, 09A 179346, 09 189792, 09 193769, 11A 059435*

SUBAQUEOUS TUNNELS

00 195145

SUBBALLAST

00A 179327, 00 189067, 01 195110, 01A 196745

SUBGRADE

00 156837, *00A 179327, 00 189067, 00 193754, 00 196354, 00 196355, 01A 038973, 01A 170618, 01A 188667, 01 194494, 01 195110, 01 196450, 01A 196737, 02 190333*

SUBMARINE TUNNELING

00 183789, 00 189764, 00 195145, 00 196470, 00 197279, 00 197290, 00 197291, 12 195677

SUBSIDIES

01A 059295, 18A 080324, 18 196872, 20A 156542, 22A 179684, 23A 156666, 23 190540, 23 195701, 24A 082106, 24 189071, 25A 156676, 25 186632, 25 186635, 25 186650, 25 188152, 25A 188665, 25 189051, 25 189765, 25 190310, 25 190311, 25 190312, 25 190313, 25 195057, 25 195543, 25 196870, 25 196871, 25 197335

SUBSTATION SPACING

13 053325

SUBSTATIONS

04 196929, 04 196998, 13 053325, 13 188999, 13 189739, 13 194635, 13 194654, 13 194670, 13 194873, 13 194876, 13 195103, 13 196365, 13 196371, 13 196386, 13 196403, 13 196937, 13 196947

SUBSURFACE INVESTIGATIONS

00 186243, 00 190056

SUBWAY CONSTRUCTION

00A 059406, 00A 135550, 00A 136152, 00A 136165, 00A 138532, 00A 179329, 00A 185230, 00A 188643, 00A 188666, 00A 188669, 00A 188670, 00A 188671, 00 188993, 00 188995, 00 189006, 00 189008, 00 189009, 00 189775, 00 189776, 00 194141, 00 194142, 00 196622, 00 196626, 00 196627, 00A 196752, 00 197460, 15A 129701, 15A 188644

SUBWAY DESIGN

00A 177845, 00A 179332, 00 192188

SUBWAY ENVIRONMENT

04A 054561, 10A 196753, 13 196937

SUBWAY NOISE

10 189769, 10 197435

SUBWAY STATIONS

00A 059406, 00A 179344, 00 189006, 00 197284, 11 197367

SUBWAY VENTILATION

10A 188673, 10 189007, 13 196937

SUBWAYS

00 190212, 00 196715, *00A 196751, 02A 128041, 04A 054561, 10 191407, 10 191428, 10 191429, 10 191431, 10 191435, 10 191440, 10 197007, 11 191913*

SULFUR

10 193764

SUPERCHARGING

04 190396, 04 196935

SUPERCONDUCTIVITY

11 186476, 11 196532

SUPERELEVATION

02A 170644

SUPERVISION

21A 188662, 24 189061

SURFACE ELECTROMAGNETIC WAVES

01A 059227

SURFACE ROUGHNESS

09 193747

Subject Term Index

SURVEYING

00A 185235, 00 189815, 00 190056, 00 192188, 00 194878, 00 195120,
00 195548, 00 195683

SURVEYS

10A 179685, 10 188991, 10 189744, 11A 058375, 15 190485, 15 190486,
15 190487, 15 197340, 22 195691, 23 192230, 23 197455, 23 197462

SUSPENDED VEHICLES

11 196366

SUSPENSION BRIDGES

00 183789

SUSPENSION SYSTEMS

02A 058257, 02A 081796, 02A 138469, 02A 160409, 02A 170666, 02 190282,
02 190288, 02 191335, 02 194869, 02 194880, 02 195092, 02 195692,
02 196447, 02 196448, 02 196454, 03 053311, 03 053321, 03A 081798,
03A 138539, 03A 160405, 03A 170617, 03A 170654, 03 194507, 03 194643,
03 194644, 03 194646, 03 196385, 03 196538, 03 197017, 09 169393,
23A 099391

SUSPENSIONS

02A 148358, 02 190298, 11A 148347, 03 194507, 11 190279

SWEDEN

00 197290, 12 192294, 16 194868

SWEDISH STATE RAILWAYS

16 196979, 25 197292

SWEDISH TECHNOLOGY

00 195075, 04 189740, 04 195060, 11 197367, 21 189766

SWING BRIDGES

00 188833

SWISS FEDERAL RAILWAYS

01A 170636, 13 196936, 13 196995

SWISS TECHNOLOGY

02 194869, 03 190339, 03 196543, 04 196935, 04 196938, 04 196940,
04 196941, 04 196942, 04 196944

SWITCH HEATERS

00 193896, 01 196521

SWITCH MACHINES

06 189754

SWITCH POINTS

00 193896, 01 196397

SWITCHES

00 193896, 01 053324, 01A 170636, 01 195688, 01A 196728, 11A 159659

SWITCHGEAR

04 195105, 13 194670, 13 194873

SWITCHING

11A 059435, 21 192031, 21 196373

SWITCHING LOCOMOTIVES

04A 099377

SWITZERLAND

25 189762

SYNTHETICS

00 156837, 00 189067, 01 196535, 05 194511, 16A 196743, 16A 196749,
20 196108

SYSTEMS ANALYSIS

24 196985

SYSTEMS ENGINEERING

04 191750, 04 191752, 06 190320, 11 189816, 11 194657, 12A 058838,
21 192213

T

TAMPA

11 197330

TAMPERS

01 053310, 01 190293, 01 195130, 01 196356

TAMPING

01 053310, 01 189042, 01 189758, 01 195067, 01 195679

TANK CAR CONSTRUCTION MATERIALS

12A 081788

TANK CAR DESIGN

03A 099426, 03 189070, 03 194636, 03 196405, 09A 058267, 12A 081788,
12A 138567

TANK CAR HEADS

12A 081788, 12 192094

TANK CAR SAFETY

03A 138565, 12A 099389, 12 186377, 12 186628, 12 190308, 12 190321,
12 190583, 12 193741, 20 196424

TANK CAR SAFETY RESEARCH AND TEST PROJECT

03A 099426, 09A 058267, 12A 081788, 12A 099424, 12A 099428, 12A 099436,
26A 099429

TANK CARS

03 195099, 09A 058267, 12A 081788, 12 185875, 12 192347, 12 192391,
12 196681, 22 190326, 22 195714, 22A 196117, 26A 099429

TANK CONTAINERS

21 195743

TARIFFS

17A 188645, 18 186406, 18 196374, 21 194662, 22A 179686, 22A 179699,
25A 059207

TAXATION

24 194855, 25 191361

TECHNOLOGICAL FORECASTS

00 190266, 03A 170665, 04 190345, 04 196404, 06 196999, 15 193618,
18 185810, 18 185811, 18 196455, 19 194130, 20 190208, 23 192058,
24 196104

TECHNOLOGY

25 186632, 25 186635

TECHNOLOGY TRANSFER

02A 170661, 04A 196717, 07A 170662, 25 196518

TELECOMMUNICATIONS

05 195070, 06A 170631, 06A 170635, 06 189016, 06 189075, 06 189771,
06 190316, 06 194503, 06 195066, 06 195080, 06A 196730, 17 193722,
23 192058

TELEPHONE EQUIPMENT

06 195066

TELEPROCESSING

06A 170628

TELEVISION

06 189075, 06 190309, 10 190328

TEMPERATURE CONTROL

00 190361

TEMPERATURE DISTRIBUTION

03A 195918, 10A 196753, 10 197018

TENSIONING

00 183801, 13 194635

TERMINAL CONGESTION

21 197288

TERMINAL FACILITIES

21 194313

TERMINAL OPERATIONS

21 196982

TERMINALS

21A 138527, 21A 160398, 21A 170622, 23A 058757, 23A 170626

TEST CARS

03A 059420, 03A 148336

TEST EQUIPMENT

00 053332, 00A 196751, 01 053318, 01 191483, 09A 138558

TEST FACILITIES

01A 138560, 01A 196735, 02 194880, 02 195082, 02 195083, 02 196378,
02A 196722, 03A 170665, 04 190366, 04 195118, 05 197015, 09A 138558,
09 196100, 11A 148334, 11 194679, 11A 196738, 11A 196739, 13 189783,
22 186333, 22 186334, 24 195126

TEST PROCEDURES

00 053332, 01A 170616, 01 196107, 05 053309, 10 192346

TEST TRACKS

00 189067, 00 193754, 01A 099369, 01A 139165, 01A 185233, 01A 188667,
01 190346, 02A 139178, 02 189063, 02 196398, 02A 196722, 09 196100,
11 194679, 11 194680

TEST TRAINS

02A 139178, 03A 170639

TEST VEHICLES

01A 170616

TESTING

01A 196745, 03 194668, 04 195125, 09 189035, 09 190356, 24 194638

TESTS

00 183760, 00 183780, 00 185258, 00 185892, 00A 188668, 00 189759,
00 189790, 00 190341, 01A 170607, 01 189047, 01 196107, 01 196535,
02A 081803, 02A 179333, 02 189801, 02 191066, 02 194877, 02 194880,
03A 055916, 03A 081786, 03A 138559, 03A 172456, 03 189070, 03 194644,
03 195129, 04 189795, 04 194816, 04 197438, 05A 170652, 05A 170656,
05 194645, 06 189075, 09A 138557, 09 189792, 09 190305, 09 193747,
09 196452, 09 196453, 09 197421, 09 197422, 10 186798, 10 190503,
16 197013, 21A 170664, 22 186235, 22 195072, 26 191943

TEXAS

18 186641, 22A 156972, 22A 179690

TEXTBOOKS

06 190320, 22 196528, 24 196996

TEXTILES

00 189067

TGV TRAINS

03 195129

Subject Term Index

THAWING
22 189038, 22 195062, 22 195072, 22 197016

THERMAL CRACKS
03A 099382

THERMAL INSULATION
00 195112, 03 194653

THERMAL MEASUREMENTS
05A 159634

THERMAL STRESSES
00 183754, 01A 179337

THERMIT WELDING
01A 170600, 09 189780

THESAURUS
26 190335

THIRD RAIL SYSTEMS
04A 193777, 13 191730

THREE AXLE TRUCKS
02 196447, 02 196454

THREE PHASE ASYNCHRONOUS MOTORS
04 194500, 04 194655, 04 195061, 04 195127, 04 195132, 04 195137, 13 195058, 13 196372, 13 196382

THREE PHASE INDUCTION MOTORS
04 189795, 04 189808

THREE-PHASE INDUCTION MOTORS
04 190332, 04 190345

THYRISTOR CONTROL
06A 170635

THYRISTORS
02 194630, 04 189740, 04 190338, 04 194671, 04 195060, 04 195084, 04 195085, 04 196384, 04 196929, 05 195713, 06 194656, 13 053325, 13 196371

TICKETING SYSTEMS
23 194131

TIE CASCADING
01A 188648

TIE PADS
01 196535

TIE PLATES
01 189046

TIEDOWNS
02A 179333, 02 191290, 03 196406, 22 186235, 22 186336, 22 186337, 22 186826, 22 191106

TILTING TRAINS
03 196538

TIMBER SUPPLY
09 186484, 20A 138367

TIMBER TRETTLES
00 183801

TIMETABLES
23 186458

TIRES
03A 170659, 03 196997

TOILETS
03A 170658

TOLERANCES
09 190305

TONNAGE RATINGS
02A 170595, 02 194630, 02 196451

TOPOGRAPHY
00 193486, 00 194878

TORONTO
15 190263

TOXICITY
09A 148320, 09A 170603, 09 195695, 09 197421, 09 197422, 10 194866, 12 192391, 12 196681, 22A 195928

TRACK ALIGNMENT
00 195548, 01A 170649, 01 196934

TRACK BEHAVIOR
01A 170636, 01 194497

TRACK BUCKLING
01A 179337, 01 189010, 01 189026, 01 189042, 01 189046

TRACK CIRCUITS
01 196535, 06 053306, 06A 138529, 06 191738, 06 195720, 06 196525, 06 196714, 08A 193281

TRACK COMPONENT INVESTIGATIONS
01A 148355, 01A 188667, 01 192246, 01 194497, 01 196450, 01A 196735, 01A 196737

TRACK COMPONENTS
01A 081797, 01A 188658, 01 189005, 01 189046, 01 189761, 01 195063, 09 189039

TRACK CONSTRUCTION
01A 179328, 01 194494

TRACK DATA COLLECTION
01A 038974, 01A 059295, 01A 138560, 01A 138561, 01A 139165, 01 194650, 01A 196723, 01A 196737, 02A 139178

TRACK DEFECTS
01 189010

TRACK DEFLECTION
01 196450, 02 190333, 02 190357

TRACK DEFORMATION
01A 170618, 01A 179337, 01 195110, 01 196106

TRACK DESIGN
01A 081797, 01A 138562, 01A 138563, 01A 138564, 01A 170625, 01A 170636, 01A 179337

TRACK DETERIORATION
01 196535, 01A 196723, 01A 196737, 09A 138558, 18 193742

TRACK FAILURE
12A 148324

TRACK GAUGE
01 191266

TRACK GEOMETRY
01 053310, 01 053318, 01 053324, 01A 059223, 01A 059295, 01A 059681, 01A 099378, 01A 138561, 01A 170649, 01 189010, 02 196524, 07A 170662

TRACK GEOMETRY MEASUREMENT
01A 059295, 01A 059681, 01A 170636, 01A 188649, 01 189786, 01 190293, 01A 193778, 01 194650

TRACK GEOMETRY SURVEY DEVICE
01A 059295

TRACK INSPECTION
01A 059295, 01A 099369, 09A 138557, 12A 188661, 12 193741

TRACK INSPECTION CARS
01A 058458, 01A 099378, 01A 099394, 01A 138560, 01A 138561, 01A 188649, 01 189786, 01 191483, 01 193748, 01 194632, 01 194650, 01A 196723

TRACK IRREGULARITIES
01 194650, 02A 170648, 02 190290, 02 190291, 02 190292, 02 190294, 02 190295, 02 194640, 02 195083, 02 195116, 02 195123, 02 196524, 11 189817

TRACK LAYING
01A 188648, 01 189003, 01 189044, 01 195679

TRACK LINING
01 053310, 01 195130

TRACK LOADING
01A 170616, 01A 170649, 01A 185233

TRACK MAINTENANCE
00 196353, 01 053310, 01 053318, 01A 059295, 01A 059681, 01A 138562, 01A 138564, 01A 179328, 01A 185232, 01 189037, 01 190318, 01 194494, 01 194496, 01 195688

TRACK MAINTENANCE COSTS
01A 148355, 01 189066, 01 195547, 02 190357, 02 195144

TRACK MAINTENANCE EQUIPMENT
01 053310, 01 053318, 01A 170649, 01A 188648, 01A 188650, 01 189003, 01 189004, 01 189005, 01 189012, 01 189042, 01 189044, 01 189045, 01 189758, 01 189761, 01 190293, 01 193745, 01 195063, 01 195067, 01 195130, 01 195547, 01 195679, 01 196356

TRACK MAINTENANCE GANGS
12A 170651

TRACK MAINTENANCE PLANNING
00 196354, 00 196402, 01A 148355, 01A 170618, 01 183907, 01A 188649, 01 193745, 01 193748, 01 193753, 01 194496, 01 194628, 01 195063, 01 195547, 01 195549, 01 195679, 01 196105, 01 196396, 01 196397, 01 196401, 01A 196723, 01A 196735, 01A 196737, 08 195680, 18 193742, 24 189061

TRACK PANELS
01 189026, 01 189044

TRACK PERFORMANCE
01A 170649, 01 194497

TRACK QUALITY
02A 099367, 02A 170648

TRACK REHABILITATION
00 195548, 00 195683, 01A 059295, 01 193745, 18 193742, 22A 138365, 23A 170626, 24A 082106, 24A 159650, 24 192061, 25A 156676, 25 190312

TRACK RENEWALS
01A 188648, 01 195067, 01 195679

TRACK RESPONSE INVESTIGATIONS
01A 138560, 01A 138561, 01A 139165, 01A 170783, 01A 179337, 01A 185233, 01A 188658, 01 194497, 02 189063, 17A 160402

TRACK SAFETY
01A 138560, 01A 138561, 09A 138557

TRACK SAFETY STANDARDS
01A 099378

Subject Term Index

TRACK SCALES
21 196391

TRACK STABILITY
00 156837, 01A 138562, 01A 138564, 01 189037, 02A 170660

TRACK STANDARDS
01A 059295, 01A 099378, 01A 138560, 01A 138561, 01A 138562, 01A 138563, 01A 170616, 01A 185232, 01 189761, 01 194628, 01 196105, 02 194640, 02 196989, 07A 170662, 12 193741

TRACK STIFFNESS
01A 179337, 01 189026, 01 194650, 01 196450, 01A 196723, 01A 196735, 02 053305, 02 190333, 02 190357, 03 196393

TRACK STRESS
01A 170649, 01 196450, 02A 170657

TRACK STRUCTURES
00 156837, 00 189006, 00 189067, 00 193754, 00 196353, 01A 038973, 01A 138562, 01A 138563, 01A 138564, 01A 170616, 01A 170649, 01A 170783, 01A 179328, 01A 185233, 01A 188658, 01A 188667, 01 189010, 01 189019, 01 189026, 01 189047, 01 189761, 01 192246, 01 194628, 01 194674, 01 195063, 01 195110, 01 195688, 01 196106, 01 196397, 01 196401, 01 196450, 01 196535, 01A 196723, 01A 196735, 01A 196737, 01A 196745, 02A 058257, 02A 139178, 02A 170661, 02A 170663, 02 190357, 02 196357, 02 196398, 02 196989, 03 196393, 10 197007, 17A 160402, 24 195696, 24 196358

TRACK SUBGRADE STABILIZATION
01 194494

TRACK TESTS
01A 138560, 01A 170636, 01A 188658, 01 194497

TRACK THERMAL STRESS
01A 179337

TRACKAGE RIGHTS
24 193743

TRACKED AIR CUSHION VEHICLES
11A 148347, 11 191958, 11 191959, 11 191960

TRACKED LEVITATED VEHICLES
11A 148347, 11A 193781, 11A 196729

TRACTION MOTORS
02 190299, 04 189795, 04 189808, 04 190344, 04 190345, 04 190364, 04 190365, 04 190366, 04 193768, 04 194512, 04 194669, 04 195118, 04 195137, 04 195544, 04 196461, 04A 196721, 04 196941, 04 196992, 04 197285, 05 195100, 09 196388, 16A 128051

TRACTIVE EFFORT
02 194630, 03 194646

TRAFFIC CONTROL
11 194659, 21 197288

TRAFFIC CONTROL SYSTEMS
06 197286

TRAFFIC DENSITY
00 183751, 01A 148355, 01A 188649, 01 189047, 01 195549, 01 196107, 01A 196737, 08A 185241, 13A 179334, 18 195698, 21 194686, 21 195073, 24 189028, 24 194861, 24 194879, 25 190311

TRAFFIC MANAGEMENT
22 185948, 22 186466

TRAFFIC PATTERNS
17A 179340

TRAILER DESIGN
20 189803

TRAILER HANDLING
21A 196742

TRAILER ON FLAT CAR
02A 160409, 02 194877, 03A 059420, 03 194134, 03 196369, 20 189053, 20 189072, 20 189803, 21A 160398, 21 192213, 22 191106, 22A 195927

TRAILERS
02A 160409, 03A 195918, 22A 099636, 22 186826, 22A 195927, 22A 195928

TRAIN COMMUNICATION SYSTEMS
04A 170637, 06 053328, 06 053329

TRAIN COMMUNICATIONS
04A 193777, 06 189741

TRAIN CREW REQUIREMENTS
24 192061

TRAIN DELAYS
01 189045, 21 194686, 21 195113, 23 189785, 23 196533

TRAIN DESCRIBERS
06 189013

TRAIN DISCONTINUANCE
23 193770

TRAIN HANDLING
02A 170661, 02A 170666, 02A 188653, 02 189062, 02 189801, 02 196451, 07A 049659, 07A 170662, 17A 188651, 17 193773, 21A 170664, 21 194133

TRAIN II
17A 159631

TRAIN LOCATION
06A 196718, 06A 196719

TRAIN MAKEUP
02A 170661, 02A 170666, 02A 188653, 07A 170662, 12 186628, 21A 170664

TRAIN MEETS
06 189060, 21 195113

TRAIN MOVEMENTS
06 189060

TRAIN NOISE
10A 170655

TRAIN OPERATIONS
12A 148324

TRAIN OPERATIONS SIMULATOR
02 186848, 02A 188653, 02 189062, 02 196451

TRAIN PERFORMANCE
02A 170591, 02A 170595, 02 189062, 02 196451, 04 195693, 04 195694, 04 196537, 04 196938, 16A 128051, 21 195073

TRAIN PERFORMANCE CALCULATOR
02 186848, 02 196990, 02 196991, 13A 170609, 16A 148321, 21 195113

TRAIN RADIO
06 053330, 06 053331, 06 189000, 06 189741, 06 190316, 12 190268

TRAIN RESISTANCE
02A 128041, 02A 170594, 02A 170595, 02 186848, 10 189007

TRAIN SPEED
01 196107

TRAIN TRACK DYNAMICS
00 189787, 00 189793, 01A 038974, 01A 081797, 01A 138563, 02 053305, 02 053320, 02A 058257, 02A 058263, 02A 059427, 02A 081796, 02A 081799, 02A 081803, 02A 081805, 02A 099367, 02A 099390, 02A 128041, 02A 138469, 02A 148358, 02A 160409, 02A 170644, 02A 170645, 02A 170648, 02A 170657, 02A 170660, 02 183782, 02A 188653, 02 189018, 02 189063, 02 189801, 02 190287, 02 190288, 02 190290, 02 190291, 02 190292, 02 190294, 02 190295, 02 190296, 02 190300, 02 190304, 02 190333, 02 190349, 02 190357, 02 190358, 02 191066, 02 194508, 02A 194540, 02 194880, 02 195083, 02 195114, 02 195115, 02 195116, 02 195123, 02 195136, 02 195143, 02 195144, 02 195692, 02 196398, 02 196449, 02 196524, 02 196983, 02 196989, 03A 081798, 03A 081800, 03A 081801, 03A 138565, 03A 138796, 03A 170608, 03 196540, 05A 081802, 12A 081788, 12 193741, 17A 160402, 24 194638, 24 196104

TRAIN TRACK DYNAMICS RESEARCH
02A 170661, 02A 170663, 02A 170666, 03A 170665, 07A 170662, 21A 170664, 21 194133

TRAINING
06 195066, 07A 170590, 07A 170662, 07 196527, 12 189784, 12 190583, 24A 179528

TRAINING PROGRAMS
07 196361, 12A 188664, 17A 192818

TRAINLINES
04A 193777, 05 195070, 18 196455

TRAINMAN'S TASKS
12 192094

TRAINS
05 189036, 11 190301

TRAINSETS
03 195129, 04 189032, 05 190307

TRANSDUCERS
01 194632

TRANSFER FUNCTIONS
01 053310

TRANSFORMERS
13 194873, 13 196937

TRANSISTORS
04 190315, 04 196370

TRANSITION CURVES
01A 170636, 02 190358

TRANSMISSIONS
04 195118, 06 053328, 06 053329

TRANSPORTATION ALTERNATIVES
16 194123

TRANSPORTATION CONTROL SYSTEMS
17A 138526

TRANSPORTATION ENGINEERING
17A 192818

TRANSPORTATION NEEDS
16 194123, 18A 059894

TRANSPORTATION PLANNING
11 196456, 12A 058838, 12 186378, 12 191469, 15 194862, 15 195139, 16 185618, 16 189011, 16A 193782, 16 194123, 17 197289, 17 197510, 18 185810, 18 185811, 18 186641, 18 189796, 18 189806, 18A 193784, 18 194666, 20A 138364, 20A 153650, 20 186407, 20 190768, 20 191159, 20 191181, 20 191286, 20 196108, 21 188757, 21 196529, 22A 179683,

Subject Term Index

22 186247, 22 186389, 22 186402, 22 189054, 22 190884, 22 190887,
22 190888, 22 190912, 22 195096, 22 195744, 22A 196119, 22 196473,
23A 188660, 23 196543, 24A 082106, 24A 170612, 24 196996, 25A 058753,
25A 153574, 25 186650, 25 186867, 25 188152, 25 189797, 25 189798,
25 191473, 25 192039, 25A 193783, 25 195107, 25 195543, 26 186473,
26 189839, 26 192099

TRANSPORTATION SYSTEMS ANALYSIS
17A 192818

TRANSPORTATION TECHNOLOGY
16 194123, 19 194130

TRANSPORTATION TRENDS
16 194123, 19 194130

TRANSPORTATION TRUST FUNDS
18A 059894

TREAD BRAKING
03 193767, 05 191446

TRESPASSERS
24 195682

TRESTLES
00 189793

TROLLEY WIRE
13 195687

TRUCK AND BOLSTER SYSTEMS
03A 081787, 03 194644

TRUCK CENTER DISTANCE
02 190360, 03A 170608

TRUCK DESIGN
02A 059427, 02A 081796, 02A 099390, 02 190287, 02 190288, 02 190360,
02 195144, 02 195692, 02 196447, 02 196448, 02 196454, 03 053326,
03A 081787, 03A 081798, 03A 138539, 03A 138796, 03A 170608, 03A 170617,
03A 170665, 03A 188657, 03 189813, 03 190359, 03 194642, 03 194643,
03 194644, 03 194646, 03 196385, 03 197004, 03 197010, 04 190363,
04 190364, 04 190365, 04 195544, 04 196941, 09 169393, 19 195697,
23A 099391

TRUCK DESIGN OPTIMIZATION PROJECT
02A 138469, 02 191066, 02 191335

TRUCK DYNAMICS
02 189018, 02 191066, 02 191335

TRUCK HUNTING
02A 170666, 02 190288, 02 190290, 02 190292, 02 190296, 02 190297,
02 190304, 02 191066, 02 195121, 02 196447, 02 196448, 02 196454,
03A 138796, 03A 170617, 03 189813, 03 194642, 03 196385

TRUCK PERFORMANCE
02A 138469, 03 053326

TRUCK SAFETY RESEARCH AND TEST PROJECT
03A 081787

TRUCK WEAR
03 053326, 03A 081787

TRUCKS
02A 058257, 03A 050338, 03 053326, 03 196984, 03 196993

TRUSS BRIDGES
02 183782

TUBESILLS
09 189792

TUBULAR AXLES
04 189795, 04 189808

TUNNEL CONSTRUCTION
00 189756, 00 189775, 00 190267, 00 190271, 00 196622

TUNNEL DESIGN
00A 135550, 00A 136152, 00A 138532, 00A 179326, 00A 179332, 00A 179344,
00A 188671, 00 189815, 00 190056, 00 194667, 00A 196750, 00 196931,
00 197279, 00 197290, 00 197291, 00 197344, 13 196392

TUNNEL ENVIRONMENT
00 190361, 10 197018

TUNNEL EXCAVATION
00 185674, 00 185675, 00 185677, 00A 188643, 00 191482, 00 194155,
00 195727, 00 197445, 00 197446

TUNNEL LININGS
00A 135514, 00A 135550, 00A 179326, 00A 179329, 00 185578, 00 185674,
00 185675, 00 185677, 00 185892, 00A 188666, 00A 188670, 00 189775,
00 191405, 00 194136, 00 194137, 00 195074, 00 195909, 00 196624,
00A 196751, 00 196932, 00 197280, 00 197418

TUNNEL MAINTENANCE
00 195909, 00 196715, 00A 196751, 23A 170626

TUNNEL VENTILATION
10 189007, 10 190302

TUNNELING
00A 135514, 00A 135550, 00A 136152, 00A 136165, 00A 138532, 00A 185230,
00 185892, 00A 188643, 00A 188666, 00A 188669, 00A 188670, 00A 188671,
00 188994, 00 188995, 00 189008, 00 189009, 00 189764, 00 189767,
00 189776, 00 190212, 00 192081, 00 192082, 00 192083, 00 194136,
00 194137, 00 194141, 00 194142, 00 194155, 00 194667, 00 195075,
00 195145, 00 195721, 00 196623, 00 196624, 00 196626, 00 196627,
00 196628, 00A 196750, 00A 196752, 00 196932, 00 197279, 00 197344,
00 197442, 15A 188644, 26 192074, 26 192075

TUNNELING MACHINES
00 185674, 00 185675, 00 185677, 00 188993, 00 190271, 00 196625,
00 197281, 00 197284

TUNNELS
00A 059406, 00A 177845, 00 189757, 00 195112, 00 195120, 01 194674,
02A 128041, 06A 170631, 09A 135495, 13 195086

TURNOUTS
00 195065, 01 053324, 01A 170636, 01 189044, 01 195688, 11A 159659

TWO AXLE CARS
02 190295, 02 195116, 02 195121, 03 053311, 03 053321, 03A 170654,
03 194134

TWO AXLE TRUCKS
02 196447, 02 196448, 02 196454

TWO CYCLE DIESEL ENGINES
04 190306, 04 197273

TYNE AND WEAR METRO
00 197287, 23 194139, 23 194143

U

ULTRASONIC FLAW DETECTION
01 191483, 03A 170659, 09 190356

ULTRASONIC INSPECTION
01A 058458, 01A 099369, 01A 099394, 01A 099396, 01 194632, 03 196376,
09 196375

ULTRASONIC TESTS
00 189791, 03A 099382, 03 196981, 07 190283, 09 193750

ULTRASONICS
01A 059371, 09 190356

UNCONVENTIONAL TRACK
01A 170625

UNDERFRAMES
03 193761

UNDERGROUND STRUCTURES
00A 179332

UNDERPASSES
00 196932

UNION PACIFIC RAILROAD
04 191751, 04 191752, 04 191754, 06 189075, 06 195066, 17 194689,
21A 185238

UNIT TRAINS
01 193748, 02 189801, 02 190357, 03 196405, 08A 185241, 09A 196724,
10 186686, 11 191667, 11 191668, 18A 177624, 20A 083533, 20A 179667,
20 185655, 20 188532, 20 190790, 20 191160, 20 194127, 20 194631,
20 195068, 20 195553, 20 195554, 20 195555, 20 195556, 20 196424,
21 194662, 21 194851, 21 195550, 21 196364, 22A 138481, 22A 179696,
22A 179699, 22 189055, 22 190322, 22 190323, 22 190372, 22 193766,
22 195072, 22 195102, 24 189074, 24 196358

UNITIZED LOADS
03A 179688, 03A 195918, 22A 083511, 22 195076

UNLOADING FACILITIES
20 185655, 20 194631, 20A 196118, 22 174305, 22 189055, 22 189814,
22 190322, 22 190371, 22 193766, 22 195062, 22 196395

UNLOADING PROCESSES
22 189002, 22 195714

URBAN DEVELOPMENT
15 190485, 15 190486, 15 190487, 15 190522, 15 190906, 15 190959,
15 190968, 15 190970, 15 191033, 15 192051, 15 197283

URBAN GROWTH PATTERNS
15 193618

URBAN PLANNING
00A 136152

URBAN RAPID RAIL VEHICLES AND SYSTEMS PROGRAM
03A 170604

URBAN RENEWAL
24 196541, 24 196542

URBAN TRANSPORTATION
00 195078, 11A 059924, 11 186851, 11 190284, 12A 059864, 12 190881,
23A 059246, 23 190540, 23 197431, 26 185409

URBAN TRANSPORTATION PLANNING
00 196622, 07 190995, 10A 188654, 10A 188655, 10 189025, 10 190264,
11A 159662, 11 190971, 11 190993, 11 196456, 11 197361, 11 197362,
11 197363, 11 197364, 11 197417, 11 197459, 15A 129701, 15A 160469,
15A 179338, 15A 179339, 15 185781, 15A 188644, 15A 188646, 15A 188656,
15 189029, 15 190263, 15 190522, 15 190582, 15 190905, 15 190959,
15 190968, 15 191029, 15 191033, 15 192051, 15 192212, 15 193618,
15 197283, 15 197485, 16 185618, 16 186430, 16 186471, 16 189011,
16 189811, 16 190303, 16 197272, 18 196585, 23A 058757, 23A 058815,

Subject Term Index

23A 059246, 23A 156668, 23A 177691, 23A 178058, 23A 185243, 23A 185244,
 23 186869, 23 186870, 23 186871, 23 188992, 23 190265, 23 191660,
 23 191936, 23 192230, 23 194139, 23 194143, 23 195077, 23 197011,
 23 197440, 23 197455, 23 197462, 25A 099365, 25 191689, 26 191952,
 26 192099

URETHANES
09A 179345

USER CHARGES
 18 196530, 20 190261, 25A 179675, 25 188152

USSR RAILWAYS
 01 189045, 01 195134, 01 195679, 01 196400, 03 196993, 04 196992,
 09 196100, 13 195124, 16 194498, 16 195135, 18 195133, 21 197014,
 24 189028, 24 194499, 24 196977

UTILITIES
 10 196113, 13 189802, 16 185817, 20A 185240, 20 185651, 20 185655,
 20 186423, 20 191275, 20 191872, 20 193765, 20 194631, 20 195068,
 20 195556, 20 196114, 22 195062, 22 196395

UTILIZATION
 03 196359, 13 196372, 18A 193784, 21A 185236, 21 190826

V

VALIDATION
 00 185892, 01A 188658, 01 196450, 02A 059427, 02 189062, 02 189801,
 02 190290, 02 190295, 02 190300, 02 194877, 03 189065, 11 189816,
 11 195712, 17 185591, 22 195072

VALVES
 03 189070

VANDALISM
 11A 159658, 12 190881, 20 188532, 24 195682

VEGETABLES TRAFFIC
 22A 196117

VEGETATION
10A 179685

VEGETATION CONTROL
 00 196402

VEHICLE DESIGN
03A 170654, 11A 159658, 11 196520

VEHICLE DYNAMICS
02A 058263, 02A 148358, 02A 170644, 11 190279, 11 190281

VEHICLE GUIDEWAY DYNAMICS
 11 197319

VEHICLE INSPECTION
03A 138559, 09A 138557

VEHICLE LOCATION SYSTEMS
 06 197286

VEHICLE MAINTENANCE
 11 197358

VEHICLE SPACING
 11 194659

VEHICLE STABILITY
 02 053320, 02A 170644

VELIM TEST TRACK
01A 170625, 02A 170657, 03A 170639, 03 194644, 24 195126

VENTILATION
 10 189007, 10A 196753

VERTICAL DISPLACEMENT
 00 195120, 01 189010, 07 193762

VERTICAL DYNAMICS
02A 058263, 02A 188653, 02A 196732

VERTICAL LOADING
 02 190357, 02 194640, 02 194647

VERTICAL STABILITY
01A 179337

VIBRATION
 01 189042, 02 191290, 03A 059420, 07 190276

VIBRATION ANALYSIS
 00 196933, 02 194877, 02 195692, 03 189065, 04 197273, 09 185481,
 09 190741, 10 197157

VIBRATION CONTROL
02A 160409, 10A 188647, 10A 188654

VIBRATION DAMPING
 09 189039

VIBRATION LEVELS
02A 157664, 10A 138534, 22 195076

VIBRATION TESTS
01A 170625, 02A 179333, 02 196378, 03A 059420, 10 195717, 22 194856

VIBRATIONS
 07 195090, 10 197435

VIENNA ARSENAL
03A 170638, 06 053329, 06A 170628

VIGILANCE
 06 189000, 07A 049659, 08 190274, 12 192094

VISCOSITY
 16 190353, 16 196123

VISIBILITY
 07 191932, 07 192096, 08 190274, 08 193342, 08 196471, 08 197278,
 08 197314, 12 193879

VISUAL PERCEPTION
 07 186143, 07 191932

VISUAL WARNING SYSTEMS
12A 170651

VOLTAGE REGULATION
 13 188999

W

WAGES
17A 148350, 18 195699

WAREHOUSES
 22 196528

WARNING DEVICES
 00 183803, 03 196981, 03 196984, 06 189000, 06A 193284, 08A 178037,
 08 190274, 08 191687, 08 193730, 08A 194539, 08 196471, 08 197278

WARNING SYSTEMS
*03A 099439, 05 195070, 06 053329, 06 185686, 08A 153623, 08A 159654,
 08A 193281, 08A 193282, 08 193342, 08 197314*

WASHINGTON METRO
*00A 179344, 00 190212, 00 192188, 00 196627, 00 197284, 00 197442,
 10A 196753, 15A 129701, 15 192212, 23 186869, 23 186870, 25 195057*

WASHINGTON STATE
22A 153666

WASTE DISPOSAL
 01 189005, 22 186247, 22 186389, 22 186392

WASTE MATERIALS TRAFFIC
 10 186798, 12 192294, 22 185690, 22 185691, 22 185883, 22 186020,
 22 186025, 22 186466, 22 186800, 22 186827, 22 190884, 22 190887,
 22 190888, 22 192170, 22 192174

WASTE TRAFFIC
 12 191517, 12 195097, 22 186466, 22 195096

WATER
 00 195721, 16 197013

WATER TABLE
 00 189006

WATERPROOFING
00A 188669, 09 190664

WATERSHED RUNOFF
 00 191675, 00 195684

WATERWAYS
 00 186293

WAVEGUIDES
06A 170631

WAYBILL PROCEDURES
 06 195066, 17A 196731, 17A 196741

WAYBILL SAMPLES
 20 194857

WAYBILLS
 18 186406

WAYSIDE
*00A 185230, 00 197281, 02 195101, 03 196984, 04 191750, 04 191751,
 04 191752, 04 191753, 04 191754, 04 196522, 04A 196748, 06 053331,
 06 190329, 10 186613, 10A 188647, 10A 188654, 10 189025, 10 189743,
 10 189744, 10 189746, 10 190328, 10 191407, 10 191428, 10 191429,
 10 191431, 10 191435, 10 191440, 10A 193280, 10 197435, 15A 188644,
 15 190485*

WAYSIDE COMMUNICATION SYSTEMS
02A 058465, 06A 170631

WEAR
*02A 148358, 02A 170663, 03 053326, 03A 059420, 03 195111, 03 195686,
 04 190278, 05 197015, 09A 138558, 13 195089, 13 195124, 13 195687*

WEAR INDEXES
17A 160402

WEAR TESTS
 03 053321, 03 053326, 03A 059420

WEATHER
11A 160276

WEED CONTROL
 00 196402

WEIGHING PLANTS
 21 196391, 22 189814, 22 195102

WEIGHT RESPONSIVE RETARDERS
 21 196391

Subject Term Index

WEIGHT TRANSFER
03 194646

WELDED JOINTS
01A 058458, 01A 099396, 09 053317

WELDED RAIL
01A 058458, 01A 099396, 01A 170600, 01A 179337, 01 189012, 01 189037, 01 189046, 01 190346, 01 193745, 01 193753, 01 194628, 01 195679, 01 195681, 01 196397, 01 196400, 01A 196735, 02A 170645, 02 195143, 06 195720, 09 193750, 09A 196724, 10 191406

WELDED STEEL BEAMS
09 053317

WELDED STEEL BRIDGES
00A 170632, 00 183753, 00 183754, 00 183755, 00 193721, 00 193749, 00 195627, 00 195906

WELDED STRUCTURES
03 190285, 09 053317

WELDING
00A 170632, 00 195627, 01A 170600, 03 195099, 04 190278, 13 194510

WELDING EQUIPMENT
01 189012

WELDING STRESSES
09 053317

WESTERN STATES
10 196113, 20 185629, 20 185866, 20 186383, 20 186689, 20 188532, 20 193765, 20 195553, 20 195554, 20 196114, 20 196922, 21 196364, 22 174305, 22 190372

WHEAT TRAFFIC
24 196103

WHEEL AXLE INTERFERENCE
09 189001

WHEEL CREEP
02 053320, 02 190288, 02 190294, 02 190300, 02 195136, 02 196983

WHEEL DAMPING
03 194660, 10A 058675

WHEEL DEFECTS
03 190343, 03 196997, 09 196980

WHEEL DESIGN
02A 081799, 03A 046502, 03A 099382, 03 189064, 03 193767, 19 195697

WHEEL DIAMETER
02 190298, 02 194630

WHEEL FAILURE
03A 099382, 12 192347

WHEEL FATIGUE
09 196980

WHEEL FLANGE FORCES
02 195136, 03A 138796

WHEEL FLANGES
09 190342

WHEEL FLAT SPOTS
03 190343, 10A 058675

WHEEL INSPECTION
03A 170659

WHEEL LIFT
02 189800

WHEEL LOAD
01A 170616, 01 194652, 02A 196732, 03A 170665, 03 189064, 03 193767, 09 189035

WHEEL METALLURGY
02A 081799, 03A 099382, 09 196375, 09 196536, 09 196980, 12 192347

WHEEL MOUNTING TECHNIQUES
09 189001

WHEEL PRESSES
09 189001

WHEEL RAIL ADHESION
02 053315, 02A 170591

WHEEL RAIL CONTACT FORCES
02 053315, 02A 081799, 02A 099367, 02A 170648, 02 190294, 02 190349, 02 194508, 02 195115, 02 195116, 02 196983, 03 196540, 09 189747, 09 191902

WHEEL RAIL DYNAMICS
01A 059223, 01A 081797, 01A 138563, 01 189026, 02 053315, 02 053320, 02A 058257, 02A 058263, 02A 081796, 02A 081799, 02A 148358, 02A 170648, 02A 170666, 02 194508, 02 196983

WHEEL RAIL DYNAMICS RESEARCH FACILITY
02 195692, 03A 170665

WHEEL RAIL DYNAMICS SIMULATOR
02 195082, 02 195083

WHEEL RAIL FORCES
02A 194540

WHEEL RAIL INTERACTION
02A 170648, 02A 188653, 02A 188663, 02 189018, 02 190287, 02 190291, 02 190296, 02 190297, 02 190299, 02 190304, 02 190349, 02 194508, 02A 194540, 02 194647, 02 195101, 02 195114, 02 195121, 02 195123, 02 195143, 02 195144, 02 195692, 02 196447, 02 196448, 02 196454, 02A 196732, 02 196983, 03A 170608, 03A 170617, 05A 159634, 10A 148341, 10 191406

WHEEL RAIL NOISE
03 194660, 10A 148341, 10A 170655, 10A 188647, 10A 188654, 10 189746, 10 190503, 10 195095, 10 195717, 10 197435, 10 197522

WHEEL RAIL SIMULATORS
02 190294, 02 196378, 10A 148341, 10 195717

WHEEL RIM STRESSES
03 193767

WHEEL RIMS
03 196997

WHEEL SCREECH
10A 170655

WHEEL SCREECH NOISE
03 194660, 10A 148341, 10A 170655

WHEEL SENSORS
06A 159657

WHEEL SLIDE
02A 170591, 05 191446

WHEEL SLIP
02A 170591, 02 190298, 02 190299, 03A 136342

WHEEL SLIP CONTROLS
05 195138

WHEEL SLIP DETECTORS
02 190298, 03A 138539

WHEEL STRESSES
02A 194540, 02 195114, 02A 196732, 03A 046502, 03 189064, 03 196997, 09 189035

WHEEL THERMAL STRESSES
03A 099382, 03 189064, 03 193767, 12 192347

WHEEL THERMO SCANNER
05A 159634

WHEEL TREAD DAMAGE
09 196536

WHEEL TREAD DESIGN
03A 138796

WHEEL TREADS
05A 157901

WHEEL WEAR
02A 139178, 02 190287, 02 194630, 03A 138796, 03A 188657, 03 195111, 03 195686, 09 196100, 10 191406

WHEELBASE
02 190360, 03A 170608

WHEELS
02 194647, 03 053322, 03 196984

WHEELSET
02 190291, 02 190294, 02 195101, 02 195115, 03 053322, 03 053323, 03 053327, 03A 170630, 03 194507, 03 196993, 09 189001

WHEELSET SUSPENSION
03 194507, 03 196385

WIND
02A 170595, 12 193879, 12 196681

WIND TUNNELS
02A 170594

WINDOWS
07 186143

WINDSHIELDS
07 186143

WISCONSIN
22A 157092

WOOD PILES
00 183797

WOOD PRESERVATIVES
06A 196730, 09A 136093, 09 186484, 09 190664

WOOD PRODUCTS
09 186484

WOOD SHORTAGE
06A 196730

WOOD SUPPLY
01A 179687, 09A 179691

WOODEN CROSS TIES
01A 138568, 01A 179687, 01 195549, 09A 179691, 20A 138367

WORK RULES
17A 148350, 21A 138527, 21A 157598, 21A 159626, 21A 170622, 21A 188662, 24A 179528, 24 196362

WORK STOPPAGES
24 196362

Subject Term Index

WYOMING

20 186684, 20 194127

X

X-RAY INSPECTION

03 195099

Y

YARD AND TERMINAL CONTROL SYSTEMS

06A 136338, 18A 129729, 21A 185236

YARD AND TERMINAL INFORMATION SYSTEMS

21A 170664, 21A 188662

YARD AUTOMATIC CONTROL

06 195117, 21 195071, 21 197014

YARD CONTROL SYSTEMS

06A 159656, 06A 159657, 06 188998, 06 189753, 06 195117, 09 196388,
17A 196726, 21A 170664, 21 197014

YARD DESIGN

21A 170620, 21 196381

YARD LAYOUT

21A 170620, 21 189752

YARD OPERATIONS

18A 129729, 18 195698, 21A 170596, 21A 170620, 21A 170622, 21A 188662,
21 195071, 21A 196733, 21A 196734

YARD THROUGHPUT

06A 136338, 06A 159656, 17A 196726, 18A 129729, 21 189752, 21 195071,
21 196381, 21A 196733, 21A 196734

YARDS

10A 058621

YARDS AND TERMINALS

00 190347, 18A 129729, 21A 138527, 21A 157598, 21A 170622, 21 194683,
24A 159650, 24 190771

YOKES

03A 081786, 03A 081801

YUGOSLAV RAILWAYS

03 197017

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