



RRIS

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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.

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Notice

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Foreword

This *Bulletin*, containing 1055 abstracts of journal articles, research reports, computer programs, and magnetic tape data sets and 428 summaries of ongoing research activities, covers material accessioned by the Railroad Research Information Service between February and July 1981.

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.

USING THE RAILROAD RESEARCH BULLETIN

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

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.

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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.

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The RRIS data base may be searched online through the Lockheed DIALOG Information Retrieval Service. This method of access is handled entirely through Lockheed and is available only to its users in the United States and Canada. RRIS citations are updated monthly in Lockheed File 63. Contact Lockheed Information Systems, 3460 Hillview Avenue, Palo Alto, CA 94304; telephone 800-227-1960 (in California, 800-982-5838). RRIS can supply a listing of its key words with frequency counts as an aid to DIALOG users; contact RRIS for ordering information.

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statement. 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 about the document desired. When ordering from National Technical Information Service, be sure to give the NTIS accession number as well as title and other information. A loan and photocopy service for many of the articles and papers cited is operated by two major transportation libraries, as explained on page vi.

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Washington, DC 20036
- AAR**
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3140 South Federal Street
Chicago, IL 60616
- AIAA**
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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
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New York, NY 10017
- FRA**
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Washington, DC 20590
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International Union of Railways, BD
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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**
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400 Seventh Street, SW
Washington, DC 20590
202-426-1792

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Cambridge, MA 02142
617-494-2016

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1. TRIS accession number (six-digit number at top of citation);
2. Title;
3. Author, including individuals and organizations responsible for the publication; and
4. Publication data, including publisher, periodical title, conference, date, paging, serial numbers.

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Two major services can supply photocopies of journal articles, technical papers, and certain other material at standard rates. They are cited in many RRIS availability statements.

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212-644-7611

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Ann Arbor, MI 48106
313-761-4700

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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 |
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| NAE* | National Academy of Engineering | | |
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| NRC* | National Research Council | | |
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*See page v for availability of papers and research reports.

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.

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Abstract of a research report

Document record number
TRIS accession number
Subject area code

02 128640

Title
Research report abstract

TEST TRAIN PROGRAM SIXTH PROGRESS REPORT

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

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
Journal article abstract

INVESTIGATION INTO CAUSES OF RAIL CORRUGATIONS

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 | → | 09 141649 |
| TRIS accession number | | |
| Subject area code | | |
| Translated title | → | 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] |
| Title in original language | → | 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] |
| Journal article abstract | → | |
| Language of full-text article | → | |
| Author, publication data, document data | → | Butteaud, B <i>Revue Generale des Chemins de Fer</i> May 1976, pp 304-323, 40 Fig., 3 App. |
| Source of abstract | → | ACKNOWLEDGMENT: UIC |
| Availability | → | ORDER FROM: ESL |
| Washington, D.C., availability with RP, JC, or call number | → | 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 | → | 02 058303 |
| TRIS accession number | | |
| RRIS subject area number | | |
| Project title | → | FREIGHT CAR TRUCK DESIGN OPTIMIZATION |
| Project summary | → | The Truck Design Optimization Project (TDOP) is a multiyear project intended to evaluate performance characteristics of existing railroad freight car trucks; determine through cost-benefit analysis the feasibility of improving truck performance by mechanical modification of existing type trucks or through introduction of new truck designs that respect carbody/-suspension system interfaces or are otherwise compatible with existing freight train systems; provide performance and testing specifications for use in the development of freight car suspension systems, and study concepts of integrated carbody support systems and advanced designs in anticipation of future railroad requirements. |
| Agency performing the work | → | PERFORMING AGENCY: Southern Pacific Transportation Company |
| Project investigators | → | INVESTIGATOR: Byrne, R (Tel 415-362-1212X-22547) |
| Project sponsors | → | SPONSORING AGENCY: Federal Railroad Administration, Office of Research and Development |
| Contract monitor | → | RESPONSIBLE INDIVIDUAL: Fay, GR (Tel 202-426-0855) |
| Project data | → | Contract DOT-FR-40023 STATUS: Active NOTICE DATE: Feb. 1976 START DATE: June 1974 COMPLETION DATE: Dec. 1978 TOTAL FUNDS: \$2,000,000 |
| Source of this summary | → | ACKNOWLEDGMENT: FRA |

Abstracts of Reports and Journal Articles

00 Right-of-Way

00 053401

PROBLEMS ARISING FROM THE RUNNING OF TRAIN TRAFFIC AT VERY HIGH-SPEED TRAINS IN TUNNELS. THEORETICAL PREDICTION METHODS FOR CALCULATING UNSTEADY FLOWS IN RAILWAY TUNNELS.

This report gives the background to the development of methods for predicting unsteady flows in railway tunnels. In this report, a choice is made among five flow models of various complexities and of more or less practical application, in order to compare theory with the results of experiments carried out by the railway in tunnels and to make relevant recommendations.

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

International Union of Railways C 149/RP 1, Sept. 1980, 26p, 4 Fig.

ORDER FROM: UIC

DOTL RP

00 324317

AUTOMATED PLOTTING OF PHOTOGRAMMETRIC DATA

A computer aided system for automatically plotting planimetric and contour maps is described in detail including digitizing instructions and program listings. This is a batch system and no interactive graphics is involved. Basic hardware requirements are a digitizer, computer and an automated drafting machine. Preliminary results indicate a savings of at least 30% in the production of maps. Other benefits as a by-product from this system such as a digital terrain model is not quantified. (FHWA)

Mori, J Paik, J

California, Department of Transportation, Federal Highway Administration, (13303-627133) Final Rpt. FHWA/CA/GM-80/1, June 1980, v.p.

Contract F-7-109

ORDER FROM: Federal Highway Administration, 400 7th Street, SW, Washington, D.C., 20590

00 324453

DAMAGE EVALUATION AND REPAIR METHODS FOR PRESTRESSED CONCRETE BRIDGE MEMBERS

The research described in this report provides guidance for the assessment and repair of accidental damage to prestressed concrete bridge members, primarily longitudinal girders. Repair and replacement techniques presently being used have been identified and evaluated. Plausible repair-in-place techniques are included with appropriate calculations and details. Primary emphasis is placed on repair of damage from collision. In addition, guidance is provided for assessment and repair of damage from fire, manufacturing defects, and other causes. The incidence and percentage of accidental damages are included. The guidelines for damage assessment and for selection of repair methods specifically address service load capacity, ultimate load capacity, overload capacity, fatigue life, durability, cost, user inconvenience and speed of repairs, esthetics, and range of applicability. Repair-in-place techniques and replacement techniques have been evaluated in accordance with these guidelines by using a value-engineering process. A principal finding of this study is that the damage inspection phase should be carefully differentiated and separated from the engineering assessment phase.

Shanafelt, GO Horn, WB *NCHRP Report* No. 226, Nov. 1980, 66p, Figs., Tabs., 13 Ref., 3 App.

ORDER FROM: TRB Publications Off

DOTL RP

00 324454

FATIGUE BEHAVIOR OF FULL-SCALE WELDED BRIDGE ATTACHMENTS

This report contains the findings of NCHRP Project 12-15(3). The objective of this study was to examine the fatigue strength of beams with web and flange lateral attachment plates. In addition to providing a more comprehensive data base for this type of detail, the program was intended to examine the influence of lateral bracing members on the out-of-plane distortion of the lateral plates. Further work also was undertaken during the experimental studies on the effectiveness of peening and gas tungsten arc remelting the fatigue-damaged connections and on the ability of drilled holes to arrest crack growth. A total of 18 beams, each with three welded gusset plate details, were tested in fatigue with stress ranges of 6 to 15 ksi. Several other details were welded to the girder web in order to simulate beam flanges framing into a web plate. The results of these tests were used to assess the adequacy of the applicable provisions of the AASHTO specifications. In addition, the influence of lateral bracing on the fatigue performance of the attachments was evaluated. Recommendations for modifications to current practice are included in the report.

Fisher, JW Barthelemy, BM Mertz, DR Edinger, JA (Lehigh University) *NCHRP Report* No. 227, Nov. 1980, 47p, Figs., 17 Ref., 2 App.

ORDER FROM: TRB Publications Off

DOTL RP

00 325377

REPRESENTATIVE GROUND PARAMETERS FOR STRUCTURAL ANALYSIS OF TUNNELS; VOLUME 2. IN SITU TESTING TECHNIQUES

This report is the second in a series reporting the results of the above titled study. This document, Volume II, is principally concerned with in situ site investigation techniques but also considers the preliminary phases of a site investigation program, classification and correlation systems applicable to underground design and construction, and large scale field testing procedures. Volume I is concerned with the thought processes and considerations related to the planning and supplementation of site investigation programs for tunnel design and construction. It is intended that these documents will provide guidance to those engineers responsible for the planning and implementation of site investigation programs related to tunnel design and construction. This report will also be of value to owners, contractors and others in the underground construction community. Volume III summarizes currently used analytical design procedures, ascertains the geotechnical parameters required as input into these design procedures, and assesses the significance of these geotechnical parameters. Volume IV consists of a review of the literature on case studies pertaining to tunnel design and construction. Knowledge gained which may be of significant benefit to future tunnel designers and contractors is cited. (FHWA)

Hampton, D McCusker, TG Essex, RJ

Hampton (Delon) and Associates, Chartered, Federal Highway Administration Final Rpt. FHWA-RD-80-013, Oct. 1980, 319p

RESPONSIBLE INDIVIDUAL: Linger, DA (HRS-11)

Contract DOT-FH-11-9150

ACKNOWLEDGMENT: Federal Highway Administration
ORDER FROM: NTIS

PB81-122038

00 325379

FATIGUE OF CURVED STEEL BRIDGE ELEMENTS-ANALYSIS AND DESIGN OF PLATE GIRDER AND BOX GIRDER TEST ASSEMBLIES

Research on the fatigue behavior of horizontally curved, steel bridge elements was conducted at Lehigh University under the sponsorship of the Federal Highway Administration (FHWA) of the U.S. Department of Transportation. This multi-phase investigation involves the performance of five Tasks: 1) analysis and design of large scale plate girder and box girder test assemblies, 2) special studies of selected topics, 3) fatigue tests of the curved plate girder and box girder test assemblies, 4) ultimate load tests of the test assemblies, and 5) development of design recommendations suitable for inclusion in the AASHTO design specifications. The first Task, analysis and design of horizontally curved plate girder and box girder test assemblies, is contained herein. The research effort centered on fatigue crack propagation at welded details. Examination of design drawings of existing, curved, highway bridges indicated a variety of welded details in current use (see Tables 3 and 9). In view of the number of details to be tested and the desired test replication, five plate girder test assemblies and three box girder test assemblies were designed to provide stress and deflection conditions typical of actual bridges at the details to be tested. The test assemblies were analyzed using existing, available computer programs. Test assembly design was in accordance with the AASHTO design specifications as modified by the CURT tentative design recommendations. An account of the test assembly design process and the final designs of the test assemblies are included herein. Later reports will document the execution of Tasks 2 through 5. (FHWA)

Daniels, JH Zettlemoyer, N Abraham, D Batcheler, RP
Lehigh University, Federal Highway Administration, (Fritz Rpt. 398.1)
Intrm Rpt. FHWA-RD-79-131, Aug. 1979, 109p

Contract DOT-FH-11-8198

ACKNOWLEDGMENT: Federal Highway Administration
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PB81-116899

00 325380

FATIGUE OF CURVED STEEL BRIDGE ELEMENTS-EFFECT OF HEAT CURVING ON THE FATIGUE STRENGTH OF PLATE GIRDERS

Research on the fatigue behavior of horizontally curved, steel bridge elements was conducted at Lehigh University under the sponsorship of the Federal Highway Administration (FHWA) of the U. S. Department of Transportation. This multiphase investigation involves the performance of five tasks: 1) analysis and design of large scale test assemblies 2) special studies of selected topics, 3) fatigue tests and 4) ultimate load tests of test assemblies, and 5) development of design recommendations. This report presents the results of a special study (Task 2) of the effects of heat curving on the fatigue strength of plate girders. The reports listed in Appendix B document other phases of this investigation. Following a survey of the available literature on heat curving, an analytical parametric study of the residual stresses and strains due to heat curving is presented. The results of the parametric study are then examined for their applications to fatigue. Two mechanisms are considered: 1) mean stress effects on fatigue crack growth, and 2) fatigue crack growth at web boundaries due to excessive web bowing. The results of this study indicate that heat curving has no significant effect on the fatigue strength of plate girders. (FHWA)

Daniels, JH Batcheler, RP
Lehigh University, Federal Highway Administration, (Fritz Rpt. 398.5)
Intrm Rpt. FHWA-RD-79-135, Aug. 1979, 66p

Contract DOT-FH-11-8198

ACKNOWLEDGMENT: Federal Highway Administration
ORDER FROM: NTIS

PB81-116907

00 325381

FATIGUE OF CURVED STEEL BRIDGE ELEMENTS-EFFECT OF INTERNAL DIAPHRAGMS ON FATIGUE STRENGTH OF CURVED BOX GIRDERS

Research on the fatigue behavior of horizontally curved, steel bridge elements was conducted at Lehigh University under the sponsorship of the

Federal Highway Administration (FHWA) of the U.S. Department of Transportation. The investigation is centered on the effect of welded details on curved girder fatigue strength. Fatigue tests of five full-scale curved plate girder assemblies and three full-scale curved box girders are part of the investigation. This report examines analytically the effects of spacing of rigid interior diaphragms on the stresses and deflections of curved box girders. Available computer programs are employed and existing results are utilized with little emphasis on the procedure of computation. The objective is to assess the qualitative relationship between stresses and the coupling influence of diaphragm spacing and curvature, so as to gain insight to the fatigue behavior of box girders. Results of the analyses indicate that decreasing of diaphragm spacing effectively controls the torsional stresses. The ratio of diaphragm spacing to radius of curved box girders is introduced as a parameter for monitoring stress ranges. It appears that the relationship between stress range and the spacing-to-radius ratio is practically linear for a given geometry of curved box girder. More study is recommended to explore further this ratio as a parameter for controlling the magnitude of stress range. (FHWA)

Daniels, JH Abraham, D Yen, BT
Lehigh University, Federal Highway Administration, (Fritz Rpt. 398.6)
Intrm Rpt. FHWA-RD-79-136, Aug. 1979, 57p

Contract DOT-FH-11-8198

ACKNOWLEDGMENT: Federal Highway Administration
ORDER FROM: NTIS

PB81-116915

00 325382

FATIGUE OF CURVED STEEL BRIDGE ELEMENTS-ULTIMATE STRENGTH TESTS OF HORIZONTALLY CURVED PLATE AND BOX GIRDERS

The research reported herein is part of a 5 year multiphase investigation involving extensive analytical and experimental studies of horizontally curved steel plate and box girders. The project, which began in 1973, is entitled "Fatigue of Curved Steel Bridge Elements". The work is sponsored by the FHWA and was carried out in Fritz Engineering Laboratory at Lehigh University. This report presents the results of the ultimate strength tests of one curved non-composite plate girder assembly, two curved composite plate girder assemblies and two curved composite box girders. The primary objectives of the research reported herein are: (1) to determine the load-deflection behavior of large size curved plate girder assemblies and curved box girders which are loaded to ultimate strength, and (2) to compare the experimental behavior with analytic predictions. This study is of very limited scope and is intended only as a pilot study of the ultimate strength of curved plate and box girders. The study was conducted primarily because the test girders were available and could be retrofitted following the fatigue tests. (FHWA)

Daniels, JH Fisher, TA Batcheler, RP Maurer, JK
Lehigh University, Federal Highway Administration, (Fritz Rpt. 398.7)
Intrm Rpt. FHWA-RD-79-137, Aug. 1979, 83p

RESPONSIBLE INDIVIDUAL: Nishanian, J

Contract DOT-FH-11-8109

ACKNOWLEDGMENT: Federal Highway Administration
ORDER FROM: NTIS

PB81-116923

00 325383

FATIGUE OF CURVED STEEL BRIDGE ELEMENTS-DESIGN RECOMMENDATIONS FOR FATIGUE OF CURVED PLATE GIRDER AND BOX GIRDER BRIDGES

Research on the fatigue behavior of horizontally curved, steel bridge elements was conducted at Fritz Engineering Laboratory, Lehigh University, under the sponsorship of the Federal Highway Administration (FHWA) of the U.S. Department of Transportation. The multi-phase investigation spanning nearly five years was performed in five Tasks: 1) analysis and design of five large scale horizontally curved steel twin plate girder assemblies and three large scale horizontally curved steel box girders, primarily for fatigue testing, 2) special analytical studies of the influences on fatigue of stress range gradient, heat curving, "oil canning" of webs and the spacing of internal diaphragms in curved box girders, 3) fatigue tests, to 2,000,000 cycles, of each of the above eight curved test girders, 4) ultimate strength tests of three of the curved plate girder assemblies and two of the

curved box girders following the fatigue tests (composite reinforced concrete slabs were added to two of the three curved plate girder assemblies and to both curved box girders) and 5) development of design recommendations suitable for inclusion in the AASHTO bridge design Specifications. This is the eighth and final report of the project and presents the results of Task 5 above. The entire project is described and the findings summarized which were presented in the previous project reports. The report concludes with suggested additions and modifications to the Tentative Design Specifications for Horizontally Curved Highway Bridges, prepared for the FHWA-DOT by CURT under Contract Number FH-11-7389, March 1975. (FHWA)

Daniels, JH Fisher, JW Yen, BT
Lehigh University, Federal Highway Administration, (Fritz Rpt 398.8)
Final Rpt. FHWA-RD-79-138, Apr. 1980, 60p

RESPONSIBLE INDIVIDUAL: Nishanian, J (HRS-11)
Contract DOT-FH-11-8198

ACKNOWLEDGMENT: Federal Highway Administration
ORDER FROM: NTIS

PB81-115115

00 325959

LIME TREATED SUBGRADE SOILS: AN EVALUATION

The results of an evaluation of lime treated subgrade soils in Oklahoma are presented. The treated roadway extents ranged widely with respect to geographic area, climatic conditions, soil type, age, and contractor. Many laboratory test procedures were conducted on samples taken from untreated and treated subgrade soils. The effectiveness of lime treatment after the roadways had been in service for at least 5 years varied widely. Typically plasticity, shrinkage, and swelling of subgrade soils were reduced, while apparent particle size, and pH were increased. The Oklahoma Subgrade Index, on which pavement thickness designs are based, was reduced sufficiently to justify the allowance of one-half inch of equivalent base thickness for one inch of lime treated subgrade. (FHWA)

Oklahoma Department of Highways, Federal Highway Administration
Final Rpt. FHWA-OK-80-133, Dec. 1980, 83p

Contract 74-03-1

ACKNOWLEDGMENT: Federal Highway Administration
ORDER FROM: NTIS

PB81-148629

00 326449

STATIC AND DYNAMIC TESTS OF FULL SCALE DOUBLE-TEE GIRDERS FOR DADE COUNTY RAPID TRANSIT SYSTEM

Metropolitan Dade County, Florida, is now in the process of building a new rapid transit system of about 50 miles. The first-stage construction of this new system scheduled for completion in 1984, consists of 22.5 miles, and includes 21.5 miles of aerial guideways. The aerial structures to be used for the guideways are prestressed concrete double-tee girders, which is a first in the use of such a structure in a U.S. transit system. In view of large capital investment involved, and the fact that a double-tee has not been used on any rapid rail transit system, the Urban Mass Transportation Administration agreed to fund full-scale tests. These tests were to serve three purposes: (1) to prove the adequacy of all design methods; (2) to check some of the construction and reinforcement details; and (3) to verify the dynamic performance of the girders. Demonstration tests were carried out on three full-size 80 feet long by 5 feet deep by 12 feet wide precast prestressed double-tee girders proposed for the aerial guideways. Two of the three girders cast in Miami were shipped by rail to P.C.A. Laboratories in Skokie, Illinois for extensive static and dynamic testing, with the third girder kept in Miami to monitor camber and loss of prestress. Static test results of uncracked and deliberately precracked girders showed that service torsional rotations, which were in close agreement with a theoretical mixed torsion analysis, were small enough to ensure rider comfort. Fatigue resistance of the girders was fully established by two separate test spectra involving 5 and 6 million cycles of loading representing the cumulative damage of sixty years of operational life. No deterioration whatsoever was observed in terms of flexural and torsional stiffness, crack propagation, or strand stresses. Post-cracking behavior of the girders showed adequate strength and ductility with an ultimate capacity of 1.6 times the required factored severe derailment loading including 100% impact. This test report concludes that the excellent behavior of the girders from serviceability and strength considerations, substantiated all the design analyses and details used.

Hsu, TTC

Dade County Office of Transportation Admin, Urban Mass
Transportation Administration, (UMTA-FL-06-0017) Final Rpt.
UMTA-FL-06-0017-80-1, Oct. 1979, 164p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-115388

00 328354

THE STOCKHOLM UNDERGROUND, 1975

In connection with the opening of the central section--Slussen to Hotorget--of Line 1 of the Stockholm underground railway in 1957, and the inauguration of Line 2 in 1964, technical descriptions of the system were published. With the opening of the major part of the third line, the Jarva Line, yet another important stage in the extension of the underground network will have been completed. Since publication of the second technical description, the second line has also been extended to Botkyrka and to the University. Work is continuing on extensions to Lines 2 and 3. The present technical description has been produced in accordance with a decision reached by the Stockholm County Council Traffic Board, and it deals with the sections added most recently as well as with technically interesting aspects of previous construction work on the Underground. The object is to provide a concise but at the same time comprehensive documentation of the technical methods applied over about thirty years of underground railway construction.

Rosell, B Baeckstroem, I Ehrman, C Hillbom, B
Stockholms Laens Landstings Aug. 1976, 188p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-130353

00 328563

FEATURE TAGGING

The automated recognition of cartographic symbols such as dual cased roads and railroads would significantly reduce the manual labor involved in generating digital cartographic data bases. The effort described in this report was successful in detecting 96.5% of the railroad symbol components. There were only 1.5% false taggings. 98.3% of the dual cased roads were tagged with only .7% false taggings. Goodyear Aerospace Corporation (GAC) believes that minor modifications to the algorithms would produce near perfect results for both features. Because of the success of this effort, GAC feels that the project should be continued to allow evaluation on existing map sheet data and expansion of the effort to additional cartographic symbols. (Author)

Biecker, GA Potter, JL Paden, DS
Goodyear Aerospace Corporation, Army Engineer Topographic Laboratories Final Rpt. ETL-0227, Apr. 1980, 32p

Contract DAAK70-79-C-0070

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A091691/6

00 328814

UTILIZATION OF FILTER FABRIC FOR STREAMBANK PROTECTION APPLICATIONS

A survey of literature, CE field offices, and filter fabric manufacturers was made to obtain published and unpublished information and case histories on the use of filter fabric as a component of streambank protection works. Properly selected and placed filter fabric may be considered as a substitute for part or all of a granular filter under revetment for situations where granular filter bedding materials are not readily available or cost-effective. Other possible uses also are described. Available information on the currently specified methods of placing filter fabric is provided and cautions concerning its use are emphasized. Filter fabrics should not be used in lieu of granular filters on soils having more than 85 percent of material by weight passing the No. 200 sieve or in high energy environments. A glossary of basic terminology and a bibliography of relevant literature are included. (Author)

Keown, MP Dardeau, EAJ
Waterways Experiment Station Final Rpt. WES/TR/HL-80-12, July
1980, 123p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

AD-A090821/0

00 330151

SOILS-BALLAST-GEOTEXTILE RELATIONSHIP: PART 1--BALLAST AND SUBGRADE

Geotextiles, engineering fabrics, can be properly used only if there is an understanding of the surroundings in which the material is to be placed. This first installment presents information on the soils and ballast environment in which geotextiles are applied, defining common soils and stress conditions that require frequent addition or replacement of ballast to retain track geometry. Also examined are the resilient responses and permanent deformation within the subgrade and ballast. The subsequent article lists the contributions and limitations of fabrics in track-structure applications.

Puffer, W (Monsanto Textiles Company) *Railway Track and Structures* Vol. 77 No. 1, Jan. 1981, p 32, 6 Fig., 2 Tab.

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DOTL JC

00 330152

QUICK-SET GROUT/BINDER FOR NEC BRIDGE

Replacement of an aging concrete bridge deck with eight precast concrete ballast-deck segments on a Northeast Corridor bridge was facilitated by use of a polymer concrete as a self-leveling grout and structural binder. The fast-setting of the grout on the original bridge girders enabled Amtrak maintenance forces to complete the rehabilitation rapidly on a busy four-track mainline.

Railway Track and Structures Vol. 77 No. 1, Jan. 1981, p 38, 1 Phot.

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DOTL JC

00 330161

URBAN RAIL TUNNELING TECHNOLOGY PROGRAM DIGEST

Following a four-fold increase in urban tunnel construction costs during the 1970s, subway building now will cost up to \$100 million per mile in congested urban areas. UMTA is seeking ways to control and reduce expenditures for urban tunneling and has conducted a research and development program aimed at these objectives. This booklet has individual chapters dealing with each of the major facets of the R&D program: Cost estimating; socioeconomic and environmental impacts; contracting and management; construction monitoring; subsurface exploration; ground-support systems; excavation technology and muck transport; design and construction guidelines; lining and support systems. A glossary and bibliography of pertinent UMTA reports are also included.

Urban Mass Transportation Administration Reprint UMTA-MA-06-0100-80-3, Oct. 1980, 68p, 4 Fig., 6 Tab., Photos.

ORDER FROM: NTIS

PB81-165219, DOTL RP

00 330192

SERRE DE LA VOUTE TUNNEL IN DOUBLING THE TURIN-MODANE LINE [La galleria Serre de la Voute nel raddoppio della linea Torino-Modane]

The new Serrè de la Voute tunnel is part of the doubling of the Turin-Modane line, at present in progress between the stations of Bussoleno and Salbertrand. Its completion has made it possible to start traffic operations on a first section of the new line: namely that between Exilles and Salbertrand, due to the nature of the terrain in the area of the entrance of the tunnel on the Salbertrand side, and to the encountering in the excavation of this of a water-bearing stratum of such importance as to produce instability in the entire down-slope towards the Dora Riparia. The surveys carried out, the engineering works to form a tunnel-slope complex that would give a sufficient guarantee of stability, and other structures erected in connection with this are described. [Italian]

Piepoli, G *Ingegneria Ferroviaria* Vol. 35 No. 2, Feb. 1980, pp 127-139

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

00 330199

RAILWAY BRIDGES SUBJECTED TO TRAFFIC LOADS AND THEIR DESIGN FOR FATIGUE

The article summarises the most significant results of theoretical and experimental research on dynamic stress in railway bridges under traffic load. The statistical distribution of axle-loads is given together with the stress values measured on several railway bridges and some methods are suggested for representing them. From an analysis of the results obtained it has been possible to establish a spectrum of the stresses in railway bridges and to deduce methods for setting the dimensions of such bridges to take account of the load factor and of fatigue.

Fryba, L *Rail International* Vol. 11 No. 10, Oct. 1980, pp 573-598, 26 Fig., 12 Tab., 18 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

00 330215

APPLICATIONS OF THE FLOATING-TUNNEL TECHNIQUE [Les franchissements par tunnels flottants]

After examining the different possible options for crossing sea-stretches (bridge, floating bridge, underwater floating tunnel, tunnel laid on the sea floor, tunnel cut beneath the sea floor), the article presents various methods of building underwater tunnels. An appendix to the article examines the calibration of cables necessary for balancing a railway tunnel section in ordinary concrete with a density of 2.4, and that of a tunnel in light concrete with the same characteristics. A list of underwater tunnels, built between 1910 and 1975, is added to the article. [French]

Lacroix, R Blondeau, P *Travaux* No. 548, Oct. 1980, pp 46-55, 6 Tab., 17 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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00 330219

TUNNEL CLEANING MACHINES

Description of experiments and problems encountered with the special tunnel cleaning machine on 256 km of the London Transport network.

Ridge, N Faulkner, FJS *Railway Engineer International* Vol. 5 No. 5, Sept. 1980, pp 38-40, 2 Fig., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

00 330661

VEGETATION CONTROL: TURBULENT YEARS AHEAD

Growing environmental restrictions could soon impinge on railroad vegetation control even though such regulations are intended for agriculture and forest products industries where aerial applications of herbicides are routine. Further limits on the types of herbicides may also affect the ability of railroads to control economically the vegetation currently treated with certain chemicals.

Railway Track and Structures Vol. 77 No. 2, Feb. 1981, pp 24-25, 1 Phot.

ORDER FROM: ESL

DOTL JC

00 330665

SITE INVESTIGATION-HOW MUCH SHOULD BE DONE

Although a high level of geological and hydrological information is of benefit to a tunnelling contractor to achieve accurate pricing, methods of assessing the degree of site investigation necessary are discussed in the article. The degree suggested is that sufficient to maximise the benefits and minimise the project costs after having recouped the cost of investigation. TRRL studies have evaluated actual cost data from completed tunnels in an attempt to formulate empirical guidance laws between significant variables influencing cost as a measure of site investigation effectiveness. Methods of index-linking construction costs to allow for inflationary elements are also discussed.

Attewell, PB Clark, CR *Tunnels and Tunnelling* Vol. 12 No. 10, Nov. 1980, pp 11-12, 1 Tab.

ACKNOWLEDGMENT: TRRL (IRRD 252109)

ORDER FROM: ESL

DOTL JC

00 330666

THE CONTRIBUTION OF AERIAL PHOTOGRAPHY TO FEASIBILITY STUDIES OF RAILWAY ALIGNMENTS IN SUB-DESERT ZONES [Apport de la photographie aerienne au niveau de l'etude de faisabilite sur traces en zone-subdesertique]

The author gives an example of the use of aerial photography in the feasibility study of a railway alignment in a sub-desert zone. He shows the appreciable saving in time resulting from the use of this method to help define possible itineraries. Photo-interpretation at this stage consists mainly in drawing up a map of the obstacles to be avoided and analyzing the distribution of the materials able to be reutilized in the construction of the foundation. See IRRD 110294. [French]

Doridot, M *Bulletin de Liaison des Lab des Ponts et Chaussees* No. 107, May 1980, pp.52-58, 10 Fig., 2 Tab., 7 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 110296), Central Laboratory of Bridges & Highways, France

ORDER FROM: Central Laboratory of Bridges & Highways, France, 58 Boulevard Lefebvre, 75732 Paris, France

00 330667

CITY RAIL LINK SQUEEZES INTO OLD TUNNEL

The article describes the removal of extensive sections of brick invert along the London city line tunnel between Kings Cross and Farrington to increase clearances for operating British Rail electric services into Moorgate. The extreme caution exercised in the removal of about 200 separate breakouts which were made at six locations is emphasized. A Krupp 200 breaker was used for the work, the brickwork being replaced by reinforced concrete. Reference is made to traffic control during concreting operations. Around 150 cubic metres of pumped ready mixed concrete was moved up to 200 metres each day. A Pact system paver will be used to slipform the concrete track bases.

Winney, M *New Civil Engineer* No. 413, Nov. 1980, pp 24-25, 2 Fig., 1 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 251564)

ORDER FROM: Institution of Civil Engineers, 1-7, Great George Street, Westminster, London SW1P 3AA, England

00 331106

SPECIFIC MEASURES TO SOLVE PROBLEMS PERTAINING TO EARTH AND FOUNDATION ENGINEERING

With the use of geo-textiles for earth engineering and with the nailing of skid-risky embankments by steel injection lances and the improvement of the foundation soil by depth jolters causing dynamic intense solidification of the subsoil, there are novel or further-developed procedures available which could help to solve even awkward problems of the earth and foundation engineering. A description is given of their mode of operation as well as of how to apply them to the civil engineering sphere of the German Federal Railway. [German]

Martinek, K Janker, M *Eisenbahningenieur* Vol. 31 No. 11, Nov. 1980, p 457

ACKNOWLEDGMENT: British Railways

ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

00 331109

TUNNELING RESEARCH FOR US HIGHWAYS AND URBAN RAIL SYSTEMS

Site exploration, ground support systems, construction monitoring and instrumentation, ground control, contracting and management, and tunnel environment were subjects discussed at a recent conference on highways and urban rail systems.

Farquhar, OS *Tunnels and Tunnelling* Vol. 12 No. 11, Dec. 1980, pp 15-18

ACKNOWLEDGMENT: British Railways

ORDER FROM: ESL

DOTL JC

00 331113

THE "NEW AUSTRIAN METHOD" IN TUNNEL CONSTRUCTION [Il "Nuovo Metodo Austriaco" nella costruzione delle gallerie]

After a review of the principal formulae according to the theory of Rabcewicz, an analysis is presented of their design application to the more

common types of rock, forecasting the loads acting upon a tunnel support structure. Some detailed examples are given of the application of these methods to the design of tunnel supports and linings for 6 types of rock classified as follows: (1) stable; (2) slightly friable; (3) medium to very high friability; (4) unstable with thrust faults; (5A) very faulty, very plastic, and blowing up; and (5B) completely loose and unstable. [Italian]

Benussi, G *Strade* Vol. 82 No. 1190, May 1980, pp 237-251, 4 Fig., 6 Tab., 6 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 252671)

ORDER FROM: Permanent International Association of Road Congr, Via Andreani 4, Milan, Italy

DOTL JC

00 331117

PRECAST RAILWAY UNDERPASSES PRESSED AND PULLED IN POSITION [Ferdigstoepte NSB-underganger presset og dradd paa plass]

When building railway bridges and underpasses on busy railway lines regular train services must be maintained during the construction period. This is normally obtained by making a temporary relocation of the line, or by temporarily installing steel beams to support the rails, so that excavation and construction can proceed under the steel beams. There are also some other methods, and a more advanced one is to construct the underpass beside the line, and then move it into position. This method was used in two different ways at two underpasses on the Oestfoldbanen. The smallest was a pedestrian culvert of 50 tons which was pulled into position by a rescue car in 10 minutes after the railway embankment was excavated. The biggest, a road underpass of approx. 1700 tons, was pressed through the existing embankment during a period of 3 days and nights by use of 8 hydraulic jacks of 300 tons each. [Norwegian]

Ness, I (Norges Statsbaner) *Plan og Bygg* Vol. 28 No. 9, Nov. 1980, pp 28-29, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 252626), Norwegian State Highway Laboratory

ORDER FROM: Ingenioerforlaget A-S, Box 2476, Solli, Oslo 2, Norway

00 331118

UNSTEADY AIRFLOWS IN RAPID TRANSIT SYSTEMS. PART 1: MEASUREMENTS ON THE LONDON TRANSPORT VICTORIA LINE. PART 2: THEORETICAL BACKGROUND AND DESIGN PARAMETERS

Part 1: the measurement of pressure fluctuations on the London Transport Victoria line is described and results are presented in sufficient detail for accurate comparisons to be made with theoretical models. Measurements were obtained during the night-time shut-down period, and so complicating effects due to other trains are absent. The results give a clear indication of the relative importance of several events such as entry to and exit from a station. The effectiveness of cross-passages for draught relief is clearly demonstrated. A computer program is used to simulate the airflows, and satisfactory correlation is obtained with the measured results at different train speeds. The program is used to predict system characteristics that were not measured during the tests. It is found that platform wind velocities and passenger pressure histories do not violate recommended acceptable limits even when the train passes through the station at 65 km/h without stopping. Part 2: the principal aerodynamic effects in a rapid transit system are predicted by use of a computer program. Account is taken of the influence of cross-passages, ventilation shafts, cross-overs and stations, etc., on the airflows generated by any number of trains travelling along any routes with any speed histories. Very few empirical coefficients are needed to obtain satisfactory correlations with experimental data. The program is used to investigate the relative influence of important system parameters, and skin friction is found to have a particularly strong effect. It is shown that the tunnel system can be considerably simplified in the numerical simulation without serious loss of accuracy, but that account must be taken of local cross-passages and ventilation shafts.(a)

Vardy, AE (Dundee University, Scotland) *Institution of Mechanical Engineers Proceedings* Vol. 194 Dec. 1980, pp 341-356

ACKNOWLEDGMENT: TRRL (IRRD 252433)

ORDER FROM: ESL

DOTL JC

00 331121

TUNNELLING EXPERIENCES UNDER THE CENTRE OF OSLO

The design and construction of a 3500 M long tunnel connecting east- and west-bound railway lines through Oslo is described. One part of the tunnel passes through bedrock at a depth of 20-40 M below ground level. The bedrock consists of sedimentary rocks-clayey rocks and shales, calcareous shales and limestones, with occasional shear zones with minor dislocations cutting through the rock. Above and along the tunnel there are a number of clay-filled depressions in the bedrock. Major problems described concern vibrations from blasting and the inflow of groundwater into the tunnels and halls. Drilling and blasting operations were carried out in a conventional manner. As tunnelling operations commenced in built-up areas government restrictions concerning acceptable threshold noise values which are tabulated, had to be adhered to. Problems encountered with extensive leakage through the concrete lining are described. The covering abstract for the proceedings is IRRD abstract no 252594.

Eurotunnel '80, held Basle, Switzerland, 16-19 September, 1980.

Heltzen, AM

Institution of Mining and Metallurgy 1980, pp 1-5, 3 Fig., 2 Tab., 5 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 252595)

ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 331122

METRO WORKS IN ANTWERP, BELGIUM: USE OF A 6.50 M DIAMETER BENTONITE SHIELD FOR THE TUNNELS AND PIPE-JACKING FOR THE STATIONS

Metro works in Antwerp were started in January, 1970; the first part, carried out by cut and cover methods, caused considerable traffic congestion and generally disturbed the business area. Pressure by the public led the national ministry of transport (which finances the entire works) to accept that the second part should be undertaken by underground methods to avoid any disruption. Previous tenders were withdrawn and a new investigation was ordered. In the revised tender-documents the use of a 6.5 M diameter bentonite shield was specified to avoid compressed-air working and to reduce surface settlement. Details of the shield are presented, together with technical information on the overall project. A method of pipe-jacking for the roof slab of tunnels is described for use where the tunnel is shallow and a shield cannot be used. The covering abstract for the proceedings is IRRD abstract no 252594.

Eurotunnel '80, held Basle, Switzerland, 16-19 September, 1980.

Hoste, GR

Institution of Mining and Metallurgy 1980, pp 28-32, 4 Fig., 5 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 252598)

ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 331123

APPLICATION OF THE NEW AUSTRIAN TUNNELLING METHOD FOR METRO CONSTRUCTION IN THE FEDERAL REPUBLIC OF GERMANY

Following the decision of the city of Frankfurt in 1969 to test the New Austrian Tunnelling Method for metro tunnel driving (it had previously been applied only to railway tunnels) eight other towns in the Federal Republic of Germany have applied this economic and widely applicable method of metro tunnel construction. Geological problems, particularly in near-surface Quaternary strata, were dealt with in various ways-by mechanical support, grouting, freezing, etc. The tunnel cross-sections increased from the 34 sq M single-track road tunnel to the 200 sq M three-aisle Schweizer Platz metro station in Frankfurt. The construction of this underground station demonstrates the development over the last ten years, of the application of the NATM in metro tunnel construction in Germany. The covering abstract for the proceedings is IRRD abstract no 252594.

Eurotunnel '80, held Basle, Switzerland, 16-19 September, 1980.

Babendererde, S

Institution of Mining and Metallurgy 1980, pp 54-58, 3 Fig., 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 252601)

ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 331124

PRECAST-CONCRETE TUNNEL LINERS IN THE CONSTRUCTION OF THE BUDAPEST AND PRAGUE METRO BELGRADE RAILWAY TUNNELS

In the field of tunnel construction several attempts have been made to substitute the much more economical reinforced-concrete tunnel liners for cast iron and steel linings. Adequate connexions and problems related to watertightness posed many difficulties, which generally resulted in segments that were too complicated and heavy. A new design of precast-concrete tunnel liners that was developed in Hungary has solved these problems. The development of a deformable hinged tunnel lining system with dowel-type connexion on the one hand, and the decrease of bending moments as a result of the good interaction of the lining and surrounding soil on the other, gave a very small wall thickness. Numerous tests for load-bearing capacity, accuracy and watertightness have shown that the lining withstands the forces that act on it and meets the technological requirements. Detailed information is given on the new precast tunnel lining system and the tests for bearing capacity of the hinges, as well as on precasting of the segments, erection and grouting. Geological and structural details of the use of the system in soft, water-bearing layers, especially in the construction of the Budapest metro, which was awarded the "golden trophy of the europrefab", are also presented. A short account follows on the use of the system in the construction of the Prague metro and the new Belgrade railway tunnel. (a) the covering abstract for the proceedings is IRRD abstract no. 252594.

Eurotunnel '80, held Basle, Switzerland, 16-19 September 1980.

Fogarasi, G Rozsa, L

Institution of Mining and Metallurgy 1980, pp 102-109, 10 Fig., 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 252607)

ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 331125

GARE DE LYON PROJECT, FRANCE

The article reviews the development of the Paris gare de Lyon project to construct a common interchange between metro and mainline rail services. The interchange or "under-station" common structure is being constructed beneath the existing SNCF installation. For this construction, excavation down to 23 M was carried out, the area being surrounded by a peripheral moulded wall in the upper strata (earth and alluvium) and by an impervious screen, made by surface injection, down to the level of the limestone. The walls were excavated using an experimental machine known as the hydromill which is able to operate without a rock-drill and so eliminate the transmission of shocks and vibrations to nearby buildings. To ensure stability of the structure on the supposition of ten-year floods, use was made of the decompression shaft system drilled at the excavation stage. All parts of the structure were sheathed with PVC sheeting up to the maximum level of the water table. Details are given of precautions taken to ensure the stability of the foundations of surrounding buildings by underpinning and grouting operations. The covering abstract for the proceedings is IRRD abstract no 252594.

Eurotunnel '80, held Basle, Switzerland, 16-19 September, 1980.

Lezsa, L, (Paris Transport Authority)

Institution of Mining and Metallurgy 1980, pp 110-119, 10 Fig., 9 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 252608)

ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 331126

ADAPTATION TO THE SITE OF PLANS FOR UNDERGROUND WORKING IN AN URBAN AREA

It is necessary to take into consideration a number of factors to ensure success when planning underground workings. This is particularly true when tunnels have to be built on an urban site and in poor ground. The predominant factors then are related to the geology, the hydrogeology, the liability of the ground to cave, the congestion of the subsoil, the urban density, the nearness of premises, etc. In addition, the purpose for which the future works are intended obviously has important repercussions. For example, in building an underground railway line the depth to which the stations are constructed is far from being of minor significance. Finally, the disruption caused by the works and, consequently, the working plan have to be taken into consideration. The extension of line 10 of the metro to the adjacent suburb west of Paris provides, in this respect, a good illustration

of the need to adapt, as closely as possible, the working methods to the conditions encountered. Work on the Porte d'Auteuil section and implementation of the works in two sections are described. (a) the covering abstract for the proceedings is IRRD abstract no 252594.

Eurotunnel '80, held Basle, Switzerland, 16-19 September, 1980.

Bougard, JF (Paris Transport Authority)
Institution of Mining and Metallurgy 1980, pp 130-134, 3 Fig., 5 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 252610)
ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 331219
WHATEVER HAPPENED TO SOS? COMMUNITY CONFLICT AND TRANSIT DEVELOPMENT

This report deals with the planning and development of the East Line in Decatur, Georgia, which presented an array of events and situations that impacted on both Decatur and MARTA. Controversy over saving historic Sycamore Street, known as Save Old Sycamore (SOS), is explained and resolution of the conflicts are detailed. The responses of the local government, the business community, and neighborhood groups were variable. Periods of community support for MARTA were followed by controversies over the location and impact of the rail line and Decatur Station. This variability presented significant problems for the Authority, which had to push for timely completion of the East Line. (UMTA)

Almy, TA Proehl, CW, Jr
Georgia University, Athens, Georgia University, Athens, (GA-11-0006)
UMTA-GA11-0006-81-11, July 1979, 25p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB81-157422

00 331466
THOROUGH INSPECTION INITIATES LANDMARK BRIDGE UPGRADING

Investigation of structural characteristics of a 73-year-old bascule bridge spanning the Connecticut River on Amtrak's Northeast Corridor route have produced a plan for rehabilitation of steel, masonry and machinery components. Major evaluations were made of superstructure, substructure, operating machinery, electrical equipment and the operator's house. Described are inspection procedures and methods of structural and fatigue analysis which were the bases for rehabilitation and strengthening.

Arango, G (Steinman, Boynton, Gronquist and Birdsall) *Railway Track and Structures* Vol. 77 No. 3, Mar. 1981, pp 60-62, 4 Phot.

ORDER FROM: ESL

DOTL JC

00 331488
SUBWAY BUILT 2 FT UNDER STREET

The paper reports how workers plagued by a high water table during subway construction in a densely populated city have overcome the problem by building a tunnel only 2 ft below the surface and sealing the top and bottom of the shallow structure with plastic sheeting.

Engineering News-Record Vol. 205 No. 12, Sept. 1980, pp 66-67

ACKNOWLEDGMENT: EI
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DOTL JC

00 331548
ATTEMPT OF TECHNICAL-ECONOMICAL OPTIMIZATION OF HIGH-PRESSURE JET ASSISTANCE FOR TUNNELING MACHINES

The improvement of cutter disk performance by high-pressure water jet assist was found to be a proportional function of the hydraulic capacity installed. For tunneling machines of 6-m to 7-m diameters, this function theoretically results in electric drive capacity requirements which, if met, would entail serious technical and human-engineering problems for tunneling within underground mining operations. By systematic evaluation of full-scale tunneling tests, all possibilities for optimization of this combined tunneling technique were evaluated. Tunneling advance in time, rotational speed of the drillings head, advance force and cutter depths are of essential importance in this respect. Further investigations were carried out in view

of obtaining relatively good heading rates by selective, high-pressure water jet assist of particularly defined areas of the tunneling head. In addition, successful and cost effective application of additives to high-pressure water are discussed.

Proceedings of the International Symposium on Jet Cutting Technology, 5th, Hanover, Germany, June 2-4, 1980.

Baumann, L Heneke, J *BHRA Fluid Engineering Series* 1980, pp 119-139

ORDER FROM: Air Science Company, P.O. Box 143, Corning, New York, 14830

00 331549
ENGINEERING GEOLOGICAL INVESTIGATIONS IN SOFT ROCK TERRAIN, PORO-O-TARAO TUNNEL, NEW ZEALAND

Construction of tunnels in soft sedimentary rocks and colluvium derived from them can pose problems that are only normally encountered in hard rocks or soils. This was illustrated recently during investigations for the construction of a new 1.3 km, 6 m diameter railway tunnel at Poro-o-tarao. The various investigations undertaken are reviewed, and the effects on construction of the geomechanical characteristics of the materials encountered are described.

Australia-New Zealand Conference on Geomechanics, 3rd. Vol. 2, Wellington, New Zealand, May 12-16, 1980; Proceedings of Technical Groups, New Zealand Institution of Engineers. Vol. 6, Issue 1(G).

Borrie, GW Riddolls, BW
Institution of Engineers, New Zealand Proceeding 1980, p 2.195, Refs.

ACKNOWLEDGMENT: EI
ORDER FROM: Institution of Engineers, New Zealand, 101 Molesworth Street, P.O. Box 12241, Wellington, New Zealand

00 331551
EASTERN LINE OF THE AMSTERDAM RAPID TRANSIT SYSTEM [La ligne EST du metro d'Amsterdam]

The paper presents an historical survey of design and construction methods and discusses waterable position, method selection, caisson method, concrete, sidewall cooling and joint-squeezing. Construction of the surface section is described. [French]

Hespe, S *Tunnels et Ouvrages Souterrains* No. 40, July 1980, pp 237-244

ACKNOWLEDGMENT: EI
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DOTL JC

00 331838
DOUBLE-DECK BRIDGE IS RESTORED

The paper reports on the restoration of a twin-deck highway-railroad bridge by replacing its outer lanes and reinforcing its steel truss while traffic flows on both levels. To strengthen the bridge's 24-in.-deep, wide-flange stringers, 12-ft-long prestress rods in brackets were installed at each side of the top of the web: Three-in.-wide compression plates are bolted in 6-ft lengths on top of the bottom flange on both sides of the web. The compression plates are welded to the diaphragm where the stringer intersects the floor beam to match the 12-ft length of the prestress rods.

Engineering News-Record Vol. 205 No. 16, Oct. 1980, p 35

ACKNOWLEDGMENT: EI
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DOTL JC

00 331844
BALTIMORE'S GOT THE SUBWAY EVERYONE LOVES

Some of the innovations of Baltimore's 13.5-mile subway system are explored. The system, on which construction began in 1976, is under budget and on time. The first 7.5-mile section will open in 1982. Innovations on the system include: enlightened contract writing, with minimal use of exculpatory language; extensive use of geotechnical data, including sharing it with contractors; and extensive use of slurry walls, compaction and chemical grouting to cut underpinning costs.

Seltz-Petrash, AE *ASCE Civil Engineering* Vol. 51 No. 1, Jan. 1981, pp 42-45

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 331892

THE ADVANCE OF THE AUTOMATIC MOLE

Britain's tunneling technology has been outdistanced by foreign competition, particularly developments by Japanese engineers. Japan constructs more tunnels of all types than any other nation and has refined soft ground tunneling machines to the point where an unmanned Tele-Mole can be controlled from the surface laser targeting and TV monitoring. The result is tunneling cheaper and safer than ever before.

Harding, P. *New Scientist* Vol. 89 No. 1243, Mar. 1981, pp 594-597, 6 Phot.

ORDER FROM: IPC Magazines Limited, Commonwealth House, 1-19 New Oxford Street, London WC1A 1NG, England

DOTL JC

00 334296

INERTIAL SURVEY BEATS WINTER ODDS

Union Pacific has turned to aerial topography and inertial surveying for the location of a proposed line in Wyoming. The 37-mile alignment was through a territory with few reference points. The inertial survey device with its gyroscope and accelerometers can be transported by helicopter or land vehicle to produce three-dimensional coordinates and maps accurate to 1 in 20,000. The computer-processed results are automatically transformed into complete maps.

Progressive Railroading Vol. 24 No. 4, Apr. 1981, pp 77-78, 2 Phot.

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

DOTL JC

00 334338

RESTORATION OF TUNNELS: REPAIR TECHNIQUES

This third article in the series on the restoration of tunnels deals with the independent or combined use of sprayed concrete and of resin or mortar sealed anchorage. These methods have been employed for the strengthening of tunnels in a relatively poor state of repair; examples of application are given. [French]

Eraud, J. *Revue Generale des Chemins de Fer* Vol. 99 Dec. 1980, pp 681-700

ACKNOWLEDGMENT: British Railways

ORDER FROM: ESL

DOTL JC

00 334435

JAPANESE TUNNEL DESIGN: LESSONS FOR THE U. S.

The Japanese construction industry has a great deal to offer regarding designs, methods, and procedures that can efficiently overcome the tough physical and environmental constraints encountered when tunneling in dense urban areas. This is particularly true regarding softground tunneling. The following issues are explored: the use of pre-cast concrete liners, slurry-shield tunneling, earth pressure balance shield tunneling, and non-disruptive cut-and-cover tunneling. All have been used successfully by Japanese design-construction firms. In addition, a diagram illustrates an unusual underwater tube tunnel project undertaken in the Port of Tokyo.

Paulson, BC, Jr (Stanford University) *ASCE Civil Engineering* Vol. 51 No. 3, Mar. 1981, pp 51-53

ACKNOWLEDGMENT: EI

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DOTL JC

00 334437

SELECTION OF TUNNELLING FORMWORK

The article discusses a number of important points to consider before tunneling formwork is designed, including ground conditions, access, concreting limitations, availability of labour and local methods of construction. It advises that full trial assembly of the formwork must take place before equipment is delivered to site. This is not only for the manufacturers' purposes, but also for the contractors' inspection, as any changes or modifications required can be made more satisfactorily at this time rather than on site.

Jeffery, R. *Tunnels and Tunnelling* Vol. 12 No. 10, Nov. 1980, pp 15-17

ACKNOWLEDGMENT: EI

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DOTL JC

00 334445

A METHOD OF DESIGN OF FILTER MATERIALS FOR SUBSURFACE DRAINAGE

A number of procedures for the design of subsoil drainage filter materials has been examined. A suggested design procedure based on the particle size distribution of the material is given and a simple design form developed. Explanatory notes detailing each design step are printed on the back of the form. A worked example to show the simplicity of the method is included as an appendix. The design is based on the use of slotted, corrugated plastic, subsurface soil pipes of the type now commonly used by SRA's and others in the construction of longitudinal drains adjacent to the edge of road pavements. It is stressed that all components of the road pavement (basecourse etc.) as well as in-situ soils, select fills etc. Should be considered in the design and specification of filter materials for a subsurface drainage system. The design method presented is suggested as being suitable for the majority of in-situ materials encountered in the field. It allows for the use of filter socks as well as two-stage filters. Testing of the proposed filter material for the determination of mineralogical and mechanical soundness is recommended.

Gerke, RJ Tynan, AE

Australian Road Research Board Monograph AIR 317-2, Oct. 1980, 17p, 6 Fig., 18 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 250460), Australian Road Research Board

ORDER FROM: Australian Road Research Board, P.O. Box 156, Bag 4, Nunawading, Victoria 3131, Australia

00 334449

THE USE OF REINFORCED EARTH IN ROAD AND RAILWAY CONSTRUCTION [L'impiego della terra armata nelle costruzioni stradale e ferroviarie]

This article presents a summary review of the use of reinforced earth techniques throughout the world up to the end of 1978. France is by far the leading country in the practice of this technology (910 structures with a total area of 493370 sq M). The USA is second (293 structures- 268000 sq M) and Japan third (178 structures-57544 sq M). Overall, road construction accounts for 81% of reinforced earth applications, railways 2.5%, industrial construction 12%, and residential construction (in hilly or mountainous terrain) 4.5%. Some examples of the use of reinforced earth in motorway construction are illustrated. [Italian]

Rinelli, S. *Strade* Vol. 82 No. 1191, July 1980, pp 347-353, 7 Fig., 2 Tab., 10 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 253147)

ORDER FROM: Permanent International Association of Road Congr, Via Andreani 4, Milan, Italy

DOTL JC

00 334450

REINFORCED EARTH VERSUS MULTI-ANCHOR STRUCTURES

The author considers that multi-anchor structures, while having the same advantages as reinforced earth may prove to be much cheaper. The article gives details of reinforced earth design, considering the choice of material for reinforcing strips and fill to satisfy requirements for durability and load transfer. The importance of good drainage is emphasised. In comparison a description is presented of multi-anchor design with its load transmission through reinforcement to anchors and thence to fill. The two methods are compared graphically with respect to internal and external stability, and the advantages of the multi-anchor method are then considered with regard to choice of reinforcement, fill material and use in excavations and cuttings.

Dalton, DC. *Ground Engineering* Vol. 13 No. 8, Nov. 1980, pp 40-41, 3 Fig., 1 Phot., 4 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 253157)

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00 334495

PROFILE MEASUREMENT IN TUNNEL CONSTRUCTION. SITUATION AND TRENDS CONCERNING THE DEVELOPMENT OF PROCEDURES FOR MEASURING PROFILES OF RAILWAY TUNNELS [Profilmessungen im Tunnelbau. Stand und Entwicklungstendenzen der Verfahren zur profilmessigen Erfassung von Eisenbahntunneln]

Existing methods of measuring railway tunnel profiles and monitoring their condition can no longer be used on the German Federal Railway's very busy

main lines unless allowance is made for operating problems, some of which are highly important. Work has been in progress for some time on the development of new faster methods which provide data without contact, together with automated recording and analysis of profile data. The author describes new developments in this field. [German]

Brandenburg, D *Eisenbahningenieur* Vol. 32 No. 1, Jan. 1981, pp 18-26, 10 Phot., 9 Ref.

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

00 334700

GEOTECHNICAL ASPECTS OF THE UJO TUNNEL CONSTRUCTION USING THE NATM

The article reports on a study of the interaction between the rock mass and the tunnel support obtained during excavation of a single track railway tunnel in Spain constructed using the New Austrian Tunneling Method (NATM), where the initial support has been left as final. Some 700 rock mass quality determinations using the Norwegian Geotechnical Institute method have been performed along the tunnel. Measuring stations were installed at 734 locations to monitor horizontal convergence. Interesting conclusions relating rock mass quality to tunnel support and convergence have been obtained. Some recommendations to improve the rock mass classification systems are proposed.

Leiria, FD Oyanguren, PR *Tunnels and Tunnelling* Vol. 12 No. 9, Oct. 1980, pp 50-52

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 334703

SPECIAL ISSUE ON DAMAGE PREVENTION AND EARTHQUAKE

An earthquake-resistant design system for railroads with primary emphasis on the response to displacement is described and analyzed. The design system was established for the primary purpose of securing operating safety of trains.

Ohashi, K (Japanese National Railways) *Permanent Way* Vol. 22 No. 3, Sept. 1980, pp 3-16

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

00 334716

FRANCE BUILDS 160-MPH RAIL LINE

The paper reports that the twin-track route, nearly all above ground, will carry new technology trains at more than 160 mph over the natural contours of the land and across a minimum number of structures.

Engineering News-Record Vol. 206 No. 1, Jan. 1981, pp 22-23

ACKNOWLEDGMENT: EI
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DOTL JC

00 334720

UNDERGROUND EXCAVATIONS IN ROCK

This book deals with the geotechnical aspects of the design of underground openings for mining and civil engineering purposes. It contains a number of worked examples to assist the reader in applying the techniques described to his or her own problems. The data are presented under the following chapter headings: (1) planning considerations; (2) classification of rock masses; (3) geological data collection; (4) graphical presentation of geological data; (5) stresses around underground excavations; (6) strength of rock and rock masses; (7) underground excavation failure mechanisms; (8) underground excavation support design; (9) rockbolts, shotcrete and mesh; (10) blasting in underground excavations; (11) instrumentation. Several appendices deal with: isometric drawing charts, stresses around single openings, two-dimensional boundary element stress analysis, determination of material constants, underground wedge analysis, and conversion factors. A very extensive bibliography is included.

The ISBN of the hardback version of the book is ISBN 0900488 54 9.

Hoek, E Brown, ET

Institution of Mining and Metallurgy Monograph 1980, 527p, Figs., Tabs., Photos., Refs.

ACKNOWLEDGMENT: TRRL (IRRD 253665)
ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 334722

THE PARIS UNDERGROUND RAILWAY: THE EXTENSION OF LINE A OF THE REGIONAL EXPRESS NETWORK (RER) AT TORCY [Metro de Paris: le prolongement a Torcy de la ligne A du reseau express regional]

This extension is 9 km long from the present terminus at Noisy-le-Grand Mont and comprises 4 stations, each serving a sector of the new town of Marne-la-Vallee. Along most of the line, the construction of the RER precedes urban development thus benefiting from privileged conditions as regards alignment and ease of construction. To limit nuisances, the railway line is built mainly in cuttings in marl and marl-limestone layers surrounded by the water table. Approximately twenty structures were necessary to link the planned road network, including a 570 m-long viaduct with noise barriers. The whole construction period will last 30 months, the total cost will be 400 million francs. [French]

Taillebois, A *Travaux* No. 545/546, July 1980, pp 48-62, Figs., Photos.

ACKNOWLEDGMENT: TRRL (IRRD 110375), Central Laboratory of Bridges & Highways, France
ORDER FROM: ESL

00 334723

LARGE-SCALE STRUCTURES OF THE PARIS-SOUTH-EAST EXPRESS LINE [Les grands ouvrages de la ligne a tres grande vitesse Paris-Sud-Est]

The author briefly recalls the generalities of the Paris-Southeast express line, the alignment and geological conditions along the track, the constraints taken into account in the planning: satisfactory geometry of the track, strength and durability, economic, technical and aesthetic constraints. A description is given of the viaducts, and mention is made of the special recommendations to ensure the durability of the large scale prestressed concrete railway structures. The progress of the work is outlined: the viaduct across the Seine at Montereau, viaduct over the Burgundy Canal and the Armancon River, the Serain and Saulieu viaducts, the Arroux, Ladree, Digoine, La Roche viaducts, and the viaduct over the central canal and the RN74. The precautions taken during launching by sliding are described. [French]

Borderie, P (Societe Nationale des Chemins de Fer Francais) *Travaux* No. 544, June 1980, pp 98-108, 6 Fig., 10 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 110380), Central Laboratory of Bridges & Highways, France
ORDER FROM: ESL

00 334726

MAJOR CROSS LONDON RAIL TUNNEL PROPOSED

A British rail proposal to link inter-city and suburban rail routes north and west of London with those in the south is discussed. The proposed route calls for a deep-level rail tunnel to traverse the city. The 8-10 km long twin tunnels are intended to overcome problems of delay and congestion between mainline stations. A projected line from Victoria to Euston would run under the Thames avoiding the foundations of concentrated areas of high-rise buildings. The scheme would include the provision of a travelator connecting Euston and Kings Cross. The cross-London link proposal is intended to be considered in conjunction with the Channel Tunnel proposal so opening rail links as far as Brussels for the north of England commuter.

Tunnels and Tunnelling Vol. 13 No. 1, Jan. 1981, p 10, 1 Fig.

ACKNOWLEDGMENT: TRRL (IRRD 253583)
ORDER FROM: ESL

DOTL JC

00 334727

GIANT SIZE SLURRY SHIELD IS A SUCCESS IN TOKYO

The 844 M long double-track Hikawadai tunnel section of the No. 8 line of the Teito Rapid Transit Authority is being driven by a 10 M o/d shield and lined with 9.8 M o/d concrete segments. The line incorporates curves of 800 M and 1500 M radius. The shield passes under the Shakuji river bed with

an overburden of 8 M and then passes beneath residential areas where the overburden is 12-18 M. The upper portion of the tunnel lies in a sand and gravel layer known as Tokyo gravel stratum. The sand layer at the crown is loose and liable to collapse. The large-scale slurry shield was chosen for the double-track tunnel excavation to overcome problems of sand instability and drainage. The success of the largest shield used in Japan is said to be due to exhaustive soil investigation, careful design and manufacture of equipment, and close slurry control.

Watanabe, T (Teito Rapid Transit Authority); Yamazaki, H (Tekken Construction) *Tunnels and Tunnelling* Vol. 13 No. 1, Jan. 1981, pp 13-17, 5 Fig., 1 Tab., 5 Phot., 3 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 253584)

ORDER FROM: ESL

DOTL JC

00 334730

FATIGUE LIFE OF CRITICAL MEMBERS IN A RAILWAY TRUSS BRIDGE

The fatigue life of critical members, such as hangers, floor beams and stringers in a single track, open deck railroad truss bridge, was investigated for various unit freight trains, operating at different speeds. A partial bridge model was used, along with a three-car train, to determine the stress cycles. For determining the fatigue lives of critical members, four fully-loaded trains per day were assumed to pass over the bridge. Each train was assumed to consist of one hundred, 70-ton cars or seventy, 100-ton cars. The 100-ton freight cars cause a larger stress range, and consequently shorter fatigue lives than the 70-ton freight cars. For the hundred car train, with 70-ton and 100-ton cars mixed in various proportions, the fatigue lives became shorter as the percentage of 100-ton cars in the consist was increased. The impact percentages were also studied.

Wiryachai, A Chu, KH Garg, VK
Association of American Railroads Technical Center Tech Rpt. AAR R-472, Feb. 1981, 41p, 15 Fig., 7 Tab., 49 Ref.

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

DOTL RP

00 334731

RAILWAY BRIDGE IMPACTS RESULTING FROM FLAT WHEELS AND TRACK IRREGULARITIES

The impact factors in bridge members due to flat wheels and track irregularities were investigated. The maximum wheel flat height was taken as 0.2 in., maximum pier settlement as plus or minus 0.25 in., and maximum camber error as plus or minus 0.5 in.. The track roughness spectra for Class 6 track was used in the analysis, and only selected members of the 175 ft. pinned connection truss bridge were studied. A train of three, 70-ton freight cars with spring constants of 11.2 kip/in. per wheel was used. The train was moving at various speeds and with initial car displacements of 0.25 in. and car rolls of 0.02 rad. Damping of the bridge and vehicles was neglected. The impact factors for the train moving at 50 mph agree fairly well with the current AREA Specification.

Wiryachai, A Chu, KH Garg, VK
Association of American Railroads Technical Center Res Rpt. AAR R-475, Mar. 1981, 43p, 16 Fig., 8 Tab., 28 Ref.

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

DOTL RP

00 334944

SOILS-BALLAST-GEOTEXTILE RELATIONSHIP: PART 2--THE FABRIC FACTOR

The ballast-subgrade system should provide uniform track support, free from excessive permanent deformation, while also maintaining a resiliency within acceptable predetermined limits. Resiliency will allow the ties to move with, rather than within, the ballast and avoid abrasive wear which shortens tie life. The author explains how geotextiles assure the long-term resiliency of ballast and subgrade by excluding excessive moisture and by providing drainage paths that assure lateral water flow. Fabrics also stabilize track structures when tensioned so ballast particles are restrained to act as a unit and offer a positive separation of ballast and subgrade materials. No single fabric function or fabric weight can be considered to be a universal geotextile.

See also Part 1, RRS 00 330151.

Puffer, W *Railway Track and Structures* Vol. 77 No. 5, May 1981, pp 44-46, 2 Fig., 5 Tab.

ORDER FROM: ESL

DOTL JC

00 335333

ENGINEERING TRADE-OFFS IN SUBGRADE STABILIZATION

The mechanisms of subgrade soil stabilization with lime and cement are examined, and these methods are then compared with geotextiles, both on the basis of physical and cost performance. Lime and cement stabilization here involve mix-in-place processes, rather than injection methods. Life cycle costing should be used, rather than choosing a stabilization solely on a first-cost basis. Analytical techniques are described.

Puffer, W *Railway Track and Structures* Vol. 77 No. 6, June 1981, p 25, 2 Fig., 7 Tab.

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DOTL JC

00 335334

DO-IT-YOURSELF ANALYSIS OF GEOTEXTILE PERFORMANCE

The author gives simple experiments by which geotextiles and railroad subgrades may be appraised. While stabilization of civil engineering works requires a geotechnical background because parameters are both complex and varied, the performances of such processes are explained.

Kinney, TC *Railway Track and Structures* Vol. 77 No. 6, June 1981, p 32, 3 Fig., 2 Phot.

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00 335364

MAINTENANCE OF RAILWAY TRACK BEDS [MAINTENANCE DES COUCHES D'ASSISE DES VOIES FERREES]

Continuous progress in the field of superstructures means that tracks are equipped with more efficient and uniform elements and the bed itself is thus improved and also more uniform. The article analyses maintenance organization, conventional track bed techniques and full drainage operations. [French]

Sauvage, R Huart, F *SNCF-Informations Tech-Direction de l'Equipement* No. 20, Dec. 1980, pp 15-33, 24 Phot.

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

00 335440

TRENDS IN CONSTRUCTION METHODS FOR PRESTRESSED CONCRETE BRIDGES [Evolution des methodes de construction des ponts en beton precontraint]

Report on the two CEIFICI (Research centre for information and training of civil and industrial engineers) meetings on recent construction techniques for prestressed concrete bridges. One report describes construction methods for the bridges slid into position on the new Paris-South East line. [French]

Ingenieur-Constructeur No. 257-258, June 1980, pp 3-52, 1 Fig., Tabs., Photos.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Compagnie Francaise d'Editions, Service Abonnements Techniques, 40 rue du Colisee, 75008 Paris, France

00 335441

RECOMMENDATIONS ON DIAGNOSTIC METHODS FOR LINED TUNNELS. SAFETY OF SUPPORTS IN UNDERGROUND TUNNELS [Recommandations sur les methodes de diagnostic pour les tunnels revetus. Securite de soutènement dans les ouvrages souterrains]

No Abstract. [French]

Tunnels et Ouvrages Souterrains No. 44, Mar. 1981, p 62, 1 Tab., 17 Phot.

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

DOTL JC

00 335444

THE EMBANKMENT ON THE CAGLIARI-DECIMOMANNU LINE (PARTS I AND II) [Rilevato sulla linea Cagliari-Decimomannu (prima parte, seconda parte)]

Work on doubling the track on the Cagliari-Decimomannu section of the Cagliari-Orbia coastal railway line is to include the building of a prestressed concrete viaduct made up of 18 arches each measuring 18 m. long over the S. Gilla lake area. The first part of the study illustrates forecast calculations based on results obtained in laboratory analyses of the different terrain concerned and gives correlation with on-site experience involving terrain with similar characteristics. The second part presents the technical aspects of the building of a 5 m high experimental embankment to support the track over a distance of 90 m, and the calculations for predicting subsidence in the base under the ballast on this embankment. [Italian]

See also pp 7-13, No. 12, December 1980 issue.

Cannella, L *Tecnica Professionale* No. 11, Nov. 1980, pp 2-7, 21 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Collegio Ingegneri Ferroviari Italiani, Via Giolitti 34, Rome, Italy

00 335450

TUNNEL AND STRUCTURE-GAUGE MEASURING BY SELF-PROPELLED RAIL MOUNTED LARGE RADAR UNIT

No Abstract.

Rail Engineering International Vol. 9 No. 4, Oct. 1980, pp 118-119, 3 Phot.

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

DOTL JC

00 335453

PREDICTING DAMAGE WHEN DRAWING UP PLANS AND DURING CONSTRUCTION OF ROADS AND RAILWAY LINES, IN AREAS SUBJECT TO THE FORMATION OF ICE [PROGNOZIROVANJE USCERBA PRI PROEKTIROVANII I STROITEL'STVE DOROG V USLOVIJACH FORMIROVANIIJA NALEDEJ]

The article describes the use of mathematical statistics methods to determine the frequency of the formation of ice on roads and railway tracks, and to predict damage to transport infrastructures. [Russian]

Nevskij, SD *Transportnoye Stroitel'stvo* No. 2, 1981, pp 41-42

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

00 335454

EQUIPMENT FOR AN OPEN-CUT TUNNEL CONSTRUCTION SYSTEM USING MOBILE REINFORCEMENT DURING DIGGING [PROHODCESKIJ KOMPLEKS S PEREDVIZNOJ KREP'JU DLJA SOORUZENIJA TONNELEJ OTHRYTYM SPOSOBOM]

Technical description of a new range of type KMO 2x5 tunnel boring equipment (recommended for mass production) for building metro tunnels by the open-cut method. It is designed for the use of mechanical diggers with reinforcement of the side walls, and for covering over the tunnel in cities. [Russian]

Maksimov, BS Semenov, AV *Transportnoye Stroitel'stvo* No. 1, 1981, pp 13-14, 2 Phot.

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

00 335455

PROTECTING RAILWAY TRACKS AGAINST FROST [ZUR FROSTSICHERUNG VON EISENBAHNGLEISEN]

In the case of bad hydrological or sub-soil conditions a protective layer of porous, frost-resistant stone is usually included in the railway infrastructure, calculated according to soil bearing capacity. The study attempts to determine to what extent the protective layer also guards the railway infrastructure against frost and in what conditions an insulating layer of hard synthetic foam is required to ensure protection. Measurement diagrams are presented for insulated or uninsulated railway infrastructure according to frost and soil bearing capacity. [German]

Goebel, C *Signal und Schiene* Vol. 24 No. 6, Nov. 1980, pp 274-276, 5 Fig., 3 Tab., 5 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Transpress VEB Verlag fuer Verkehrswesen, Franzoesische Strasse 13/14, Postfach 1235, 108 Berlin, East Germany

00 335464

LAND MOVEMENT DETECTION SYSTEM INSTALLED AT SAINT ARCONS, AT KM 528,300 ON THE SAINT-GERMAIN-DES-FOSSES-NIMES LINE [SYSTEME DE DETECTION DES MOUVEMENTS DE TERRAIN INSTALLE A SAINT-ARCONS AU KM 528,300 DE LA LIGNE SAINT-GERMAIN-DES-FOSSES-NIMES]

This device has been installed for two years, and detects: Rotating movements in landslides by means of mercury circuit-breakers; movements at track-bed level by means of a chain composed of break-wires and rails. The device activates a warning system which stops trains by burning flares as they approach. [French]

Coves, P *SNCF-Informations Tech-Direction de l'Equipement* No. 20, Dec. 1980, pp 3-13, 11 Phot.

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

00 335466

SPECIAL ISSUE ON ROADBED

Series of 3 papers: Kito, M and others: Testing protection measures; Owada, K: Maintenance of track land on sub-standard formation subgrade; and Yamada, Y: Stabilization with lime and plaster.

Permanent Way Vol. 22 No. 87, Dec. 1980, pp 3-36, 12 Tab., 45 Phot.

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

DOTL JC

00 335555

ROCK-MECHANICS RESEARCH REQUIREMENTS FOR RESOURCE RECOVERY, CONSTRUCTION, AND EARTHQUAKE-HAZARD REDUCTION

Principles of rock mechanics, the science of predicting the behavior of rock masses, are often based on insufficient data with significant disparities between experiment, theory and field experience. The U.S., committed increasingly to major projects involving rock masses, is interested in their economical and safe execution. In this study seven subpanels assessed the current state of knowledge in specific areas, and recommended research that should be undertaken to reduce or eliminate deficiencies. Although the groups endeavored to assess the costs, time, manpower and appropriate funding agencies, these matters were generally beyond their scope since they were charged with making recommendations covering technical areas. The Steering Group then made six observations concerning funding, the need for large-scale laboratory and field testing, and the advantages of combining such investigations with current engineering projects involving rock masses.

Also available from the National Technical Information Service, Springfield, Virginia, 22161, Report No. NRC/AMPS/RM-81-1.

National Academy of Sciences 1981, 222p, Figs., Tabs., Refs., 1 App.

ORDER FROM: National Academy of Sciences, US National Committee for Rock Mechanics, Washington, DC 20418

00 335607

FUNDAMENTALS FOR THE DESIGN AND CONSTRUCTION OF TUNNELS LOCATED IN SWELLING ROCK AND THEIR USE DURING CONSTRUCTION OF THE TURNING LOOP OF THE SUBWAY STUTTGART, 1978

The decisive causes for swelling phenomena in connection with tunnel structures, namely the addition of water onto the clay mineral corrensitate as well as the transformation of anhydrite into gypsum under addition of water are discussed. A method is described for designing the lining of tunnels in swelling rock. General principles for the dependency of swelling displacements upon the primary stresses, the cross-section shape for the tunnel, and upon the overburden pressure are established. The influence and importance of the quantity of water necessary for the swelling processes are also pointed out.

Publications of the Institute of Foundation Engineering Soil Mechanics

and Rock Mechanics, Water Ways Construction, RWTH University of Aachen, West Germany, (English Edition) V6.

Wittke, W

Rheinisch-Westfälische Technische Hochschule 1978, 131p, 9 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: Rheinisch-Westfälische Technische Hochschule, Institute of Foundation Engineering, Templergraben 55, 5100 Aachen, West Germany

00 335617

SPEDDY MUCKING OUT IS KEY TO TBM SUCCESS ON MANHATTAN SUBWAY

In late 1978, a \$186 million contract to construct the last section in Manhattan of the new East 63 Street subway line to Queens was awarded by the Transit Authority. It was decided to drive the tunnel with a Robbins tunnel boring machine and an effective mucking out system was evolved. The article discusses various aspects of the project, with emphasis on the haulage system designed to remove spoil from the tunnel efficiently.

Garrett, RE *Tunnels and Tunnelling* Vol. 12 No. 11, Dec. 1980, pp 45-46

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

00 335622

LARGE-DIAMETER SHIELD-DRIVEN TUNNEL IN THICK WATER-BEARING SAND STRATA: USE OF PILOT TUNNEL FOR GROUND DEWATERING

A pilot subway tunnel with a 2.6-m outside diameter in Japan was driven within the cross-section of the proposed large-diameter tunnel, and, using this pilot tunnel for drainage, the groundwater head was lowered from 12 m to the required height (approximately 5 m). Reference is made to the basic measures taken to deal with the groundwater in shield tunnelling through water-bearing strata, the groundwater lowering method that was employed on the Toshimacho section and the results of the theoretical analyses on groundwater flow, and forced compressed-air discharge to exclude the remaining hydrostatic and artesian groundwater and its advantages over conventional treatment of the remaining groundwater.

Tunnelling '79, Proceedings of the International Symposium, 2nd, London, England, March 12-16, 1979.

Miyoshi, M Okuzono, K

Institution of Mining and Metallurgy Proceeding 1979, pp 264-270

ACKNOWLEDGMENT: EI

ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 335627

DYNAMIC TESTS AND ANALYSIS OF A MASSIVE PIER SUBJECTED TO ICE FORCES

This paper describes the field tests and analysis of a massive bridge pier that is subjected to the action of dynamic ice forces. The field results indicate that the pier has a natural frequency of 8.9 hz and a damping ratio of 0.19 in the fundamental mode of vibration. By using these dynamic characteristics, the response of the pier to dynamic ice forces was analysed. This analysis confirms that the pier is capable of responding in full to short duration peak ice forces. (TRRL)

Montgomery, CJ (Alberta University, Canada); Lipsett, AW (Alberta Research Council, Canada) *Canadian Journal of Civil Engineering* Vol. 7 No. 3, Sept. 1980, pp 432-441, 11 Fig., 3 Tab., 2 Phot., 13 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 254192), Roads and Transportation Association of Canada

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00 335632

RECENT MAJOR BRIDGES IN DENMARK

Fifty years of significant Danish bridge building have culminated during the last 10-15 years. Three long-span concrete box girder bridges have been built

recently by applying different versions of balanced cantilevering. The Sallingsund bridge was erected using prefabricated match-cast and epoxy-glued segments, whereas the Vejleford and Alssund bridges utilized segments cast in place. The main traffic artery connecting the eastern and western parts of Denmark incorporated the planned 20 km combined railway and motorway bridge across the Great Belt. Final decisions for the construction of this bridge are pending. Future bridge activities in Denmark will primarily focus on maintenance to keep the substantial bridge system in service. (TRRL)

Ostenfeld, K Rostam, S *Nordisk Betong*. Vol. 25 No. 1, Jan. 1981, pp 23-27, 4 Fig., 14 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 254056), National Swedish Road & Traffic Research Institute

ORDER FROM: ESL

00 335832

TUNNELS FORM VITAL LINK IN 3145 KM SIBERIAN RAILWAY

Construction problems being encountered in the excavation of 32 km of tunnels as part of the 3145 km Baikal-Amur mainline Railway (BAM), in central Siberia, are reviewed. Tunnelling is taking place north of Lake Baikal in the Stanovoy upland ranges where problems are caused by extreme permafrost and unpredictable tectonic action in an area subject to constant earth tremors. Tunnelling progress in unstable granite, initially measured in centimetres has improved to several metres daily with the use of drilling rigs with telescopic rods replacing cutter-loaders. Parallel to the main tunnel of over 9 M diameter is an adit, designed for rock investigation, which accommodates underground water thus draining the tunnel.

Tunnels and Tunnelling Vol. 13 No. 3, Apr. 1981, pp 59-60, 1 Fig., 1 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 254601)

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DOTL JC

00 335837

LYNE BRIDGE

This article describes the cable-stayed concrete skew bridge which carries a freight and passenger rail link over the M25 motorway in Surrey, UK. The structure consists of two continuous 55 M spans with solid post-tensioned edge beams and a reinforced concrete deck. Two concrete towers, 22 M high, for supporting the cables are located above edge beams and pillars at mid-span. PSC Tetron pot bearings support the loads at mid-span and abutments. Details are given of the cable systems and the particular attention given to protection from corrosion.

Concrete Quarterly No. 128, Jan. 1981, pp 36-39, 1 Fig., 4 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 254300)

ORDER FROM: Cement and Concrete Association, Wexham Springs, Slough SL3 6PL, Buckinghamshire, England

DOTL JC

00 335843

EXTENSION OF LINE B OF THE RATP (PARIS SUBWAY) UP TO THE GARE DU NORD [PROLONGEMENT DE LA LIGNE B DE LA RATP A LA GARE DU NORD]

The author describes the work involved in the extension of line B of the Paris Metro from the station at "Chatelet-les-Halles" to "Gare du Nord". He gives a geometrical and geological description of the project and presents the work involved in carrying out the different contracts. These works are being carried out on a very densely populated urban site under very unfavourable geological and hydrogeological conditions. Consequently, different methods of construction have been adopted to deal with the conditions encountered: large-span arches made up of prefabricated articulated segments, mechanical pre-cutting, stabilization by grouting. [French]

Bougard, M (Paris Transport Authority) *Tunnels et Ouvrages Souterrains* No. 39, May 1980, pp 178-195, 27 Fig., 16 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 110431), Central Laboratory of Bridges & Highways, France

ORDER FROM: ESL

DOTL JC

00 335863

REPAIR OF TUNNELS. PREFABRICATED ARCH STONES

In this fourth article on tunnel restoration, the author describes a method requiring considerable civil engineering work, used in cases of seriously damaged masonry, and which entails the precise organisation of work sites and heavy restrictions on traffic. Four examples of such work sites are given, including that in Blaisy-Bas tunnel which was built in 1849 and is 4,100 m long. The arch stones have been reinforced over a distance of 1,100 m without interrupting traffic on the SNCF's busiest line. [French]

Eraud, J *Revue Generale des Chemins de Fer* Vol. 100 Mar. 1981, pp 145-168

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

00 336254

RAPID EXCAVATION OF ROCK WITH SMALL CHARGES OF HIGH EXPLOSIVE. OPEN FILE REPORT

The purpose of this investigation was to test a blast shield, develop a conceptual design for an automated drill and blast system (ADBS), and make an economic analysis of the ADBS compared with conventional drill, blast, and muck (DBM) systems. The ADBS tunneling concept was developed in an effort to design an excavation system of greater efficiency than the DBM system conventionally used. The ADBS would minimize downtime and approach noncyclic efficiently by small charge blasting. Small charge blasting uses simultaneously detonated light charges in four to eight short holes, usually in a line. Limitation of the total explosive per blast reduced air blast overpressure, fly rock velocity, vibrations, and noise enabling the blast shield to adequately contain these side effects. Conceptual design for the ADBS included blast shield, chasis, hydraulic drills, automated explosive loading and firing system, and an armored cab. Horizontal and vertical blast shield alignment controls and ventilation are incorporated into the design. The economic analysis determined ADBS advance costs to be 17 to 20 pct lower than DBM on a per foot basis.

Clark, GB Ashcom, DW Hanna, K
Colorado School of Mines, Bureau of Mines Final Rpt. BU-
MINES-OFR-111-80, Jan. 1980, 250p

Grant H0272020

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-125577

00 341044

TUNNELLING '79, PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM, 2ND, 1979

Proceedings of the international symposium include 35 papers that deal with the design, analysis and construction of vehicular, railroad sewer tunnels; study of soil and rock mechanics for ground support of tunnels; and geological surveys for the site selection of tunnels. 9 papers are indexed separately.

Tunnelling '79, Proceedings of the International Symposium, 2nd, London, England, March 12-16, 1979.

Jones, MJ
Institution of Mining and Metallurgy Proceeding 1979, 408p

ACKNOWLEDGMENT: EI
ORDER FROM: Institution of Mining and Metallurgy, 44 Portland Place, London, England

00 341285

GEOTECHNICAL MEASUREMENTS IN MODERN TUNNEL CONSTRUCTION [MOYENS MODERNES DE MESURES GEOTECHNIQUES DANS LA CONSTRUCTION DES TUNNELS]

The article reports on geotechnical measuring methods which are applied during the course of the New Austrian Tunnelling Method. The physical and mechanical parameters on which this method is based are successively presented. The measurements of these parameters were the subject of a programme routine, the various parts of which are analysed here together with the instruments employed. Furthermore, by means of practical examples, the methods of interpretation and the contribution of each element in the programme of auscultation are explained. The major importance of these in-situ measurements is demonstrated by a detailed examination of the interactions between the different parameters measured and the behaviour of the total rock mass: these different elements being much more representative of the state of the sub-surface environment than the coefficients of safety calculated on the basis of laboratory tests and the results of methods of calculation taking into account an ideal model. (TRRL) [French]

Habenicht, H *Tunnels et Ouvrages Souterrains* No. 38, Apr. 1980, pp 145-155, 15 Fig., 2 Phot., 26 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 110430), Central Laboratory of Bridges & Highways, France
ORDER FROM: ESL

DOTL JC

01 053391

MEAN FOR IMPROVING RAILS. POSSIBLE WAYS OF IMPROVING THE SERVICE PROPERTIES OF RAILS BY METALLURGICAL MEANS (REPORT OF ENQUIRY)

This report constitutes an analysis of the replies to a questionnaire sent to the Member Railways of ORE concerning possible ways of improving the service properties of rails by metallurgical means. The railways are very interested in these problems and are of the opinion that exhaustive studies seem necessary in the following fields; resistance of steels to brittle fracture and notch effect sensitivity, the influence of residual stresses, and improved ultrasonic inspection techniques for better detection of inclusions. Special attention is also focused on the problem of corrugatory wear.

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

International Union of Railways D 148/RP 1, Apr. 1980, 27p, 1 Fig.

ORDER FROM: UIC

DOTL RP

01 053399

MEAN FOR IMPROVING RAILS. THEORETICAL CALCULATIONS OF THE DETERIORATION IN TRACK GEOMETRY AT DISCRETE IRREGULARITIES IN TRACK LEVEL

This report describes the results of calculations of deterioration in vertical level made using the BR track deterioration computer program. Attention is concentrated on the effects of weld irregularities and it is emphasized that this represents only part of the total deterioration. Some tentative conclusions are drawn regarding the maximum permissible size of rail defects.

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

International Union of Railways D 148/RP 2, Sept. 1980, 24p, 15 Fig.

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01 053402

DEVELOPMENT OF APPARATUS FOR MEASURING THE LONGITUDINAL FORCES IN RAILS LAID IN THE TRACK. PRELIMINARY SELECTION OF TECHNIQUES FOR DETERMINING LONGITUDINAL RAIL FORCES

This report gives the results of the assessment of the techniques for determining longitudinal rail forces. On the basis of both the theoretical and the experimental studies carried out by the Committee the conclusions and recommendations for subsequent development of these techniques are drawn up. Three methods are proposed for further development: magnetic parameters method; Magneto-mechanical acoustic emission; and rail flexural response.

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

International Union of Railways D 150/RP 1, Sept. 1980, 42p, 14 Fig.

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01 194265

SOIL-STRUCTURAL INTERACTION AND CONCRETE TIE DESIGN

Although reflection of moments occurs under dynamic loading, full reflection does not occur under heavy loads. The author's suggestion that concrete ties be designed with a uniform prestressed section of constant cross-sectional area seems unjustified. A shallower section at tie center enables a better utilization of materials in a prestressed concrete tie. The author pointed out the extensive use of concrete ties by the Florida East Coast Railroad, Black Mesa and Lake Powell Railroad, and the Canadian National Railway. The writer wishes to add to this list Amtrak which recently awarded a contract for manufacturing 1,100,000 concrete ties to be installed on 400 track miles of the Northeast Corridor Improvement Program. /Author/

Discussion from the Proc. Paper 13557, February 1978.

Hanna, AN (Portland Cement Association) *ASCE Journal of the Geotechnical Engineering Div* Proceeding Vol. 104 No. GT11, Nov. 1978, p 1420, Refs., 1 App.

ORDER FROM: ESL

DOTL JC

01 326445

TRACK GEOMETRY MEASUREMENT SYSTEM

This report contains a summary of the results of the test program that was conducted to validate the TGMS under various static and dynamic conditions. The TGMS has the capability to measure or derive gage, crosslevel (superelevation), warp (twist), curvature, maximum operating speeds for curves, vehicle speed and elapsed distance at speeds from near 0 to 30 mph. The TGMS is equipped with an automatic location detection system to accurately reference detected track geometry exceptions to permanent fixtures of the track roadbed. The track geometry measurements are compared to the Federal Railroad Administration Track Safety Standards and all detected exceptions are reported in real time by onboard digital computer.

Howerter, ED

ENSCO, Incorporated, Transportation Systems Center, Federal Railroad Administration Final Rpt. 1196, DOT-TSC-FRA-80-25, Sept. 1980, 99p

Contract DOT-TSC-1367

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-114563, DOTL NTIS

01 328980

INTERACTION AND LOAD TRANSFER THROUGH TRACK GUIDEWAY SYSTEMS. FINAL REPORT

This report describes investigations toward analysis of load transfer and interaction in multicomponent track support systems such as railroad beds. A comprehensive review of the available and relevant literature is followed by delineation of the need for improvements and generalization of the previous analytical and numerical models for track beds. A new finite element approach, called Resistance-Response (RR) method is proposed; it can account for factors such as three-dimensional geometry, nonlinear behavior and interaction effects between various track components. Attention is given to the constitutive behavior of "solid" as well as "interface" media. A new dynamic multi degree-of-freedom shear device is developed in order to obtain behavior of interfaces subjected to repetitive loads in various modes of deformation. Proposed work for the next year's research is described, and the potential of application of the research results for analysis and design and improvements in track structures is indicated.

Desai, CS Kuppusamy, T Sriwardane, HJ Sture, S

Virginia Polytechnic Institute & State University, Department of Transportation July 1980, 91p

Contract DOT-OS-80013

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-158693

01 330159

POSITIVE FASTENING FOR SEPTA TRACK

Southeastern Pennsylvania Transportation Authority is rehabilitating the track structures on its Frankford elevated rapid transit line. Heavier rail and Pandrol fasteners are used on both the wooden-tie track and on the segments where a new concrete invert is now installed to eliminate stub wooden ties.

Progressive Railroading Vol. 24 No. 2, Feb. 1981, pp 80-82, 6 Phot.

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

DOTL JC

01 330210

NOT JUST A NEW LINE, BUT A NEW TYPE OF LINE. SOME ASPECTS OF PERMANENT WAY ON THE PARIS SOUTH EAST LINE FOR THE HIGH SPEED TRAIN (TGV) [Une ligne "nouvelle", pas une "nouvelle ligne". Quelques aspects des installations fixes de la ligne TGV Paris-Sud-Est]

The first article describes the main new technical features of the line while the second examines in more detail the track, the points and crossings, the electrical supply systems and traction current distribution, and the principles of the signalling system. [French]

Caire, D Gache, A *Chemins de Fer* No. 344, Sept. 1980, pp 202-223, 40 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Association Francaise des Amis des Chemins de Fer, Gare de l'Est, 75475 Paris, France

01 330211

ECONOMICALLY USEFUL SERVICE LIFE OF TRACK SUPERSTRUCTURE [EKONOMICESKI CELESOOBRAZNYE SROKI SLUZBY VERHNEGO STROENIJA PUTI]

The author describes a method for determining economically rational service life of track superstructure, and recommends the use of standard constructions on sections with different operating conditions. [Russian]

Golovancikov, AM *Vestnik VNIIZT* No. 6, 1980, pp 48-50, 1 Fig., 2 Tab., 3 Ref.

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

01 330212

CAUSES OF DETERIORATION IN RAILS DEPENDING ON THE QUALITY OF STEEL USED [Priciny povrezdaemosti v puti zahalennykh rel'sov iz legirovannykh stalej]

The author summarizes results in the field of research into the causes of defect formation in steel alloy rails, and formulates general requirements for the chemical composition of steel heat-treated for rail manufacture. [Russian]

Velikanov, AV *Vestnik VNIIZT* No. 6, 1980, pp 51-54, 1 Fig., 1 Tab., 2 Phot., 2 Ref.

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

01 330213

METHOD FOR CALCULATING VERTICAL AND LATERAL FORCES EXERTED ON RAILS UNDERGOING WEAR RESISTANCE TESTS [Metodika issledovaniya vertikal'nykh i bokovykh sil pri iznosnykh ispytaniyakh rel'sov]

Method for collection and computer processing of data obtained during tests for wear resistance of rails on the VNIIZT circular test track. [Russian]

Skalov, AD Koval', VA. *Vestnik VNIIZT* No. 6, 1980, pp 54-56, 2 Fig., 3 Tab., 3 Ref.

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

01 330224

DEVELOPMENT OF RAIL FASTENINGS AND CONCRETE SLEEPERS IN FRANCE, GENERAL USE OF THE NABLA FASTENING ON ALL TYPES OF SLEEPERS [L'evolution des attaches de rails et des traverses en beton francaises. Generalisation de l'attache NABLA sur tous les types de traverses]

Like the RN fastening developed previously, the new NABLA fastening can be used on wooden, concrete or metal sleepers. The article presents the different models, as well as the two new types of concrete sleeper recently perfected by the SNCF. [French]

Erieau, J *Revue Generale des Chemins de Fer* Nov. 1980, pp 619-632, 3 Tab., 15 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

01 330649

REPAIRING TRACK LAID ON STEDEF TYPE SLABS AFTER DAMAGE BY A DERAILMENT

Slab track has been adopted or experimented with by various railways throughout the world, it has been feared that such track might be seriously damaged as a result of a derailment. Experience gained after two derailments on track laid on STEDEF slabs has shown that, at least with this type of slab which is independent of the superstructure, it is just as easy and as quick to effect repairs and restore services as with track laid on ballast. [French]

Hofmann, C Pfarrer, H Cervi, G *Revue Generale des Chemins de Fer* Vol. 99 Oct. 1980, pp 561-570

ACKNOWLEDGMENT: British Railways
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DOTL JC

01 331101

REMARKS ON PRESENT TRENDS IN RESEARCH AND TECHNICAL DEVELOPMENT IN THE FIELD OF RAILWAY TRACKS

A review of current trends by the Director of O.R.E.

Semrau, M *Rail International* Vol. 11 No. 11, Nov. 1980, pp 626-628

ACKNOWLEDGMENT: British Railways
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DOTL JC

01 331103

MODERN TRANSITION CURVE CALCULATIONS FOR RAILWAYS

The necessary series developments for exact calculation of the clothoid and the transition curve with parabolic line of curvature can be solved relatively easily today with the aid of suitable desk-top computers. There is therefore no longer any good reason for the substitute use of the cubic parabola, biquadratic parabola, etc. Reversible unambiguous transition curve calculations are to be aimed for which are based only on the original definition. Owing to the many parallel tracks, the basic transition curve forms should be generally replaced by their parallels. In this way the otherwise necessary calculation conventions can be dispensed with as a result of the non-existence of parallel clothoid elements. [German]

Schuh, P *Eisenbahntechnische Rundschau* Vol. 29 No. 11, Nov. 1980, pp 785-788

ACKNOWLEDGMENT: British Railways
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

01 331110

SOME EXPERIENCE GAINED BY NETHERLANDS RAILWAYS IN USING THE DYNAMIC TRACK STABILIZER

The paper reports on experience gained by Netherlands Railways (NS) in the past three years in the use of the dynamic track stabilizer developed by Plasser & Theurer, Vienna. NS have employed the dynamic track stabilizer mainly with the intention to increase the lateral strength immediately after renewal and tamping work. A few test results are discussed, namely measurements of the resistance to transverse shifting and measurements of the subsoil vibration propagation due to stabilization. Moreover, results on the track geometry of stabilized and non-stabilized track sections are compared. [German]

Esveld, C *Glaser's Annalen ZEV* Vol. 104 No. 11, Nov. 1980, pp 390-394

ACKNOWLEDGMENT: British Railways
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DOTL JC

01 331129

CONSTRUCTION OF TARCOOLA-ALICE SPRINGS STANDARD GAUGE RAILWAY

This paper describes the construction of stage 2-Robin Rise to Marla Bore-of the Tarcoola-Alice Springs Railway, Western Australia. The railway consists of a single track of standard gauge railway 831 km long, capable of carrying 20 tonne axle loads. A feature of the line is the continuous welded rails and prestressed concrete sleepers. The new line is located approximately 150 km west of the existing narrow gauge link and is generally outside or near the Lake Eyre basin to avoid the many watercourses. Preliminary survey started in 1971 with construction commencing in April, 1975. Design standards applied to the new line are: ruling gradient 1 in 25; parabolic vertical curves inserted where net change of grade exceeds 0.2 per cent; minimum horizontal curve radius generally 1200 metres. A standard 60 M length cubic parabola transition is used for curves of all radii; bridges and structures designed by metric cooper M220 loading. All overhead structures provide a 4.25 M clear width to a height of 6 M above rail level and formation width is 7.5 to 9 M on embankments and 9 M minimum in cuttings. The overall budget cost for the project was \$A145 M and the work was completed ahead of time and within budget.(a)

Barry, J *Highway Engineer* Vol. 28 No. 1, Jan. 1981, pp 3-8, 1 Fig., 8 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 252663)
ORDER FROM: ESL

DOTL JC

01 331464

CONTINUOUS BOLTED RAIL PART 2--ON THE TP&W

The Camrail high-strength track bolt has been developed to produce such a high clamping force in rail joints that track so fastened has the continuity of continuous welded rail. A specially calibrated breakaway portion of the bolt head assures proper torquing forces that produce 2-1/2 times the clamping force developed in a conventional rail joint. The joint-freezing concept is explained initially and then a second article describes how this bolt can produce "ribbon" rail on short lines where transport of CWR can be uneconomical, or how the bolt may be used in conjunction with welded rail to produce insulated joints or to permit easy rail transposition on curves. Toledo, Peoria and Western has used the bolts in a 4.7-mile segment of its line in Illinois.

DeBerg, DG (Toledo, Peoria & Western Railroad) *Railway Track and Structures* Vol. 77 No. 3, Mar. 1981, p 39, 8 Phot.

ORDER FROM: ESL

DOTL JC

01 331465

MAINTENANCE-OF-WAY PLANNING: OCCUPANCY FOR HI-DENSITY SINGLE TRACK

Southern Pacific uses computer simulation techniques for determining the balance between high productivity of track maintenance forces and minimum interference with train movements, particularly in single-track territory with high traffic densities. Various combinations of men and equipment are investigated. The method of maximizing production and minimizing train delay is based on a mathematical model which permits medium-term (90 days ahead) planning. The example shows that, for up to 30 trains per day, a 17-man gang with appropriate equipment proves most economical.

Cox, RE Weishaar, FL, Jr *Railway Track and Structures* Vol. 77 No. 3, Mar. 1981, p 46, 6 Fig., 1 Phot.

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DOTL JC

01 331467

GETTING THE BEST OUT OF TRACK RENEWAL MACHINES

Over 500 large machines of 30 different types are used by 35 railways for comprehensive replacement of track. Older types lift complete panels, but modern machines that can renew cross-ties and welded rail continuously are increasingly popular. These machines are being used in various ways; their productivity also varies and depends primarily on the planning of the complex operation of track renewal. In terms of manpower the Italian State Railways has proven most efficient, the result of a flexible and effective system of bidding by contractors.

Burns, DR *Railway Gazette International* Vol. 137 No. 3, Mar. 1981, p 183, 16 Phot.

ORDER FROM: ESL

DOTL JC

01 331469

BR COMMISSIONS CROSSING TEST SITE

Six 1:9.25 angle frogs have been installed for test purposes in the British Railways Nottingham--Sheffield main line to determine the performance of different steels in forged and cast form and the effect of different methods of fabrication. Later they will be transferred to actual crossings for regular service but their behavior under traffic will continue to be monitored.

Frederick, CO Thornton, PJ *Railway Gazette International* Vol. 137 No. 3, Mar. 1981; pp 196-197, 10 Phot.

ORDER FROM: ESL

DOTL JC

01 331470

TIME FOR DECISION IN MAINTENANCE-OF-WAY

Maintenance-of-way planners, instead of lamenting larger cars and increased traffic, should work to integrate current technological progress with the demands of current traffic. The author suggests that maintenance officers join with other departments to improve profitability, determining all factors that affect costs. Economic analysis cannot be purely historical; increased data processing capabilities mean that it is no longer necessary to generalize costs. The importance of supervision, maintenance procedures and equip-

ment, productivity, and track data collection are stressed. Efforts must continue to strengthen a "mature" track structure and to plan for incorporation of improved materials and processes.

Berkshire, HB *Progressive Railroading* Vol. 24 No. 3, Mar. 1981, pp 41-44, 3 Phot.

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

DOTL JC

01 331472

WHEEL LOAD PROBLEM SOLVERS

Santa Fe has turned to resilient fasteners for critical curves in segments of wooden-tie track in Arizona where it was encountering rail overturning. Pandrol and Springclip fasteners with their longitudinal clamping make rail anchors unnecessary; the stage could also be set for increased use of concrete ties. Other applications have been made to prevent entry of sand that produces abrasive wear between tie plate and rail base, and to reduce maintenance requirements of bridges by preventing movement between tie plates and ties.

Progressive Railroading Vol. 24 No. 3, Mar. 1981, p 57, 4 Phot.

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

DOTL JC

01 331473

CN RAIL FILLS THE WELD CLOSURE GAP

Canadian National is utilizing electric flash butt welding in conjunction with its rail changeout machine to produce closures between strings of continuous welded rail and for installation of prefabricated bonded insulated joints where needed. A Holland MobileWelder, mounted in a high/rail vehicle, has been adapted for producing satisfactory welds between CWR strings. Railroads use a variety of procedures for closure welds.

Progressive Railroading Vol. 24 No. 3, Mar. 1981, pp 64-66, 5 Phot.

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

DOTL JC

01 331491

RAILROAD USES RUBBER FOR FAST INSTALLATION; SMOOTH, EASY RIDE

This report covers the crossing installation on the Detroit, Toledo and Ironton Railroad which used rubber panels.

Better Roads Vol. 50 No. 9, Sept. 1980, p 29

ACKNOWLEDGMENT: EI

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DOTL JC

01 331504

WELDING OF JOINTLESS RAIL [Zagadnienie spajania szyn w torach bezстыkowych]

This article discusses the metallurgy of rails joined by arc welding and the equipment used for such welding, as well as the characteristics of and methods for making thermit welds. The tests are described for determining the quality of welded rail joints. [Polish]

Rytwinski, Z Malinowski, H *Przeglad Spawalnictwa* No. 11, Nov. 1980, pp 14-18, 8 Fig., 1 Tab.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Ars Polona-Ruch, Krakowskie Przedmiescie 7, Warsaw, Poland

01 331507

R 65 TYPE POINTS [Vyhybky soustavy R 65]

On CSD lines with a load of over 25 million gross tonne-km per year, R 65 type rails (as used and improved in the USSR) are in service. Points suitable for use with this system have therefore had to be developed on the CSD. The article gives a technical description of the construction of R 65 type points. [Czech]

Melka, Z *Zeleznicni Technika* No. 2, 1980, pp 89-93, 4 Fig., 9 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Nakladatelstvi Dopravy a Spoju, Hybernska 5, 115 78 Prague 1, Czechoslovakia

01 331508

MEASUREMENT OF THE TECHNICAL CONDITION OF HIGH SPEED TRACK ON THE PKP [Messungen des technischen Zustands der Gleise fuer hohe Fahrgeschwindigkeiten der Zuege bei den PKP]

After a brief introduction, the author describes studies carried out by the Institute for Railway Research on a number of sections on the PKP test track. These studies make it possible to determine the "synthesized" index of track condition, particularly in Poland. This index is a numerical value expressing geometric parameters and constructional characteristics specific to the track sections examined. It can therefore be used as a standard for planning essential ongoing track maintenance work. [German]

Zalewski, J *Zeitschrift der OSShD* Vol. 23 No. 4(132), 1980, pp 4-8, 1 Fig., 4 Tab., 2 Phot., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Hoza 63/67, Warsaw, Poland

01 331510

MATHEMATICAL MODEL FOR OPTIMUM DISTRIBUTION OF MAJOR TRACK MAINTENANCE WORK IN A GIVEN REGION

[Matematicheskaja model' optimal'nogo raspredelenija ob'emov kapital'nogo remonta puti po ucastkam dorogi]

The author proposes a mathematical model for optimum distribution of major track maintenance work in a given region, using a linear programming method as part of the automatic track management system. [Russian]

Sac, EJ *Vestnik VNIIZT* No. 5, 1980, pp 55-57, 1 Tab., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

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

01 331514

THE INFLUENCE OF TRACK PARAMETERS ON WEAR ON THE SIDE EDGES OF RAILS ON CURVES WITH SMALL RADIUS

Rail wear is the result of rail/wheel interaction and depends on line profile, cant in curves, running conditions, gross tonnage, axle-weights, rolling stock dynamics, track resilience etc, etc. The article shows that wear on the side edges of rails can be reduced by improving the horizontal resilience of the track as well as by greasing and using highly wear-resistant rails. The authors describe the advantages to be obtained from using spring clips and rubber underlay plates.

Mirtchev, M Nedjalkov, G *Rail International* Vol. 11 No. 11, Nov. 1980, pp 661-667, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

01 331516

THE GROWTH OF TRANSVERSE FATIGUE DEFECTS IN THE HEAD OF RAILWAY RAILS

Transverse fatigue defects in the rail head are one of the most serious types of rail defect. An analytical method has been developed to simulate the growth of noticeable defects until the rail actually breaks. This model is applied under different conditions. The conclusion is that heat variations in the rail are more important than the effects of wheel-loads.

Mair, RI Groenhout, R *Rail Engineering International* Vol. 11 No. 12, Dec. 1980, pp 675-686, 12 Fig., 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

01 331518

LN REBUILDS FOR GROWING COAL TONNAGE

The Louisville and Nashville Railroad is improving the quality of its main lines in order to cope with growing coal tonnage. A detailed description is given of the way in which a team of 50 people are deployed on track renewal, and the tasks involved and the materials used.

Middleton, WD *Railway Age* Vol. 181 No. 21, Nov. 1980, p 36, 2 Fig., 10 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

01 331526

RAILWAY TRACK DESIGN: A REVIEW OF CURRENT PRACTICE

Until now it has not been possible to evaluate the characteristics of the dynamic response of the track so as to constitute a basis for a rational design. The present design is based on the establishment of a relation between the dynamic response observed and the equivalent static load, assumed to have been determined empirically. The design of railway track is as much an art as a question of mathematical precision. This work deals with the international practices at present applied for designing the structure of the track above the formation subgrade, i.e. the rails, the sleepers and the ballast. The book is of interest to all railway track designers.

Doyle, NF

Australian Government Publishing Service UIC Cat 54 0 12, 1980, 280p, Tabs., Photos., Refs., 2 App.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Australian Government Publishing Service, P.O. Box 84, Canberra, A.C.T. 2600, Australia

01 331530

RESILIENT YET POSITIVE HOLDING DOWN OF RAILS BY LATEST FRENCH FASTENING

Describes this robust but flexible, long-wearing design.

Erieau, J *Rail Engineering International* Vol. 9 No. 3, July 1980, pp 81-84, 7 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

01 331538

AUTOMATED INSPECTION OF BRITISH RAIL TRACK

An ultrasonic test vehicle is operated by British Rail in order to monitor track. An on-board computer system has recently been installed, which processes and records data produced by 10 ultrasonic probes and 2 sound probes. The project and current status are reviewed.

World Conference on Non-Destructive Testing, 9th, Melbourne, Australia, November 19-23, 1979.

Gardner, WE Hawker, BM Highton, B Martin, R Whitehead, NP Johnson, PC

World Conference on Non-Destructive Testing Paper 1C-2, 1979, 7p

ACKNOWLEDGMENT: EI

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01 331547

STRUCTURAL STRENGTH, RELIABILITY, AND SERVICE LIFE OF HEAT TREATED RAILROAD RAILS [Konstruktsionnaya prochnost', nadezhnost' i dolgovechnost' termouprochnennykh zheleznodorozhnykh rel'sov]

An analysis of abundant statistical and experimental data collected on the basis of many years of experience of maintenance of railroad rails subjected to various technologies of surface hardening is presented. [Russian]

Lempitskii, VV Kazarnovskii, DS Shnaperman, LY *Problemy Prochnosti* Vol. 133 No. 7, July 1980, pp 67-74, 12 Ref.

ACKNOWLEDGMENT: EI

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01 331554

QUALITY CONTROL MEASURES IN THE PRODUCTION OF PRESTRESSED CONCRETE SLEEPERS

Precasting ensures consistent quality and improved performance of finished components owing to stringent quality control measures generally adopted during their production. Among the many precast concrete components used in buildings and other structures, the prestressed concrete monoblock railway sleeper merits special attention, because of the very high degree of quality control required to be exercised during its production. The paper briefly describes the influence of some of the major parameters on the production and testing of prestressed concrete sleepers.

Controle de Qualite des Structures en Beton, Proceeding Volume,

Stockholm, Sweden, June 17-21, 1979.
 Parameswaran, VS Venugopal, MS Rao, AGM Karim,
 EA Murthy, DSR
 Swedish Cement and Concrete Research Institute 1979, pp 297-304

ACKNOWLEDGMENT: EI
 ORDER FROM: Swedish Cement and Concrete Research Institute, Fack,
 S-10044 Stockholm 70, Sweden

01 334290
NEW M/W TECHNOLOGY EVOLVES AT PUEBLO'S FAST TRACK

Railroads and their suppliers are utilizing information from the DOT FAST track at Pueblo, CO, to bring new technical insights to bear on rail metallurgy and heat treatment, curve lubrication, track fasteners, rail grinding, welded turnouts, and operation of rail-flaw detector cars. A survey of railroad chief engineers and some suppliers indicates how they use the FAST test results and what they feel could be done to improve the data.

Dick, MH *Railway Age* Vol. 182 No. 4, Mar. 1981, p 32, 2 Phot.

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01 334297
AMTRAK'S PRODUCTIVITY ON TRACK REHABILITATION IS LOWER THAN OTHER RAILROADS--PRECISE COMPARISON NOT FEASIBLE

Under the \$2.5 billion federally funded Northeast Corridor Improvement Project, Amtrak's track rehabilitation is the largest work element in improving rail passenger service. GAO compared Amtrak's productivity in some of this work with that of other railroads and concluded that Amtrak's was not as high. Conditions affecting productivity vary among railroads. Since many of these variations cannot be measured, productivity rates cannot be compared with precision. Because of the large differences in rates, GAO believes its conclusion is a fair one. No attempt was made to determine the reasons for the differences in productivity; therefore, GAO cannot predict Amtrak's productivity potential.

General Accounting Office CED-81-60, Mar. 1981, 28p, 5 App.

ORDER FROM: GAO-Document Handling & Info Services Facility, P.O. Box 6015, Gaithersburg, Maryland, 20760

01 334335
CLOSING THE GAPS IN TRACK DESIGN

Standard track with concrete sleepers and continuously-welded rail has already been laid on 7,000 km of line in China. Engineers are well on the way to solving problems of wear under exceptionally heavy traffic, but the key area of points and crossings remains a source of difficulty. Moving frogs to eliminate the gap have been installed experimentally between Beijing and Shanghai, and efforts are being made to reduce stresses due to differential expansion of track and structures on long bridges. Chinese Railways plans to minimize track maintenance problems at source by aiming for longer component life at the design stage; proposals for widespread mechanisation of maintenance work are also nearing fruition.

Yu, S *Railway Gazette International* Vol. 137 No. 1, Jan. 1981, pp 43-46

ACKNOWLEDGMENT: British Railways

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01 334423
DEVELOPMENT OF BALLASTED TRACK WITH RESILIENT TIES

To minimize maintenance for ballasted track, it has been determined that that track structure must have a lower spring constant. To achieve this, JNR has adopted elastic rail fasteners, used resilient pads under concrete cross ties, and installed resilient mats under the ballast. As an alternative to pads under the ties, JNR has now experimented with the coating of sides and bottoms of the ties with a resilient resin. The proper track stiffness has been achieved and noise and vibration reduced, but the resin itself has proved costly.

Sato, Y Usami, T Nakamura, S Kobayashi, T Iwasaki, I *Railway Technical Research Inst, Quarterly Reports* Vol. 21 No. 4, 1980, pp 161-164, 8 Fig.

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

DOTL JC

01 334425
TEST ON CHARACTERISTICS OF BALLASTED TRACK LAID ON REINFORCED SOIL SUBGRADE

Tests were run on the static and dynamic characteristics of ballasted track laid on a reinforced soil subgrade where reinforcement consists of a 5-cm thickness of asphalt concrete covered by asphalt emulsion atop 45-cm bed of grain-sized crushed stone. Static loading, frequency response and fatigue tests were carried out by an oil-pressure loading device on a test track panel; the fourth test was a fixed type wheelset dropping device. Further tests are planned with this construction on embankments and in cuts.

Nagafuji, T *Railway Technical Research Inst, Quarterly Reports* Vol. 21 No. 4, 1980, pp 180-181, 6 Fig.

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

DOTL JC

01 334480
A NEW CRANE WAGON FOR PERMANENT WAY MAINTENANCE ON THE GERMAN FEDERAL RAILWAY [Ein neuer Kranwagen der Deutschen Bundesbahn fuer die Oberbauunterhaltung]

For permanent way maintenance, besides track-laying machines, special crane cars are used. To replace old equipment, the German Federal Railway has developed a new type of vehicle with a lifting power to 20 t and diesel-hydraulic propulsion, which can also be used under a live overhead contact wire. The two prototypes are described in detail. [German]

Kramer, U Schmidt, E *Glaser's Annalen ZEV* Vol. 104 No. 12, Dec. 1980, pp 411-418, 3 Tab., 15 Phot., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

01 334482
DEVELOPMENT OF A NEW PROFILE FOR STEEL SLEEPERS TO BE USED ON MAIN LINE TRACK ON THE GERMAN FEDERAL RAILWAY [Entwicklung eines neuen Stahlschwellenprofils fuer Gleise erster Ordnung der Deutschen Bundesbahn]

No Abstract. [German]

Pietzko, G Schmedders, H *Thyssen Technische Berichte* Vol. 12 No. 2, 1980, pp 126-136, 13 Phot., 7 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

01 334509
PERFECTING DETECTION OF RAIL DEFECTS ON SZD TRACKS [Vervollkommnung der Schienendefektoskopie in der Gleiswirtschaft der SZD]

The article describes the different types of rail breakage detectors used on the SZD since the "Fifties"; present conditions of use and new rail inspection techniques with magnetic and ultrasonic detector cars. [German]

Koslov, VB *Zeitschrift der OSShD* Vol. 23 No. 5(133), 1980, pp 3-5

ACKNOWLEDGMENT: International Union of Railways, BD
 ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Hoza 63/67, Warsaw, Poland

01 334708
ROLE OF SAFETY AND TRAIN SPEED IN TRACK MAINTENANCE SPENDING DECISIONS: A CASE ANALYSIS

This article reports the results of a comprehensive case study of railroad decision-making with regard to the selection of speed limits and associated levels of scheduled track maintenance (T/M) expenditures on individual lines of road. The focus, in particular, is on relationships between safety (track standards and accidents), train speeds (including economic incentives that influence train speed), and levels of T/M spending.

Tyworth, JE (Pennsylvania State University, University Park); Reinschmidt, AJ *Traffic Quarterly* Vol. 35 No. 1, Jan. 1981, pp 43-67, 12 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

01 334728

**A PROTOTYPE MAINTENANCE-OF-WAY PLANNING SYSTEM.
VOLUME II APPENDICES F THROUGH H**

This volume contains Appendices F, G, and H of the final report. Appendix F gives the data base used to develop the predictive models of track degradation. Appendix G gives the preliminary predictive equations for the fourteen candidate Track Quality Indices (TQI's) and two additional alignment TQI's. These equations are given for maintenance levels 0 through 5. Appendix H contains the predictive equations for the five final TQI's. These equations are also given for maintenance levels 0 through 5. The final predictive equations were developed using stepwise autoregression.

Volume I, FRA/ORD-80/47.I, RRIS 01 325717, Bulletin 8101, is available from NTIS PB81-147159. This Volume and Volume III are not published, but are available from FRA/ORD on a loan basis; Contact Mr. P. Olekszyk.

Hamid, A Sawyer, D Kenworthy, MA Rasmussen, K
ENSCO, Incorporated, Federal Railroad Administration Tech Rpt.
FRA/ORD-80/47.II, DOT-FR-80-17, June 1980, 415p

Contract DOT-FR-64113

ORDER FROM: FRA

01 334729

**A PROTOTYPE MAINTENANCE-OF-WAY PLANNING SYSTEM.
VOLUME III SOFTWARE DOCUMENTATION**

This volume documents the software developed for a prototype maintenance-of-way planning system. The documentation is provided in accordance with FIPS Publication No. 38 dated 15 February 1976 and should serve both as a User's Guide and a Software Maintenance Manual. The MOW software consists of three software packages: the Data Base Management System, the Track Quality Indices Package, and the Regression Analysis Software package. This volume discusses the applications, procedures and requirements of each software package. In addition, the mathematical and logical procedures, flow charts and program listings are also included.

Volume I, FRA/ORD-80/47. I, RRIS 01 325717, Bulletin 8101, is available from NTIS PB81-147159. This Volume and Volume III are not published, but are available from FRA/ORD on a loan basis; Contact Mr. P. Olekszyk.

Hamid, A Rasmussen, K Baluja, M Fisher, H Kenworthy,
MA Sawyer, D
ENSCO, Incorporated Tech Rpt. FRA/ORD-80/47. III, DOT-
FR-80-17, June 1980, 455p, Figs., Tabs.

Contract DOT-FR-64113

ORDER FROM: FRA

01 334945

RIDING THE NW'S TGC

Norfolk and Western operates a Plasser EM-80 track geometry vehicle which is to cover mainline track three times annually and secondary lines and branches twice a year. The comprehensive real-time track geometry data is valuable for track maintenance planning and for producing systemwide information on track conditions. The two-axle self-propelled car has six special sensing axles which are actuated pneumatically for measuring track profile, gauge, alignment and surface. The on-board PDP-8 minicomputer not only analyzes test data for basic track characteristics but also produces limiting speeds for curves and index figures on track quality. Tolerances for each track geometry parameter are stored in the computer to produce exemptions printouts.

Middleton, WD *Railway Track and Structures* Vol. 77 No. 5; May 1981,
p 49, 7 Phot.

ORDER FROM: ESL

DOTL JC

01 334957

THE ROAD MAINTENANCE COST MODEL

The objective of the Road Maintenance Cost Model research was to formulate an overall framework for the conversion of ongoing research

efforts into a methodology for the estimation of route-specific and service-specific unit costs for road maintenance. A computer model, which simulates the mechanisms by which rail deteriorates under traffic to levels where replacement of the rail is normally required, was constructed and improved. Methodologies for the estimation of deterioration and related costs for ties and ballast with changes in traffic and track condition were also developed. This work was performed at the Canadian Institute of Guided Ground Transport with the support of Canadian National, Canadian Pacific Ltd and Transport Canada.

McIlveen, ER Roney, MD Lake, RW
Canadian Institute of Guided Ground Transport, Department of
Transport, Canada, (PRO-823) Final Rpt. CIGGT Rpt. 80-16, Mar.
1981, 62p, 25 Fig., 3 Tab., 20 Ref., 2 App.

Contract DGSR-15

ORDER FROM: CIGGT

DOTL RP

01 334959

**RAILROAD TRACK. THEORY AND PRACTICE: MATERIAL
PROPERTIES, CROSS-SECTIONS, WELDING, AND
TREATMENT**

This handbook, compiled by the former head of German Federal Railway track department, contains papers which provide insights into the theory, practice and experience of German and Swiss track engineers in the design, construction, and maintenance of high-performance track systems. Topics include wheel-rail interaction, rail manufacture, properties and behavior of rails, quality control, fabrication and maintenance of continuous welded rail, rail flaws, rail fasteners, switch design, track economics, rail cascading, and special problems with rail in subways.

Fastenrath, F

Ungar (Frederick) Publishing Company, Incorporated 1981, 480p

ORDER FROM: Ungar (Frederick) Publishing Company, Incorporated, 250
Park Avenue South, New York, New York, 10003

01 335265

**ECONOMICS OF RAILWAY CONSTRUCTION AND
MAINTENANCE. REPORT OF COMMITTEE 22--DETERMINE
THE ECONOMICS OF WORK EQUIPMENT VS. SMALL
MACHINES OR HAND LABOR IN TIE RENEWALS**

A survey of 14 railroads showed that 81.5 percent of all ties are inserted by mechanized gangs, 3.9 percent by undertrack plows, 1.7 percent by various track undercutters, and 12.9 percent by other manual or mechanized means. Total cost of tie insertion is more than twice as high when done by hand or small machines. While well-organized mechanized gangs are much more efficient, savings are maximized only by diligent supervision to assure adequate on-track time. If such occupancy becomes less than one hour, well organized hand insertion of ties using small machines proves more economical.

AREA Bulletin Vol. 82 No. 681, Jan. 1981, pp 248-255

ORDER FROM: AREA

DOTL JC

01 335267

**THE STATUS OF CONCRETE RAILROAD TIES IN NORTH
AMERICA--1980**

Engineers acknowledge the failures of some early concrete cross tie installations in the U.S. where the highest and most severe rail loadings in the world exist. All applications of concrete ties meeting current AREA specifications have performed quite well, particularly in the light of problems previously experienced. Economic pressures in Great Britain, Australia, West Germany, Russia, Japan, South Africa and India have forced railroads there to depart from traditional timber tie design, adopting instead concrete ties and continuous welded rail. With major concrete tie installations now being made by Canadian National and in the Northeast Corridor, a basis of engineering economic analysis exists. Prestressed concrete ties should be given serious consideration in the rehabilitation and construction of track.

Venuti, WJ *AREA Bulletin* Vol. 82 No. 680, Nov. 1980, pp 131-149, 9
Fig., 2 Ref.

ORDER FROM: AREA

DOTL JC

01 335268

FIELD EVALUATION OF MAINLINE QUALITY TRACK, USING A TRACK STRENGTH TEST VEHICLE

Results of the field test of the prototype Track Strength Test Vehicle, the Decarotor, on mainline track are reported. This part of the ongoing Track Strength Characterization Program is directed at measuring the load-carrying capacity of track structures, at development of suitable measurement techniques, at determining usefulness of such measurement and at matching track strength with vehicle loading. It was shown that continuous strength measurements are feasible and can consistently identify track weaknesses such as clusters of poor ties. Nondestructive tests from a moving vehicle can evaluate long stretches of track. Stationary load deflection tests can identify condition of ties or rail fasteners. Further work is necessary to demonstrate the practical value of the testing techniques.

Zarembski, AM Choros, J (Association of American Railroads Technical Center) *AREA Bulletin* Vol. 82 No. 680, Nov. 1980, pp 150-176, 16 Fig., 3 Tab., 6 Ref.

ORDER FROM: AREA

DOTL JC

01 335287

ULTRASONIC TESTING OF ALUMINO-THERMIC RAIL WELDS
Almost all the track used by high speed Inter-City trains in the United Kingdom is now continuously welded. Author explains the type of rail weld defects which may occur in thermit welds and the methods of non-destructive testing used by British Rail to ensure safe operation of their trains.

Farley, PG *Metal Construction* Vol. 12 No. 12, Dec. 1980, pp 678-684, Refs.

ORDER FROM: ESL

DOTL JC

01 335446

A CONTRIBUTION TOWARDS THE MINIMIZATION OF THE COSTS OF THE MAINTENANCE OF THE PERMANENT WAY ON RAILWAYS

Mechanization and automation of track maintenance methods have progressed so far that it would appear difficult to achieve any further savings in terms of staff or greater efficiency in the foreseeable future. Reductions in costs are possible however if the basic conditions are established whereby track maintenance work is carried out "as and when it proves technically necessary". The quality of the work and its effectiveness in terms of time must be taken into account when calculating viability. Working methods will have to continue to improve and track servicing will have to be organized according to the average volume of work required per year. These measures as a whole should allow overall track maintenance costs to be reduced to a minimum.

Herbst, W *Rail International* Vol. 12 No. 3, Mar. 1981, pp 105-130, 9 Fig., 6 Phot., 4 Ref.

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

DOTL JC

01 335451

THE "PERMANENT WAY" IN THE CONTEXT OF WHEEL/RAIL RESEARCH CONDUCTED BY THE GERMAN FEDERAL MINISTRY OF RESEARCH AND TECHNOLOGY [DIE "FESTE FAHRBAHN" IN DER RAD/SCHIENE-FORSCHUNG DES BUNDESMINISTERS FUER FORSCHUNG UND TECHNOLOGIE]

The program of studies organized by the German Federal Ministry of Research and Technology, aimed at defining the technical and economic limits of the wheel/rail system, includes the development of a ballastless permanent way as a determining factor in some circumstances. Experimental sections of line have been built at Rheda station on the Dachau-Karlsfeld line and on the northern orbital line at Munich. Besides the track itself, research is being made on track fasteners. [German]

Sonntag, P Oberweiler, G *Archiv fuer Eisenbahntechnik* No. 35, Dec. 1980, pp 55-60, 10 Phot., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

01 335467

ITALIAN RAILWAY LINES AND TRACK QUALITY REQUIREMENTS: DEVELOPMENTS, TRENDS, PROSPECTS [L'ARMAMENTO DELLE LINEE FS E LE ESIGENZE DI ELEVATI STANDARDS DI QUALITA: SVILUPPI, ORIENTAMENTI, PROSPETTIVE]

No Abstract. [Italian]

D'Alessio, A *Ingegneria Ferroviaria* No. 1, Jan. 1981, pp 3-8, 2 Tab., 1 Phot.

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

DOTL JC

01 335472

RAIL GRINDING: A CLOSER LOOK

The causes of rail surface damage are explained, along with the need for rail grinding which the author calls essential for today's heavy traffic lines where corrugation develops.

Bruno, AT *Railway Track and Structures* Vol. 77 No. 2, Feb. 1981, pp 36-38, 6 Phot.

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

DOTL JC

01 335615

PROBLEMS IN SHINKANSEN RAILS AND COUNTERMEASURES

The paper presents a discussion that centers on damages to SHINKANSEN rails of Japanese National Railways. State of damage in welded and other parts of rail is described and countermeasures are proposed. Valuable data are presented on the use and management of rails, the improvement of material quality and welding technique, which are expected to contribute to advances in rail technology under fast running conditions.

Railway Technical Research Inst, Quarterly Reports Vol. 21 No. 3, Sept. 1980, pp 115-122

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

01 336002

RAILROAD TIES. JANUARY, 1970-DECEMBER, 1980 (CITATIONS FROM THE NTIS DATA BASE)

The citations in this bibliography cover rail system investment analysis and evolution of track rehabilitation, test procedures and results of tests on the physical properties of rail concrete ties, jointbars, and fasteners, track and bridge maintenance, standards and specifications for railroad or mass transit ties, problems and needs in track structure design and analysis, evaluation of performance for cross ties and fasteners, and the economics of concrete and wood railroad ties. (Contains 58 citations, fully indexed and including a table of contents.)

Sponsored by National Technical Information Service, Springfield, VA.

New England Research Application Center, National Technical Information Service NERACUSGNT2455, Dec. 1980, 69p

ACKNOWLEDGMENT: NTIS
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PB81-856387

01 336136

REPORT ON ENGINEERING INVESTIGATION OF VARIOUS TYPES OF WELDED RAIL JOINTS

A literature search of current rail joining methods was conducted. In addition, several rail weldments were fabricated and subjected to nondestructive and destructive testing. The purpose was to evaluate rail joining methods for use at Naval facilities as well as to develop a suitable nondestructive test procedure for use on welded rail joints. Bolted rail joints were found to be the least expensive upon initial installation followed by thermite and then flash butt type welded joints (depending on the quantity of joints to be fabricated). Flash butt joints were found to provide the longest service life followed by thermite and then bolted joints. An ultrasonic test procedure and a thermite welding procedure were developed for use with welded rail joints. (Author)

Kelly, D
Mare Island Naval Shipyard Aug. 1980, 112p
ACKNOWLEDGMENT: NTIS
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AD-A094198/9

01 337143
NONDESTRUCTIVE TECHNIQUES FOR MEASURING THE
LONGITUDINAL FORCE IN RAILS, PROCEEDINGS OF A
JOINT GOVERNMENT-INDUSTRY CONFERENCE HELD IN
WASHINGTON, DC. ON FEBRUARY 26-27, 1979
The Conference on Nondestructive Techniques for Measuring the Longitudinal Force in Rails consisted of an introductory session followed by three

major sessions on ultrasonic techniques, Barkhausen and sonic techniques, and X-ray diffraction techniques. This report is made up of the technical papers presented at the conference, together with the edited transcripts of the panel discussions and question-and-answer periods held at the end of each major session.

Elliott, P
Unified Industries, Incorporated, Federal Railroad Administration Final Rpt. FRA/ORD-80/50, Dec. 1979, 191p

Contract DOT-FR-8046

ACKNOWLEDGMENT: NTIS
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PB81-179368, DOTL NTIS

02 053406

PERMISSIBLE LIMIT VALUES FOR THE Y AND Q FORCES AND DERAILMENT CRITERIA. EFFECT OF TRAIN SPEED ON THE PERMISSIBLE MAXIMUM VALUE OF LOAD (LATERAL LOAD) FROM THE POINT OF VIEW OF TRACK DISPLACEMENT

For safety reasons the study was divided into two complementary phases, viz. running tests on the track and simulation tests on a rig. The former provided information about the effect of speed on the transverse and vertical sleeper reactions during the passing of wheelsets applying loads lower than the limit of transverse track displacement. The latter extended the tests up to the point of track displacement. The results obtained showed that neither the length of the influence line of the sleeper reactions in the track nor the maximum permissible lateral force on the rig varies to any marked extent with the speed. These findings prompt the conclusion that the permissible lateral force does not vary significantly with the speed.

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

International Union of Railways C 138/RP 5, Sept. 1980, 40p, 62 Fig., 11 Tab.

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02 053409

PERMISSIBLE LIMIT VALUES FOR THE Y AND Q FORCES AND DERAILMENT CRITERIA. PERMISSIBLE MAXIMUM VALUES FOR THE Y AND Q FORCES FROM THE POINT OF VIEW OF RAIL STRESSES AS A FUNCTION OF DIFFERENT PARAMETERS

Using the calculation methods described in C 138/RP 2 and in Technical Document DT 104, the influence of the vertical and horizontal stiffness of the track, the sleeper spacing, adjacent axes and rail profile has been shown by means of isobars. The calculation results have been compared with measurements. Other parameters influencing the permissible maximum values for the Y and Q forces are mentioned.

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

International Union of Railways C 138/RP 6, Sept. 1980, 30p, 18 Fig., 2 Tab.

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02 053412

ELASTIC SYSTEMS FOR TRACTION AND SHOCK GEAR (SIDE BUFFERS AND CENTRE BUFFERS). THEORETICAL CALCULATIONS OF LONGITUDINAL FORCES IN TRAINS

This report contains the description of a computer program for simulating the movement of trains of arbitrary composition and permitting the longitudinal forces in trains to be determined. The mathematical model and the structure of the program are described.

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

International Union of Railways B 36/RP 22, Apr. 1980, 80p, 4 App.

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02 327156

DYNAMIC ANALYSIS TO ESTABLISH NORMAL SHOCK AND VIBRATION OF RADIOACTIVE MATERIAL SHIPPING PACKAGES

A computer program MARCS (Model Analysis of a Rail Car-Cask System) was written to perform a modal analysis on the systems represented by the CARDT and CARDS (Cask-Rail Car Dynamic Simulator) models. Parameters generated by MARCS will be used to generate frequency response spectra. A preliminary evaluation of the performance of CARDS was made by comparing calculated results with response variables measured during Test 3 of the series of tests conducted at the Savannah River Laboratories, Aiken, SC.

Fields, SR Mech, SJ

Hanford Engineering Development Laboratory, Nuclear Regulatory Commission Prog Rpt. HEDL-TME-80-24, Aug. 1980, 34p

ACKNOWLEDGMENT: NTIS

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NUREG/CR-1484

02 327158

SHOCK ENVIRONMENTS FOR LARGE SHIPPING CONTAINERS DURING RAIL COUPLING OPERATIONS

Sandia National Laboratories participated in a study to define the shock environments to which large, fissile material shipping containers may be exposed during rail-coupling operations. Tests were conducted using impact velocities up to 17.98 km/h (11.17 mph). The cargo on the rail cars consisted of a 36-tonne (40-ton) cask mounted on a skid or a 64-tonne (70-ton) cask. The rail cars were equipped with either standard draft gear, hydraulic end-of-car draft gear, or a sliding center sill cushion underframe. The maximum peak acceleration and its pulse duration were determined for the longitudinal, transverse, and vertical axes of the two casks.

Magnuson, CF

Sandia Laboratories, Nuclear Regulatory Commission, Department of Energy SAND-79-2168, June 1980, 74p

Contract DE-AC04-76DP00789

ACKNOWLEDGMENT: NTIS

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NUREG/CR-1277

02 328304

FRICTION SNUBBER FORCE MEASUREMENT SYSTEM. DATA TAPE, TEST RUNS 1 AND 2

Twelve field test runs were performed to measure friction snubber forces using a device developed by Wyle Laboratories, Colorado Springs. Reel 1 contains test runs 001 and 002. Four devices were installed on a Type I truck (the Barber S-2) which was placed under the B-end of an empty open hopper car. Forty-eight channels of data were acquired on friction snubber force, car speed, automatic location detection, acceleration, and displacement at critical points on the truck and carbody. The first test run was made over branchline class 2 track on the Blue Diamond Spur near Las Vegas, Nevada. The test zone included both tangent and curved jointed rail with an uphill grade of approximately 1.8%. The test run starts at 20 mph at milepost 5 and continues until milepost 7, where the speed starts decreasing down to 2 mph at the end of the test at milepost 8.2. The second test run was made over mainline class 4 track with a downhill grade of approximately 0.8%. The test run starts at 50 mph at milepost 322 and continues until milepost 324.5, where the speed starts decreasing down to 5 mph at the end of the test at milepost 326.8. The significant test parameters associated with these two tests are: Car Type-100-ton open hopper; Car Orientation-B-end forward; Car Tare Weight-63,600 pounds; Tare Weight 149,300 pounds; Type of Lading-empty; Truck Center-40 feet, 6 inches; No. of Loco's-1; No. of Cars Fore-2; No. of Cars Aft-2; Truck Type-Barber 70-ton; Wheel Base-68 inches; Springs Group Out-7 D5; Spring Group In-4 D5; Stat Spring Comp-11 inches; Center Plate Diameter-14 inches; Center Plate Lub-Moly Disulfid; Side Bear B-End -Stucki double; Side Bear Clear-0.23 inches; Snubber Type -load varying; Snubber Springs-2 Barber B432.

See also PB81-122772. Also available in set of 6 tapes PC T07, PB81-122822. Source tape is in ASCII and BINARY character sets. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-129596.

Bakken, GB Bates, E Gibson, DW

Federal Railroad Administration FRA/ORD/MT-80/72/1, FRA/DF-80/001, Oct. 1979, n.p.

ACKNOWLEDGMENT: NTIS

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PB81-122764

02 328305

FRICTION SNUBBER FORCE MEASUREMENT SYSTEM. DATA TAPE, TEST RUNS 3 AND 4

Twelve field test runs were performed to measure friction snubber forces using a device developed by Wyle Laboratories, Colorado Springs. Reel 2 contains test runs 003 and 004. Four devices were installed on a Type I truck (the Barber S-2) which was placed under the B-end of a half-loaded, open hopper car. Forty-eight channels of data were acquired on friction snubber force, car speed, automatic location detection, acceleration, and displacement.

ment at critical points on the truck and carbody. The first test run was made over branchline class 2 track on the Blue Diamond Spur near Las Vegas, Nevada. The test zone included both tangent and curved jointed rail with an uphill grade of approximately 1.8%. The test run starts at 20 mph at milepost 5 and continues until milepost 7, where the speed starts decreasing down to 2 mph at the end of the test at milepost 8.2. The second test run was made over mainline class 4 track with a downhill grade of approximately 0.8%. The test run starts at 50 mph at milepost 322 and continues until milepost 324.5, where the speed starts decreasing down to 5 mph at the end of the test at milepost 326.8. The significant test parameters associated with these two tests are: Car Type-100-ton open hopper; Car Orientation-B-end forward; Car Tare Weight-63,600 pounds; Tare Weight 149,300 pounds; Type of Lading-gravel; Truck Center-40 feet, 6 inches; No. of Loco's-1; No. of Cars Fore-2; No. of Cars Aft-2; Truck Type-Barber 70-ton; Wheel Base-68 inches; Springs Group Out-7 D5; Spring Group In-4 D5; Stat Spring Comp-11 inches; Center Plate Diameter-14 inches; Center Plate Lub-Moly Disulfided; Side Bear B-End -Stucki double; Side Bear Clear-0.23 inches; Snubber Type -load varying; Snubber Springs-2 Barber B432.

See also PB81-122764, and PB81-122780. Also available in set of 6 tapes PC T07, PB81-122822. Source tape is in ASCII and BINARY character sets. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-129596.

Bakken, GB Bates, E Gibson, DW
Federal Railroad Administration FRA/ORD/MT-80/72/2, FRA/
DF-80/002, Oct. 1979, n.p.

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PB81-122772, DOTL NTIS

02 328306

FRICITION SNUBBER FORCE MEASUREMENT SYSTEM. DATA TAPE, TESTS RUNS 5 AND 6

Twelve field test runs were performed to measure friction snubber forces using a device developed by Wyle Laboratories, Colorado Springs. Reel 3 contains test runs 005 and 006. Four devices were installed on a Type I truck (the Barber S-2) which was placed under the B-end of a loaded open hopper car. Forty-eight channels of data were acquired on friction snubber force, car speed, automatic location detection, acceleration, and displacement at critical points on the truck and carbody. The first test run was made over branchline class 2 track on the Blue Diamond Spur near Las Vegas, Nevada. The test zone included both tangent and curved jointed rail with an uphill grade of approximately 1.8%. The test run starts at 20 mph at milepost 5 and continues until milepost 7, where the speed starts decreasing down to 2 mph at the end of the test at milepost 8.2. The second test run was made over mainline class 4 track with a downhill grade of approximately 0.8%. The test run starts at 50 mph at milepost 322 and continues until milepost 324.5, where the speed starts decreasing down to 5 mph at the end of the test at milepost 326.8. The significant test parameters associated with these two tests are: Car Type-100-ton open hopper; Car Orientation-B-end forward; Car Tare Weight-63,600 pounds; Tare Weight 209,500 pounds; Type of Lading-empty; Truck Center-40 feet, 6 inches; No. of Loco's-1; No. of Cars Fore-2; No. of Cars Aft-2; Truck Type-Barber 70-ton; Wheel Base-68 inches; Springs Group Out-7 D5; Spring Group In-4 D5; Stat Spring Comp-11 inches; Center Plate Diameter-14 inches; Center Plate Lub-Moly Disulfided; Side Bear B-End -Stucki double; Side Bear Clear-0.23 inches; Snubber Type -load varying; Snubber Springs-2 Barber B432.

See also PB81-122772, and PB81-122798. Also available in set of 6 tapes PC T07, PB81-122822. Source tape is in ASCII and BINARY character sets. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-129596.

Bakken, GB Bates, E Gibson, DW
Federal Railroad Administration FRA/ORD/MT-80/72/3, FRA/
DF-80/003, Oct. 1979, n.p.

ACKNOWLEDGMENT: NTIS
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PB81-122780, DOTL NTIS

02 328307

FRICITION SNUBBER FORCE MEASUREMENT SYSTEM. DATA TAPE, TEST RUNS 7 AND 8

Twelve field test runs were performed to measure friction snubber forces using a device developed by Wyle Laboratories, Colorado Springs. Reel 4 contains test runs 007 and 008. Four devices were installed on a Type I truck (the Barber S-2) which was placed under the B-end of a loaded open hopper car. Forty-eight channels of data were acquired on friction snubber force, car speed, automatic location detection, acceleration, and displacement at critical points on the truck and carbody. The first test run was made over branchline class 2 track on the Blue Diamond Spur near Las Vegas, Nevada. The test zone included both tangent and curved jointed rail with an uphill grade of approximately 1.8%. The test run starts at 20 mph at milepost 5 and continues until milepost 7, where the speed starts decreasing down to 2 mph at the end of the test at milepost 8.2. The second test run was made over mainline class 4 track with a downhill grade of approximately 0.8%. The test run starts at 50 mph at milepost 322 and continues until milepost 324.5, where the speed starts decreasing down to 5 mph at the end of the test at milepost 326.8. The significant test parameters associated with these two tests are: Car Type-100-ton open hopper; Car Orientation-B-end forward; Car Tare Weight-63,600 pounds; Tare Weight 149,300 pounds; Type of Lading-empty; Truck Center-36 feet, 2 inches; No. of Loco's-1; No. of Cars Fore-2; No. of Cars Aft-2; Truck Type-ASF Ride Control 70-ton; Wheel Base-68 inches; Springs Group Out-7 D5; Spring Group In-6 D5; Center Plate Diameter- 14 inches; Center Plate Lub-Moly Disulfided; Side Bear B-End-Stucki double; Side Bear Clear-0.25 inches; Snubber Type-constant Snubber Springs-2 ASF 3020.

See also PB81-122780, and PB81-122806. Also available in set of 6 tapes PC T07, PB81-122822. Source tape is in ASCII and BINARY character sets. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-129596.

Bakken, GB Bates, E Gibson, DW
Federal Railroad Administration FRA/ORD/MT-80/72/4, FRA/
DF-80/004, Oct. 1979, n.p.

ACKNOWLEDGMENT: NTIS
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PB81-122798, DOTL NTIS

02 328308

FRICITION SNUBBER FORCE MEASUREMENT SYSTEM. DATA TAPE, TEST RUNS 9 AND 10

Twelve field test runs were performed to measure friction snubber forces using a device developed by Wyle Laboratories, Colorado Springs. Reel 5 contains test runs 009 and 010. Four devices were installed on a Type I truck (the ASF Ride Control) which was placed under the B-end of a half-loaded, open hopper car. Forty-eight channels of data were acquired on friction snubber force, car speed, automatic location detection, acceleration, and displacement at critical points on the truck and carbody. The first test run was made over branchline class 2 track on the Blue Diamond Spur near Las Vegas, Nevada. The test zone included both tangent and curved jointed rail with an uphill grade of approximately 1.8%. The test run starts at 20 mph at milepost 5 and continues until milepost 7, where the speed starts decreasing down to 2 mph at the end of the test at milepost 8.2. The second test run was made over mainline class 4 track with a downhill grade of approximately 0.8%. The test run starts at 50 mph at milepost 322 and continues until milepost 324.5, where the speed starts decreasing down to 5 mph at the end of the test at milepost 326.8. The significant test parameters associated with these two tests are: Car Type-100-ton open hopper; Car Orientation-B-end forward; Car Tare Weight-57,900 pounds; Tare Weight 141,000 pounds; Type of Lading-gravel; Truck Center-36 feet, 2 inches; No. of Loco's-1; No. of Cars Fore-2; No. of Cars Aft-2; Truck Type-ASF Ride Control 70-ton; Wheel Base-68 inches; Springs Group Out-7 D5; Spring Group In-6 D5; Center Plate Diameter-14 inches; Center Plate Lub -Moly Disulfided; Side Bear B-End-Stucki double; Side Bear Clear-0.25 inches; Snubber Type-constant; Snubber Springs-2 ASF 3020.

See also PB81-122798, and PB81-122814. Also available in set of 6 tapes PC T07, PB81-122822. Source tape is in ASCII and BINARY character sets. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-129596.

Bakken, GB Bates, E Gibson, DW
Federal Railroad Administration FRA/ORD/MT-80/72/5, FRA/
DF-80/005, Oct. 1979, n.p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-122806, DOTL NTIS

02 328309

FRICTION SNUBBER FORCE MEASUREMENT SYSTEM. DATA TAPE, TEST RUNS 11 AND 12

Twelve field test runs were performed to measure friction snubber forces using a device developed by Wyle Laboratories, Colorado Springs. Reel 6 contains test runs 011 and 012. Four devices were installed on a Type I truck (the ASF Ride Control) which was placed under the B-end of a loaded open hopper car. Forty-eight channels of data were acquired on friction snubber force, car speed, automatic location detection, acceleration, and displacement at critical points on the truck and carbody. The first test run was made over branchline class 2 track on the Blue Diamond Spur near Las Vegas, Nevada. The test zone included both tangent and curved jointed rail with an uphill grade of approximately 1.8%. The test run starts at 20 mph at milepost 5 and continues until milepost 7, where the speed starts decreasing down to 2 mph at the end of the test at milepost 8.2. The second test run was made over mainline class 4 track with a downhill grade of approximately 0.8%. The test run starts at 50 mph at milepost 322 and continues until milepost 324.5, where the speed starts decreasing down to 5 mph at the end of the test at milepost 326.8. The significant test parameters associated with these two tests are: Car Type-100-ton open hopper; Car Orientation-B-end forward; Car Tare Weight-57,900 pounds; Tare Weight 201,500 pounds; Type of Lading-gravel; Truck Center-36 feet, 2 inches; No. of Loco's-1; No. of Cars Fore-2; No. of Cars Aft-2; Truck Type-ASF Ride Control 70-ton; Wheel Base-68 inches; Springs Group Out-7 D5; Spring Group In -6 D5; Center Plate Diameter-14 inches; Center Plate Lub -Moly Disulfided; Side Bear B-End-Stucki double; Side Bear Clear-0.25 inches; Snubber Type-constant; Snubber Springs-2 ASF 3020.

See also PB81-122806. Also available in set of 6 tapes PC T07, PB81-122822. Source tape is in ASCII and BINARY character sets. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-129596.

Bakken, GB Bates, E Gibson, DW
Federal Railroad Administration FRA/ORD/MT-80/72/6, FRA/DF-80/006, Oct. 1979, n.p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-122814, DOTL NTIS

02 328310

FRICTION SNUBBER FORCE MEASUREMENT SYSTEM COMPLETE TEST DATA

No abstract available.

Set includes PB81-122764, PB81-122772, PB81-122780, PB81-122798, PB81-122806, PB81-122814, and documentation, PB80-129596. For first six numbers listed above see RRIS 02 328304 thru RRIS 02 328309, respectively; Bulletin 8102.

Federal Railroad Administration Oct. 1979, n.p.

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-122822, DOTL NTIS

02 328581

THE SHOCK AND VIBRATION DIGEST. VOLUME 12, NUMBER 10

Partial contents: Historical Aspects of the Seismic Analysis of Large Dams; Damping of Mechanical Vibrations and Acoustic Waves; Techniques for Measurement of Wheel-Rail Forces; and Abstracts from the Current Literature.

Availability: Naval Research Lab., Attn: Code 5804, Washington, DC 20375. Annual rate \$100.00 (No copies furnished by DTIC).

Nagle-Eshleman, J
Naval Research Laboratory Oct. 1980, 102p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A091552/0

02 329068

WHEEL/RAIL LOADS TEST, HOPPER CAR RIDE DATA

The wheel/rail loads test program was carried out at the Transportation Test Center near Pueblo, Colorado in June 1979, primarily to determine wheel/rail loads for a variety of car and operating configurations. As part of this program, ride quality data were obtained for two 100-ton hopper cars. These data are reported and, where possible, compared with similar data obtained in 1977. During the time between the 1977 and 1979 tests, one of the cars had operated extensively in the Facility for Accelerated Service Testing (FAST) consist, and had accumulated 181,000 miles, while the other remained as a low-mileage vehicle. The objectives of the test were to determine any changes in the ride quality of the high-mileage car and to quantify the effects of various FAST track sections on the vehicle ride performance. The results show that there was little change in the suspension performance of the high mileage car. Accelerometers mounted on the roller bearing adaptors of both cars produced lower acceleration levels on the test sections that contained concrete ties than on other FAST sections with wood ties.

Allen, RA. Peters, J
Federal Railroad Administration Intrm Rpt. FRA/TTC-80/07, Aug. 1980, 85p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-159006, DOTL NTIS

02 330177

RAIL TIEDOWN TESTS WITH HEAVY CASKS FOR RADIOACTIVE SHIPMENTS

A rail tiedown test program was conducted at the Savannah River Plant in July and August 1978. For each test, a 40- or 70-ton cask was secured on a railcar. The railcar was pushed to speeds up to 11 mph and allowed to couple to parked railcars simulating ordinary railyard operations. The test car carrying the cask was heavily instrumented to measure the accelerations and forces generated at strategically selected places. Eighteen test runs were made with different combinations of railcars, couplers, casks, speeds, and tiedown configurations. The major objectives of the test program were to (1) provide test data as a basis to develop a tiedown standard for rail cask shipments of radioactive materials and (2) collect dynamic data to support analytical models of the railcar cask tiedown system. The optimum tiedown configuration demonstrated for heavy casks was a combination of welded, fixed stops to secure the cask longitudinally and flexible cables to restrain vertical and lateral cask movement. Cables alone were inadequate to secure a heavy cask to a standard railcar, and bolting was found disadvantageous in several respects. The use of cushioning coupler mechanisms dramatically reduced the tiedown requirements for the rail coupling operation. The test program and general conclusions are discussed.

Petry, SF
Du Pont de Nemours (EI) and Company, Incorporated Aug. 1980, 56p

Contract AC09-76SR00001

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

DP-1536

02 330200

SOME WHEEL-RAIL INTERACTION FACTORS INFLUENCING VEHICLE DYNAMICS

The article discusses briefly the complex nature of wheel-rail interaction and its modifications as they have been experimentally observed on the 1:4.5 scale IIT-GM-EMD wheel-rail interaction simulation equipment. Attention is drawn to some of the conventional solutions as regards wheel/rail contact and the stress factors involved and the author examines the possibility of applying them on American railways. After mentioning briefly some of the well-known contributions to these solutions in the field of rail vehicle dynamics, he underlines the need to improve wheel slide conditions.

Kumar, S *Rail International* Vol. 11 No. 10, Oct. 1980, pp 599-610, 15 Fig., 1 Phot., 41 Ref.

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

DOTL JC

02 330204

USE OF MICROCOMPUTERS FOR A CONTINUOUS AND GLOBAL ASSESSMENT OF VEHICLE COMFORT [Empleos de minocomputadores para la evaluación continua y global del confort de vehículos]

Passenger comfort gave rise to the establishment of study criteria defined by several standards and in particular ISO Standard 2631. The article explains that the use of micro-computers facilitates research in this field and gives, as an example, the results obtained on the experimental Talgo Train with tilting body, on the RENFE and SNCF lines, and on other passenger trains. [Spanish]

Bailaron, F Brihuega, JA *AIT-Revista* No. 34, May 1980, pp 39-44, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

02 330652

EVALUATION OF TIME-DURATION DEPENDENT WHEEL LOAD CRITERIA FOR WHEELCLIMB DERAILMENT

This paper shows that the JNR and other time-duration dependent criteria based on wheel load measurements alone are unsuccessful in predicting derailment safety. For wheelclimb processes involving negligible lateral velocities, the derailment limit can be estimated from quasisteady analysis of wheel/rail forces. The evaluation of criteria is based on experiments with a single wheelset and a nonlinear theory for dynamic wheelclimb.

Papers presented at the ASME Winter Annual Meeting, November 16-21, 1980; Dynamic Systems and Control.

Sweet, LM Karmel, A (Princeton University) *American Society of Mechanical Engineers Papers* Conf Paper ASME 80-WA/DSC-21, 1980, n.p.

ACKNOWLEDGMENT: Mechanical Engineering
ORDER FROM: ESL

02 330653

PARAMETRIC EXCITATION OF RAIL VEHICLE WHEELSETS DUE TO TRACK IRREGULARITY

The effects of vertical and lateral track irregularity on the lateral stability of a simply restrained railway vehicle wheelset undergoing small amplitude motion are investigated. The influence of parametric excitation on the stability of wheelset motion and, in particular, on the lowering of the critical speed of secondary hunting, is examined analytically for the simple case of harmonic track irregularity. Depending on vehicle parameters and quality of track a substantial reduction in critical speed is possible.

Papers presented at the ASME Winter Annual Meeting, November 16-21, 1980; Dynamic Systems and Control.

Burton, TD (Washington State University) *American Society of Mechanical Engineers Papers* Conf Paper ASME 80-WA/DSC-20, 1980, n.p.

ACKNOWLEDGMENT: Mechanical Engineering
ORDER FROM: ESL

02 330655

RAILWAY FREIGHT CAR FIELD TESTS

A project entitled "Freight Car Dynamics", was conducted by Clemson and Arizona State Universities under contract to the Federal Railroad Administration. This paper summarizes efforts to characterize the vehicle and roadbed, and contains results of the test data analysis carried out by Clemson and Arizona State Universities.

Papers presented at the ASME Winter Annual Meeting, November 16-21, 1980; Dynamic Systems and Control.

Fries, RH Cooperrider, NK (Arizona State University, Tempe); Law, EH (Clemson University) *American Society of Mechanical Engineers Papers* Conf Paper ASME 80-WA/DSC-7, 1980, n.p.

ACKNOWLEDGMENT: Mechanical Engineering
ORDER FROM: ESL

02 331098

ASYMPTOTIC THEORY OF FREIGHT CAR HUNTING

A simple formula is derived for the hunting speed of a freight car from an 8 degree of freedom linear model using asymptotic techniques. A comparison is made between the approximation and exact (numerical) solutions. The

two agree within 10 per cent for parameter values typical of present designs.

Whitman, AM *ASME Journal of Dynamic Systems, Meas and Control* Vol. 102 No. 3, Sept. 1980, pp 190-193

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

02 331108

HARMONIC ROLL RESPONSE OF A RAILROAD FREIGHT CAR
A mathematical model of a railroad freight car has been developed under the Track-Train Dynamics Programme. The model simulates a car equipped with auxiliary suspension devices (e.g., rubber-cushion type or viscous dampers) under various perturbed track conditions. The study compares the model predictions with test data, and demonstrates the application of the model in studies of various auxiliary suspension devices for controlling the harmonic roll response and component loadings of a railroad freight car.

Hussain, SMA Garg, VK Singh, SP *ASME Journal of Engineering for Industry* Vol. 102 No. 3, Aug. 1980, pp 282-288

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

02 331131

A MATHEMATICAL MODEL TO PREDICT THE DYNAMIC VERTICAL WHEEL/RAIL FORCES ASSOCIATED WITH LOW RAIL JOINTS

The magnitudes of transient vertical wheel/rail forces, known as the P sub 1 and P sub 2 forces, respectively, resulting from a vehicle's passage over isolated low rail joints are very large in comparison with static wheel/rail loads. In this study, a mathematical model was developed to predict the vertical wheel/rail forces and the forces between a locomotive's suspended traction motor and associated truck frame. A parametric study to investigate the influences of various input and system parameters on these forces was conducted using the model. It was also shown that a simplified first order model is sufficiently accurate to predict vertical wheel/rail forces.

Arslan, AV Novoseletsky, L
Association of American Railroads Technical Center AAR R-462, Dec. 1980, 78p, 24 Fig., 2 Tab., 5 Ref.

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

DOTL RP

02 331468

THE HIGH COST OF THE 30 TONNE AXLE

Just as the severe damage inflicted on highways by axles carrying ten tonnes or more is seldom reflected in user charges, so North American railways have been slow to grasp the true cost of raising gross car weights to 120 tonnes on four axles. It appears that increasing axle load from 25 to 30 tonnes will halve rail life. Once the effect on the track is taken into account, the apparent economies of high-capacity cars vanish--unless their utilization is below 50 km per day.

Ahlf, RE (Illinois Central Gulf Railroad) *Railway Gazette International* Vol. 137 No. 3, Mar. 1981, p 191, 1 Fig., 1 Tab., 3 Phot.

ORDER FROM: ESL

DOTL JC

02 331513

HIGH SPEED TRAFFIC WITH THE WHEEL/RAIL SYSTEM [Schnellstverkehr mit Rad/Schiene-Technik]

This work deals with the following subjects: track/vehicle interaction, vehicles, track, operating, energy supplies, environmental problems, test installations, experimental vehicles, and test programs. [German]

Muehlhans, E
Deutsche Eisenbahn Consulting DB: Dok 5310, 1980, 455p, 350 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Deutsche Eisenbahn Consulting, Frankfurt am Main, West Germany

02 331520

PREVENTING DERAILMENTS OF SLOW-MOVING FREIGHT WAGONS [Sikkerhet mot avsporing av godsvogner ved lav hastighet]

The author examines the problem of derailments in general and goes on to adopt a critical approach to the work of the ORE B55 Committee during the 1963-1975 period, in particular as regards the question of preventing freight wagon derailment on uneven track. He concludes by describing NSB experience in respect of derailments. [Norwegian]

Meulman, J *NSB-Teknikk* Vol. 6 No. 2, 1980, pp 48-65, 38 Phot., 17 Ref.

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

02 331535

APPLICATIONS OF QUASILINEARIZATION TO THE LIMIT CYCLE BEHAVIOUR OF THE NONLINEAR WHEEL-RAIL SYSTEM

The spatial kinematic constraints of arbitrary wheel and rail profiles are analysed by solving a system of nonlinear equations. The nonlinear equations for longitudinal and lateral creepages and spin are derived. The nonlinear equations of motion of a restrained wheelset on straight and curved track are set up and reduced. The external loads exerted on the wheelset are expanded. Nonlinear creep loads are evaluated, using different methods of saturation.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of IAVSD Symposium, 6th, (International Association for Vehicle System Dynamics), Technical University of Berlin, West Germany, September 3-7, 1979.

Hauschild, W (Technical University of Berlin, West Germany)
Swets en Zeitlinger BV Proceeding 1980, pp 146-163, 14 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: Swets en Zeitlinger BV, Heereweg 347B, Lisse, Netherlands

02 331536

PRACTICAL CALCULATION METHOD OF QUASI-STATIC CURVING PERFORMANCE OF RAILWAY BOGIE VEHICLES

The study described was carried out to obtain a calculation method of quasi-static curving performance of railroad bogie vehicles consisting of both 6 and 14 degrees of freedom systems. In this analysis, the non-linear characteristics of contact forces between wheel and rail are taken into consideration, and the successive approximation method is applied to carry out the numerical calculations.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of IAVSD Symposium, 6th, (International Association for Vehicle System Dynamics), Technical University of Berlin, West Germany, September 3-7, 1979.

Matsui, N (Tokyo Car Corporation)
Swets en Zeitlinger BV Proceeding 1980, pp 276-289, 6 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: Swets en Zeitlinger BV, Heereweg 347B, Lisse, Netherlands

02 331537

OPTIMIZING THE WHEEL PROFILE TO IMPROVE RAIL VEHICLE DYNAMIC PERFORMANCE

A procedure for designing wheel profiles is presented which incorporates an analysis of the stability and curving performance of an idealized nonlinear rail vehicle model and the tendency of a profile to change shape with wear. The procedure is a closed-loop process implemented under operator control on a hybrid computer system. The vehicle performance for an initial profile is analyzed and the profile is systematically adjusted until dynamic performance and wear tendency objectives are met or have reached a successful compromise.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of IAVSD Symposium, 6th, (International Association for Vehicle System Dynamics), Technical University of Berlin, West Germany, September 3-7, 1979.

Heller, R (Clemson University); Law, EH
Swets en Zeitlinger BV Proceeding 1980, pp 179-197, 16 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: Swets en Zeitlinger BV, Heereweg 347B, Lisse, Netherlands

02 331540

EXACT THEORY OF THE MOTION OF A SINGLE WHEELSET MOVING ON A PERFECTLY STRAIGHT TRACK

The paper deals with a problem in the field of railway dynamics: the motion of a single wheelset on a perfectly straight and rigid track for any arbitrary profiles of rail and tire. The exact equations of motion are shown and their derivation is discussed.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of IAVSD Symposium, 6th, (International Association for Vehicle System Dynamics), Technical University of Berlin, West Germany, September 3-7, 1979.

Pater, AD de
Swets en Zeitlinger BV Proceeding 1980, pp 397-407, 4 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: Swets en Zeitlinger BV, Heereweg 347B, Lisse, Netherlands

02 331542

WHEELCLIMB DERAILMENT CRITERIA UNDER STEADY ROLLING AND DYNAMIC LOADING CONDITIONS

Criteria for predicting wheelclimb derailment under steady rolling conditions are developed analytically and verified experimentally using a one-fifth scale model wheelset on tangent track. Criteria based on wheel and axle loads are compared, including the effect of applied roll moments. Derailment limit under dynamic wheelclimb are established using a nonlinear simulation model.

Dynamics of Vehicles on Roads and on Tracks, Proceedings of IAVSD Symposium, 6th, (International Association for Vehicle System Dynamics), Technical University of Berlin, West Germany, September 3-7, 1979.

Sweet, LM (Princeton University); Karmel, A Moy, PK
Swets en Zeitlinger BV Proceeding 1980, pp 496-510, 6 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: Swets en Zeitlinger BV, Heereweg 347B, Lisse, Netherlands

02 331848

NONLINEAR CONTACT GEOMETRY EFFECTS ON WHEELSET DYNAMICS

The nonlinear dynamic behavior of a simply restrained railway vehicle wheelset on tangent track is investigated. Nonlinearities due to the kinematics of wheel/rail contact (excluding flange contact) and creep force variation with creepage are considered for mildly noncircular wheel and rail profiles. The general equations of lateral and yawing motion of the wheelset are derived. These are then simplified by considering both normalized amplitude of the motion and angle of wheel/rail contact in the undisturbed position.

Burton, TD (Washington State University); Whitman, AM *ASME Journal of Applied Mechanics* Vol. 47 No. 1, Mar. 1980, pp 155-160, 18 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

02 331869

DYNAMICS OF CARS OF THE ER22 AND ER200 ELECTRIC TRAINS ON TRUCKS WITH PNEUMATIC SUSPENSION

[Dinamika vagonov elektropoezdov er22 i er200 na teleshkakh s pnevmaticheskim podveshivaniem]

This monograph is devoted to theoretical and experimental research on the dynamics of electric train power cars and trailing cars moving at high speeds. A review is given of power-car and trailing-car running gear designs used in the USSR and abroad, and the results are given of theoretical solutions for car oscillations associated with various parameters of spring suspension rigidity, dampening, correlations of oscillating masses, and moments of inertia when moving on straight and curved sections of track. The results are given of tests of ER22 electric trains with pneumatic spring suspension, as are the results of computations for negotiating curved sections of track and for determining the influence on the track. Recommendations are given in the conclusion on the selection of electric train power-car and trailing-car running gear parameters. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

L'vov, AA Romen, YuS Kuznetsov, AV Ershkov,
OP Krepkogorskiy, SS Anisimov, PS Zakharov, AN Petrova, VN
Trudy TSNII Proceeding No. 417, 1970, 184p, 91 Fig., 37 Tab., 43 Ref.

ACKNOWLEDGMENT: FRA

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

02 331870

DYNAMICS OF ELECTRIC TRAINS, DIESEL TRAINS, AND FREIGHT CARS [Dinamika elektropoezdov, dizel'-poezdov i gruzovykh vagonov]

This proceeding presents 11 technical papers: (1) Results of Dynamic (Running) Tests of the ER9P Electric Train; (2) Amplitude-Frequency Characteristics of Vehicle Oscillations with Different Suspension Parameters; (3) Spectra of Electric Train Oscillations while Moving Over Irregularities in Track Geometry; (4) Dynamic Characteristics and Effects on the Track of the Diesel Trains DR1 and D1; (5) Experimental Research on the Effect of Worn Running Gear of Loaded Four-Axle Cars on Car Dynamics and Track Forces; (6) Dynamic Characteristics of Freight Cars on Curves Out of Horizontal Alignment; (7) Dynamic Characteristics of Eight-Axle Well Cars with Respect to Variations in the Positioning of Very Heavy Loads; (8) Parameters of a Journal Suspension Truck on a Four-Axle Car; (9) Dynamic Stability of Cars on Three-Axle Trucks with Central Suspension; (10) Research on Friction Forces in the Wedge Oscillation Damper of the TsNII-Kh3 Truck; (11) Experimental Research on Freight Cars with Maximum Wear of Running Gear and in the Presence of Deviations from Track Maintenance Standards. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Trudy TSNII Proceeding No. 519, 1974, 188p, 96 Fig., 36 Tab., 34 Ref.

ACKNOWLEDGMENT: FRA

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

02 331871

RESULTS OF DYNAMIC (RUNNING) TESTS OF THE ER9P ELECTRIC TRAIN [Rezultaty dinamicheskikh (khodovykh) ispytaniy elektropoezda ER9P]

The results are given of dynamic (running) tests of ER9P electric trains that were run at speeds up to 150 km/hr on straight and curved sections of track with different radii. Recommendations are made for improving the running qualities of electric train cars. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

L'vov, AA Zakharov, AN Brzhezovskiy, AM *Trudy TSNII* No. 519, 1974, pp 3-19, 5 Fig., 2 Tab.

ACKNOWLEDGMENT: FRA

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

02 331872

AMPLITUDE-FREQUENCY CHARACTERISTICS OF VEHICLE OSCILLATIONS WITH DIFFERENT SUSPENSION PARAMETERS [Amplitudno-chastotnye kharakteristiki kolebaniy ekipazha s razlichnymi parametrami podveshivaniya]

The amplitude-frequency characteristics are shown of oscillations of an electric train car with different suspension parameters obtained by computed means on the electronic digital computer machine "Nairi." The analysis is given of the effect of nonsimultaneous passing of wheel pairs over track irregularities on the amplitude-frequency characteristics of central and journal suspension flexion and vehicle body accelerations. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Zakharov, AN Brzhezovskiy, AM *Trudy TSNII* Proceeding No. 519, 1974, pp 20-30, 6 Fig., 1 Tab., 4 Ref.

ACKNOWLEDGMENT: FRA

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

02 331873

SPECTRA OF ELECTRIC TRAIN OSCILLATIONS WHILE MOVING OVER IRREGULARITIES [Spektry kolebaniy vagonov elektropoezda pri dvizhenii po geometricheskim nerovnostyam puti]

Presented are spectra of carbody accelerations and flexions of the central and journal suspensions of an electric train car with different suspension parameters, obtained from the amplitude-frequency characteristics of carbody oscillations and the spectrum of track geometry irregularities. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Azkharov, AN Brzhezovskiy, AM *Trudy TSNII* Proceeding No. 519, 1974, pp 20-30, 6 Fig., 2 Ref.

ACKNOWLEDGMENT: FRA

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

02 331874

DYNAMIC CHARACTERISTICS AND EFFECTS ON THE TRACK OF THE DIESEL TRAINS DR1 AND D1 [Dinamicheskie kachestva i vozdeystvie na put' dizel'-poezdov DR1 i D1]

Described are the results of dynamic (running) tests and the effects on the railroad track of D1 diesel trains with powered three-axle trucks of different designs and of the Riga Car Manufacturing Plant's DR1 diesel trains. Given, on the basis of experimental tests, are an evaluation of the dynamic characteristics of diesel trains and the operating speeds established for track sections of different condition and design. Recommendations are given for the further improvement of the dynamic characteristics of diesel trains. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

L'vov, AA Zhelmin, GG Zakharov, AN Shinkarev, BS Nikitenko, DI Verkhotin, AA *Trudy TSNII* Proceeding No. 519, 1974, pp 38-67, 15 Fig., 9 Tab., 4 Ref.

ACKNOWLEDGMENT: FRA

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

02 331875

EXPERIMENTAL RESEARCH ON THE EFFECT OF WORN RUNNING GEAR OF LOADED FOUR-AXLE CARS ON CAR DYNAMICS AND TRACK FORCES [Eksperimental'nye issledovaniya vliyaniya iznosov khodovykh chastey gruzhenykh chetyrekhosnykh vagonov na dinamiku i vozdeystvie na put']

The results are presented of complex dynamic (running) tests for determining the dynamic characteristics and forces on track of four-axle gondolas with MT-50 and TsNII-Kh3 trucks having nominal and maximum allowable wear and axle loads of 21 and 22 metric tons. Conditions are examined for the operation of cars with worn running gear on the Soviet railroad network in terms of the track quality and the different types of track structure on straight and curved sections. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Gracheva, LO Anisimov, PS Pevzner, VO Shinkarev, BS *Trudy TSNII* Proceeding No. 519, 1974, pp 67-107, 23 Fig., 13 Tab.

ACKNOWLEDGMENT: FRA

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

02 331876

DYNAMIC CHARACTERISTICS OF FREIGHT CARS ON CURVES OUT OF HORIZONTAL ALIGNMENT [Osobennosti dvizheniya gruzovykh vagonov po krivym, imeyuschim otstupleniya v plane]

The results are given of experimental research on the dynamic characteristics of the movement of a freight car on TsNII-Kh3 trucks on curved sections of track out of horizontal alignment. An analysis is given of the effect on the dynamic parameters of transverse undamped accelerations, the severity of which is caused by deviations in track alignment. Also given are an analysis

of the parameters of track geometry irregularities and a correlative analysis of the variables of track dynamics. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Ershkov, OP Kartsev, VYa Petrova, VN. *Trudy TSNII* Proceeding No. 519, 1974, pp 108-125, 14 Fig., 1 Tab., 12 Ref.

ACKNOWLEDGMENT: FRA

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

02 331877

DYNAMIC CHARACTERISTICS OF EIGHT-AXLE WELL CARS WITH RESPECT TO VARIATIONS IN THE POSITIONING OF VERY HEAVY LOADS [Dinamicheskie osobennosti vos'miosnykh transporterov s razlichnym razmescheniem na nikh tyazhelovesnykh gruzov]

The results are given of experimental research on the dynamics of an eight-axle well car with a carrying capacity of 120 metric tons when very heavy loads are variously positioned off-center on the car. Recommendations are given on conditions for hauling such loads on a well car (a type of flatcar with a lowered center platform). [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Anisimov, PS Gracheva, LO Zhelnin, GG. *Trudy TSNII* Proceeding No. 519, 1974, pp 126-144, 4 Fig., 7 Tab., 2 Ref.

ACKNOWLEDGMENT: FRA

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02 331878

PARAMETERS OF A JOURNAL SUSPENSION TRUCK ON A FOUR-AXLE CAR [Parametry telezhki buksovogo podveshivaniya chetyrekhosnogo vagona]

The dynamic stability of a four-axle gondola on journal suspension trucks is examined. Oscillation frequencies and transverse suspension stiffness are determined for various car speeds; dynamic stability ranges are developed; and the optimal value for transverse journal suspension stiffness is determined. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

L'vov, AA. *Trudy TSNII* Proceeding No. 519, 1974, pp 144-153, 7 Fig., 3 Tab., 4 Ref.

ACKNOWLEDGMENT: FRA

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

02 331879

DYNAMIC STABILITY OF CARS ON THREE-AXLE TRUCKS WITH CENTRAL SUSPENSION [Ustoychivost' dvizheniya vagonov na trekhosnykh telezhkakh s tsentral'nym podveshivaniem]

Shown is the dynamic stability of a six-axle car on three-axle trucks with central suspension. The results are presented of varying the roots of equations for various calculation methods, as well as of the effect on the equation roots of varying the transverse suspension stiffness. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

L'vov, AA. *Trudy TSNII* Proceeding No. 519, 1974, pp 153-163, 7 Fig., 2 Ref.

ACKNOWLEDGMENT: FRA

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

02 331880

RESEARCH ON FRICTION FORCES IN THE WEDGE OSCILLATION DAMPER OF THE TSNII-KH3 TRUCK [Issledovanie sil treniya v klinovom gasitele kolebaniy telezhki TsNII-Kh3]

Discussed is the analytical and experimental research of friction forces of the wedge oscillation damper of the TsNII-Kh3 truck when the car is stationary and when it is in motion. Recommendations are given for improving the performance of the wedge oscillation damper. The "intersecting friction" of the damper is examined at speeds up to 120 km/hr. The effect of the position of the damper wedge on the relative amount of friction in the spring group is also examined. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Anisimov, PS. *Trudy TSNII* Proceeding No. 519, 1974, pp 164-174, 5 Fig., 4 Ref.

ACKNOWLEDGMENT: FRA

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

02 331881

EXPERIMENTAL RESEARCH ON FREIGHT CARS WITH MAXIMUM WEAR OF RUNNING GEAR AND IN THE PRESENCE OF DEVIATIONS FROM TRACK MAINTENANCE STANDARDS [Eksperimental'nye issledovaniya gruzovykh vagonov s maksimal'nymi iznosami khodovykh chastey pri nalichii otpustleniy ot norm v soderzhanii puti]

The results are given of a set of tests of freight car dynamics and track forces associated with operating loaded four-axle gondolas with MT-50 and TsNII-Kh3 trucks under the most unfavorable combination of truck wear and poor track conditions. These track conditions included artificially induced irregularities in track geometry. The results include the effects of truck wear and track geometry deviations on the dynamic indices of gondolas and track forces at train speeds up to 120 km/hr. Also given is the methodology for the tests. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Gracheva, LO Pevzner, VO Anisimov, PS Shinkarev, TS Yankilevich, VL. *Trudy TSNII* Proceeding No. 519, 1974, pp 175-188, 2 Tab.

ACKNOWLEDGMENT: FRA

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02 334185

RIDE-QUALITY MODELS FOR DIVERSE TRANSPORTATION SYSTEMS

This research was undertaken to develop comfort (ride-quality) models for six specific vehicles and to refine an existing composite ride-quality model. The vehicles were an automated guideway transit vehicle, a short-haul intercity rail vehicle, an urban rapid rail vehicle, a luxury-type charter bus, a compact car, and a subcompact automobile. Experiments on most vehicles were conducted in two phases: model development and model validation. In both phases, physical variables were measured for a series of ride segments, and each segment was rated for comfort level by a group of paid subjects. The important determinants of comfort for most vehicles were roll, pitch, and vertical acceleration. These variables are highly intercorrelated; all load on the same principal component of the motion-correlation matrix. Two composite ride-quality models are presented; one has four variables (roll, pitch, and vertical and longitudinal acceleration) and one has two variables (vertical acceleration and roll). The two-variable comfort model is sufficient for most uses. (Author)

This paper appeared in Transportation Research Record No. 774, Maintenance Management Systems and Transportation Ride Quality.

Richards, LG Jacobson, ID (Virginia University); Pepler, RD (Dunlap and Associates, Incorporated). *Transportation Research Record* No. 774, 1980, pp 39-45, 6 Tab., 22 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

02 334307

WEAR KINETICS OF RAIL AND WHEEL STEELS IN THE DRY FRICTION CONDITION

Wear data, wear surfaces and the particles obtained in unlubricated rolling experiments were analyzed. It is observed that wear is not directly proportional to the number of cycles. Wear particle formation appears to be due to crack generation and propagation in the highly stressed surface layers of the materials. A theoretical analysis is given to predict wear rate and the nature of the wear process. This paper presents the results and analysis of wear in dry rolling contact simulating the interaction of steel rails and wheels.

Aronov, V (Illinois Institute of Technology); Kalpakjian, S *Wear* Vol. 61 No. 1, June 1980, pp 101-110, 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

02 334463

DRAFT GEAR/CUSHIONING UNIT OPTIMIZATION FOR TRAIN ACTION--VOLUMES I AND II: FINAL REPORT

This report describes a series of impact tests that were conducted by W. H. Miner, Inc., Research and Development Division, for the Draft Gear/Cushioning Unit Optimization Task of Track-Train Dynamics-Phase II. Using a special test fixture car, modified for these tests, buff and draft impact tests were conducted on two end-of-car cushioning units and two draft gears. Forces and displacements of the draft gears and cushioning units, over their active strokes, were recorded on magnetic tape for all of the impacts in the test series, at speeds of 1 to 6 mph. Force vs. displacement curves for each impact are presented. The test data was developed for future use in improving subroutines in the Detailed Train Action Simulation Program. Within the scope of this task, it has also been used to develop guidelines for improving the in-train performance of draft gears and end-of-car cushioning units. The United States Government assumes no liability for the contents of this report or the use thereof.

Volume I contains the main body of the report. Volume II consists of the Appendices, containing all of the force vs. displacement curves. See also Report R-308, Draft Gear/Cushioning Unit Optimization for Train Action, Interim Report, RRIS 02 189801; Bulletin 7902.

Punwani, SK

Association of American Railroads Technical Center, Federal Railroad Administration Res Rpt. AAR R-363, Sept. 1980, 430p, Figs., Tabs.

Contract DOT-FR 64228

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

DOTL RP

02 334465

SDP-40F LOCOMOTIVE TESTS ON THE BURLINGTON NORTHERN RAILROAD

This report describes the results of SDP-40F locomotive tests, conducted on the Burlington Northern Railroad. The test data was analyzed to characterize the locomotive's wheel-rail forces, as related to variations in track geometry and operating procedures. An analysis was also made to determine and quantify those factors which have the greatest influence upon the observed wheel-rail forces.

Palmer, DW Nayak, PR

Little (Arthur D), Incorporated, Association of American Railroads Technical Center Tech Rpt. AAR R-410, Mar. 1980, 73p, 25 Fig., 15 Tab., 2 App.

Contract ADL 82746

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

DOTL RP

02 334490

STUDY INTO THE EFFECTS OF ECCENTRIC RAILWAY VEHICLE WHEELS [Eltorzult vasuti jarmukerekek hatasainak vizsgalata]

When out-of-round wheels are used, the rail is subject to extra stress and may even be ruptured. This article shows to what extent out-of-round wheels affect rails, and how faster vibration can occur in the superstructure. The

study also indicates effects of wheel flats on the rail temperature, how the fatigue rupture point can be calculated, and how vibration and noise are caused by the above-mentioned vehicles. [Hungarian]

Unyi, B *Kozlekedestudományi Szemle* Vol. 30 No. 10, Oct. 1980, pp 455-459, 9 Phot., 6 Ref.

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

02 334497

THE RHINE-SPELLE-FREREN EXPERIMENTAL LINE FOR ESTABLISHING THE POWER CAPACITY OF THE WHEEL/RAIL TECHNIQUE [Rheine-Spelle-Freren Versuchsstrecke zur Erforschung des Leistungsvermoegens der Rad/Schiene-Technik]

This straight line, 23 km in length, can be covered in both directions at speeds of up to 350 km/h. The main objectives are: experimentation with new mechanical and electrical components in vehicles, study of running dynamics and adhesion values, study of dynamic vehicle/track interaction, study of dynamic behaviour in bridges, experimentation with crossing points at high speeds, the development of new energy transmission systems for speeds of over 250 km/h, experimentation with new aspects of operating techniques (route safety, information transmission and monitoring the position of trains and vehicles). [German]

Hochbruck, H *Elektrische Bahnen* Vol. 78 No. 12, Dec. 1980, pp 329-337, 7 Phot., 13 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

02 334499

THE EFFECTIVE GRADIENT TECHNIQUE IN TRAIN PERFORMANCE CALCULATIONS

One of the critical features of a computer program to simulate train performance is its ability to manipulate efficiently the data describing the track geometry. The gradient and curvature data together determine the equivalent gradient resistance which, in turn, plays an important part in any simulation involving section times, maximum train loads and train speeds. In this paper the effective gradient technique is introduced. This technique reduces significantly the computation required to assess the effects of track geometry on the performance of a train.

Smith, HR Blair, JR *Rail International* Vol. 12 No. 1, Jan. 1981, pp 23-34, 5 Fig., 7 Tab., 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
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02 334507

SPECIAL WORLD RECORD: 380 KM/H [Special record du monde: 380 km/h]

A series of articles and interviews on the new world speed record (380 km/h) set up on 16 February 1981. Historical account of 150 years of railway world records. State of progress of the Paris South-East line construction work. Signalling in the driver's cab. [French]

Vie du Rail No. 1785, Mar. 1981, p 1, Photos.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: French National Railroads, 610 Fifth Avenue, New York, New York, 10020

02 334684

EVALUATION TECHNIQUES FOR LOCOMOTIVE PERFORMANCE (FUEL ECONOMY, ADHESION, TRACTIVE EFFORT)

With the advent of a computerized data collection and processing system at Southern Pacific, significant advances have been made in measuring the actual operating performance of locomotives. The combination of hardware and software that has been developed has enabled the locomotives' performance to be monitored in real-time, whether it is fuel consumption, tractive effort or adhesion characteristics. On-board, computerized graphical output enhances the usability of the data collected. Performance evaluation techniques are discussed, as are differences between design performance and actual performance. Recommendations are made as to more pertinent

measures of performance, based upon output of the locomotive as a system.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

Andresen, J

American Society of Mechanical Engineers Conf Paper 81-RT-1, Jan. 1981, 15p, 9 Fig.

ORDER FROM: ESL

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02 334687

DYNAMIC RESPONSE OF FREIGHT VEHICLE SYSTEMS--A PERFORMANCE CHARACTERIZATION

This paper presents the results of performance characteristics of modern truck designs. The dynamic response of the conventional three-piece freight car trucks is discussed in detail, including the analysis of and results from field test data, and the analytic models, their verification against test data, and the use of simulated data obtained through the use of the models. A comprehensive picture of the dynamic response characteristics of the three-piece freight car truck is presented by considering four distinct and inclusive performance regimes, namely lateral stability, trackability, curve negotiation and ride quality. This performance characterization of the conventional freight car truck will form the backdrop for the presently ongoing evaluation and assessment of the response characteristics of the premium state-of-the-art freight car trucks so that the effects of design innovations on truck performance and the consequent benefits to operating railroads can be objectively assessed.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

RamaChandran, PV ElMadany, MM (Wyle Laboratories); Tsai, NT (Federal Railroad Administration)

American Society of Mechanical Engineers Conf Paper 81-RT-4, Jan. 1981, 8p, 15 Fig., 9 Ref.

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02 334688

ANALYSIS OF WHEEL RAIL FORCE AND FLANGE FORCE DURING STEADY STATE CURVING OF RIGID TRUCKS

The wheel/rail forces and flange forces resulting from steady state curve negotiation are developed through analysis of a rigid two-axle truck. The analysis provides closed form relations for estimating wheel/rail forces, flange forces, truck angle of attack and sliding conditions for this type of truck as a function of curve radius. The wheel profiles are modeled by conical wheel treads with vertical wheel flanges and flange friction effects are included. The theory used includes both linear and nonlinear creep.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

Weinstock, H (Transportation Systems Center); Greif, R (Tufts University)

American Society of Mechanical Engineers Conf Paper 81-RT-5, Jan. 1981, 10p, 8 Fig., 1 Tab., 8 Ref., 1 App.

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02 334689

FUNDAMENTAL STUDY ON SEMI-ACTIVELY CONTROLLED PNEUMATIC SERVO SUSPENSIONS FOR RAIL CARS

Semi-actively controlled suspension systems were devised to reduce the vibrations of railroad passenger cars. Two vertical and one lateral pneumatic servo cylinders were mounted parallel to the air springs on each truck. The acceleration signal of the car body above each cylinder was transferred independently to each controller, and the vertical and lateral controllers were adjusted to approximate the results of the optimum analysis of vertical vibration mode and yawing mode respectively. The system was simply arranged for these reasons. The vibrations of a car body were proved to be reduced by 50 percent in all vibration modes by theoretical analysis and also by a 1/5 scale model car with multi-degrees of freedom. The same reduction was also attained in a full-scale model with a single-degree of freedom.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad

Conference, April 28-30, 1981.

Jindai, K (Japanese National Railways); Kasai, K Terada, K Kakehi, Y Iwasaki, F (Hitachi Limited)

American Society of Mechanical Engineers Conf Paper 81-RT-6, Jan. 1981, 7p, 14 Fig., 6 Ref.

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02 334690

DESIGNING PERTURBED TEST TRACKS FOR EVALUATING RAIL VEHICLE DYNAMIC PERFORMANCE

Perturbed tracks provide a controlled means for evaluating the performance of rail vehicles in various dynamic modes, such as hunting, rock-and-roll, pitch-and-bounce, yaw-and-sway, and dynamic curving. This paper describes a systematic approach for designing such tracks and illustrates the methodology as it has been applied to the preliminary design of the tangent and curved perturbed tracks for the Stability Assessment Facility for Equipment (SAFE), which is being developed under the auspices of the Government-Industry Track Train Dynamics Program.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

Brantman, R (Transportation Systems Center); Boghani, AB (Little (Arthur D), Incorporated)

American Society of Mechanical Engineers Conf Paper 81-RT-7, Jan. 1981, 11p, 9 Fig., 5 Tab., 5 Ref., 1 App.

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02 334692

EFFECTS OF CENTERPLATE FRICTION ON TRUCK YAW HUNTING AND CARBODY LATERAL STABILITY

Observations of rail vehicle behavior indicate that metal-to-metal centerplate bearings are governed by Coulomb friction. A ten-degree-of-freedom, half-vehicle minicomputer model is used to investigate the behavior of a typical rail vehicle, with and without Coulomb centerplate friction. It is shown that Coulomb centerplate friction damps out small-amplitude yaw oscillations of a truck operating above its "critical speed," while larger-amplitude yaw oscillations can be self-sustaining or unstable. It is also shown that Coulomb centerplate friction can either improve or degrade carbody lateral stability, as compared to a vehicle with frictionless centerplates. Practical design alternatives are discussed.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

Woytowich, RT (American Bureau of Shipping)

American Society of Mechanical Engineers Conf Paper 81-RT-9, Jan. 1981, 7p, 11 Fig., 1 Tab., 11 Ref.

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02 334695

STATISTICAL ANALYSIS OF WHEEL DERAILMENT PROBABILITY BASED ON THE DERAILMENT COEFFICIENT

The probability of wheel climb commencing is calculated using Nadal's formula as a basis. In particular, the functional form of Nadal's formula is maintained with normal probability density functions used to describe the two arguments in Nadal's formula, namely contact plane angle and coefficient of friction at the contact point. The theoretical value of the probability of wheel climb commencing for a given lateral/vertical force ratio value at the wheel flange-railhead interface is then compared with experimental results for positive angles of attack, yielding good agreement for one contact plane angle. Theoretical results for negative angles of attack are generated for several cases.

Cherchas, DB

Toronto-York University Joint Program in Transp Research Rpt. 67, No Date, 32p

ORDER FROM: Toronto-York University Joint Program in Transp, 4700 Keele Street, Room 430 Osgoode Hall, Downsview, Ontario M3J 1P3, Canada

02 334711

TECHNIQUES FOR MEASUREMENT OF WHEEL-RAIL FORCES

It is shown that loads from an instrumented wheelset can be used to evaluate the dynamic response of a specific vehicle to a broad spectrum of track conditions over a given track route. Loads from an instrumented track site can provide an evaluation of all passing wheels (not just the instrumented wheelset) and can therefore encompass a full range of rail vehicles, speeds, and operating conditions for that specific location for comparison with the test vehicle. A judicious combination of both on-board and wayside measurements can most cost-effectively provide an evaluation of new equipment and a comparison with the existing load environment.

Ahlbeck, DR Harrison, HD *Shock and Vibration Digest* Vol. 12 No. 10, Oct. 1980, pp 31-41, 23 Ref.

ACKNOWLEDGMENT: EI

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02 334734

NATURAL FREQUENCIES OF BERNOULLI-EULER BEAMS RESTING ON TWO ELASTIC SUPPORTS: APPLICATION TO RAILWAY VEHICLES

The purpose of the present study is to investigate the effect of the different parameters of the elastic supports upon which a deformable beam lies, upon the natural frequencies of the system. The influence of support parameters is obtained by exploiting characteristic transcendental equations. The natural flexural vibrations of the beam are only affected by the stiffness of the support over a very restricted range: outside this range the frequencies are those of a completely free beam or a beam supported by two simple rigid supports (infinite stiffness).

Richard, J *Vehicle System Dynamics* Vol. 9 No. 6, Dec. 1980, pp 309-326

ACKNOWLEDGMENT: British Railways

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02 334740

EFFECT OF GUSTS ON HIGH-SPEED TRAINS

A programme relating to the investigation of the limits of the wheelrail system, sponsored by the Federal Ministry for Research and Technology, included tests on the effect of strong side winds and gusts on the vehicle. The paper gives an extract of the final report. The effect under review is approximately proportional to the train speed, because the forces normally rise as the square of the speed, while they are reduced as the angle of sideslip decreases, with the slope of the pressure gradient curve increasing with the square of the train speed. The more streamlined front end shapes of future vehicles will result in a higher stressing because the leeward air flow will remain attached to the vehicle for a longer time, causing large areas of underpressure. Critical conditions can arise, if the front wheels are unloaded due to a higher lift and lightweight construction or by arranging the motive power system more towards the rear end. The gust factors and peak gusts for high-speed sections in the German Federal Republic are derived from meteorological statistics to establish the relationships for running speed, gust velocity and sideslip angle to be used as a basis for the model tests in the hydrodynamic tank. The transient gust component is simulated by a jet directed across the hauling section. Different front end sections as well as centre and tail sections of faired and unfaired wheel/rail test vehicles are subjected to this jet in a series of model tests. The associated lift and side pressures are used in the computer model representing the traction dynamics, in the roller type dynamometer and for the extrapolation of results applicable to full-scale open country conditions. To verify these transient data, comparable steady-state values obtained by wind tunnel tests are used. [German]

Neppert, H *Glaser's Annalen ZEV* Vol. 105 No. 2, Feb. 1981, pp 43-53

ACKNOWLEDGMENT: British Railways

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DOTL JC

02 335050

SUMMARY REPORT TRACK/TRAIN DYNAMICS--PHASE V

Canadian National's participation in the International Track Train Dynamics Program has, in Phase V, included investigations of the fundamentals of freight car tracking behavior which yielded data on vehicle performance and truck design parameters; on initial and residual stress in continuous welded

rail; and of the cost/benefit relationships for concrete cross ties in North American track structures.

Canadian National Railways TP 2010, Apr. 1979, 42p, 1 Phot., 1 App.

Contract OSD-78-00031

ORDER FROM: Transport Canada Research and Development Centre, 1000 Sherbrooke Street, West, P.O. Box 549, Montreal, Quebec H3A 2R3, Canada

DOTL RP

02 335059

DYNAMIC RAIL OVERTURNING: APPLICATION

A mathematical model of rail overturning was developed on paper entitled, "Dynamic Rail Overturning: Modelling." This model together with other defined parameters of the rail fasteners are utilized to investigate several case studies of dynamic behaviour of the rail. Comparison between these dynamic cases and static tests has been done. It is recommended that multiple axial load should be considered in the future dynamic studies.

Bhatti, MH (Illinois Institute of Technology); Torkamani, MAM (Pittsburgh University, Pittsburgh); Zaremski, AM (Association of American Railroads Technical Center) *Rail International* No. 10, Oct. 1980, pp 558-572, 24 Fig., Refs., 1 App.

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02 335073

VIBRATION TEST UNIT CONTROL AND COMPUTER SYSTEM

The Vibration Test Unit (VTU) is designed to vibrate a railcar to simulate the action of track/train dynamics using a hydraulic shaker system. Studies of suspension characteristics, rock and roll tendencies of rail vehicles, component and vehicle natural frequencies, ride comfort; lading responses, and simulation of full scale vehicle inputs at each wheel/rail interface and lateral inputs along each axle line at the rail/wheel interface. The VTU uses a dual minicomputer system for signal generation, data acquisition, and limit checking.

Proceedings of the Annual Technological Meeting of the Institute of Environmental Sciences, 26th, Life Cycle Problems and Environmental Technology, Philadelphia, Pa., May 12-14, 1980.

Coupland, RO (Wyle Laboratories); Nintzel, AJ
Institute of Environmental Sciences 1980, pp 207-211

ACKNOWLEDGMENT: EI

ORDER FROM: Institute of Environmental Sciences, 940 East Northwest Highway, Mount Prospect, Illinois, 60056

02 335086

LIMIT CYCLE BEHAVIOR OF RAIL VEHICLES

Significant practical problems are associated with the limit cycle behavior of rail vehicles. Although linear stability theory may be adequate for some vehicles, the presence of nonlinearities such as Coulomb friction in the vehicle suspension introduces the possibility of nested unstable and stable limit cycles. Determination of stability boundaries, or unstable limit cycles is of particular interest. Because realistic problems involve high order systems and multiple nonlinearities, approximation and numerical techniques are used in their solution. An overview of this rail vehicle stability problem, including vehicle description, solution techniques and typical limit cycle behavior is given.

Proceedings of the Joint Automatic Control Conference, v2.

Cooperrider, NK (Arizona State University, Tempe)
Institute of Electrical and Electronics Engineers Proceeding IEEE
80CH1580-0, Paper FP9-C; 1980, 5p, 16 Ref.

ACKNOWLEDGMENT: EI

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02 335458

INFLUENCE OF TRANSVERSE COUPLING OF ELECTRIC LOCOMOTIVE TRUCKS ON STABILITY IN RUNNING AND ABILITY TO NEGOTIATE CURVES [EINFLUSS DER QUERKUPPLUNG DER DREHGESTELLE ELEKTRISCHER LOKOMOTIVEN AUF DIE LAUFSTABILITAET UND DEN BOGENLAUF]

The influence of transverse coupling in the case of different types of suspension is studied with the help of a calculation model. The result shows

that transverse coupling with linear suspension is only relevant on curves with a radius of less than 1,200 m; on a straight track it is less appropriate or even unusable. [German]

Hanneforth, W Fischer, W *Hochschule f Verkehrs F List Wissenschaft Zeitschr* Vol. 27 No. 5, 1980, pp 915-921, 3 Fig., 1 Phot., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hochschule fuer Verkehrswesen Friedrich List, Friedrich List Platz 1, Dresden 801, East Germany

02 335616

ON THE VIBRATION OF A BAR SUPPORTED BY UNIFORMLY SPACED SPRINGS

The bending vibration of a bar supported by uniformly spaced springs is discussed and the procedure obtaining the vibration response for a stationary point force is formulated. The solution, which involves the resonance characteristics of interest, is applied to rail dynamics.

Moritohi, Y *Railway Technical Research Inst, Quarterly Reports* Vol. 21 No. 3, Sept. 1980, pp 138-146

ACKNOWLEDGMENT: EI
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DOTL JC

02 335848

EFFECT OF RAIL LIFT-OFF ON THE ANALYSIS OF RAILROAD TRACKS

The standard analysis of bending stresses in the rails of a railroad track is based on the assumption that the track can be modeled as a beam attached to a Winkler base. However, it was observed in the field that when a locomotive or a loaded car passes over a track, sections of the rails often lift off from the base a short distance away from the wheels. The purpose of the present paper is to determine under what conditions lift-off will take place for one and for two axle trucks and then to establish the effect of this lift-off on the rail stresses and on the forces the rails exert on the ties, for the tracks currently in use. The analysis is performed by modeling the track as a rail that rests on a Winkler base and is subjected to vertical wheel loads.

Kerr, AD Bassler, SB
Delaware University, Newark, National Science Foundation Tech Rpt. CE-80-19, Oct. 1980, 30p, 9 Fig., 10 Ref.

Grant NSF CME 8001928

ORDER FROM: Department of Civil Engineering, Delaware University, Newark, DE 19711

DOTL RP

02 335852

THE DYNAMICS OF GUIDED INDEPENDENTLY-ROTATING-WHEEL TRUCKS

The upper limit of running velocity of conventional railway vehicles is considered to be about 350 km/h owing to the difficulty of stabilizing hunting motions, and some new guide system is considered necessary for the railway vehicle running at higher speed than this limit. One of the solutions is the guided CIW (Cylindrical-and-Independently-rotating-Wheel) truck reported in this paper. From the analysis of the stability of motion, curve negotiating characteristics and the forced vibration induced by alignment irregularities of guide rail, it is concluded that it is possible to realize a high speed vehicle by means of the guided CIW trucks.

Koyanagi, S *Railway Technical Research Inst, Quarterly Reports* Vol. 22 No. 1, Mar. 1981, pp 19-25, 7 Fig., 1 Tab., 1 Ref.

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

DOTL JC

02 335864

INVESTIGATION INTO THE INFLUENCE OF DYNAMIC FORCES ON THE TRIBOLOGICAL BEHAVIOUR OF BODIES IN ROLLING/SLIDING CONTACT WITH PARTICULAR REGARD TO SURFACE CORRUGATIONS

Up to the present rolling/sliding (rolling with slip) friction behaviour has always been investigated in a quasi-static state in a test rig. In reality, however, load fluctuations of a greater or lesser intensity are mostly present in rolling friction systems, e.g. the wheel/rail systems (travelling cranes, conveyors, railways, rotary furnaces, etc.) or the wheel/wheel system (rolling

bearings, gears etc.). Practical experience has shown that dynamic loads can greatly influence the tribological behavior. With regard to the applicability of test results, this paper investigates the influence of dynamic forces on the frictional and wear behaviour of bodies in rolling/sliding contact. An attempt has been made to explain, with the aid of mathematical models, the frictional behaviour observed during the tests.

Krause, H Senuma, T *ASME Journal of Lubrication Technology* Vol. 103 No. 1, Jan. 1981, pp 26-34

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

02 336368

NON-UNIFORM FLOWS IN RAILWAY TUNNELS

Two possible contributory causes of the lack of agreement between predicted and measured pressure histories in railway tunnels are investigated. It is shown that non-uniformity of velocity distributions at a cross-section can greatly influence the steady component of air flows alongside trains. The unsteady component is less sensitive to the velocity distribution, but it may be strongly influenced by the dependence of skin friction on accelerations.

Also pub. as ISSN-0309-7293.

Vardy, AE
Cambridge University, England 9 CUED/A-AERO/TR.7-197, 1979, 55

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-130312

02 336515

FLOW RESTRICTIONS IN RAILWAY TUNNELS

The use of flow restrictions to induce pressure losses at the tail of a train and at a tunnel exit portal is proposed as a method of eliminating the sudden pressure changes experienced by passengers on a single train in a tunnel. The proposal is introduced in a qualitative manner. It is then shown to be theoretically sound, and considerable potential advantage is demonstrated. Relatively little attention is paid to the practical means of inducing pressure losses, but it is shown that geometrical restrictions could be used. Experimental evidence is presented in support of the theoretical proposals.

Also pub. as ISSN-0309-7293.

Vardy, AE
Cambridge University, England CUED/A-AERO/TR-6, 1978, 78p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-130395

02 341242

RESISTANCE OF A FREIGHT TRAIN TO FORWARD MOTION--VOLUME III-FREIGHT TRAIN FUEL CONSUMPTION: ECONOMIC ANALYSIS AND CORRELATION OF PREDICTIONS WITH FIELD DATA

This final report is a supplement to two earlier FRA reports on train resistance and its impact upon fuel consumption. The portion of this effort reported herein was partly directed toward detailed correlation of predictions of fuel consumption from simulated runs with actual field measurement. In addition, computer simulations were made in an effort to corroborate some theoretical curves set forth in Volume II and other places in the literature. The economics of fuel savings effected through the use of light weight hopper cars in unit coal train service are examined in great detail, and various types of economic models which might be used to evaluate such savings and considerations concerning the proper selection of one of them are discussed in an appendix. Consideration is given to future investigations and conclusions are drawn. A second appendix explains the improvements made to the computer program since the version reported in Volume II and the modifications to the calculating routine to optimize the efficiency of the program and minimize operating time.

Muhlenberg, JD
Mitre Corporation, Federal Railroad Administration Final Rpt. FRA-/ORD-78/04.III, MTR-80W77, Feb. 1981, 161p, 21 Fig., 21 Tab., 26 Ref., 3 App.

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PB81-191017, DOTL NTIS, DOTL RP

02 341243

RESISTANCE OF A FREIGHT TRAIN TO FORWARD MOTION--VOLUME IV--USER'S MANUAL FOR FREIGHT TRAIN FUEL CONSUMPTION PROGRAM

This document provides information concerning a computer program devised to predict fuel consumption of a freight train operated over a track with known characteristics. The information is of value to both the user who wants merely to utilize the capabilities of the program and the programmers who need to understand its inner workings. The program is listed in its entirety in the document.

Computer program available on magnetic tape, see FRA/ORD/MT-78/04.IV.

Muhlenberg, JD

Mitre Corporation, Federal Railroad Administration Final Rpt. FRA/ORD-78/04.IV, MTR-80W00127, Feb. 1981, 62p, 13 Fig., 1 Tab., 7 Ref.

Contract DOT-FR-54090

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PB81-195810, DOTL NTIS, DOTL RP

02 341247

WIND TUNNEL TESTS OF TRAILER AND CONTAINER MODELS TO DETERMINE THE INDEPENDENT INFLUENCE OF HEIGHT AND GAP SPACINGS AND TRAILER UNDERCARRIAGE SHIELDING ON AERODYNAMIC FORCES OCCURRING DURING RAILROAD TRANSPORT

A series of wind tunnel tests have been run on scale model trains of 40 ft. containers and trailers. The models were 1/43 scale. A train of five models was used with forces and moments measured on the center model. A variety of spaces were used between the models. The height of the container models was varied and the undercarriage of the trailers was protected with shields of different heights. These tests are the latest in a series designed to determine the aerodynamic forces on containers and trailers on flatcars. This series provides additional information on the effect of different container block height and gap spacings and the effect of spacing on the forces on trailers with different amounts of shielding up to large values of yaw angle. The tests showed that axial force initially increased with yaw angles up to 30 to 40 deg and then decreased. This decrease is caused by the axial component of the wind velocity decreasing with increasing yaw angle until it becomes zero at 90 deg yaw angle. The side forces increase with yaw angle reaching a maximum at about 60 deg. The moment data shows that the side force is applied about half way up the block at a point a little forward of the center. On the trailers, the point of application is still about half way between the top of the trailer and the ground for all shieldings used and either ahead of or behind the centerline depending on the amount of shielding.

Hammit, AG

Hammit (Andrew G) Associates, Federal Railroad Administration Final Rpt. FRA/ORD-80/51, 12-101-80, Mar. 1980, 90p, 63 Fig., 3 Tab., 2 Ref., 1 App.

Contract DOT-FR-8058

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PB81-210734, DOTL NTIS, DOTL RP

02 341249

TEST TRAIN PROGRAM ELEVENTH PROGRESS REPORT

This report describes progress on the Engineering and Test Support Services for Railroad Instrumentation, Data Acquisition, Processing and Evaluation Program from 1 July 1978 through 30 June 1979. This report covers operation and maintenance of the FRA track-geometry-measurement and data acquisition fleet. It also covers track survey operations and dynamic tests on lightweight flatcars, Rohr Turboliners, Amcoach brakes, Metroliners, perturbed track testing of locomotives, track stiffness, DODX railcars and LRC cant deficiency. A description of the Wayside Detection Facility is included as well as descriptions of various improvements to the survey cars and their measurement equipment.

ENSCO, Incorporated, Federal Railroad Administration Prog Rpt. FRA/ORD-80/78, DOT-FR-80-20, Jan. 1981, 145p, 20 Fig., 7 Tab., 1 App.

Contract DOT-FR-64113

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PB81-177420, DOTL NTIS, DOTL RP

02 341256

FUNDAMENTAL STUDIES RELATED TO WHEEL-RAIL CONTACT STRESS

This Final Report summarizes the research performed and provides a brief review of the major results of the program. The problems discussed include: the development of cost-effective methods for finding the wheel-rail contact patch, finding subsurface internal stresses, determining points where plastic flow will first occur, finding the distribution of surface shear stresses on the contact patch, finding the boundary between slip and adhesion on the contact patch, and finding the relationship between applied forces and wheel-rail creepage. This work will be useful in explaining, and devising means of preventing various forms of stress-induced rail and wheel failures, as well as a whole complex of problems related to wheel-rail guidance and tractive forces. In particular, the dynamic behavior of rail vehicles can be analyzed relative to the forces developed at the rail-wheel interface.

Paul, B

Pennsylvania University, Philadelphia, Federal Railroad Administration Final Rpt. FRA/ORD-81/05, Jan. 1981, 29p, Figs., 2 App.

Contract DOT-OS-60144

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PB81-194300, DOTL NTIS, DOTL RP

02 341259

TRUCK DESIGN OPTIMIZATION PROJECT (TDOP) PHASE II PERFORMANCE CHARACTERIZATION OF TYPE I FREIGHT CAR TRUCKS

TDOP/Phase II is part of a series of studies being conducted by the FRA to define the engineering options available to the railroad industry to improve the efficiency and productivity of rail freight operations. As part of this effort, experimental and analytic studies have been conducted to define the performance capabilities of the current freight car truck configurations. The results of these studies are used in arriving at quantitative characterization of performance of the standard, three-piece freight car truck under revenue service conditions. Field test data generated during TDOP/Phase I were supplemented with additional data gathered from field tests conducted during Phase II. These test data were reduced, analyzed, and interpreted in the light of physical reasoning as well as analytic simulations. Overall truck performance has been classified into four distinct and non-overlapping regimes, namely lateral stability, trackability, steady state curve negotiation, and ride quality. Performance indices, or measurable quantities typical of each performance regime, have been defined and quantified through the use of field test data and analytic simulations. Correlating the quantified performance indices within each regime with representative operating conditions such as speed, lading, and track quality, ranges of quantified performance levels have been arrived at as being characteristic of truck performance under the corresponding conditions of operation.

Ramachandran, PV ElMadany, MM

Wyle Laboratories, Federal Railroad Administration Tech Rpt. FRA/ORD-81/10, TDOP Rpt. TR-10, Jan. 1981, 74p, Figs., 3 Tab., 8 Ref., 4 App.

Contract DOT-FR-742-4277

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PB81-172157, DOTL NTIS, DOTL RP

02 341260

REVIEW AND SUMMARY OF COMPUTER PROGRAMS FOR RAILWAY VEHICLE DYNAMICS

To assess the state of development of computer programs which apply to the dynamics of rail vehicles, reviews were prepared of programs in six different categories: lateral stability, curving dynamics, wheel/rail contact, freight vehicle dynamics, analog hybrid simulation, and train dynamics. In addition, a number of European programs were summarized. A survey of users of the programs was also undertaken. The great majority of available programs are not widely used; some were developed for specific purposes

and are not suitable for general use. The three programs which are most frequently applied are Train Operations Simulator (TOS); Quasi-Static Lateral Stability Model (QLTS), and Nonlinear Flexible Car Body Vehicle Model (FVEH). These codes appear to be the best choices for further improvement and verification. Other areas in which users believe computer programs could be profitably employed are wear, fatigue, fracture, inelastic behavior, and impact. The principal drawback in applying existing codes seems to be the difficulty in obtaining accurate input data, such as damping constants, moments of inertia, stiffnesses, and locations of mass centers.

Pilkey, WD
Virginia University, Federal Railroad Administration Final Rpt. FRA-
/ORD-81/17, UVA-529162-MAE80-101, Feb. 1981, 129p, Figs., Tabs.,
Refs., 3 App.

Contract DOT-FR-8076

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PB81-183857, DOTL NTIS, DOTL RP

03 053390

**STANDARDISATION OF PASSENGER COACHES.
PERMISSIBLE LOADING OF INTERNAL PARTS OF
PASSENGER COACHES**

For the dimensioning and design of internal components of passenger coaches, certain load assumptions have to be made. At the moment such guidelines are available only on a national scale. This report classifies the components and component assemblies found in passenger coaches and defines the types of loading to which they may be exposed. The extent of the loadings is also indicated. For the more important loadings, reference values are given and certain safety factors recommended.

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

International Union of Railways B 106/RP 2, Apr. 1980, 39p, 11 Fig., 8 Tab.

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03 053396

**STANDARDISATION OF WAGONS. PROGRAMME OF TESTS
TO BE CARRIED OUT ON WAGONS WITH STEEL
UNDERFRAME AND BODY (SUITABLE FOR BEING FITTED
WITH THE AUTOMATIC BUFFING AND DRAW COUPLER)
AND ON THEIR CAST STEEL FRAME BOGIES**

This report replaces the previous Report B 12/RP 17 (77), 3rd edition. It surveys all the tests which are at present considered as representing the complete series of tests to which a new type of wagon should be exposed. The conditions under which these tests should be made and the results to be obtained (maximum or minimum values) are laid down for each test. On account of the detailed information it contains, taking into consideration the developments which have taken place during the last few years in the construction of goods wagons, this report constitutes a valuable basis for the design of new types of wagons.

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

International Union of Railways 4th Ed. B 12/RP 17 (80), Apr. 1980, 61p, 15 Fig.

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03 053397

**STANDARDISATION OF WAGONS. IMPACT TESTS WITH
WAGONS TO SIMULATE OPERATIONAL LOADING**

The present report describes the performance and evaluation of static compression tests and subsequent impact tests intended to simulate impact loading, to which the wagon is submitted in an operational life of 16 years. The tests were made with 3 wagons of different types with the same external test conditions. In particular, the report contains information about the behaviour of these wagons in respect of loading in the static compression test and impact test.

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

International Union of Railways B 12/RP 30, Sept. 1979, 22p, 18 Fig., 7 Tab.

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03 053398

**STANDARDISATION OF WAGONS. STANDARDISATION OF A
BOGIE WITH BUILT-IN BRAKE CYLINDER AND BRAKE-ROD
ADJUSTER SUITABLE FOR S TRAFFIC**

This report describes the design of a bogie with built-in brake cylinder and brake-rod adjuster suitable for S traffic, intended for an axle-load of 20 t and based on the already standardised Y 25 Cs bogie. The report contains the results of strength tests.

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

International Union of Railways B 12/RP 31, Sept. 1980, 16p, 7 Fig.

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03 053400

**CONDITIONS WHICH SHOULD BE COMPLIED WITH BY
WAGON COMPONENTS FOR 22 T AXLELOAD. ANALYSIS AND
SYNTHESIS OF THE RESULTS OF THE THREE FIRST SERIES
OF TESTS WITH 22 T AXLELOAD, CARRIED OUT AT VELIM**

Tests at VELIM were jointly organised by the D 141 and B 142 Committees. As far as the rolling stock was concerned, they consisted of 3 series of tests, each corresponding to approximately 60,000 km. This report describes these tests and gives the results obtained.

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

International Union of Railways B 142/RP 3, Apr. 1980, 48p, 42 Fig.

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03 053407

**CONDITIONS GOVERNING THE ACQUISITION AND USE OF
DRAWINGS OF STANDARDISED ROLLING STOCK. 1.
DRAWINGS OF STANDARD WAGONS**

No Abstract.

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

International Union of Railways 3rd Ed. DG 4.1, Sept. 1980, 17p, 5 App.

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DOTL RP

03 328219

**OPERATIONAL PARAMETERS IN ACOUSTIC SIGNATURE
INSPECTION OF RAILROAD WHEELS**

A brief summary is given of some prior studies which established the feasibility of using acoustic signatures for inspection of railroad wheels. The purpose of the present work was to elucidate operational parameters which would be of importance for the development of a prototype system. Experimental and theoretical investigations were conducted to obtain more information on the effects on wheel vibrations of geometrical variations, wear, internal stress etc. Hardware improvements and interfacing were carried out for a wayside installation, in addition to software development for real time data acquisition and processing. Field tests were made to evaluate system performance, to permit follow-up on certain wheels and to obtain tape recordings from a sample of axle sets in service. These tape recordings were used to optimize the data processing software and to attempt to correlate identifiable wheel conditions with characteristics of the acoustic signature. The greatest signature differences were obtained when one of a pair of wheels was cracked. Differential wear was found to be a major cause of differences in the signatures of good wheel pairs. It is claimed that the knowledge gained from this study is sufficient to warrant the installation of a prototype system with a reasonable likelihood of success. Another important finding is that the frequencies of certain resonant modes shift slightly with changes in residual stress.

Dousis, D Finch, RD

Houston University, Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-80/21, DOT-TSC-FRA-80-9, Apr. 1980, 296p

Contract DOT-TSC-1187

ACKNOWLEDGMENT: NTIS

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PB81-116766, DOTL NTIS

03 328364

**THE FEASIBILITY OF RETROFITTING LIFTS ON COMMUTER
AND LIGHT RAIL VEHICLES**

The objectives of this study were to determine if lift retrofit applications to rail vehicles are technically feasible, and if so, the extent to which existing bus lift technology can be utilized. This report examines some of the technical issues associated with the retrofitting of lifts for elderly and handicapped passengers on light and commuter rail vehicles. There are four major sections to this report. The first section develops the inventory of light rail (LR) and commuter rail (CR) vehicles in the U.S. by number and type. It addresses the characteristics of rail vehicles that differentiate them from buses and makes preliminary indications of which vehicles might be preferable candidates for lift retrofits. The second section assesses the

existing bus lift technology. Descriptions of lift designs and operation obtained from manufacturers are presented. The third major section of this report develops the interface requirements between lifts and vehicles based on existing vehicle characteristics and on lift kinematic concepts. The final section examines ancillary issues of lift retrofits on rail vehicles, such as ancillary hardware modifications, safety and liability concerns, and concerns about costs and sources of required funding.

McInerney, FT
Technology Research and Analysis Corporation, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-80-39, Sept. 1980, 139p

Contract DOT-TSC-1711

ACKNOWLEDGMENT: NTIS
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PB81-130684

03 328388

FREIGHT CAR FATIGUE ANALYSIS TEST ON FAST (FACILITY FOR ACCELERATED SERVICE TESTING)

As a result of observed cracks in the fabricated center sills of many freight cars in the FAST consist, a special Fatigue Analysis Test (FAT) was conducted on the FAST Track during August and September of 1978. This report provides an analysis of the static and dynamic strain data from a base case "uncracked" car, a "cracked" car, and four cars with various structural "fixes" at the critical lower body bolster/center sill region. Vertical strain ranges were found to be critically high in the relatively thin section fabricated center sill with corresponding maximum stress ranges exceeding 30,000 psi during some periods of FAST operation. The prediction of the base case eight car mileage to crack initiation based on measured strain is reasonably conservative relative to the minimum FAST mileage to the first crack detection. A ranking of the merit of the "fixes" based on an application of the Fatigue Life Analysis Program is given. The report concludes that the observed cracks were caused by many cycles of critically high strain in the fabricated center sill section, and that a doubler plate appears to be the best fix. Also, the Fatigue Design Guidelines are reasonably conservative in predicting fatigue cracks. Recommendations are included to explore some residual uncertainties from the test and also structural analysis difficulties.

Prepared in cooperation with Railway Progress Inst., Alexandria, VA.

Moyar, GJ Burns, JE
Association of American Railroads Technical Center, Federal Railroad Administration Final Rpt. FRA/TTC-80/04, July 1980, 65p

ACKNOWLEDGMENT: NTIS
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PB81-142002

03 329088

LOW-PROFILE, LIGHT-WEIGHT INTERMODAL RAILCAR. VOLUME I: PERFORMANCE SPECIFICATION

The Performance Specification and Acceptance Test Plan, respectively contained in Volumes I and II of this report, define the requirements for a low-profile, light-weight intermodal railcar. The car specified here must be able to operate within restricted clearances when carrying either highway trailers or standard shipping containers and must be designed for low aerodynamic resistance and light weight in order to conserve energy. Also, it must be capable of dynamically stable operation at the high speeds which may be expected in special intermodal unit trains. Both safety and protection of lading against the damage which can be caused by excessive ride vibration must be considered in the design of the car. It is intended that these requirements will stimulate the development of innovative railcar designs. The car specified here is an idealized concept which satisfies the most stringent technological requirements presently envisioned for intermodal service. The performance baseline defined here may not be equally appropriate for all users of the specification, some of whom may wish to modify some of the requirements better to reflect their particular needs. The acceptance test plan includes not only the performance tests which must be performed to verify compliance with the specification, but also the sequence of preliminary and detailed analyses which should be performed to facilitate development of a car design which will meet the performance requirements.

Shladover, SE Hull, RL
Systems Control, Incorporated, Federal Railroad Administration Final Rpt. FRA/ORD-81/04.I, Feb. 1981, 25p

Contract DOT-FR-9050

ACKNOWLEDGMENT: NTIS
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PB81-163685, DOTL NTIS

03 329091

RAIL PASSENGER VEHICLE TRUCK DESIGN METHODOLOGY

A procedure for the selection of rail passenger truck design parameters to meet dynamic performance indices has been developed. The procedure is based upon partitioning the design task into three tradeoff studies: (1) a vertical ride quality-secondary stroke trade-off, (2) a lateral ride quality-second stroke trade-off, and (3) a stability curving trade-off. The procedure is illustrated with the selection of design parameters for an intercity 130-mph vehicle and an urban 80-mph vehicle.

Wormley, DN Hedrick, K Horak, D Bell, C
Massachusetts Institute of Technology, Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-81/11, DOT-TSC-FRA-81-1, Jan. 1981, 190p

Contract DOT-TSC-1471

ACKNOWLEDGMENT: NTIS
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PB81-165383, DOTL NTIS

03 329161

LOW-PROFILE, LIGHT-WEIGHT INTERMODAL RAILCAR. VOLUME III: REQUIREMENTS DEFINITION

A major constraint limiting the growth of TOFC service in the Northeast has been one of railroad clearance restrictions along the Northeast Corridor. Presently, tunnel clearances at Washington, DC., Baltimore, and New York restrict TOFC train movements using standard TTX-type railcars loaded with standard sized highway trailers. The design of a low profile intermodal car would increase operating efficiency and expand the TOFC market for the railroads by improving the car's payload-to-weight ratio, reducing its aerodynamic drag, and eliminating the need for circuitous routings. Shippers could benefit from the new car through increased service, reduced drayage expenses, reduced transit times, and greater schedule reliability. Reductions in road congestion, road repair costs, air and noise pollution, combined with increases in employment and local tax contributions resulting from industrial growth would significantly serve the public interest. In response to these needs, the Congress directed the Federal Railroad Administration to sponsor the design, construction, and testing of a prototype intermodal railcar. This report documents the results of the project to develop the requirements definition for the design of the railcar, the primary output of which was a Preliminary Performance Specification.

See also Volume I, PB81-163385 and Volume 2, PB81-167934.

Kearney (AT) and Company Incorporated, Federal Railroad Administration Final Rpt. FRA/ORD-81/04.III, Feb. 1981, 254p

Contract DOT-FR-8075

ACKNOWLEDGMENT: NTIS
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PB81-171548, DOTL NTIS

03 330146

APT TECHNOLOGY--NEARLY READY TO BANK ON

Technical problems which have set back the beginning of experimental revenue service by at least nine months for British Rail's Advanced Passenger Train are discussed. Three electrically powered APT-P prototypes of this high-speed tilting train, when placed on mainline routes, have exhibited problems with the tilt servomechanism, ride quality, electronic brake control, hydrokinetic brakes and power collection. It is concluded that while the technology is available, the development, in-service proving and redesign for production still have a long way to go.

Ford, R *Modern Railways* Vol. 37 No. 387, Dec. 1980, pp 537-540, 9 Phot.

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

DOTL JC

03 330150

NEW LIFE FOR RESILIENT WHEELS

A simplified design by SAB involves a V-shaped rubber-ring assembly claimed to reduce substantially noise and vibration produced even by the firm's other resilient wheel design when used under transit and intercity passenger equipment.

Progressive Railroading Vol. 24 No. 1, Jan. 1981, pp 83-84, 1 Phot.
 ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

DOTL JC

03 330186

WELDED STRUCTURE OF A UNIQUE HIGH-STRENGTH STEEL RAILROAD CARRIER [Svornaya konstruktsiya unikal'nogo zheleznodorozhnogo transportera iz vysokoprochnoi stali]

The welded structure of a unique railroad carrier with the load-carrying capacity of 500 t is described. High-strength steel of the C 70/60 class has been used in the welded structures. The technology of manufacture of the welded structures and results of the running tests of the carrier are described. [Russian]

Kasatkin, BS Tereshchenko, AF Tarnogradskii, VP Konstantinov, AI Laptev, YN Svoevolin, AP *Automatic Welding* Vol. 326 No. 5, 1980, p 45

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

03 330188

WELDED BOGIE FRAMES FOR THE FRENCH HIGH-SPEED TRAIN [Construction mecano-soudee des chassis de bogies pour le TGV]

The production line with a capacity of 26 welded bogie frames per month is described. The bogie frame manufacture is based on the following aspects: control of the welded joint geometry, control of the movement of the MAG torch, and implementation of a quality assurance plan. [French]

Rimbaud, M *Soudage et Techniques Connexes* Vol. 34 No. 3-4, Mar. 1980, pp 111-114

ACKNOWLEDGMENT: EI
 ORDER FROM: ESL

03 330189

ALN 668--A SUCCESS OF ITALIAN RAILWAY ENGINEERING [Aln 668--Un successo della ingegneria ferroviaria italiana]

The ALN 668, considered the standard Diesel railcar of the FS, recently reached 25 years of age, and during this long period it has known a growing and uninterrupted success, giving rise to about 40 production orders for the FS, private Italian Railways and foreign Railways. The main cause of this result is to be sought in the continual evolution of the vehicle to bring its construction into line with the suggestions emerging from operational experience and the greater possibilities gradually offered by technological progress. Various features of the ALN 668 and improvements are described. [Italian]

Di Majo, F Racca, C *Ingegneria Ferroviaria* Vol. 35 No. 2, Feb. 1980, pp 103-117

ACKNOWLEDGMENT: EI
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DOTL JC

03 330196

FS WAGONS FOR RAIL-ROAD COMBINED TRANSPORT [I carri FS per i trasporti combinati strada-rotaia]

Presentation of the new FS wagons for rail-road combined transport, 300 of which have been ordered. [Italian]

Colzi, L *Ferrovia e Trasporti* No. 8-9, Aug. 1980, pp 45-48, 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
 ORDER FROM: Ferrovia e Trasporti, Rome, Italy

03 330206

LIGHT SUBURBAN UNITS [Unidades ligeras para cercanias]

The author first sets out the ideal characteristics which ought to be manifested by the RENFE's suburban rolling stock in order to fulfill the special requirements of this traffic, and goes on to analyse the results of a computer-simulated study of the running of two theoretical units, one in a light alloy and the other in steel, comparing these with the 440-type unit in service on the RENFE. The study yields characteristic basic data currently being examined by the RENFE and a group of Spanish railway rolling stock manufacturers. [Spanish]

Sanchez, JL *AIT-Revista* No. 35, July 1980, pp 27-34, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
 ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

03 330208

DEVELOPMENT OF RAILCAR AIR SPRINGS IN JAPAN

Air springs are now widely used on rolling stock in Japan. They were first adopted by JNR for the Shinkansen line and are now increasingly used on conventional lines. Private railways are fitting most of their newly built rolling stock with air springs. This article is an introduction to the development of air springs in Japan.

Mashimo, Y *Japanese Railway Engineering* Vol. 20 No. 2, 1980, pp 20-24, 7 Fig., 1 Phot.

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

03 330648

RAILCAR ROLLER-BEARING FAILURE-PROGRESSION TESTS

Laboratory endurance tests of six railcar roller bearings that had previously suffered physical damage or were otherwise degraded as a result of actual railroad service were conducted. The primary objective of the test was to obtain a better understanding of the railcar roller-bearing failure process(es) and the manner in which bearing defects progress. A 150-h test with 117 872N (26,500 pounds) radial load (equivalent full carload) at 528 rpm (equivalent to approximately 84 km/h or 52 mph) was planned for each bearing. Only one bearing actually failed to complete the 150-h or 12,550-km (7,800-mi) test. All bearings exhibited further measurable degradation or defect progression during the course of the tests.

Waldron, WD *Lubrication Engineering* Vol. 36 No. 9, Sept. 1980, pp 534-540

ACKNOWLEDGMENT: British Railways
 ORDER FROM: ESL

DOTL JC

03 331471

UNION PACIFIC GOES FOR THE "4-RUNNER"

UP and Trailer Train are committed to the production of 100 four-unit intermodal flat cars, each unit of which has a pair of single-axle trucks. Weight savings and improved aerodynamics are achieved, along with the ability to move the increasingly popular 45-ft trailers. The four-wheel units represent a combination of American and European technologies. Four-unit cars are assembled by intermediate hammerhead drawbars; outer ends have conventional couplers and draft gears. Standard components have been used wherever possible. UP will assemble its 191-ft cars in trains for Chicago--Los Angeles intermodal service.

Progressive Railroading Vol. 24 No. 3, Mar. 1981, p 48, 4 Phot.

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

DOTL JC

03 331497

ALSTHOM TWO-CAR MULTIPLE UNIT DIESEL-ELECTRIC SETS FOR METRIC GAUGE TRACKS

The paper presents the characteristics of bogies for rolling stock for metric gage tracks, the engine and electrical equipment and the lighting, heating and ventilation of the passenger accommodation.

French Railway Techniques No. 4, 1979, pp 161-171

ACKNOWLEDGMENT: EI
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DOTL JC

03 331499

BASIC DESIGN PHILOSOPHY OF THE ADVANCED PASSENGER TRAIN

Application of body-tilting techniques to British Railways Inter-City service that enables journey times to be cut substantially on routes embracing extensively curved tracks is described. Test and research evaluation obtain lateral forces within existing limits despite ultra-high speed negotiation of curves.

Ribbons, RT (British Railways Board) *Rail Engineering International* Vol. 9 No. 2, Apr. 1980, pp 43-45

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

03 331501
DEVELOPMENT BY SNCF OF INTER-CITY "PULL-AND-PUSH" SERVICES FOR 160 KM/H

The authors report how subsequent modification to locomotive lateral damping sees inauguration of extensive 160 km/h network of propelled "Corail"-stock formations with driving trailer. The new service described is using four 11-coach formations with the ten standard VTU 1st and 2nd class open-coaches and one driving-trailer VU side-corridor coach with driver's cab.

Tachet, P Chambadal, M *Rail Engineering International* Vol. 9 No. 2, Apr. 1980, pp 58-64

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

03 331505
USE OF ALUMINUM ALLOYS IN PASSENGER CAR CONSTRUCTION [Primenenie aluminievyyh splavov v passazirskom vagonostroenii]

Described are passenger coaches constructed of aluminum and its alloys. The advantages of such cars as compared with those built of steel are listed. [Russian]

Zuravleva, LV *Zheleznodorozhnyi Transport* No. 12, 1980, pp 47-49, 1 Tab.

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

03 331527
RECENT DEVELOPMENT OF LIGHT-WEIGHT METAL BODIES FOR PASSENGER SERVICE ROLLING STOCK [La recente evoluzione delle casse in lega leggera per il materiale ferroviario per servizio viaggiatori]

The article presents a panorama of recent progress achieved in this field by several railways, as well as results of resistance tests carried out on different materials. [Italian]

Corazza, GR *Ingegneria Ferroviaria* Vol. 35 No. 7-8, July 1980, pp 626-631, 2 Tab., 13 Phot.

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

DOTL JC

03 331531
TESTING NOISE-DAMPED WHEELS ON HAMBURGER HOCHBAHN

Discusses the theory behind the generation of noise by the screeching of wheels on tight curves, a method for its suppression and tests carried out on Hamburg's mass transit system.

Albert, H Raquet, E *Railway Engineer International* Vol. 5 No. 6, Nov. 1980, pp 51-53, 12 Fig.

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

DOTL JC

03 331553
OPTIMUM DESIGN OF THE SIDES OF A RAILROAD CAR

The paper describes the application of a general purpose optimization code, PARS to the design of the sides of a 100 ton high side gondola car. PARS (Program for Analysis and Resizing of Structures), a companion code to the SPAR finite element package, is used for optimizing structures modeled by finite elements. The sides of the gondola car are modeled by beam and plate finite elements. Manufacturing requirements are accounted for by design variable linking and the sides are designed subject to stress buckling and displacement constraints.

Haftka, RT (Illinois Institute of Technology); Prasad, B *Engineering Structures* Vol. 2 No. 4, Oct. 1980, pp 230-236, 21 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

03 331555
AUTOMATED NON-DESTRUCTIVE TESTING TECHNIQUES FOR THE COMPUTERISED INSPECTION ON WHEELS IN MOTION

A system for the examination of the structural integrity of wheels in motion using both ultrasonic Rayleigh surface waves and sonic excitation is presented. Certain technical aspects of this project have reached an advanced state of development elsewhere. The emphasis in this paper is on the overall automation and computerization and the statistical interpretation of the results, which are being developed in Australia.

World Conference on Non-Destructive Testing, 9th, Melbourne, Australia, November 19-23, 1979.

Kemeny, LG (New South Wales University, Australia)
World Conference on Non-Destructive Testing Paper 1C-1, 1979, 16p

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

03 331560
GENERAL CRITERIA FOR VERIFICATION CALCULATIONS OF BOGIES FOR SUBWAY CARS [Criteri generali per il calcolo di verifica delle sale delle carrozze per le ferrovie metropolitane]

The criteria that guided UNIFER draft regulations for bogie calculations are explained. Of particular interest in this regard are the questions connected with the estimation of operating loads, the identification of various standardized service situations and the evaluation of the degree of safety in the different situations. An example drawn from constructional practice and from some comparative evaluations with the present regulations is presented. [Italian]

Paolini, G (Politecnico di Milano); Vigliani, U *Ingegneria Ferroviaria* Vol. 35 No. 4, Apr. 1980, pp 325-330, 16 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

03 331860
HANDBOOK FOR TECHNICAL MANAGEMENT OF CONTAINER MANUFACTURING. PART I: DRY LOAD CONTAINERS [Rukovodstvo po technicheskomu nadzoru za izgotovleniem konteinerov. Chast' I: sukhogruznyye konteinery]

This handbook presents guidelines for the design, prototype testing, and manufacture of all Soviet dry-load containers used in international rail, highway, and maritime trade, as well as for the associated documentation and accounting procedures. Prepared by the USSR Register of Shipping, the handbook must be used by all enterprises involved in making and testing dry-load containers. Appendix 1 provides a procedures checklist for the technical management of dry-load container manufacturing and testing. Appendix 2 provides interim standards for container component testing. Appendix 3 gives the format for container test reports to be submitted to the USSR Register of Shipping. [Russian]

Abstract only available in English. Original documents, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D)

Register of Shipping of the USSR 1979, 56p, 19 Fig., 5 Tab., 3 App.

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

03 331861
GENERAL-PURPOSE CONTAINERS: OVERALL TECHNICAL SPECIFICATIONS, ACCEPTANCE RULES, TEST METHODS--GOST (STATE STANDARD) 20259-74, GOST 20260-74 [Konteinery universal'nye: obshchie technicheskie trebovaniya, pravila priyomki, metody ispytaniy--GOST 20259-74, GOST 20260-74]

This pamphlet contains USSR State Standards GOST 20259-74 and GOST 20260-74. Overall technical specifications are dealt with in GOST 20259-74 for container types UUK-2.5 (3.0), UUK-5U, UUK-10, UUK-20, and UUK-30, as identified in GOST 18477-73. GOST 20259-74 does not cover special-purpose containers. This standard corresponds to the international standard ISO 1496/1 as regards technical requirements. Appendix I provides diagrams of sizes of forces acting on container types UUK-2.5 (3.0), UUK-5U, and UUK-5. Appendix II provides diagrams of dynamic load forces acting on container types UUK-10, UUK-20, and UUK-30. Appen-

dix III provides a reference table for terms and designations used in GOST 20259-74 corresponding with those established by the international standard ISO 1496/1 and the 1972 international agreement on container safety. GOST 20260-74 establishes acceptance rules and test methods for general-purpose container types UUK-2.5 (3.0), UUK-5U, UUK-5, UUK-10, UUK-20, and UUK-30, as identified in GOST 18477-73. This standard, GOST 20260-74, also corresponds to the international standard ISO 1496/1 with regard to test methods. No appendices are given in this standard. [Russian]

Abstract only available in English. Original documents, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D).

Council of Ministers of the USSR 1975, 31p, 24 Fig., 3 App.

ACKNOWLEDGMENT: FRA

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

03 331864

SPECIAL-PURPOSE CONTAINERS: TYPES, BASIC PARAMETERS AND DIMENSIONS--GOST (STATE STANDARD) 19417-74 [Konteynery spetsializirovannye gruppye: tipy, osnovnye parametry i razmery--GOST 19417-74]

USSR State Standard GOST 19417-74 covers specialized cargo containers used for hauling solid, granular, and liquid loads; machinery parts; perishables and other products on railroad flat cars and gondolas, small highway trucks, tractor-trailer trucks, and river and oceangoing vessels. This standard meets the requirements of international standard ISO 668. [Russian]

Abstract only available in English. Original documents, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D).

Council of Ministers of the USSR No Date, 5p, 3 Tab.

ACKNOWLEDGMENT: FRA

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

03 331865

GENERAL-PURPOSE CONTAINERS: TYPES, BASIC PARAMETERS, AND DIMENSIONS--GOST (STATE STANDARD) 18477-73 [Konteynery universal'nye: Tipy, osnovnye parametry, razmery--GOST 18477-73]

USSR State Standard 18477-73 covers general-purpose containers used in railroad, highway, river, and maritime freight transportation. Basic information is given on each type of container. The types of container are determined by weight, with each type falling within one of three general categories--low tonnage (0.725 to 1.25 metric tons), medium tonnage (2.5 to 5 metric tons), and high tonnage (10 to 30 metric tons). This standard is comparable to the international standards ISO/DIS-688 and ISO/DIS-2973 and follows the recommendations given in ISO/6R-1894. It does not cover special-purpose containers. The appendix consists of a table of container types designated in accordance with recommendations in the international standard ISO/R-668. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D).

Council of Ministers of the USSR 1973, 12p, 7 Fig., 4 Tab., 1 App.

ACKNOWLEDGMENT: FRA

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03 331866

GENERAL-PURPOSE METAL CONTAINER OF 5 METRIC TONS GROSS WEIGHT--GOST (STATE STANDARD) 15102-75 [Konteyner universal'nyi metallicheskiy massoi brutto 5, 0 T--GOST 15102-75]

USSR State Standard GOST 15102-75 covers the general-purpose metal container type UUK-5 of 5 metric tons gross weight. The basic parameters and dimensions of the container are described, together with the technical specifications for manufacturing, such as conformance with other standards covering fittings, steel grade, container top sheeting, etc. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Council of Ministers of the USSR 1975, 5p

ACKNOWLEDGMENT: FRA

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03 331867

SPECIALIZED EQUIPMENT OF A CONTAINER TRANSPORTATION SYSTEM: TERMS AND DEFINITIONS--GOST (STATE STANDARD) 21390-75

[Oborudovanie spetsializirovannoe konteynernoi transportnoi sistemy: terminy i opredeleniya--GOST 21390-75]

USSR State Standard GOST 21390-75 establishes the terms and definitions of the specialized equipment of a container transportation system. For reference purposes, the standardized Russian terms and their definitions are given, together with the equivalent terms in both German and English. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Council of Ministers of the USSR 1976, 7p

ACKNOWLEDGMENT: FRA

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

03 331893

ADVANCED TRAIN HEADS FULL TILT FOR DISASTER

Problems with the tilt mechanism and tread braking have caused British Railways to postpone the entry of its prototype Advanced Passenger Train (APT) into high-speed revenue service between London and Scotland; production trains are not now to be delivered until 1984. Failure of the tilt mechanism could cause APT to exceed the loading gauge and collide with a tilted APT on an adjacent track. BR is reported to be considering alternative trains for its fast London-Glasgow operation.

Stansell, J Hamer, M *New Scientist* Vol. 89 No. 1244, Mar. 1981, p 659, 1 Phot.

ORDER FROM: IPC Magazines Limited, Commonwealth House, 1-19 New Oxford Street, London WC1A 1NG, England

DOTL JC

03 331899

FATIGUE ANALYSIS OF RAILROAD FREIGHT CAR WHEELS UNDER THERMAL LOADING CONDITIONS

When a wheel is subjected to repeated thermal loading from drag braking conditions, cracks can develop and propagate due to fatigue. Wheels of 36, 33 and 28 inch diameter were studied using the finite element method. The wheels were subjected to drag braking thermal inputs of 30, 40 and 50 hp, each applied for 30 minutes. The fatigue life was calculated for an assumed load history using Miner's linear cumulative damage rule. The temperature distribution in the wheel was obtained by means of the DOT computer program. The CREEP-PLAST program was then used to calculate the stress and strain distributions. The stress and strain values increased as the braking horsepower increased. For the same thermal loading conditions, the calculated fatigue life was lower for the smaller wheels than for the larger wheels.

Thomas, TJ Garg, VK Stone, DH Association of American Railroads Technical Center Tech Rpt: AAR R-467, Feb. 1981, 54p, 26 Fig., 3 Tab., 16 Ref.

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

DOTL RP

03 334299

INTERMODAL INNOVATION: STILL COMING ON STRONG

Equipment technology for intermodal handling is evolving rapidly as a dozen organizations push research and development for new rail equipment to meet a projected expansion of piggyback markets. The long-sought standardization of cars for universal interchange is getting less attention than maximizing efficiency of movement; some very specialized concepts are evolving for specific markets, and innovative designs such as articulation, well-type bodies and single-axle trucks are winning adherents.

Welty, G *Railway Age* Vol. 182 No. 6, Mar. 1981, p 34, 6 Phot.

ORDER FROM: ESL

DOTL JC

03 334301

GLASSHOPPER: ACF, CARGILL AND SP WIND UP A WINNER

A carbuilder, grain shipper and railroad are joint-venture partners in development of a new concept of freight car design and construction—filament-wound fiberglass-reinforced polyester carbodies. Benefiting from an earlier experiment with such carbody fabrication, the prototype covered hopper car has undergone laboratory and road testing. The 5000 cubic-foot car weighs 52,000 lb and offers both increased lading capacity and fuel efficiency. A projected second prototype will achieve further weight reduction.

Railway Age Vol. 182 No. 6, Mar. 1981, pp 56-57, 3 Phot.

ORDER FROM: ESL

DOTL JC

03 334306

CONSTRAINTS APPLICABLE TO COMPONENTS FOR SUBWAY ROLLING STOCK [Les contraintes applicables aux composants dans le materiel roulant du metro]

Railway rolling stock has to carry a considerable number of persons with maximum safety. At the RATP any trainset rendered inoperative impacts adversely on the entire system. Components have to be designed for great reliability, easy maintainability and a high degree of safety during the lifetime of the vehicles. They have also to meet the climatic and mechanical conditions required of the equipment. To obtain satisfactory quality of service at reasonable cost, the RATP has drawn up special qualifications, developed specific products, established quality levels, installed product testing procedures and a system for following up failures, and refined its maintenance policy. [French]

Boschat, F *Onde Electrique* Vol. 60 No. 8-9, Aug. 1980, pp 52-56

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

03 334313

DESIGN OF UNIT-TRAIN CAR MAINTENANCE FACILITY AND WHEEL SHOP FOR SAN ANTONIO, TEXAS

To supply two 420-MW power units in San Antonio, Texas, with about 3 million tons of coal from Wyoming, seven 110-car unit trains with a total car fleet of about 850 rotary-coupler gondola cars are required, annual car mileage is about 120,000 miles and deliveries occur once every 30 hours. This paper discusses the basis for the decision to construct a rail car maintenance facility, the design parameters and equipment of the facility, and the operational experience of the maintenance shop.

Proceedings of the American Power Conference, Vol. 41, Chicago, Illinois, April 23-25, 1979.

Clausewitz, MF Stack, JR Rinehart, RB

Illinois Institute of Technology Proceeding. 1979, pp 601-609

ACKNOWLEDGMENT: EI

ORDER FROM: Illinois Institute of Technology, American Power Conference, Chicago, Illinois, 60616

03 334322

MODEL TESTS ON STREAMLINING AND AERODYNAMIC BRAKING OF A HIGH SPEED TEST TRAIN

As part of the process in testing the stability of the new cross-anchor (Scheffel) bogies of the South African Railways, full scale high speed tests were required on a test train comprising a GE6EI electric locomotive with modified gear ratios and a standard suburban coach fitted with these bogies.

Skews, BW (Witwatersrand University, South Africa); Bradfield, LL Wright, I *South African Mechanical Engineer* Vol. 30 No. 6, June 1980, pp 221-226, 3 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

03 334332

PCC THE CAR THAT FOUGHT BACK

This history of the development of the PCC electric street railway car during the 1930s and its refinement into the 1950s contains a significant amount of technical detail. Beginning with the 1930 street railway industry—one in

decline and lacking a modern, competitive vehicle, the book traces the market study, research and development efforts, production and application of the vehicle. Operators and suppliers funded the effort through the Electric Railway Presidents Conference Committee which lent some of its initials to the car's PCC designation. All aspects of the development of the streamlined car are covered: body design, trucks and suspension, motors and drive, control systems, standardization, modularization and lightweight to reduce first cost and operating costs. Also described are contemporary efforts to produce a vehicle competitive with the PCC, as well as application of the PCC technology to rapid-transit vehicles. In conclusion the book tells of the export of both PCC cars and PCC technology to other nations where the technology continued to evolve. PCC cars still operate in some North American cities and elsewhere around the world.

Carlson, SP Schneider, FW, III Bromley, JF Jackson, RE
Interurban Press Special 64, 1980, 250p, Photos., 1 App.

ORDER FROM: Interurban Press, P.O. Box 6444, Glendale, California

03 334431

NEXT GENERATION OF BR MULTIPLE-UNITS REVERTS TO ALL-STEEL BODIES

The 48 four-car EMUs of Class 317 which will link Bedford with Moorgate in the City of London when electrification at 25 kV 50 Hz is completed next year are the first production run of British Rail's latest standard multiple-unit. Intended for use in both electric and diesel versions, the all-steel bodysell has been adapted from the successful Mk III inter-city coach, despite some difficulties in finding the right grade of steel. The small motor policy introduced in 1976 on Class 313 has been reversed in favour of concentrating all traction power equipment on one car.

Wakefield, FHG *Railway Gazette International* Vol. 137 No. 4, Apr. 1981, pp 284-286, 2 Fig., 1 Phot.

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03 334432

BUILT TO LAST IN STAINLESS STEEL

Metro cars ordered by Chicago, Miami and Baltimore represent the first large-scale production of bodies fabricated from low-carbon stainless steel. This material is not only easier to form and has better welding characteristics; it also has a superior finish which is important when cars are not painted. Stainless costs more than other steels which are not corrosion-resistant, but lends itself readily to lightweight forms of construction that can rival aluminium. Another advantage is the high modulus of elasticity which enables a stainless steel car to resist deformation from overloads or impacts while still absorbing energy.

Darrah, JB (Budd Company) *Railway Gazette International* Vol. 137 No. 4, Apr. 1981, pp 286-288, 1 Tab., 6 Phot.

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DOTL JC

03 334466

SEPTA WHEEL RESIDUAL STRESS INVESTIGATION

The residual stress determinations were made in accordance with the procedure given in the AAR Manual of Standards and Recommended Practices, Section G. Little in the way of significant residual stress was found in the critical plate fillets of the five wheels submitted by the Southeastern Pennsylvania Transportation Authority.

Opinsky, AJ

Association of American Railroads Technical Center, Southeastern Pennsylvania Transportation Authority Res Rpt. AAR R-411, Project H-213, Feb. 1980, 19p, 1 Fig., 3 Tab., 2 Ref.

Contract SEPTA P/O 029448

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

DOTL RP

03 334471

PERFORMANCE**GUIDELINES—HIGH-PERFORMANCE/HIGH-CUBE COVERED HOPPER CAR**

This Guideline describes the areas of desired improvement in 100-ton, high-cube, covered car performance and sets goals to stimulate the design

of improved covered hopper cars. Cars must improve upon the dynamic characteristics and life-cycle costs of existing covered hopper cars by reducing wear and tear on roadbed and by reducing derailment tendencies. TTD has organized a development program to design, build and test prototype cars to this Guideline.

Manos, WP Johnstone, B
 Association of American Railroads Technical Center Tech Rpt. AAR R-423, June 1980, 35p, 2 Fig.

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

DOTL RP

03 334474
SOFTWARE SERIES: SAFEM: A FINITE-ELEMENT FATIGUE LIFE DESIGN PROGRAM FOR FREIGHT CAR STRUCTURES AND COMPONENTS

The SAFEM Program enables a designer to conduct fatigue life calculations during the design process for freight cars or components when modelled by finite elements. It incorporates the recommendations given in Association of American Railroads Research Report No. 245, entitled: "Interim Guidelines for Fatigue Analysis of Freight Cars," May 1977.

Prasad, B Singh, SP
 Association of American Railroads Technical Center Tech Rpt. AAR R-434, July 1980, 158p, Figs., 3 Tab., 11 Ref., Apps.

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

DOTL RP

03 334475
EVALUATION OF NON-LINEAR FLEXIBLE CARBODY VEHICLE (FREIGHT CAR) MODEL

The Non-linear Flexible Carbody Vehicle Model, that was developed to study the dynamic behavior of a freight car travelling on tangent track, was evaluated using field test data. A description of the model, data acquisition and data reduction for validation is presented. Five car configurations, corresponding to different auxiliary suspension devices, were used for comparisons between the model results. While a good correlation was obtained for some configurations, it was found that better data on the characteristics of some devices is still needed.

Hussain, SMA Singh, SP Garg, VK
 Association of American Railroads Technical Center Tech Rpt. AAR R-435, Aug. 1980, 225p, 62 Fig., 5 Tab., 2 Ref., Apps.

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

DOTL RP

03 334477
ANALYSIS OF ROAD SERVICE ENVIRONMENTAL DATA AND LABORATORY FATIGUE TEST DATA FOR DEVELOPMENT OF RECOMMENDED BOLSTER FATIGUE TEST GUIDELINES

The development of acceptable guidelines for a truck bolster fatigue test specification requires information concerning the operating service environmental loads that this truck component will be subjected to over its lifetime. A broad range of operational data with varying speeds and track conditions are required to determine the sizes and positions of the loads, as well as the cyclic frequency. Several road service test series were run previously in relatively slow, heavy coal consists. These runs were documented and analyzed in previous publications, References 1 and 2. A generally higher speed test series using the same 100 ton coal hopper as before is described and the truck load data reduced and analyzed. Analysis of the complete set of all service conditions was used to develop a laboratory test machine simulation of the actual road conditions. Laboratory bolster fatigue tests were used to develop recommended load magnitudes and cycle requirements. Additional lab tests were used to upgrade and validate the guidelines proposed for a truck bolster fatigue test which is to be an addition to an official AAR test specification. Procedures used to develop the guidelines, including the mathematical analysis, are presented. The final version of the recommended guidelines is also presented.

Evans, RA Johnson, MR
 Association of American Railroads Technical Center, Railway Progress Institute Final Rpt. AAR R-440, Aug. 1980, 66p, Figs., Tabs., 2 Ref., 1 App.

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

DOTL RP

03 334478
ANALYTICAL INVESTIGATION OF MAXIMUM LADING END-WALL FORCES FROM VARIOUS INPUT FORCE PULSE SHAPES

The maximum lading end-wall forces resulting from five variously shaped input pulses in a struck railroad freight car were analyzed. The analytical parameters included lading flexibility and looseness, and coulombic floor friction. A unique computer program was developed to handle the mathematical non-linearities, and selected results have been compared with those obtained from two alternate methods of solution.

Manos, WP Raidt, JB
 Association of American Railroads Technical Center AAR R-452, Nov. 1980, 81p, Figs., 7 Tab., 6 Ref., 3 App.

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

DOTL RP

03 334479
SPECIAL ATTENTION MUST BE DRAWN TO AUTOMATIC COUPLING [Avtoscepnomu ustrojstvu-osoboe vnimanie]

The authors analyse failures in automatic coupling of wagons, indicate the main causes of damage and give some recommendations for increasing operating reliability. [Russian]

Senderov, GK *Zheleznodorozhnyi Transport* No. 1, 1981, pp 39-41

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

03 334481
COUPLED TORSION BARS IN RAIL VEHICLE SUSPENSIONS

Explains the theory behind the system of a secondary suspension based on coupled torsion bars, and describes experimental work.

Kebrowski, A *Railway Engineer International* Vol. 5 No. 6, Nov. 1980, pp 57-60, 12 Phot.

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

DOTL JC

03 334484
NEW SNOWPLOWS FOR VR'S DIESEL LOCOMOTIVES [Nya snoplogenheter for VR's diesellok]

The new snowplow unit consists of a plow blade and its hydraulic maneuvering machinery. The unit has a weight of 2.5 tons. When two units have been installed, which takes about 30 min per unit, one gets a very efficient snowplow. The first snowplow unit was planned in 1978, the first prototype was manufactured in 1979 and this year two more units have been manufactured. When the first snow falls, one can choose a suitable locomotive and equip it with the snowplows. When the winter is over, one can use it again as an ordinary locomotive without snowplows. [Swedish]

Alameri, M *Nordisk Jaernbane Tidskrift* Vol. 106 No. 6, 1980, pp 3-4, 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
 ORDER FROM: Nordiska Jaernvaegsmannasallskapet, SJ Centralfoervaltning, S-105 50 Stockholm C, Sweden

03 334486
CAD (COMPUTER-ASSISTED DESIGN) AND RAILWAY PERFORMANCE [La CAO au service des performances ferroviaires]

Computer-assisted design (CAD) which is a method of improving, selecting and testing projects implemented by design departments was used by the SNCF for the lay-out and earthworks of the new Paris-South East line. But the article is mainly concerned with its application in rolling stock design: aerodynamics and vehicle streamlining; static and dynamic calculation of structures. [French]

Boutonnet, JC *Revue Generale des Chemins de Fer* Jan. 1981, pp 23-32, 22 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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DOTL JC

03 334489

COMPARISON BETWEEN STEEL AND ALUMINIUM IN RAILWAY PASSENGER ROLLING STOCK CONSTRUCTION**[Competition entre l'acier et l'aluminium dans la construction du matériel à voyageurs des chemins de fer]**

Comparison of the technical and economic characteristics of steel and aluminium construction. Present construction trends in France and the world (excluding Comecon countries). Steel is likely to come into its own again. [French]

Bouley, J *Revue Generale des Chemins de Fer* Mar. 1981, pp 123-130, 11 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

03 334686

UNIT TRAIN COAL CAR DESIGN CONSIDERATIONS

Unit Coal Train cars in high mileage, heavy train service have shown weaknesses in almost all areas of design because of the radical increase in severity of service. Careful inspection and evaluation of these cars on a periodic basis will reveal design and component selection changes that must be made on future cars. The overall economics of the 100-ton cars and its effect on track must be faced soon to reduce transportation costs. This paper discusses many of the design problem areas and suggests state of the art solutions for improvement.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

Johnson, RE
American Society of Mechanical Engineers Conf Paper 81-RT-3, Jan. 1981, 8p, 15 Fig., 2 Ref.

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03 334691

WEAR PREDICTION FOR LOCOMOTIVE WHEELS

This paper presents a wear prediction methodology for locomotive wheels and a detailed analysis of wheel load changes induced by wear. These load changes, due to one or more worn wheels, are shown to be significant and deleterious to dynamic performance as well as altering the wear rates. Methods for calculating both the change in wheel profile due to wear and the consequent redistribution of loads are developed and illustrated with numerical examples.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

Ross, FD (Aerospace Corporation); Torby, BJ
American Society of Mechanical Engineers Conf Paper 81-RT-8, Jan. 1981, 9p, 7 Fig., 1 Tab., 21 Ref.

ORDER FROM: ESL

DOTL RP

03 334693

ANALYSIS OF CYCLIC THERMAL AND RESIDUAL STRESSES IN CH36 WHEELS UNDER SERIES OF SEVERE DRAG BRAKING

A finite element computer program which takes into consideration the nonlinear elasto-plastic behavior of the material, its variation with temperature and has restart capabilities, has been used to analyze the thermal and residual stress histories of CH36 wheels under the effect of two separate series of cycles of drag braking. Each series consists of five cycles, each cycle consists of applying a drag braking thermal load for a period of one hour followed by gradual cooling to room temperature. The restart capability has been used to store the final geometrical shape and corresponding state of stress at the end of each cycle, to be considered as initial conditions for the following cycle. The thermal stresses resulting from the thermal load of each cycle have been computed; as well as the residual stresses resulting after the wheel has cooled to room temperature in each cycle.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE

Railroad Conference, April 28-30, 1981.

Elgindy, IY Sciammarella, CA (Illinois Institute of Technology)
American Society of Mechanical Engineers Conf Paper 81-RT-10, Jan. 1981, 11p, 27 Fig., 3 Tab., 19 Ref.

ORDER FROM: ESL

DOTL RP

03 334701

POSTAL RAILCARS [Les autorails postaux]

The article describes the characteristics and arrangement of mail vehicles which are derived from the French National Railways two-coach sets of the X 4750 type. [French]

Pin, C Jullien, M Travers, L *Revue Generale des Chemins de Fer* Vol. 99 Oct. 1980, pp 573-577

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

03 334739

GUIDELINES FOR RAIL VEHICLE DRAWINGS

Drawings for the German standard steam locomotives had to conform to uniform rules. During the fifties, guidelines were also established for rail car drawings. To meet the requirements of the latest state of the art, including micro-filming and computer-aided drawing practices, the working group for drawings of the DIN Rail Vehicle Committee (FSF) has issued a new guideline for drawings. The guideline and its application are described. [German]

Rompa, W Siegmann, E *Glaser's Annalen ZEV* Vol. 105 No. 2, Feb. 1981, pp 40-42

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

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03 334950

THE NEW BREED OF FREIGHT CARS: A MATERIAL DIFFERENCE

Aluminum, fiberglass-reinforced plastics and high-strength plastics are among materials getting new looks from railroads and other freight-car buyers. The Glasshopper, a covered hopper car with a fiberglass-reinforced polyester body, and Algola, a lightweight unit-train gondola fabricated from Swiss-produced extrusions, are generating new interest in an era of high fuel costs. The new materials are now applied in ways other than simple substitution for steel as has usually been the case in previous freight-car applications.

Welty, G *Railway Age* Vol. 182 No. 10, May 1981, pp 26-29, 4 Phot.

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03 335054

THE GREAT TRUCK RACE: TEMPORARILY ON HOLD

While some guidelines are starting to emerge, though not always clearly, from the FRA-sponsored Truck Design Optimization Project, the appraisal of premium (including radial) freight-car trucks is intended to compare them with each other and with the conventional designs already tested. The economic justification of the higher-cost Type II designs is not always easy to demonstrate, although an analytical technique has been developed.

Armstrong, JH *Railway Age* Vol. 182 No. 8, Apr. 1981, p 40, 7 Fig., 1 Phot.

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03 335289

A PASSENGER RAIL TRUCK DESIGN METHODOLOGY

A design methodology is developed for passenger vehicle rail trucks in which primary and secondary suspension parameters and wheel/rail parameters are determined to meet a set of dynamic performance indices.

Horak, D Wormley, DN *International Journal of Vehicle Design* Vol. 2 No. 1, Feb. 1981, pp 1-18, Refs.

ORDER FROM: Inderscience Enterprises Limited, La Motte Chambers, St Helier, Jersey, England

03 335443

NEW DEVELOPMENTS IN COACH AND RAIL CAR CLEANING ON THE GERMAN FEDERAL RAILWAY [Neuerungen bei der Reinigung von Reisezug- und Triebwagen der Deutschen Bundesbahn]

The system used at present for cleaning passenger vehicles on the German Federal Railway is to be replaced by a more sophisticated one. A special Working Party, DS 403, has been experimenting with new cleaning schedules and working methods which will ensure that the quality of cleaning is maintained and take into account the high level of customer expectations. The desired objectives with regard to rationalization for the same quality or an improved quality of cleaning can be met in this area which requires considerable investment in terms of staff and costs. [German]

Boden, N *Die Bundesbahn* Vol. 57 No. 2, Feb. 1981, pp 119-127, 12 Phot., 13 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

03 335452

VERIFICATION OF THE BEHAVIOUR OF WINDOWS WHEN TRAINS PASS AT HIGH SPEEDS [PRUEFUNG DER VERHALTENS VON FENSTERN BEI SCHNELLEN ZUGBEGEGNUNGEN]

No Abstract. [German]

Kalkbrenner, E Kruegel, W *Glastechnische Berichte* Vol. 54 No. 1, 1981, pp 8-11, 6 Phot., 2 Ref.

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

03 335457

APT
Describes some of the engineering aspects of the total design; coaches, power and brakes, suspension and tilt, industrial design and economics.

Ledsome, C *Engineering* Vol. 221 No. 2, Feb. 1981, p 96, 18 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

03 335468

PRODUCTION CONTROL IN MAINTENANCE AND MANUFACTURE OF NEW RAILWAY VEHICLES [PRODUKTIONSSTEUERUNG IN DER INSTANDHALTUNG UND NEUFERTIGUNG VON SCHIENENFAHRZEUGEN]

Production control in the maintenance and manufacture of new railway vehicles serves to rationalize the corresponding manufacturing process. In a complex control system pre-fabrication and assembly must be included. The availability of materials and spare parts must also be ensured at the exact time when they are needed. Progressive production control must be developed as an important instrument of manufacturing control. [German]

Pigors, O Schmidt, KH *DET Eisenbahntechnik* Vol. 28 No. 12, Dec. 1980, pp 495-496, 1 Tab., 2 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Atlas for Action Books, Incorporated, 162 Fifth Avenue, New York, New York, 10010

03 335605

HIGH SPEED PRECISION ROTARY FORGING AT B.S.C. ICKLES WORKS

British Steel Corporation put in a railway axle production line based on a rotary forging machine. The paper describes the principles of the machine design, method of operation, tool design and tool materials.

Proceedings of the International Conference on Rotary Metalwork Processing, 1st, London, England, November 20-22, 1979.

Guy, DJ (British Steel Corporation); Hillis, JW
IFS Publications Limited Proceeding 1979, pp 405-410

ACKNOWLEDGMENT: EI
ORDER FROM: IFS Publications Limited, Bedford, England

03 335618

REQUIREMENTS FOR THERMAL VAN CONTAINERS (REFRIGERATED, HEATED, AND INSULATED)

These requirements have been established to facilitate handling and securing methods necessary for interchange of containers between marine, highway and rail transport modes. Thermal containers are employed for the transport of cargo in large unit loads, under conditions where the heat transmission between the inside and the outside of the container must be retarded or controlled.

ANSI Standard No. MH5. 1. 2M, 1980, 66p

ACKNOWLEDGMENT: EI
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03 335846

THE BACKPACKER: YOUNGSTOWN'S INTERMODAL ENTRY

A prototype articulated, multi-purpose intermodal car, the Backpacker, has been developed by Youngstown Steel Door. The well-type car without center sill has a low-level deck that can support either trailers or containers so they may be handled without clearance restrictions in interchange service. The low center of gravity improves car dynamics and reduces aerodynamic drag, cutting locomotive fuel requirements.

Railway Age Vol. 182 No. 12, June 1981, p 34, 1 Phot.

ORDER FROM: ESL

DOTL JC

03 335868

RAIL PASSENGER SEAT DEVELOPMENT

This report covers the revenue service field testing aspects of the Rail Passenger Seat Development Program. VIA Rail Canada Incorporated installed six different candidate seats and a newly designed railway passenger seat in an intercity coach operating in a high speed reserved train service between Montreal and Toronto. During the survey period from May to August 1978, a questionnaire was administered to over 5000 respondents. These respondents indicated that the overall aesthetics of the various seats were indistinguishable but that specific design feature improvements could be noted with some certainty such as ease of recline, angle of seat back, firmness of food tray, convenience of ashtray, etc. In addition, even over this short period, major differences in the mechanical integrity of the six candidate seats could be discerned.

Secord, T Rowan, WG
Transport Canada Research and Development Centre TP 2118, Mar. 1980, 115p

ORDER FROM: Transport Canada Research and Development Centre, 1000 Sherbrooke Street, West, P.O. Box 549, Montreal, Quebec H3A 2R3, Canada

03 336067

SPECIAL INVESTIGATION REPORT--TANK CAR STRUCTURAL INTEGRITY AFTER DERAILMENT

Since 1968, the Safety Board has investigated many serious accidents involving release of hazardous materials from tank cars which were either breached or ruptured following derailments. As a result of these investigations, the Safety Board recommended that Federal authorities take remedial action to reduce the likelihood of tank cars releasing their contents in the derailment environment. During its investigation of a railroad derailment near Inwood, Indiana, on November 8, 1979, the Safety Board noted unresolved questions about the dangers posed in handling severely damaged tank cars containing liquefied flammable gases at the accident site. Because of this continuing problem, the Safety Board initiated this special investigation to identify the hazards caused by the actual reduction of the ability of damaged cars to contain their lading; to determine the ability of experts to estimate this reduced capability; and to examine the feasibility of developing practical guidelines to help determine how damaged hazardous materials tank cars should be handled.

National Transportation Safety Board NTSB-SIR-80-1, Oct. 1980, 42p

ACKNOWLEDGMENT: NTIS
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PB81-134819

03 341255

**LOW-PROFILE, LIGHT-WEIGHT INTERMODAL RAILCAR
VOLUME II: ACCEPTANCE TEST PLAN**

The Performance Specification and Acceptance Test Plan, respectively contained in Volumes I and II of this report, define the requirements for a low-profile, light-weight intermodal railcar. The Car specified here must be able to operate within restricted clearances when carrying either highway trailers or standard shipping containers and must be designed for low aerodynamic resistance and light weight in order to conserve energy. Also, it must be capable of dynamically stable operation at the high speeds which may be expected in special intermodal unit trains. Both safety and protection of lading against the damage which can be caused by excessive ride vibration must be considered in the design of the Car. It is intended that these requirements will stimulate the development of innovative railcar designs. The Car specified here is an idealized concept which satisfies the most stringent technological requirements presently envisioned for intermodal

service. The performance baseline defined here may not be equally appropriate for all users of the Specification, some of whom may wish to modify some of the requirements better to reflect their particular needs. The Acceptance Test Plan includes not only the performance tests which must be performed to verify compliance with the Specification, but also the sequence of preliminary and detailed analyses which should be performed to facilitate development of a Car design which will meet the performance requirements.

Hull, RL Shladover, SE
Systems Control, Incorporated, Federal Railroad Administration Final
Rpt. FRA/ORD-81/04.II, Feb. 1981, 24p, 2 Tab.

Contract DOT-FR-9050

ORDER FROM: NTIS

PB81-167934, DOTL NTIS, DOTL RP

04 328438

DESIGN AND APPLICATIONS OF FLYWHEELS. 1970-OCTOBER, 1979 (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 266 citations, none of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Nov. 1980, 273p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-800468

04 328439

DESIGN AND APPLICATIONS OF FLYWHEELS. NOVEMBER, 1979-OCTOBER, 1980 (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 48 citations, all of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Nov. 1980, 55p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-800450

04 328640

DESIGN AND APPLICATIONS OF FLYWHEELS. SEPTEMBER, 1978-OCTOBER, 1980 (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 166 citations, 73 of which are new entries to the previous edition.)

Habercom, GE, Jr
National Technical Information Service Nov. 1980, 173p

ACKNOWLEDGMENT: NTIS
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PB81-800476

04 329137

RAILROAD ELECTROMAGNETIC COMPATIBILITY LOCOMOTIVE VOLUME 2, SUMMARY OF E-60 CP ROAD TEST ELECTROMAGNETIC EMISSION MEASUREMENTS

Results of electromagnetic emission measurements performed on an E-60 locomotive during a revenue service run from Washington, DC, to New Haven, Connecticut, and back are presented. A description of the measurements and methodology employed is included.

Prepared in cooperation with IIT Research Inst., Chicago, IL. See also report dated October 1980, Volume 1, PB81-117988.

O'Neill, DJ
Electromagnetic Compatibility Analysis Center, Federal Railroad Administration Intrm Rpt. ECAC-CR-80-73, FRA/ORD-80/66.II, Jan. 1981, 57p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-165466, DOTL NTIS

04 330183

NEW MEDIUM SPEED TWO STROKE CYCLE DIESEL ENGINE--THE GENERAL MOTORS EMD 645EB SERIES

The new EMD Model 645EB Series turbocharged and aftercooled two-stroke cycle medium-speed diesel engine, manufactured by Elec-

tro-Motive Division of General Motors Corporation is described regarding design features and performance. Design details of performance-related features--the turbocharger and unit fuel injector--are discussed and fuel economy improvements quantified. The new EB cast iron cylinder liner features a bore surface hardened with laser-beam technology in a facility believed to be the largest multi-kilowatt installation in the world today for purposes of heat treatment.

For Meeting held February 3-7, 1980.

Kotlin, JJ (General Motors Corporation); Williams, HA, Jr Malina, JA *American Society of Mechanical Engineers Papers* ASME 80-DGP-32, 1980, 12p, 4 Ref.

ACKNOWLEDGMENT: EI
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04 330185

CONVERTER PROPULSION SYSTEMS WITH THREE-PHASE INDUCTION MOTORS FOR ELECTRIC TRACTION VEHICLES

Converter systems for high-power electric traction vehicles and for smaller vehicles are described, which do not drain reactive power from the supply line or even feed reactive power into the line, if necessary, and produce only a small amount of harmonics. Some test and production vehicles with three-phase induction motors, test data, and experiences in service of such vehicles are described.

Kielgas, H *IEEE Transactions on Industry Applications* Vol. IA-16 No. 2, Mar. 1980, pp 222-233, 13 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

04 330207

THYRISTOR CHOPPER-CONTROLLED ELECTRIC CARS IN JAPAN

The effective use of energy is a vital problem for Japan since the country can cover only a small part of its needs. The railways are the most energy-saving mode of transport. They depend largely on electricity for power sources. Thyristor and chopper vehicles with regenerative brakes have been introduced. The article presents the vehicles now in use in Japan.

Katta, T *Japanese Railway Engineering* Vol. 20 No. 2, 1980, pp 3-10, 8 Tab., 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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04 330218

BR ELECTRONIC EQUIPMENT--DESIGN, MAINTENANCE AND REPAIR

Discusses the advancement from early electronic equipment to present-day designs and shows how performance has improved. New maintenance policy for traction components is also outlined.

Tomlinson, GW *Railway Engineer International* Vol. 5 No. 5, Sept. 1980, p 34, 4 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

04 330646

ADVANCED FLYWHEEL ENERGY STORAGE UNIT FOR A HIGH POWER ENERGY SOURCE FOR VEHICULAR USE

The need to reduce dependence on petroleum sources for energy generation has created a substantial interest in investigation and development of energy storage devices. The flywheel energy storage unit can provide substantial benefits to transportation propulsion systems. This method of vehicle energy storage can also be applied to third rail electrically powered vehicles or station-charged electrically powered vehicles. The one year program that is described in this paper involves the design, fabrication and experimental determination of the performance of an advanced, hermetically-sealed energy storage unit that has been sized for a typical 3000 pound curb weight vehicle.

From 14th, Intersociety Energy Conversion Conference; Boston, Massachusetts, August 5, 1979.

Raynard, AE
AiResearch Manufacturing Company Proceeding No. 79CH1477-9, 1979, pp 622-626

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: ESL

04 331100

SIMULATING THE RUNNING PERFORMANCE OF DIESEL-ELECTRIC LOCOMOTIVES USING MATHEMATICAL MODELS

The experimental and theoretical investigations described in this paper relate to the performance of the drive and control systems of motive power units. The investigations were carried out for a Series 643 diesel-electric locomotive of Yugoslav Railways under actual service conditions and with a mathematical model representative of the real system. The model was matched to the simulations capabilities of an electronic computer. By extending the investigations relating to the application of the variants of the basic model it has been possible to draw attention to a possible optimization of similar systems already during the planning stage. [German]

Valter, Z. *Glaser Annalen ZEV* Vol. 104 No. 11, Nov. 1980, pp 383-389

ACKNOWLEDGMENT: British Railways
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DOTL JC

04 331102

GOOD FUTURE FOR COAL: STEAM LOCOMOTIVES

Railways are the one form of ground transport that can run as well on coal or residual fuels as any other fuel, and America, Australia, China and several African states are looking at new design techniques. Dr. John E. Sharpe of Queen Mary College, University of London, outlines the economic factors influencing the choice of railway motive power suggesting that the coal-burning Rankine-cycle locomotive is greatly more cost effective than current diesel or electric locomotives and their projected developments.

Sharpe, JE. *Engineering* Vol. 220 No. 12, Dec. 1980, p 1348

ACKNOWLEDGMENT: British Railways
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DOTL JC

04 331111

ELECTRONICS INCREASES LOCOMOTIVE PULLING POWER

Controller compares ground speed, as reported by radar, to wheel speed. When a wheel slips, controller adjusts generator voltage supplied to traction motors so that slipping wheel runs at a speed providing optimum wheel-to-rail friction.

Machine Design Vol. 52 No. 17, July 1980, p 42

ACKNOWLEDGMENT: British Railways
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04 331476

60 YEARS OF DEVELOPMENT OF TRACTION MOTORS FOR MAIN-LINE LOCOMOTIVES

This article discusses the demands made on high-capacity traction motors for locomotives. The evolution of motors, as produced by ASEA, and the history of electric locomotive development are discussed with the design innovations involved. The recent important technical improvements are covered and it is shown how weight has been reduced and performance improved.

Lindholm, G. *ASEA Journal* Vol. 53 No. 6, 1980, pp 79-88, 19 Fig.

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04 331496

DYNAMIC RESPONSE OF A LOCOMOTIVE DRIVE AXLE WITH THREE-PHASE ASYNCHRONOUS TRACTION MOTOR [Das Dynamische Verhalten einer Lokomotivtreibachse mit Drehstrom-Asynchronfahrmotor]

The theory for the computational simulation of a locomotive driving axle with three-phase asynchronous motor is discussed. A simulation approach to an asynchronous machine is considered, along with machine performance under two possible kinds of energy supply and possibilities to influence this performance. The interaction of the electrical machine with the rubber ring cardan shaft transmission and the friction is discussed. It is concluded that a three-phase asynchronous machine can be well adapted to the conditions of railroad operation by suitable electric design. [German]

Stempina, G. *Elektrische Bahnen* Vol. 78 No. 5, May 1980, pp 138-144

ACKNOWLEDGMENT: EI
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DOTL JC

04 331498

10 YEARS OF DEVELOPMENT WORK ON THE GAS TURBINE FOR TRACTION

After a review of the objectives of the work on the traction gas turbine, this article reports on the information made available by that work and the developments which can be foreseen because of it. The options which were available in designing the new 1,200 kW turbine are stated and the first results obtained and the consequent prospects are expounded.

Senac, G (French National Railways) *French Railway Techniques* No. 4, 1979, pp 184-206

ACKNOWLEDGMENT: EI
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04 331500

NEW FAMILY OF HIGH-PERFORMANCE AC AND DC MULTIPLE-UNITS TAKING OVER BR SUBURBAN SERVICES

The paper reports that the GEC-Traction powered trainsets of British Railways design and construction introduced over the last five years have a high-degree of standardisation for operation on 25 kV and 750, 650 V dc lines. A series have been designed for 25 kV/750 V dc with ready potential to link Southern Region services with those north of the Thames.

Rail Engineering International Vol. 9 No. 2, Apr. 1980, pp 55-56

ACKNOWLEDGMENT: EI
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04 331528

THE E 633 ELECTRIC LOCOMOTIVES OF THE FS [Le locomotive elettriche Gr. E 633 delle FS]

Description of the new E 633 electric locomotives with electronic power control. After a rapid outline of general features and the mechanics, the article describes the T 850 traction motor, comparing it with old style motors, before going on to a detailed study of the traction circuit and braking. It concludes with a description of the logic circuit, which allows maximum use of the tractive unit's possibilities. [Italian]

Cavagnaro, M. Gomisel, G. *Ingegneria Ferroviaria* No. 7-8, July 1980, pp 585-598, 16 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

04 331532

DESIGN APPROACH TO THE CLASS 58

The design concept of the Class 58 locos aims to minimise the total cost of ownership. Describes how attention to the economics of building and maintenance will achieve the design objectives.

Rollin, D. Shore, AGL. *Railway Engineer International* Vol. 5 No. 6, Nov. 1980, pp 48-50, 5 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
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DOTL JC

04 331533

RAILWAYS--ARE STEAM-TURBINE-ELECTRICS A VIABLE PROPOSITION?

Reviews major attempts to develop a steam-electric locomotive, five of which used a turbine.

Duffy, MC. *Electronics and Power* Vol. 26 No. 11, Nov. 1980, pp 898-903, 7 Fig.

ACKNOWLEDGMENT: International Union of Railways, BD
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04 331534

ELECTRIC DRIVE WITH A THYRISTOR CONVERTER FOR A TWO-SYSTEM LOCOMOTIVE 69EO [Elektricky pohon s tyristorovym menicem pro dvousystemovou lokomotivu 69EO]

A new concept is presented of semiconductor converters for a two-system locomotive 69EO with a 3 kv system of dc supply and 25 kv, 50 Hz system of ac supply. The function of the locomotive with both systems of supply, the design of the converter boxes and some technical problems of the converters in the traction unit are discussed. The excitation pulse converter, the flow regulator and the electrodynamic brake are considered. [Czech]

Capek, M Sova, J Sluka, J *Elektrotechnicky Obzor* Vol. 69 No. 4, Apr. 1980, pp 220-227, 8 Ref.

ACKNOWLEDGMENT: EI
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04 331544

CONTROL AND POWER CIRCUITS OF A THYRISTOR PULSE CONVERTER FOR THE MODERNIZATION OF T3-TYPE STREETCARS [Regulacni a silove obvody tyristoroveho pulsnihho menice pro modernizaci tramvaji typu T3]

The control and power circuits of modernized type-T3 streetcars equipped with a thyristor pulse converter are described. The circuits were tested starting in 1976 on two prototypes which were used in 1977 for the construction of 10 pieces and in 1978 of a series of 60 pieces. [Czech]

Ryant, J First, A *Elektrotechnicky Obzor* Vol. 69 No. 4, Apr. 1980, pp 215-219

ACKNOWLEDGMENT: EI
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04 331552

INFLUENCE OF FEEDING WITH RIPPLE CURRENT ON THE MAGNITUDE OF LOSSES AND TEMPERATURE RISE OF THE WINDINGS IN A TRACTION MOTOR [Vliv napajeni vlnivym proudem na velikost ztrat a otepleni vinuti trakcniho motoru]

Tests of dc traction motors supplied from an impulse converter are reported. The losses in the machine which are given in dependence on ripple of the supply current and its frequency are compared with losses in case of classical dc feeding. The temperature rises of different windings are presented depending on the rippling of the supply current. [Czech]

Prochazka, J Sos, P Zakopal, E *Elektrotechnicky Obzor* Vol. 69 No. 7, July 1980, pp 445-448, 3 Ref.

ACKNOWLEDGMENT: EI
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04 331557

REGENERATIVE BRAKING OF ELECTRIC RAIL VEHICLES

The paper discusses the introduction of regenerative braking in electric rail vehicles, particularly in the case of rapid transit vehicles. A detailed description of the regenerative braking techniques applied to d.c. traction motors is given. Also examined are regenerative braking systems for ac traction vehicles.

Wagner, R *Siemens Power Engineering* Vol. 2 No. 9-10, Sept. 1980, pp 294-298, 5 Ref.

ACKNOWLEDGMENT: EI
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04 331842

AXLE MOTOR AND INVERTER DRIVEN MU FOR BR

This article describes a test vehicle being built by British Railroads to compare traction arrangements and measure electrical noise levels. The axle motors are evaluated in a multiple unit, which is being especially converted for the purpose.

French, PW *Railway Engineer International* Vol. 5 No. 4, July 1980, pp 35-38, 3 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

04 331847

EXPERIENCE OF ELECTRONICS ON RAPID TRANSIT STOCK

Over the past 20 years, each new fleet of railroad rolling stock purchased by the London Transport Executive has incorporated more and more electronic equipment. The rationale behind the adoption of this type of equipment, and the experience gained with its use are outlined. Consideration is given to areas of apparent discord between electronic technology and the railroad vehicle industry, together with an indication of how London Transport is dealing with the situation. It is intended that the paper provide various aspects of the industry (manufacturers and users, technical staff and managers) with a better insight into the problems involved with the introduction of a "new technology" into a long established industry.

Harding, MA *Institution of Electrical Engineers, Proc Part B* Vol. 127 No. 4, July 1980, pp 215-222, 3 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

04 331854

THREE-PHASE DRIVE TECHNOLOGY FOR RAPID TRANSIT RAILROADS [Drehstromantriebstechnik fuer Nahverkehrsbaehnen]

The development of power electronics and inverters has made it possible to use three-phase asynchronous motors as traction motors for electric railroads. The advantages which result from this technique for tractive units of rapid transit systems are pointed out. It is reported that the German industry has fitted some prototype vehicles with asynchronous motors. Two different inverter methods, the current dc link converter and the pulse width modulation converter, have been used. Three-phase current drive equipment for rapid transit has been constructed, based on experience gained from prototype vehicles. [German]

Wagner, R *Elektrische Bahnen* Vol. 78 No. 6, June 1980, pp 151-157, 5 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

04 334308

NEW ELECTRICAL TRACTION EQUIPMENT FOR THE ROLLING STOCK OF URBAN TRANSPORT

New Soviet traction motors and control systems for rolling stock of urban transportation are described. Between 1976-1980, the subways in the USSR were to transport more than 17 billion passengers, which is 28% more than in the preceding five-year period. The requirements with regard to the performance of subways, trolleybuses and streetcars are specified. The tasks of new control systems are indicated and some long-term problems are outlined.

Rabinovich, AA *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 27-33

ACKNOWLEDGMENT: EI
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04 334314

DETERMINATION OF PARAMETERS OF INPUT FILTERS FOR STATIC CONVERTERS OF DC ROLLING STOCK

The effect of impulse-controlled dc electrical rolling stock on the traction network is discussed. Methods are proposed for choosing the parameters of the input filter of the rolling stock, taking into account the simultaneous effects of impulse converters and traction substation on the traction network, and that for calculating the value of interference current in contact network due to traction substation.

Bodrukhina, SS *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 54-60

ACKNOWLEDGMENT: EI
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04 334315

ELECTRIC TRACTION EQUIPMENT OF HIGH-SPEED ELECTRIC TRAIN ER-200

Technical data of the high-speed electric train ER-200, as also the parameters of machines and control gear are given. Operation of power circuit diagram and its various components is described.

Tuchin, BA Veitsman, LY *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 34-40

ACKNOWLEDGMENT: EI
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04 334316

TASKS BEFORE THE BUILDERS OF ELECTRIC LOCOMOTIVES AT THE PRESENT STAGE

The main tasks before the building plants of plain are spelled out. In 1979 more than 138,000 km of rail network was operational, out of which 40,000 km were electrified--25,000 km at 3 kV dc and 15,000 km at 25 kv ac of commercial frequency. By the end of 1980 the electrified lines will extend over nearly 44,000 km and would constitute up to 31% of total length of rail network. Electrification will, for the most part, be at 25 kV ac. Batch production of the VL84 7,600 kW (more than 10,000 HP) main-line ac electric locomotive for the Baikal-Amur line will begin in 1982. The 7,000 kW (9,500 HP) dc electric locomotive, type VL14, for operation on 3kV dc lines is being developed.

Galev, NP *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 12-15

ACKNOWLEDGMENT: EI
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04 334317

SYSTEMS FOR THE AUTOMATIC CONTROL OF DIESEL LOCOMOTIVE POWER TRANSMISSION WITH LIMITATION OF EXTREMAL VALUES OF CONTROLLED PARAMETERS

Methods of interlocking feedbacks to limit maximum as well as minimum values of controlled parameters in automatic control systems of power transmission to diesel locomotives have been considered. A functional diagram for an automatic control system (ACS) for electric brakes to maintain the speed of the train constant, is given. Recommendations for design of such ACS's are given.

Lipovka, VI *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 48-53

ACKNOWLEDGMENT: EI
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04 334320

TRACTION SETS

Constructional features of traction sets PE2M, OPE2, OPE1A, OPE1B, and PE3T are described. Their parameters are given and the working principles of voltage regulators, of ac-dc and dc-dc types, are shown.

Zholobov, LF Kuz'menko, LA Patsovskii, YV *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 16-22

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

04 334323

INVESTIGATION AND DEVELOPMENT OF MULTIPLE ARC-EXTINGUISHING CHUTES FOR DC TRACTION APPARATUS

Application of plain-slot multiple arc-extinguishing chutes in hv contactors and breakers in the main dc circuits of electric trains are discussed. Some experimental data and test results of arc-extinguishing chutes are given.

Niedzviadz, LA Bucholts, YS *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 77-82

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

04 334330

EXCITATION CURRENT CONTROL OF TRACTION GENERATOR

A new system for automatic excitation control of dc traction generators is described. It is simple, reliable, adequately accurate and requires minimum adjustments. Equations for calculation of various parameters and estimation of operational stability, as well as the results of tests carried out on the test stand and in the field, are given.

Pogarskii, NA *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 41-47

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

04 334438

ELECTRONICS SUPPLY OF ENERGY OF PASSENGER COACHES IN THE PRESENCE OF MULTIVOLTAGE OPERATION [Wirtschaftliche Energieversorgung von Reisezugwagen bei Mehrspannungsbetrieb]

For the electric power supply of passenger coaches for multivoltage operation fed by the train busbar, a quadruple system converter has been developed which makes it possible to realize a small weight in spite of high efficiency. This economic solution could be realized by the application of experiences and components of classic electrical engineering conjunction with modern power electronic equipment. A two-years' successful service trial of a prototype installation has proved the serviceability. [German]

Renesse, EV *Elektrische Bahnen* Vol. 78 No. 8, Aug. 1980, pp 209-214, 4 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

04 334504

STANDARDIZATION OF ELECTRIC EQUIPMENT IN MOTIVE POWER UNITS FOR SHORT-DISTANCE TRAFFIC

[Vereinheitlichung der elektrischen Ausrüstung von Nahverkehrs-Triebfahrzeugen]

With standardized rolling stock for short distance transport, it is possible to reduce the cost price of motive power units and the number of spares that have to be held in stock. The author shows by examples (BLS trainsets, the Solothurn-Zollikofen-Bern trainsets, the Zurich Tram 2000) to what extent modular types of construction are adaptable for widespread standardization of sub-systems and components. [German]

Baechler, U *Brown Boveri Review* Vol. 68 No. 1, 1981, pp 12-19, 2 Tab., 8 Phot., 9 Ref.

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

DOTL JC

04 334505

DIAGNOSING TECHNIQUES FOR RAIL STOCK [Diagnostik bei Schienenfahrzeugen]

Nowadays diagnosing equipment is being built so that possible breakdowns in railway rolling stock multi-unit control systems can be located and prevented quickly and safely. The different diagnosing systems used are more or less sophisticated, depending on the particular situation of the rail network and the size of the electronic control equipment. The author explains his diagnosing systems, taking as examples recently-built apparatus.

Ritter, U *Brown Boveri Review* Vol. 68 No. 1, 1981, pp 28-35, 1 Tab., 14 Phot., 7 Ref.

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

DOTL JC

04 334510

SCIENTIFIC AND TECHNICAL PROGRESS IN THE DESIGN OF TRACTION VEHICLES IN THE GERMAN DEMOCRATIC REPUBLIC THROUGH COMPUTER APPLICATIONS

[Wissenschaftlich-technischer Fortschritt bei der Triebfahrzeugentwicklung in der DDR durch EDV]

The article explains the program and sub-programs of the "AUTRA" system, developed by the Institute of Light Vehicle Construction in Dresden and applied in the locomotive building works at Henningsdorf for the design and dimensions of traction vehicles (15 different types of vehicles per year). Several practical examples are also given of savings made in construction materials and energy, which justify data processing applications in this field. [German]

Garitz, KP Neumann, G *Zeitschrift der OSShD* Vol. 23 No. 5(133), 1980, pp 5-8, 3 Phot., 10 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Railway Cooperation Organization, Komitee fuer Eisenbahnverkehr, Hoza 63/67, Warsaw, Poland

04 334685

THE SD50 LOCOMOTIVE

The SD50 locomotive is the latest model in the Electro-Motive line of six-axle freight locomotives first introduced in 1952. The SD50 is a 3800/3500 horsepower heavy-duty freight locomotive with a number of new features, including the new model 645F engine, the D87 traction motor, a new model AR16 main alternator and the Super Series wheel slip control system. Ten SD50 prototype locomotives are currently in service on two U.S. railroads, four having gone into service in September, 1979, and six in December, 1980. The SD50 locomotive transmission system provides for permanent parallel motor connections with no requirements for either motor or generator transition and no need for field shunting or weakening. Experience to date indicates these locomotives can provide 33 percent improvement in adhesion as compared with previous model six-axle freight locomotives.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation of the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

Ephraim, M, Jr
American Society of Mechanical Engineers Conf Paper 81-RT-2, Jan. 1981, 7p, 18 Fig., 7 Ref.

ORDER FROM: ESL

DOTL RP

04 334955

POWER: THE COAL-FIRED ALTERNATIVE

The economics of a reciprocating, condensing steam locomotive capable of multiple-unit operation have been examined by American Coal Enterprises, the U.S. organization promoting a coal-fired motive power fleet for the U.S. as an alternative to either electrification or continued diesel-electric operation for heavy-traffic routes. Attempts are continuing to fund a prototype locomotive.

Railway Age Vol. 182 No. 9, May 1981, pp 39-40; 2 Tab.

ORDER FROM: ESL

DOTL JC

04 335052

GE'S C36-7: A BALANCE OF POWER

General Electric has introduced a 3600-hp, six-axle locomotive; the first six units are going to Norfolk and Western. The locomotive incorporates an improved adhesion control system as well as engine and auxiliary design changes to improve fuel economy.

Railway Age Vol. 182 No. 8, Apr. 1981, pp 28-29, 1 Phot.

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DOTL JC

04 335062

PERFORMANCE EVALUATION OF MONOMOTOR BOGIES ON INDIAN RAILWAYS

When new bulk wagons became available in increasing numbers on Indian Railways, gross trailing loads could be 3,000 t on existing loops and sidings and a fleet of BB type heavy duty 85.2 t freight locomotives of 21.3 t axle load was ordered. A coupled axle BB monomotor arrangement could provide the maximum permitted starting tractive effort and 42 locomotives were imported from Europe, being followed by 240 Chittaranjan manufactured locomotives. However, certain factors, peculiar to IR, increased maintenance requirements to such an extent that they soon became the most expensive series of locomotives on IR. This article outlines the history of the first Indian made 25 kV. A.C. electric locomotive.

Vir, RK *Rail International* No. 1, Jan. 1981, pp 35-40, 13 Fig., 3 Tab., 5 Ref.

ORDER FROM: ESL

DOTL JC

04 335072

INGRESS OF WATER AND THE LUBRICATION OF TRACTION MOTOR SUSPENSION BEARING

Two laboratory investigations are described which were undertaken to help solve the problem of locomotive traction motor bearing failures which occur mainly during winter operation on Canadian railroads. In the first study, a complete traction motor and wheel set was set up in an environmental

chamber and rotated under driving rain conditions. Water was found to enter through the small gaps and grooves between the bearing caps and the housing; to be pumped hydraulically through the bearing clearance into the reservoir, and also to enter as a vapor generated from water entering the gear case. Various possible means of preventing the ingress of water was proposed. In the second study, a standard traction motor bearing was tested in the laboratory under realistic load and speed conditions at temperatures down to minus 35 deg C. During the process of this investigation, it was shown that the wick lubricator is extremely effective even after soaking at low temperature prior to testing. It was shown that water supplied to the bearing clearance or steam in the reservoir have no direct deleterious effect on the lubrication, although a buildup of water in the reservoir can cause the oil to flow out rapidly through the bearing clearance. A modified close-fitting wick-bearing arrangement to keep water from entering the reservoir is proposed.

Lane, JF (National Research Council of Canada); Dayson, C *Lubrication Engineering* Vol. 37 No. 1, Jan. 1981, p 22, 2 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 335276

SINGLE-PHASE DRIVE SYSTEM WITH A SYNCHRONOUS-PHASE CONVERTOR

A new form of single-phase ac drive system is described, in which an unloaded synchronous pilot machine is used as a single-phase to three-phase converter to provide supply to 3-phase induction motors. Theory, equivalent circuits and performance results are presented for both cylindrical and salient pilot machines. It is demonstrated that the system has advantages over the classic Ferraris-Arno system, which uses an induction pilot machine.

Chalmers, BJ (Manchester University, Institute of Science & Tech); Abdel-Hamid, RH Spooner, E *Institution of Electrical Engineers, Proc Part B* Vol. 26 No. 1, Jan. 1981, pp 55-60; 5 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

04 335456

THYRISTOR TRACTION [THYRISTOR-TRAKTION]

Papers given at an ASE seminar on 2 October 1980 in Lucerne. The authors review the state of technical advance on the CFF and the DB. For the SNCF, M. Cossie shows how the use of thyristors in tractive units has developed. [German/French]

Association Suisse des Electriciens SNCF Cat. 332 P 1, 1980, 185p, Tabs., Photos., Refs.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Association Suisse des Electriciens, Stauffacherquai 36-40, 8004 Zurich, Switzerland

04 335460

THE PROBLEM OF STABILITY IN MOTION EQUATIONS OF THE PROPULSION SYSTEM OF AN ELECTRIC LOCOMOTIVE [DAS STABILITAETSPROBLEM IN DER BEWEGUNGSGLEICHUNGEN DES ANTRIEBSSYSTEMS EINER ELEKTRISCHEN LOKOMOTIVE]

Taking as an example unilateral hollow shaft transmission with spring suspension coupling as it exists in the OBB's Rh1044 thyristor locomotive, a set of movement equations are established which result in differential equations. The characteristic curve of the motor operation and the friction coefficient are linearized and attenuation by sprung components is taken into account. For driving in the case of macro-sliding, a steep characteristic curve for the motor operation, sufficient attenuation in the coupling together with a steep friction characteristic curve are required. In cases of pseudo-sliding, the fundamental vibrations and those of the axle can only be reduced through attenuation in the coupling. [German]

Koerner, E *Eisenbahntechnik* No. 3, 1980, pp 19-25, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

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

04 335471

50 KV LOCOMOTIVES FOR A MINERAL RAILWAY

An 846 km line for the transport of iron ore was electrified in 1978-9 at 50 kV a.c. The 3780 kW Co-Co locomotives used to haul trains of 20,000 tonne are described.

Souch, DJW Dowling, J *Institution of Mechanical Engineers Proceedings* Vol. 195 No. 17, 1981, pp 190-202, 13 Fig.

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

DOTL JC

04 335634

ENERGY SAVINGS WITH MELBOURNE'S NEW ELECTRIC TRAMS

Although public transport vehicles consume only one-third to one-half the energy per person kilometre of that consumed by motorcars, this characteristic has become well known only since the "energy crisis" of 1973. When compared with motor travel, metropolitan public transport services have the additional energy saving potential of reducing the average length of person journeys through their significantly more economical use of land space, thus allowing higher gross densities of more productive land uses. Electric public transport vehicles are well suited to an energy saving role. Recent developments in their traction motor control circuits have made possible further energy savings. The use of a solid state control system ("chopper" control) for regulating motor current during acceleration has eliminated the power formerly lost in "starting" resistances; while regenerative braking, in which energy from braking returns power to the trolley wire, though its energy savings have long been recognized, has only recently become commercially feasible through extension of this solid state control system. Chopper control has the additional advantage of smooth acceleration and braking. Melbourne's newest trams are being equipped with chopper control and regenerative braking. Recent tests made with a prototype tram operated under simulated service conditions showed energy savings of nearly 40 percent, indicating the significant savings possible with this type of modern electric vehicle (A).

Petroleum, Policies and People. Australian Institute of Energy, 2nd National Conference, University of Melbourne.

Fouvy, CL (Melbourne And Metropolitan Tramways Board)
Australian Institute of Energy 1980, pp 137-148, 3 Fig., 1 Tab., 19 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 250532), Australian Road Research Board

ORDER FROM: Australian Institute of Energy, P.O. Box 230, Wahroonga, New South Wales, Australia

04 336397

DETERMINATION OF EFFICIENCIES, LOSS MECHANISMS, AND PERFORMANCE DEGRADATION FACTORS IN CHOPPER CONTROLLED DC VEHICLE MOTORS. SECTION 1: TEST PROGRAM RESULTS AND RECOMMENDATIONS

The conventional series motor model is discussed as well as procedures for obtaining, by test, the parameters necessary for calculating performance and losses. The calculated results for operation from ripple free DC are compared with observed test results, indicating approximately 5% or less error. Experimental data indicating the influence of brush shift and chopper frequency are also presented. Both factors have a significant effect on the speed and torque relationships. The losses and loss mechanisms present in a DC series motor are examined and an attempt is made to evaluate the added losses due to harmonic currents and fluxes. Findings with respect to these losses are summarized.

Hamilton, HB Strangas, E
Pittsburgh University, Pittsburgh, National Aeronautics and Space Administration Final Rpt. NASA-CR-163817, Dec. 1980, 120p

Grant NSG-3163

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

N81-13269/8

04 341248

RAILROAD ELECTROMAGNETIC COMPATIBILITY: LOCOMOTIVE VOLUME 3. SUMMARY OF AEM-7 ELECTROMAGNETIC EMISSION MEASUREMENTS

Results of electromagnetic emission measurements performed on an AEM-7 at the Transportation Test Center near Pueblo, Colorado, are presented. A brief description of the measurements and methodology employed is included.

O'Neill, DJ (IIT Research Institute)

Electromagnetic Compatibility Analysis Center, Federal Railroad Administration Intrm Rpt. FRA/ORD-80/66.3, ECAC-CR-80-132, Feb. 1981, 164p, Figs., 7 Tab.

Contract DOT-AR-74311

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PB81-184343, DOTL NTIS, DOTL RP

04 341250

DUAL-MODE LOCOMOTIVE SYSTEMS ENGINEERING VOLUME 1: SUMMARY

This report, Volume I, provides a summary of the systems engineering study undertaken as Phase 1 of a proposed five-phase program. The intent of the overall program is the development, in-service demonstration, and ultimate deployment of dual-mode locomotives. This study has confirmed the technical viability of the dual-mode locomotive (DML) based on a modified model SD40-2, which can operate from either a high voltage catenary electrified at 60 Hz or from an onboard diesel engine. The DML is available in both 50- and 25-kv versions and can have a regenerative electric brake capability if required. The weight of a 50-kv, regenerative DML (the heaviest option) is under 398,000 lb, with normal options included. The space requirements for the electric components are compatible with installation on existing locomotive platforms without interfering with the diesel power equipment. The cost of the conversion of an SD40-2 to the DML configuration at locomotive rebuild is up to \$414,097. This conversion will make possible an initial electrification project that will result in a return on investment that is superior to conventional electrification for a fraction of the initial cost. A record of the Industry Review held in Chicago on October 16, 1980, presenting the results of this study, is contained in the Appendix. This report comprises two volumes as follows: Volume I-Summary and Volume II-Detailed Description and Analysis.

Cook, LM Lawson, LJ

AiResearch Manufacturing Company, Federal Railroad Administration Final Rpt. FRA/ORD-80/82.1, 80-17253-1, Feb. 1981, 94p, 19 Fig., 8 Tab., 5 Ref., 1 App.

Contract DTFR53-80-C00010

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PB81-191314, DOTL NTIS, DOTL RP

04 341251

DUAL-MODE LOCOMOTIVE SYSTEMS ENGINEERING VOLUME II: DETAILED DESCRIPTION AND ANALYSIS

This report, Volume II, provides a detailed description of the analysis of the dual mode locomotive (DML) systems engineering study undertaken as Phase I of a proposed five-phase program. The intent of the overall DML program is the development, in-service demonstration, and ultimate deployment of dual-mode locomotives. This study has confirmed the technical viability of the DML based on a modified diesel-electronic locomotive model SD40-2, which can operate from either a high voltage catenary electrified at 60 Hz or from an onboard diesel engine. The DML (the heaviest option) is under 398,000 lb, with normal options included. The space requirements for the electric components are compatible with installation on existing locomotive platforms without interfering with the diesel power equipment. The cost of the conversion of an SD40-2 to the DML configuration at locomotive rebuild ranges from \$367,014 to \$414,097. This conversion will make possible an initial electrification project that will result in a return on

investment that is superior to conventional electrification for a fraction of the initial cost. The DML permits incremental electrification, which allows the reduced dependence on imported petroleum products associated with electrification to be achieved at a rate compatible with the available capital funds. This report comprises two volumes as follows: Volume I-Summary and Volume II-Detailed Description and Analysis.

Cook, LM Lawson, LJ

AiResearch Manufacturing Company, Federal Railroad Administration
Final Rpt. FRA/ORD-80/82.II, 80-17253-2, Feb. 1981, 202p, Figs.,
Tabs., 13 Ref., 3 App.

Contract DTFR53-80-C00010

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05 327750

**DESIGN, FABRICATION AND EVALUATION OF PROTOTYPE
WAYSIDE BRAKE INSPECTION SENSORS**

Prototype Wayside instrumentation has been designed, developed, and tested that proves the feasibility of measuring braking system effectiveness on moving rail cars. The instrumentation system includes a specially designed short section of instrumented rail and two infrared detectors. The rail section deflects elastically under each passing wheel load, and two orthogonally placed transducers discriminate between rail reaction to braking and to weight. A pair of infrared detectors viewing the rims on both wheels of each axle provide thermal data useful in determining the side to side ratio of total axle braking effort. Together these sensors can generate data to evaluate the braking performance of each wheel. Field tests to evaluate the system were conducted on a commercial rail line and at the U.S. Department of Transportation's Transportation Test Center at Pueblo, CO. Test results showed that the sensors were able to indicate normal and abnormal braking conditions. Also included in the report are a railcar brake system fault and malfunction analysis, structural analysis of the instrumented rail, design analysis of the infrared sensor, detail specifications of the rail and infrared sensors, and recommendations for further system development and testing.

Spaulding, DB Lentz, KWJ Fryklund, GG Gillespie, JR Novatek, Incorporated, Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-80/20, DOT-TSC-FRA-80-8, June 1980, 205p

Contract DOT-TSC-1323

ACKNOWLEDGMENT: NTIS

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PB81-116105, DOTL NTIS

05 331900

BRAKE SHOE PERFORMANCE EVALUATION-VOLUME 1

This report (Volume 1) deals with the evaluation of freight car brake shoe performance. Single car tests of four different makes of composition shoes and two different sets of cast iron shoes were performed. The tests included stop-distance tests, with loaded and empty cars under both wet and dry tread conditions, drag tests, static holding tests, static brake shoe tests and coasting tests. Brake shoe normal and tangential forces, brake cylinder pressures, car velocities and friction coefficients were recorded as functions of time, and stop-distances were noted for the stop-distance tests. Velocity, brake cylinder pressure, brake shoe normal force, brake shoe tangent force and wheel temperature were recorded as functions of time for the drag tests. Various cross plots to compare the performance of the shoe sets, as well as to determine the effects of velocity, temperature and moisture on braking were developed. Volume 2 of this report contains the complete computer-reduced brake shoe test data from the original magnetic tapes. It is of such size and of such limited interest that only a limited number of copies were produced.

Subtask 2.1.

Manos, WP Hawthorne, KL Misner, G Brown, T Association of American Railroads Technical Center, Federal Railroad Administration Tech Rpt. AAR R-469, Apr. 1981, 153p, Figs., 7 Tab.

Contract DOT-FR-64228

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

DOTL RP

05 334329

**THERMAL FATIGUE ANALYSIS OF A RAILCAR WHEEL
UNDER DRAG BRAKING**

In order to determine the stresses developed due to the temperature gradients produced during drag braking and the effects of cyclic thermal loading on the fatigue life of the wheel, the CH-36 wheel was analyzed by using the finite element method. The temperature distribution used in the analysis was obtained by running the TRUMP program. The fatigue life of the wheel was calculated for temperature distributions representing different periods of drag braking and it was observed that the fatigue life of the wheel decreases sharply with an increase in temperature.

For Meeting held November 16-21, 1980.

Thomas, TJ (Illinois Institute of Technology); Garg, VK Stone, DH American Society of Mechanical Engineers Papers ASME 80-WA/DE-4, 1980, 8p, 12 Ref.

ACKNOWLEDGMENT: EI

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05 334331

**DISC BRAKE LININGS--ANALYTICAL STUDY AND SELECTION
CRITERIA**

This paper highlights some of the most important characteristics of a friction material in general, and in a disc brake application in particular. Further, it shows how the topic of friction material properties be approached by an individual involved in design, development, testing, or marketing of the brake linings. Based upon the author's first-hand experience in this field, a "Friction Material Analysis Chart" has been developed, which summarizes the salient features associated with brake linings. From a practical standpoint, this chart would be a valuable tool in the analysis and selection of a friction material for a brake application.

For Meeting held June 9-13, 1980.

Joshi, MN Society of Automotive Engineers Preprints SAE 800782, 1980, 13p, 5 Ref.

ACKNOWLEDGMENT: EI

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05 334694

**TRAIN BRAKE AND TRACK CAPACITY REQUIREMENTS FOR
THE '80S**

Ten years ago, the authors presented ASME Paper 71-WA/RT-9 which examined air brake system operating and test procedures and their effect on train operation. To meet the requirements of the '80s, the authors believe it is essential to look back over the last ten years at the factors which influenced the thinking, maintenance trends and performance of the freight car fleet. To meet future demands, a projection of the car fleet and the tonnage to be carried must be reviewed. Important changes and improvements have been put into place regarding air brake equipment and train speed control. This paper reviews the present situation and looks into the '90s to identify areas where further changes and improvements seem necessary.

Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint ASME/IEEE Railroad Conference, April 28-30, 1981.

Blaine, DG (Westinghouse Air Brake Company); Hengel, MF (Missouri Pacific Railroad); Peterson, JH (WABCO, Limited) American Society of Mechanical Engineers Conf Paper 81-RT-11, Jan. 1981, 21p, 14 Fig., 7 Tab., 16 Ref.

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05 341258

**CHARACTERIZING THE PERFORMANCE OF CAST-IRON,
HIGH-PHOSPHORUS CAST-IRON, AND COMPOSITION
FREIGHT CAR BRAKE SHOES UNDER SIMULATED DRAG
BRAKING CONDITIONS**

The performance of the cast-iron, high-phosphorus cast-iron, and composition brake shoes was evaluated through a test program under conditions simulating the operation of a loaded 70-ton freight car on a long downgrade or "stuck brake" situation. The major part of the test program dealt with brake tests at constant speeds of 20, 30, and 40 mph with about 30 bhp energy-dissipation rate. Additional tests included simulating "worst-usage cases" and those conducted to determine the effects of a rolling-contact load, partial shoe contact, and brake-shoe force magnitude on the performance of three types of shoes. During each test, the braking torque, the wheel temperature, and the strain in the wheel were measured. The major conclusions of the study are: The brake-shoe force ratios of 1:1:0.5 currently used for the cast-iron, high-phosphorus cast-iron, and composition shoes should be reconsidered; The current ratios could be a contributing factor in overheating of the wheel; and Using a composition shoe by mistake in a brake-rigging meant for a cast-iron shoe could lead to a wheel failure.

Boghani, AB

Little (Arthur D), Incorporated, Federal Railroad Administration Final Rpt. FRA/ORD-81/08, ADL-80589-75, Jan. 1981, 54p, 15 Fig., 7 Tab., 4 Ref.

Contract DOT-FR-74261

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05 341263

TEST RESULTS REPORT--DUAL DISC/TREAD BRAKING AND REDUCED PRESSURE BRAKING EVALUATION PROGRAMS

This report is the Test Results Report for the Dual Disc/Tread Brake Test. Data logs and records associated with this test are published separately in the Test Events Report Dual Disc/Tread Braking and Reduced Pressure Braking Evaluation Programs, Report No. FRA/ORD-81/21. The Dual Disc/Tread Braking Test was conducted to investigate the benefits of using dual systems on the Amcoach. The test evaluated candidate systems developed by Knorr-Bremse, New York Air Brake and Westinghouse Air Brake Company. The test showed that as presently configured, the Amcoach may often exceed the available adhesion and tend to experience momentary wheel sliding which causes spalling. The test indicated that the dual brake system may help to improve tread life and extend the capacity without over heating either the wheel tread or the disc. In addition to the single car cutaway test of the dual brake system and a normal Amcoach braking

system, a special reduced pressure test was performed on the Amcoach. The results showed that reducing the full-service braking pressure may be an alternative way of reducing the adhesion demand at the lower speed to relieve the wheel sliding problem. This approach extends the stopping distance by only a small amount but does not provide a mechanism for maintaining the wheel/tread surface or increasing the overall system capacity as does the dual brake system.

Frankowski, D Scofield, R
ENSCO, Incorporated, Federal Railroad Administration, National
Railroad Passenger Corporation FRA/ORD-81/22, DOT-FR-80-22,
Mar. 1981, 299p, Figs., 2 Tab., 6 App.

Contract DOT-FR-64113

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PB81-231649, DOTL NTIS

06 053389

**ELECTRONICS TEST STATION (VIENNA-ARSENAL).
ACTIVITIES OF THE ELECTRONICS TEST STATION DURING
1979 (FROM 1.1.1979 UNTIL 31.12.1979)**

This report represents a short general view of the activities of the Electronics Test Station at Vienna Arsenal in the fields of data transmission and modern testing and in particular electronic operating safety for automatic warning systems for track gangs and finally structural studies of telephone networks.

Restrictions on the use of this document are contained in the explanatory material. This report is only for internal use by the Railway Administrations.

International Union of Railways AZ 32/RP 12, Sept. 1980, 11p

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06 053392

**AUTOMATIC WARNING OF TRACK MAINTENANCE GANGS.
REPORT NO. 10--PART I. TECHNICAL SPECIFICATIONS FOR
AUTOMATIC TRACK GANG WARNING SYSTEMS (AUROWA)**

Part I of this report contains the specification for a recommended system for the automatic warning of track maintenance gangs. The second part discusses in detail the background and implications of the most important features of the specification.

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

International Union of Railways A 124/RP 10, Sept. 1980, 52p, 2 Fig.

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06 053393

**AUTOMATIC WARNING OF TRACK MAINTENANCE GANGS.
REPORT NO. 10--PART II. ELUCIDATIONS TO THE
SPECIFICATION FOR AN AUTOMATIC TRACK GANG
WARNING SYSTEM (AUROWA)**

Part I of this report contains the specification for a recommended system for the automatic warning of track maintenance gangs. The second part discusses in detail the background and implications of the most important features of the specification.

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

International Union of Railways A 124/RP 10, Sept. 1980, 34p, 4 Fig., 1 Tab.

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06 053394

**PROPAGATION OF RADIO WAVES. REPORT NO. 5: RADIO
PROPAGATION IN TUNNELS (NATURAL PROPAGATION)**

This report presents the results of experimental work carried out in order to complement published information on how radio propagation is affected in railway tunnels. 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 5, Apr. 1980, 46p, 16 Fig., 3 Tab.

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06 053395

**PROPAGATION OF RADIO WAVES. REPORT NO. 6 (FINAL
REPORT). SUMMARY REPORT AND DESIGNERS' GUIDE**

This report summarises the information experimentally obtained by the Committee ORE A 133 on radio propagation in the railway terrain, and presents it as a handbook for the prediction of radio signal strength for all the commonly found situations in railway conditions.

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

International Union of Railways A 133/RP 6, Sept. 1980, 40p, 45 Fig., 3 Tab.

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06 053403

**CALCULATION OF INTERFERENCE WITH TRACK CIRCUITS
DUE TO ELECTRIC TRACTION. THE USE OF THYRISTORS ON
THE RAILWAYS**

This technical document gives the development of a calculation method, which permits the calculation of the interference with track circuits and train regulation installations due to electric traction. The calculation is based on a numerical method using digital computers, which make it possible to solve an inhomogeneous system of differential equations with variable coefficients and arbitrary boundary conditions. Concrete calculations are made for various track circuits. On the one hand the calculations confirm the general applicability of the method worked out and, on the other hand, the possibility of determining the effect of various parameters. The mathematical method for calculating the interference to be expected with a track circuit can be applied to any track circuit with arbitrary input parameters and boundary conditions.

Restrictions on the use of this document are contained in the explanatory material. Prepared by the ORE Specialists Committee A 122.

International Union of Railways DT 91 (A 122), June 1979, 58p, 92 Fig., 12 Tab.

ORDER FROM: UIC

DOTL RP

06 053408

**STATISTICAL TECHNIQUES FOR THE ANALYSIS OF
RELIABILITY DATA**

This Technical Document presents the definitions, concepts and techniques selected by the Working Party S 1005 for the analysis of the reliability in service of the continuous train control system (ORE A 46/RP 6). These techniques are not easy to find in the literature and are of general applicability.

Restrictions on the use of this document are contained in the explanatory material. This document was prepared within the scope of studies of Working Party S 1005.

International Union of Railways DT 109 (S1005), Sept. 1980, 25p, 4 Fig.

ORDER FROM: UIC

DOTL RP

06 053410

**CONTINUOUS TRAIN CONTROL. PART I--FINAL REPORT.
RELIABILITY IN SERVICE OF THE CONTINUOUS TRAIN
CONTROL SYSTEM DESCRIBED IN ORE A 46/RP 6, APPENDIX
6A**

This report presents the results of practical experiences with the continuous train control system recommended by the ORE A 46 Committee in ORE A 46/RP 6, Appendix 6A. Practical installations in the DB, SBB and SNCF were examined and reliability data on both the DB and SBB has been collected and analysed.

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

International Union of Railways Final Rpt. S 1005/RP 2-1, Sept. 1980, 37p, 2 Tab.

ORDER FROM: UIC

DOTL RP

06 053411

**CONTINUOUS TRAIN CONTROL. PART II--FINAL REPORT.
RELIABILITY IN SERVICE OF THE CONTINUOUS TRAIN
CONTROL SYSTEM DESCRIBED IN ORE A 46/RP 6, APPENDIX
6A**

No Abstract.

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

International Union of Railways S 1005/RP 2-2, Sept. 1980, v.p., 2 Tab., 4 App.

ORDER FROM: UIC

DOTL RP

06 329084

RAILROAD CLASSIFICATION YARD TECHNOLOGY--ASSESSMENT OF CAR SPEED CONTROL SYSTEMS

The scope of this study has encompassed an evaluation of fourteen yard speed control devices, an identification of four generic speed control systems, a qualitative assessment of the four systems, and finally a quantitative analysis of three hypothetical yards each employing a system that is considered promising. These three systems are (1) the advanced clasp retarder system, (2) the quasi-continuous control system, and (3) a hybrid system incorporating quasi-continuous control. No ranking of these three systems is possible because each has its advantages and disadvantages; and one system may be more suitable than the others under a particular circumstance.

Kiang, RL Ploeger, DW Stock, WA Eckerle, J Wong, PJ
SRI International, Federal Railroad Administration, (SRI-7663) Final Rpt. FRA/ORD-80/90, Dec. 1980, 105p

Contract DOT-FR-8084

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-161556, DOTL NTIS

06 330149

AUTOMATIC DISPATCHING TO THE COLTON CUTOFF

Southern Pacific has applied microprocessor technology to the simplified centralized traffic control installed on its Palmdale-Colton Cutoff in California. Automatic field clearing normally allows two opposing trains to pass without dispatcher attention but manual override is available. A more elaborate installation on an SP line in Texas has also train tracking and train identification systems so that priorities for train movements may be established. Both installations have parallel fail-safe systems which function independently. Computer-assisted CTC is part of SP's ongoing program to eliminate pole lines through use of buried cable and transmission of signaling codes through rails by audiofrequency overlays.

Progressive Railroading Vol. 24 No. 1, Jan. 1981, pp 75-76, 3 Phot.

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

DOTL JC

06 330158

CLOSED CIRCUIT TV AIDS BUSY TERMINAL

Belt Railway of Chicago uses CCTV combining high-speed cameras, infrared lighting, and video tape recorders for car checking prior to classification. Accuracy as high as 99.9 percent is achieved as cars are moved through the scanning areas at normal yard speeds while labor requirement for the checking have been reduced substantially.

Progressive Railroading Vol. 24 No. 2, Feb. 1981, pp 66-68, 6 Phot.

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

DOTL JC

06 330180

30 GHZ FSK-TRANSMISSION SYSTEM FOR AUTOMATIC TRAIN CONTROL

A new mm-wave data transmission system for automatic train control is presented. Network structure, propagation characteristics in the mm-wave range as well as the radio frequency equipment used are discussed. The recently performed system tests with this mobile data link between track and train showed its extraordinary good performance for highly reliable duplex data transmission.

Proceedings-International Zurich Seminar on Digital Communications, Digital Transmissions in Wireless Systems, Swiss Federal Institute of Technology, Zurich, Switzerland, March 4-6, 1980.

Mueller, GF

Institute of Electrical and Electronics Engineers IEEE 80CH1521-4 COM, 1980, p C8.1

ACKNOWLEDGMENT: EI
ORDER FROM: IEEE

06 330194

RELIABILITY OF MICROCOMPUTERS FOR RAILWAY SIGNALLING [Sicherheit von Mikrocomputern fuer die Eisenbahnsignaltechnik]

No Abstract. [German]

Lohmann, HJ *Elektronische Rechenanlagen* Vol. 22 No. 5, 1980, pp 229-236

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Verlag R Oldenbourg, Rosenheimer Strasse 145, Munich 80, West Germany

06 330205

RADIO-TELEPHONE COMMUNICATIONS WITH TRAINS ON UNDERGROUND RAILWAYS [Comunicacion radiotelefonica con los trenes en los ferrocarriles metropolitanos]

After recalling the difficulties connected with radio-telephone train-ground links in underground networks, due to the close headway of trains running in tunnels, the author describes the equipment and the functioning of the system selected for the Madrid underground. [Spanish]

Canosa, A *AIT-Revista* No. 34, May 1980, pp 23-38, 10 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

06 330209

DATA SWITCHING NETWORK OF JNR AND ITS WIDE USAGE

The JNR data switching network became fully operational in April 1980 after three years work on extending it. The article gives a brief outline of the development of the data switching network, of its use and merits.

Yusa, A *Japanese Railway Engineering* Vol. 20 No. 2, 1980, pp 16-19, 9 Fig., 1 Phot.

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

06 330217

CONTROL-TO-TRAIN TWO-WAY RADIO ON SNCF ELECTRIFIED LINES

Describes the control-to-driver radio link applied to much of the Paris suburban network, and plans to extend the system.

Collard, P *Rail Engineering International* Vol. 9 No. 3, July 1980, pp 77-79, 6 Phot.

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

DOTL JC

06 330220

TARGET SHUNTING IN MARSHALLING YARDS [Zielgeschwindigkeitsbremsung in Ablaufanlagen]

Target shunting in marshalling yards was developed in several stages before reaching its present state. The author explains the basis of the control method, its characteristics and the practices adopted to obtain optimum results. [German]

Also covered in Vol. 72 Nos. 7, 8, 9, and 10, 1980 issues.

Poehlmann, A *Signal und Draht* Vol. 72 No. 6, 1980, pp 119-123

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

06 330221

WHAT ARE THE EFFECTS OF HARMONICS IN ELECTRIC SUPPLY SYSTEMS UPON RAILWAY SIGNALLING INSTALLATIONS AND WHAT PROTECTION IS POSSIBLE AGAINST THEM? [Was bewirken Netzbberschwingungen in Eisenbahnsignalanlagen und welchen Schutz gibt es dagegen?]

The growing use by consumers of electric current with non-linear characteristics causes a corresponding increase in the harmonics created in electric supply systems. This can give rise to interference from supply circuits carrying heavier loads, and the effects on railway color-light signalling systems are quoted as an example. In conclusion, some measures to overcome interference caused by centralized control signals and harmonics are described. [German]

Meier, J *Signal und Draht* Vol. 72 No. 10, Oct. 1980, pp 183-187, 7 Phot., 5 Ref.

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

06 330223

SAFETY ANALYSIS OF SIGNALLING ELECTRONICS

Shows how the increased pace of technological change has brought greater pressure on the signal engineer to introduce new techniques, and how safety analysis can be used to assure both designer and user of the suitability of safety equipment for its task.

Barnard, REB
Institution of Railway Signal Engineers Nov. 1980, 16p, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Institution of Railway Signal Engineers, 1 Ashbourne Close, London W5, England

06 331094

COMPUTER-SUPPORTED TRAIN-RUNNING SUPERVISION

In computer-supported train-running supervision, the supervisory function is exercised with the aid of a computer system, with decentral microcomputers at the stations following the train movements. These microcomputers are linked with each other and with the control centre. There a central process computer system evaluates the results of the tracking of train movements and represents these in the form of time-distance lines. These together with the automatically determined schedule deviations provide the basic information for the control-centre personnel, who then transmit their instructions by telephone or by train radio. All operational sequences are tape-recorded. [German]

Beyersdorff, R *Eisenbahntechnische Rundschau* Vol. 29 No. 11, Nov. 1980, pp 769-772

ACKNOWLEDGMENT: British Railways
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

06 331104

EXECUTION AND OPERATION TESTING OF A SPEED CONTROL SYSTEM FOR AUTOMATED RAIL VEHICLES

SELTRAC is an automatic control system for rail vehicles developed by SEL with financial support from the Federal Ministry of Research and Technology. This is a refinement of the L72 linear train control system employed on the DB. An individual problem within the overall concept is the speed control of automated vehicles. The present report describes the execution and operational testing of a digital controller with switchable pattern. [German]

Kast, H *Eisenbahntechnische Rundschau* Vol. 29 No. 11, Nov. 1980, pp 781-783

ACKNOWLEDGMENT: British Railways
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

06 331506

A METHOD FOR CONTROLLING CORROSION OF THE METALLIC SHIELDS OF UNDERGROUND CABLES [Metoda pro kontrolu karozniho stavu kovovych obalu sdelovacich uloznych kabelu u CSD]

This article describes a new method for controlling corrosion of the metallic shields of underground cables developed by the Railroad Research Institute in Prague. This method is based on the division of frequencies and successfully replaces methods used previously. [Czech]

Adam, J Cisar, F *Železniční Technika* No. 4, 1980, pp 242-243, 4 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Nakladatelství Dopravy a Spoju, Hybernska 5, 115 78 Prague 1, Czechoslovakia

06 331511

EFFICIENCY EXPECTED FROM THE INTRODUCTION OF CENTRALISED TRAFFIC CONTROL [Effektivnost' vnedrenija dispetcherskoj centralizacii]

Studies carried out by the Soviet Institute of Railway Research have confirmed the significance of introducing centralized traffic control instead of a semi-automatic block system and determining its technical and economic efficiency, which is particularly high on single track lines. At the present time on the SZD over 50% of single track lines and all double track lines require this up-to-date equipment, which when installed will allow the SZD to function more efficiently. [Russian]

Kozlov, VE Starsov, IP *Vestnik VNIIZT* No. 5, 1980, pp 1-5, 4 Fig., 1 Tab.

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

06 331519

A SMARTER BREED OF DEFECT SPOTTERS

In the series on railway technology the tenth article deals with defect spotters. These are devices which can detect, for example, hotboxes or oversize loads.

Armstrong, JH *Railway Age* Vol. 181 No. 21, Nov. 1980, p 25, 1 Tab., 1 Phot.

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

DOTL JC

06 331525

PROBLEMS OF RELIABILITY IN THE USE OF MICRO-ELECTRONICS IN RAILWAY SAFETY TECHNIQUES

[Zuverlässigkeitsprobleme beim Einsatz der Mikroelektronik in der Eisenbahnsicherungstechnik]

The next generation of railway safety installations will be based on microelectronics. In view of relay techniques, new switching and other methods will have to be found. Problems are discussed, taking as an example reliability in information processing and an accommodation circuit for optic signalling. [German]

Fenner, W *Hochschule f Verkehrs F List Wissenschaft Zeitschr* Vol. 27 No. 4, 1980, pp 733-739, 3 Phot., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hochschule fuer Verkehrswesen Friedrich List, Friedrich List Platz 1, Dresden 801, East Germany

06 331529

CONTROL OF ELECTROTECHNICAL POINTS HEATING DEVICES IN RELATION TO WEATHER [Witterungsabhaengige Steuerung von elektrotechnische Weichenheizanlagen]

An explication is given of the basic structures of the electrical equipment used to heat points and details of developments in this field. Emphasis is placed on manual controls, temperature-related controls and controls based on temperature and weather conditions. Detailed information on the last of these three types is included. [German]

Zszech, R *DET Eisenbahntechnik* Vol. 28 No. 11, Nov. 1980, pp 461-462, 3 Fig., 1 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Atlas for Action Books, Incorporated, 162 Fifth Avenue, New York, New York, 10010

06 331558

SURFACE ELECTROMAGNETIC WAVE FIELD STRENGTH MEASUREMENTS ON RAILROAD TRACKS

An investigation is presented of surface electromagnetic wave (SEW) energy distribution on railroad tracks. Radial held distribution of SEW on 112-lb/yd rails was examined utilizing a dipole diode detector. Laboratory and on site measurements were made. The field strength distribution data at frequencies 3,000, 6,000 and 9,733 GHz sub z show that the main part of the SEW TE mode energy (almost 90 percent) is on the head of the rail. Use of dielectric augmentation on the side of rails resulted in lower attenuation of the propagating SEW. Thick dielectric strip augmentation data shows enhancement of SEW propagation in agreement with McAulay. The

intertrack coupling and the characteristic frequency response versus field strength at varied distances from the source were also examined.

Lai, BCH (Missouri University, Rolla); Goblen, CA *IEEE Transactions on Microwave Theory & Techniques* Vol. MTT-28 No. 8, Aug. 1980, pp 919-924, 11 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

06 334291

UP'S BAILEY WEST: COMPUTER CONTROL FROM CREST TO COUPLING

Bailey West classification yard of Union Pacific at North Platte, NE, humps up to 2000 cars per day at rate of up to 6 per minute. Computers have a major role in operating and managing the yard. Movement of cars during classification is controlled by an integrated real-time Process Control System based on two minicomputers and UP's Terminal Information System which maintains the inventory and history of car movements in Bailey Yard along with the COIN systemwide information center in Omaha. Information about car movements is collected by various sensors and processed by the PDP11/60 minicomputers for the PCS operation.

Hatcher, DL *Railway Age* Vol. 182 No. 4, Mar. 1981, pp 42-46, 4 Phot.

ORDER FROM: ESL

DOTL JC

06 334304

USE OF THE ELECTRONIC COMPUTER IN THE DESIGN OF THE ELECTRIC CENTRAL ROUTING CONTROL POINT: FIRST PHASE--DEFINITION OF THE TABLE OF INCOMPATIBILITIES BETWEEN THE ROUTINGS [Impiego dell'elaboratore elettronico al progetto dell'apparato centrale elettrico ad itinerari: 1a fase definizione della tabella delle incompatibilita tra gli itinerari]

The procedure, named PRACEI, is suitable to represent any station, no matter how complex, also of networks which do not adopt FS diagrams and circuits, in that it is based solely on geometric elements, like track and point circuits, present in all types of installations. The PRACEI procedure has been applied with satisfactory results, to ACEI (electric central routing control points) already in operation for the definition of the table of incompatibilities between the routings. [Italian]

Rizzo, V Naglieri, T Franchi, G *Ingegneria Ferroviaria* Vol. 35 No. 5, May 1980, pp 433-448

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

06 334318

TRACTION CURRENT EFFECT ON THE PARAMETERS OF RAIL CIRCUITS [A vontatasi aram befolyasa a sinaramkorok parametereire]

On behalf partly of the Research and Development Office of the International Railway Association (UIC-ORE) and partly of the Hungarian Railways (MAV), the Institute for Traffictechnics and Organization at the Technical University in Budapest recently carried out investigations as to how the electrical parameters of the insulated track rails vary in function of the frequency and of the value of the traction current returning in the rails. The internationally known earlier measurements did not investigate the effect of the traction current and their upper limit frequencies were 20-30 kHz as opposed to the upper limit frequency of 60 kHz of the present-day measurements. The main results of the investigation are summarized. [Hungarian]

Geza, T Gyorgy, V Ferenc, P *Elektrotechnika* Vol. 72 No. 3, Mar. 1979, pp 87-98, 2 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

06 334422

DEVELOPMENT RESEARCH OF ATS-P TYPE SYSTEM

Since 1974, Japanese National Railways has been developing a new type of Automatic Train Stop to eliminate accidents caused by operators failing to respond properly even after acknowledging the warning signal or having insufficient braking distance. The new ATS-P type eliminates the operator's

acknowledgement and speed checking and stop-distance functions are correlated to stop any approaching train at a fixed point.

Kurotori, S *Railway Technical Research Inst, Quarterly Reports* Vol. 21 No. 4, 1980, pp 165-173, 24 Fig.

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

DOTL JC

06 334427

A DEVICE FOR THE DETECTION OF BOUNDARY BETWEEN FREIGHT CARS BY AXLE DETECTORS

While counting the axles in a train is simple, Japanese National Railways has found that determining the number of cars is complicated. Infrared sensors may be interrupted by ladings over two cars or by passenger trains which have no gaps between cars. This device was developed to determine the boundary between freight cars by differentiating the patterns of distance between axles of each car, utilizing only wheel detectors. As a result of determining the patterns of wheels on cars and locomotives, signals from four to six wheel sensors processed by a microcomputer were found effective in counting cars moving at speeds up to 29 km/h.

Shioya, A Nakamura, M *Railway Technical Research Inst, Quarterly Reports* Vol. 21 No. 4, 1980, pp 195-196, 4 Fig., 2 Tab.

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

DOTL JC

06 334444

INTERACTIVE HYBRID COMPUTER DESIGN OF A SIGNALING SYSTEM FOR A METRO NETWORK

An interactive hybrid computer technique which facilitates the design of a fixed block signaling system for a metro network is described. The signaling philosophy is the three-aspect three-block cab signal system employed by the majority of metro networks throughout the world. Two constraints are of critical importance for such a signaling philosophy: the stopping distances (which determine minimum block lengths), and the throughput (which indirectly governs maximum block lengths). Taking into account these two constraints, the hybrid computer technique described permits the design engineer to interactively choose the block lengths and locations. The technique may be used to design the signaling for the new Montreal Metro line currently under construction.

Janelle, A (Ecole Polytechnique, Canada); Polis, MP *IEEE Transactions on Systems, Man and Cybernetics* Vol. SMC- No. 9, Sept. 1980, pp 555-565, 5 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

06 334468

HAND CALCULATOR PROGRAMS FOR TRACK CIRCUIT ANALYSIS VOLUME IX: TECHNICAL MANUAL--THREE VOLTMETER METHOD

This is the ninth volume of a set of volumes describing the use of several hand calculator programs that involve track circuits. The programs are applicable to the HP-67 calculator. The first volume is user oriented. The remaining volumes in the set are technically oriented. Sufficient information is given in the technical manuals so that programs suitable for other calculators may be easily developed.

DePriest, JR Patel, SH
Association of American Railroads Technical Center AAR R-419, Feb. 1980, 96p, 1 App.

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

DOTL RP

06 334469

HAND CALCULATOR PROGRAMS FOR TRACK CIRCUIT ANALYSIS VOLUME X: TECHNICAL MANUAL--CENTER FED CONSTANTS

This is the tenth volume of a set of volumes describing the use of several hand calculator programs that involve track circuits. The programs are applicable

to the HP-67 calculator. The first volume is user oriented. The remaining volumes in the set are technically oriented. Sufficient information is given in the technical manuals so that programs suitable for other calculators may be easily developed.

DePriest, JR Patel, SH
Association of American Railroads Technical Center AAR R-420, Mar. 1980, 93p, 1 App.

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

DOTL RP

06 334470

HAND CALCULATOR PROGRAMS FOR TRACK CIRCUIT ANALYSIS VOLUME XI: TECHNICAL MANUAL--LONG CIRCUIT CONSTANTS

This is the eleventh volume of a set of volumes describing the use of several hand calculator programs that involve track circuits. The programs are applicable to the HP-67 calculator. The first volume is user oriented. The remaining volumes in the set are technically oriented. Sufficient information is given in the technical manuals so that programs suitable for other calculators may be easily developed.

DePriest, JR Patel, SH
Association of American Railroads Technical Center AAR R-421, Apr. 1980, 94p, 1 App.

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

DOTL RP

06 334483

ELIMINATION OF BREAKDOWNS IN PROCESSING COMPUTERS BY THE GERMAN FEDERAL RAILWAY'S SIGNALLING DEPARTMENT [Stoerungsbeseitigung an Prozessrechnern durch den Signaldienst der Deutschen Bundesbahn]

The German Federal Railway is progressively making more use of processing computers in signalling. The high degree of availability required means that breakdowns must be rapidly eliminated. In this article the author describes possible causes of breakdowns and how to remedy them. [German]

Roecker, HJ *Signal und Draht* Vol. 72 No. 12, Dec. 1980, pp 231-235, 2 Phot., 10 Ref.

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

06 334485

DEVELOPMENT TRENDS IN SIGNALLING [Entwicklungstrend der Signaltechnik]

Innovations and changes in signalling will be determined in the '80s by the current most effective electronics product--the microprocessor. The ever-diminishing stocks of energy and the ever-growing demands from the public for environmental protection mean that far-sighted economic control systems must be developed in order to increase the efficiency of lines and stations and train speeds. Solutions which seemed wishful thinking ten years ago are now likely to be implemented in the near future, thanks to the rapid progress in the field of micro-electronics. [German]

Wehner, L *Die Bundesbahn* Vol. 57 No. 1, Jan. 1981, pp 17-21, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

06 334488

COMPUTERISED SYSTEMS AVAILABLE FOR DESIGN OF SIGNALLING EQUIPMENT [Aides informatisees actuelles aux etudes des installations de signalisation]

Application of CAD (Computer Assisted Design) to signalling and safety installations. On the SNCF (diagrams of signalling circuits, technical plans of the Paris South-East line) and in large signalling enterprises Computer Assisted Design allows considerable savings in terms of time and money and a higher degree of reliability control and verification tests. [French]

Michel, P *Revue Generale des Chemins de Fer* Feb. 1981, pp 91-100, 7 Phot.

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

DOTL JC

06 334496

MONITORING TRAIN RUNNING BY COMPUTER (RZUE) [Rechnerunterstuetzte Zugueberwachungen (RZUE)]

The German Federal Railway is planning to equip its main lines and certain secondary lines carrying long distance traffic with a computerised train running monitoring system. Microcomputers installed in signal boxes will monitor the trains and transmit the results automatically to a central computer situated in regional headquarters. A visual display screen will provide the traffic controller with information on the time and route of the train. [German]

Suwe, KH *Eisenbahningenieur* Vol. 31 No. 12, Dec. 1980, pp 515-518, 2 Phot.

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

06 334498

ADVERSE ELECTRICAL PHENOMENA AND INTERFERENCE LEVELS IN RAILWAY TRACTION

Following the introduction on the CFR network of electric tractive stock controlled by thyristors, and diesel tractive stock suitable for the electric heating of trains, the need to determine the adverse electrical phenomena and interference levels affecting the functioning of track circuits and, generally speaking, installations situated near the track, have become more acute. This article deals with the methods used to determine the adverse electrical phenomena and the limiting interference levels, also part of the results obtained in connection with the program of research and recordings devised by the CFR.

Mihalescu, D Pantelimon, M *Rail International* Vol. 12 No. 1, Feb. 1981, pp 57-70, 10 Phot., 7 Ref.

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

DOTL JC

06 334501

EQUIPMENT FOR MONITORING THE RELIABILITY OF AXLE COUNTERS [Equipo supervisor de fiabilidad de contadores de ejes]

This article describes a project for automatic monitoring of the behaviour of 3 railway safety devices arranged in parallel for the purposes of studying their reliability. [Spanish]

Perez, RV *AIT-Revista* No. 36, Sept. 1980, pp 51-52, 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

06 334513

INTERLOCK-CENTRE TO CONTROL OPTICAL FIBRE LINK ON DB

Service trial using SEL-developed optical-fibre cable as a telecommunication link.

Hinkel, H *Rail Engineering International* Vol. 9 No. 4, Oct. 1980, p 113, 1 Phot.

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

DOTL JC

06 334514

TRACK-TO-TRAIN SIGNALLING TO CONTROL TRAIN RUNNING ON SNCF PARIS-SUDEST HIGH-SPEED NEW LINE

Driver-controlled 260/300 km/h services embodying manually-driven train-working backed by automatic regulation and braking to safeguard adherence to continuously displayed cab-signalling instructions.

Roumequere, P *Rail Engineering International* Vol. 9 No. 4, Oct. 1980, pp 106-108, 7 Fig.

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

DOTL JC

06 334704

CONTROL STATION OF THE SUBWAYS IN VIENNA (AUSTRIA)
[Die Leitstelle der U-bahn Wien]

The necessity of economic operating management and quick intervention in the case of failure require the combination of all operating and technical installations within a central directing station. The control station of the Viennese subway system is described where all messages and the control of the entire power supply, the central station monitoring, the telecommunication installations and the centralized control box with remote control and the central control section are combined. Use is made of the most modern techniques. [German]

Schörn, W *Elektrische Bahnen* Vol. 78 No. 9, Sept. 1980, pp 229-235, 3 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

06 334717

COMPUTER-CONTROLLED ORE TRANSPORTATION AT THE KIIRUNAVAARA IRON ORE MINE IN KIRUNA, SWEDEN

Description of a highly automated transportation system supplied by ASEA to the Kiirunavaara Iron Ore Mine for a new main haulage level at 775 meters, with special emphasis on the train haulage, locomotives, crushing plant, main functions of the control system, train control, crusher control, computer system and control modes. The experience gained during the commissioning of the transportation system has confirmed the advantages of the decentralized ATC system and the hierarchical structure of the control system.

Oberg, B *ASEA Journal* Vol. 53 No. 3, 1980, pp 35-40

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

06 334947

DIGITAL SYSTEMS UPGRADE SIGNALS AND COMMUNICATIONS

Chessie System is looking at widespread application of digital electronics to both signaling and telecommunications. Microprocessor technology is already used extensively in communications but great potential is seen for it in field signal control logic. Digital processors and data terminals, including an interactive graphics system, are routinely used in the S&C design office at Huntington, WV. The computer graphic system (CGS) is used for original design, encoding or existing drawings, design modifications, and for storage and retrieval of design data with combinations of geometric and alphanumeric input.

Kearney, GW *Progressive Railroading* Vol. 24 No. 5, May 1981, p 35, 6 Phot.

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

DOTL JC

06 334948

TCX FOR DISPATCHERS

Dispatching center for Chessie System's Ohio Division has brought together four dispatchers covering 1,250 miles of line. A computer-assisted relay-logic traffic control is part of this installation along with a Total Control Exchange (TCX) communications center based on microprocessor technology. TCX achieves a coordination of all communications paths, permitting freedom and flexibility in selecting audio paths throughout the entire division and treating each mode (radio, telephone, dispatcher circuits) identically, regardless of type.

Progressive Railroading Vol. 24 No. 5, May 1981, p 45, 2 Phot.

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

DOTL JC

06 334949

A CENTURY OF INNOVATION

The centennial of the founding of Union Switch and Signal is marked by discussion of its railroad control systems from the pioneer track circuit but with attention centered on computer applications of the past three decades. From analog computer control of classification yard car routing and retarder

exit speeds to current digital computer applications with microcomputers for process control, yard control has evolved rapidly. Centralized traffic control, now marked by applications of computers to train dispatching, is following the same evolution as yard control, but is about a decade behind. Dispatchers can spend less time in information gathering but are better able to control train movements. The role of US&S research and development is also discussed.

Progressive Railroading Vol. 24 No. 5, May 1981, p 66, 4 Phot.

ORDER FROM: ESL

DOTL JC

06 334954

SIGNALING: YESTERDAY, TODAY, AND TOMORROW

As Union Switch and Signal reaches its 100th birthday, the application of computers to train movement control is now marked by the use of minicomputers. The next evolutionary stage, the large-scale integrated circuit or microprocessor, is now starting to be utilized for railroad control applications. While computer-aided dispatching, readily handled by minicomputers, is somewhat restricted when microprocessors are used because of their limited "memory," the distributed functions of dispersed microprocessor installations still can provide an overall capability. Electronics technology is causing new looks to be taken at traditional relay-based vital (affecting safety) control systems.

Armstrong, JH *Railway Age* Vol. 182 No. 9, May 1981, p 16, 6 Phot.

ORDER FROM: ESL

DOTL JC

06 335048

BIBLIOGRAPHY OF INFORMATION REPORTS, TECHNICAL PAPERS, ADDRESSES

This bibliography was prepared from Advance Reports and Proceedings of the AAR Communication and Signal Section and Division from 1961 through 1979. It contains 134 terms from Analyzer, Wave, to Yards. Major categories include Automatic Car Identification, Communications, Computers, Detectors, Highway Grade Crossing Warning Systems, Inductive Interference, Microwave, Radio, Signaling, Telephone, Track Circuit, Training, and Yards.

Published in Advance Reports and Proceedings of Annual Meetings 1961-1979.

Association of American Railroads Dec. 1980, 38p

ORDER FROM: AAR

DOTL RP

06 335070

CABLELESS TELEVISION MONITORING IN THE AMSTERDAM METRO

A carrier-frequency operated cableless television monitoring system is described which was installed in Amsterdam Metro to monitor both station and train operations. Pictures from two cameras on the platform are electronically combined and transmitted to the screen in the cab to give the driver a clear view of all doors of a 150 m long train. It has been shown that the same carrier-frequency band can be used on neighboring tracks in the same station without any mutual interference in television reception.

Raven, KL Stach, M *Siemens Power Engineering* Vol. 1 No. 7, July 1979, pp 209-213

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

06 335266

SERVANT OR MASTER?

Railroads are again at the forefront of applications of new electronic data processing technology. While minicomputer and microprocessor applications are growing at a faster rate than very large mainframe computer installations, a survey by AAR Data Systems Division shows that the number of midsize mainframes is actually declining. This indicates that railroads are turning from slower medium size computers to either large units with high capacity or to minis which can perform specialized tasks at slower speed and involving only limited capacity. Minis are applied in centralized traffic control, signaling and engineering design; microprocessors may be teamed with minicomputers in applications such as CTC. While the problem of rapid obsolescence of semiconductor devices is one which the

industry is struggling with, the labor-saving potential promises continued growth in use of such devices.

Mitchell, FS *Modern Railroads/Rail Transit* Vol. 36 No. 6, June 1981, pp 58-60, 4 Phot.

ORDER FROM: ESL

DOTL JC

06 335275

TRACK TO TRAIN RADIO SYSTEM

A description is given of the system and equipment which has recently been installed to give radio communication between Kings Cross Signalbox and the trains used for the Great Northern Inner Suburban electric service of British Rail.

Conference on Communications Equipment and Systems, Birmingham, England, April 16-18, 1980.

Giles, LJ (British Rail); Simson, RE *IEE Conference Publication* IEE Conf Pub 184, 1980, pp 206-210, 3 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England

06 335449

INSTALLATION OF THE AUTOMATIC DRIVING SYSTEM ON LINE VII OF THE MADRID METRO [Implantación del sistema de conducción automática en la línea VII del metro de Madrid]

This article describes progress step by step, from the definition of the project to the final decision on the system. A general description is given of the processes of installation and operating tests carried out before putting into commercial service the ATP sub-system (April 1977) and ATO (July 1980). An analysis of the results of repairs completed and failures observed since the system was put into service shows that it is proving to be very satisfactory. [Spanish]

Canosa, A *AIT-Revista* No. 37, Nov. 1980, pp 19-24

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

06 335465

PREWIRED EQUIPMENT FOR SIGNALLING/SAFETY INSTALLATIONS FOR TEMPORARY SINGLE TRACKS AND TEMPORARY JOINT SECTIONS [EQUIPEMENT PRECABLE POUR LES INSTALLATIONS DE SECURITE ET DE SIGNALISATION DES VOIES UNIQUES TEMPORAIRES (VUT) ET DES TRONCS COMMUNS TEMPORAIRES (TCT)]

In order to reduce the number and type of precabled signal centers as much as possible and simplify operations when they are put into service, the various types of center have been fitted with a function selector. This device enables the same type of center to be used in various instances, without the wiring having to be modified. Adaptation to the program's requirements is effected quickly and safely by means of the appropriate selector. [French]

Delomenie, M Richebourg, M *SNCF-Informations Tech-Direction de l'Equipement* No. 20, Dec. 1980, pp 37-44, 13 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Societe Nationale des Chemins de Fer Francais, 92 rue Bonaparte, 75 Paris 6e, France

06 335556

ADVANCES IN AUTOMATIC BEARING IDENTIFICATION FOR HOT BOX DETECTOR SYSTEMS

Means of identifying freight cars and then whether they have plain or roller journal bearings have been incorporated in the Servosens Bearing Discriminator, an accessory for the Servo hot-box detector system. Since different alarm levels are necessary because roller bearings run hotter than plain bearings, bearing temperature signals are properly analyzed with system noise and waveform distortion virtually eliminated and passenger cars and locomotives positively identified.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Glazar, AJ (Servo Corporation of America)

Association of American Railroads Tech Paper 1980, pp 1-31, 20 Fig., 1 App.

ORDER FROM: AAR

DOTL RP

06 335557

COMPUTERIZATION AS APPLIED TO CTC OFFICE CONTROL SYSTEMS

The evolution from vacuum-tube computers through transistor devices and integrated circuits to miracle chips is traced, specifically with application to centralized traffic control systems. In the 1960s mini-computers first proved cost effective in controlling large territories or complex interlockings. They next aided the dispatcher in performance of clerical duties. Automatic train tracking, train routing and OS accumulation contributed to improved traffic control. Microprocessors then offered lower costs with high reliability in CTC control. Minicomputers and microprocessors are now being utilized either independently or together for CTC office control with their particular characteristics determining which technology is most suitable.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Steiner, FT

Association of American Railroads Tech Paper Aug. 1980, pp 32-47, 3 Phot.

ORDER FROM: AAR

DOTL RP

06 335558

ELECTRICAL PROTECTION, A CASE STUDY

Methods for protecting communications, signals, process control and data facilities in Southern Railway's new Spencer Yard against lightning and power surges. A chain of protective devices for electrical equipment has been designed to extend from the high-voltage switchgear to the 120-volt outlet, assuring reliability and continuous productivity of the yard.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Sinclair, JF (Southern Railway System)

Association of American Railroads Tech Paper, 1980, pp 48-58, 5 Fig., 4 Ref.

ORDER FROM: AAR

DOTL RP

06 335559

MICROPROCESSOR TECHNOLOGY GOES TO WORK IN TRAFFIC CONTROL

There will be tremendous growth in all types of products and systems based on microprocessors. The special needs of the railroad industry place particular design constraints on these products, forcing microprocessor innovations to be justifiably efficient, reliable, and easy to apply. GRS has introduced both a specialized microprocessor and a traffic control system, micro Traffic Master, to implement the available technology in a manner tailored to the rail industry. Some of the features of the concept are: similarity of function to traditional relay logic, simplicity of design for easy maintenance, and inherent operating enhancements that make the task of dispatching easier. The Genralogic I microprocessor has also been conceived as part of an overall package that includes specialized test equipment, program support facilities, program simulators, and other maintenance elements. This avoids the problem of a new technology being introduced without sufficient support, leaving the customer to determine what's been supplied and how to use it.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Jackson, KK (General Railway Signal Company)

Association of American Railroads Tech Paper 1980, pp 59-71, 3 Phot.

ORDER FROM: AAR

DOTL RP

06 335560

A PROBABLE ROLE FOR SATELLITES IN LAND MOBILE RADIO

NASA's geostationary satellites of the ATS series were used as repeaters for land mobile communications in many experiments and demonstrations with

automobiles, trucks, towboats, ships and aircraft. Results of a concept study show how a satellite could be used to augment the terrestrial "cellular" type mobile radio telephone systems that are now being developed for metropolitan areas. The satellite-aided system may be cost effective in thinly populated areas where the terrestrially based systems are not cost effective. The two systems would be compatible so that the same vehicle equipment would work through the terrestrial systems where that service is available and through the satellite where the terrestrial service is not available. The satellite would have an antenna that forms many independent beams, each with a multichannel duplex repeater. The beams would illuminate the nation with many "footprints" in a manner corresponding to the cells of an urban terrestrial system. The multibeam satellite can provide geographical frequency reuse appropriate for the areas it serves. It does not appear practical to share channels with the terrestrial systems so additional frequency assignments would be needed in order to add the satellite-aided service to the terrestrial service. Satellite-aided and terrestrial systems are significantly different in propagation characteristics and in cost factors for large area coverage. The experimental results illuminate the differences and suggest that satellite-aided mobile radio telephone systems are worth serious consideration.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Anderson, RE (General Electric Company)
Association of American Railroads Tech Paper 1980, pp 72-87, 6 Fig., 4 Tab., 3 Ref.

ORDER FROM: AAR

DOTL RP

**06 335561
COMMUNICATIONS SATELLITES--PAST, PRESENT, AND FUTURE**

Growth of commercial satellite communications, following introduction of the geosynchronous type in 1965, has proceeded rapidly. High-frequency systems of up to 30 GHz provide spot beams that eliminate interference to adjacent ground areas so they may use the same frequency bands. Implementation of mobile satellite communications is costly, requiring volume to be very heavy to justify any commercial introduction. Communications carriers will continue to increase the effectiveness with which they utilize present technology; NASA ultimately plans for a high-frequency, large-capacity satellite system with vastly increased capacity, including provision for mobile communications.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Dement, DK
Association of American Railroads Tech Paper 1980, pp 88-96, 2 Fig., 4 Ref.

ORDER FROM: AAR

DOTL RP

**06 335562
"IN BAND" PORTABLE AREA COMMUNICATIONS MOBILE REPEATER**

Two-Way Radio is more flexible and useful if the radio communications can be extended beyond a vehicle. The Portable Area Communications Mobile Repeater (PAC-RT) provides a means for the operator of the vehicle radio to use the high power of the vehicle radio and yet have the flexibility to use a portable. The mobile radio is configured as part of a repeater system to accomplish this task. The coverage is then not limited by the portable but is virtually the same as the mobile radio to base station coverage. This gives the user the flexibility to depart from the vehicle, to communicate the short distance to the vehicle via the portable set, turn on the mobile radio transmitter and rebroadcasting the information to the base station. A portable radio equipped with a coded signal is used to activate repeater operation. Portable to portable communications without repeater operation is obtained without the signal. With the signal and using the repeater and also switching a portable to a mobile frequency the portable to portable range can more than double.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Smith, JL (Conrail); Rupp, HR (Motorola)
Association of American Railroads Tech Paper 1980, pp 97-117, 13 Fig., 5 Tab.

ORDER FROM: AAR

DOTL RP

**06 335563
MICROWAVE ENGINEERING AND THE PROGRAMMABLE CALCULATOR**

A portable, programmable calculator can be utilized for laying out a microwave system, making multiple iterations to determine the most economical site locations for repeater stations. Functions of the calculator used for this Microwave Path Engineering can be expanded to include altimeter correction, path data sheet calculations, predicted outage calculations and other pertinent design details. An engineer's productivity and accuracy are enhanced at reasonable cost.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Hendricks, JE, Jr (GTE Lenkurt Incorporated)
Association of American Railroads Tech Paper 1980, pp 118-138, 6 Fig., Apps.

ORDER FROM: AAR

DOTL RP

**06 335564
SATELLITE COMMUNICATION RELATED TO THE RAILROAD INDUSTRY**

Satellite data networks offer a simple solution to geographically dispersed wideband data requirements in which a simple, reliable satellite earth terminal communicates via a single relay in space to other terminals which may be located anywhere in the U.S. Such an earth terminal can also interconnect with other transmission media such as point-to-point microwave, telephone lines, and computer data centers. This paper describes the process of design and shows the configuration of one such network laid out for Burlington Northern.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Lambson, RE (Motorola)
Association of American Railroads Tech Paper 1980, pp 139-165
3 Fig, 1 Tab, 2 App.

ORDER FROM: AAR

DOTL RP

**06 335565
TIME TO TAKE A STEP FORWARD**

The role of micro-technology, or LSI (Large Scale Integrated) circuits, in reducing the cost of installation and maintenance of signaling is discussed. While this technology is widely used in non-vital circuitry where cost and space requirements have been reduced and reliability greatly enhanced, there has been reluctance to make applications in vital, or fail-safe, systems. Vital relays can be replaced with microprocessor control in CTC, with proper attention given to reliability, safety, modularity, standardization, compatibility, maintainability, logic, and data transmission requirements. LSI circuits are seen as having the potential for simplifying cab signaling.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Wilson, GD (Southern Pacific Transportation Company)
Association of American Railroads Tech Paper 1980, pp 207-222

ORDER FROM: AAR

DOTL RP

**06 335567
FREQUENCY SYNTHESIS IN TWO-WAY COMMUNICATIONS**

Frequency synthesis, accomplished by using one or more reference oscillators to produce a multiplicity of output frequencies different from the reference frequencies, is used in radio communication services which are channelized into equally spaced assignments. Usually two reference frequencies are mixed and the output filtered to exclude one of the two resultant mixer outputs. Introduction of synthesizers to railroad radio can mark the beginning of the end of conventional crystal controlled frequencies.

Technical Papers presented at General Sessions and Committee Work-

shops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Rupp, H (Motorola)
Association of American Railroads Tech Paper 1980, pp 227-239, 6 Fig.
ORDER FROM: AAR

DOTL RP

06 335568

SYNTHESIZER TECHNIQUES

With synthesis of radio frequencies for mobile radio applications increasing, the new technology is reviewed as it relates to the Basic Phase Lock Loop (PLL) Synthesizer, Mixer PLL Synthesizer, Prescale PLL Synthesizer, and Dual Modulus Prescale PLL Synthesizer. Also included are general descriptions of the functional building blocks that make up a synthesizer, along with general and specific design considerations for the various types.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Myers, HE
Association of American Railroads Tech Paper 1980, pp 251-261, 4 Fig.
ORDER FROM: AAR

DOTL RP

06 335569

A CONCEPTUAL STANDARD FOR MULTI-CHANNEL FREQUENCY SELECTION FOR THE CLEAN CAB RADIO

This paper presents a concept which could provide a common or universal plug-in module to control channel selection in clean cab radio employing synthesized circuitry. By employing a universal plug-in module, run-through train operation could be accommodated by simply changing the module. The proposed configurations could permit implementation of a wide variety of designs, all of which would be controlled by a common plug-in module. Railroads would thus enjoy the advantages of flexible universal frequency control regardless of the synthesizing techniques employed by various manufacturers.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Lippard, JH
Association of American Railroads Tech Paper 1980, pp 262-270, 2 Fig., 3 Tab.

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DOTL RP

06 335570

ELECTROMAGNETIC COMPATIBILITY TEST FACILITY FOR SIGNAL AND COMMUNICATION SYSTEMS

The EMC Test Facility has been developed for a 3-mile segment of the 14-mile electrified Railroad Test Track at the Transportation Test Center at Pueblo, CO. EMC has become more important as the usage and sophistication of electrical and electronic equipment has increased, now involving higher speed circuitry, broader bandwidths and greater utilization of all available frequencies. Electrification represents a major challenge to satisfactory operation of electronic systems that may be located along the right-of-way. The Test Facility will include track circuits, buried cables, a typical open pole line and other components of a U.S. railroads wayside signal and communications system.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Cracker, WF (Federal Railroad Administration); Siemens, WH (Kaiser Engineers)
Association of American Railroads Tech Paper 1980, pp 271-277, 4 Fig., 3 Ref.

ORDER FROM: AAR

DOTL RP

06 335603

SPARCS--A STORED PROGRAM AUTOMATIC RADIO CONNECTION SYSTEM

A large area coverage radio system with telephone access is described. Two operator-controlled systems have been installed on British Rail. This paper

describes the development of a stored program automatic radio connection system, which allows direct dialing between individual mobile radio users and access to the British Rail automatic trunk telephone network. Emergency override access from the mobile radios is provided.

Cree, DJ (British Railways Board); Whittaker, AJ *Radio and Electronic Engineer* Vol. 50 No. 7, July 1980, pp 345-352

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

06 335608

PERFORMANCE MEASUREMENT AND ANALYSIS OF THE SHINKANSEN TRAFFIC CONTROL COMPUTER SYSTEM

The traffic control system for Shinkansen is a kind of on-line real-time computer system which controls the speed, direction and movements of trains throughout the entire line. In order to create a highly reliable, efficient and quick-responding system, a hierarchical hardware system has been introduced and improvement in operational efficiency taken into consideration in the software system. The basic concept used for designing a hardware system and the system evaluation for improvement of performance are described. The latter includes actual measurements by hardware, software monitors and performance simulations. The total system has been operating for more than one year with no down-time.

Real-Time Data Handling and Processing Control, Proceedings of the European Symposium, 1st, Berlin, Germany, October 23-25, 1979. Published for the Commission of the European Communities (EUR 6691 DEF).

Akita, K (Japanese National Railways)
North-Holland Publishing Company 1980, pp 117-121, 2 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: North-Holland Publishing Company, 52 Vanderbilt Avenue, New York, New York, 10017

06 341031

BURLINGTON NORTHERN INC. COMPUTER AIDED CTC LINCOLN AND ALLIANCE NEBRASKA

Burlington Northern's computer aided centralized traffic control between Lincoln and Alliance Nebraska is described in detail. One of the prime assets of this system is proving to be the automatic tracking of trains and advancement of the train I.D. through the territory. The hardware configurations of the computers is listed, and suggestions are made, based on BN's experience, for the design and implementation of a similar system.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Walker, MB
Association of American Railroads Tech Paper 1979, pp 17-22, 1 App.

ORDER FROM: AAR

DOTL RP

06 341032

IF ITS A COMPUTER, WHAT DOES IT COMPUTE?

The railroad signal industry is using computers of various sizes and configurations in both the design and implementation of signal systems. The areas of use range from a basic micro-processor performing easily defined logic control functions, to the use of large data processors to aid in the design and analysis of complex transportation control systems and subsystems. The use of computers as a process controller in various types of signal systems has become relatively commonplace, and their applications are generally widely-known. However, their use in the design phases of a project has not been given such wide exposure, thus these applications are not of general knowledge. This paper will discuss the use of the various types and sizes of computers as used in performing functions outside of the control process, and in particular how they are used in conjunction with the design and production of some typical signal systems. Examples will be presented of the use of computers for the analysis of signal block layouts, for the simulation of the operation of trains, and in modelling a complex track circuit. Additionally, their use as design aids in the application engineering drawings will be described.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Rusick, JH
Association of American Railroads Tech Paper 1979, pp 23-30, 4 Fig.

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06 341033

BATTERIES FOR PHOTOVOLTAIC POWERED SIGNALING DEVICES

Batteries used to back up photovoltaic power signaling devices, must operate with maximum reliability under probably the most adverse conditions ever imposed on a battery: temperature extremes, extreme vibration, being in some state of discharge most of the time, and having to supply power 365 days a year. The cycling type lead calcium battery meets all the requirements for reliability and operation with a minimum of maintenance.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Molnar, CJ

Association of American Railroads Tech Paper 1979, pp 31-36

ORDER FROM: AAR

DOTL RP

06 341034

NEW DIMENSIONS IN TERRESTRIAL PHOTOVOLTAIC SYSTEM DESIGN

Solar (photovoltaic) power for terrestrial applications has become a viable and cost effective source of electricity during the past 5-6 years. Photovoltaics--the direct conversion of solar energy into electrical energy via solar cells--is a well established technology that has been proven in space for nearly two decades. However, the design of a solar cell power system involves a process of optimization of unique elements quite different from that employed in conventional power systems. Solar input varies locally and temporally. Energy storage needs are a dual function of fluctuating solar input and load profiles with a substantial range of photovoltaic array size/storage trade-offs available in designing a stand alone system. Since high reliability and low maintenance are required of power supplies for railway, communications and signalling applications, special attention must be paid to system complexity and hardware selected. Unique analytical techniques are described in this paper which have been used to design systems now operating successfully in remote locations in almost every geographical area of the world. A specific application is treated in detail as an example of the implementation of these techniques.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Blumenstock, T (Solarex Corporation)

Association of American Railroads Tech Paper 1979, pp 37-46, 6 Fig., 3 Ref.

ORDER FROM: AAR

DOTL RP

06 341035

OPTICAL COMMUNICATIONS--A POTENTIAL COMMUNICATIONS MEDIUM FOR THE RAILROADS

Fiber optics communication has been shown to be practical and cost-effective in the telephone industry. The value of fiber optics in the electric power utility, military, and CATV environments has also been demonstrated. Will fiber optics play a role in communications and control within the railroad industry? This presentation provides a brief review of what fiber optic communications is, where it can be used in the railroad environment, what its potential advantages are, and the economics of using fiber optic communications equipment. The question of practicality will be addressed by looking at recent installations.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Fairaizl, AF (Sicor Optical Cables, Incorporated)

Association of American Railroads Tech Paper 1979, pp 47-59, 10 Fig., 5 Ref.

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06 341036

PRODUCT SAFETY WHAT IT MEANS TO THE RAILROADS AND SUPPLIERS

While the railroad business continues to grow, the demand for new and more sophisticated control systems continues to be one of the highest priorities for

the suppliers. Higher speeds, higher density, more complex equipment and new technologies are creating new requirements in the areas of product safety from both the railroad and the supplier. Now is the time to develop updated requisites and performance specifications for solid state equipment.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Kennedy, RW

Association of American Railroads Tech Paper 1979, pp 60-63

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DOTL RP

06 341037

ADVANCEMENTS IN UNPRESSURIZED 2 GHZ ANTENNAS SYSTEMS PERFORMANCE

In 1974, the first all-foamed-filled, unpresurized, 2 GHz microwave system was introduced. This system has been supplied for over five years providing a reliable and economical antenna system for use in the 1850-1990 and 2100 MHz frequency bands. The system utilizes foam-filled antenna feed and low-VSWR, foam-dielectric cable. The use of a foam-filled system eliminates pressurization equipment, increases reliability, results in significant cost savings and provides an economical option over conventional pressurized antenna systems.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Oster, J (Andrew Corporation)

Association of American Railroads Tech Paper Bulletin 8657, Sept. 1979, pp 64-71, 14 Fig.

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06 341040

THE DOWTY SYSTEM FOR THE CONTINUOUS CONTROL OF FREIGHT CAR SPEED. DESIGN ASPECTS FOR A TYPICAL CLASSIFICATION YARD--PARTS 1 AND 2

The Dowty equipped yard does not require the complex control systems of a conventional yard using "clasp" retarders. The self-contained speed sensitive retarders are simply fitted to the rail to provide continuous speed control from the hump, through the switching areas and down into the class tracks. A fully automatic Dowty speed control system is simple and economic to construct, operate and maintain. A typical system design is presented.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Melhuish, AW (Dowty Corporation)

Association of American Railroads Tech Paper 1979, pp 109-121, 5 Fig., 2 Phot.

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DOTL RP

06 341041

BURLINGTON NORTHERN COMMUNICATIONS TRAINING PROGRAM

The BN communications training programs are hybrid programs that combine formal classroom instruction with home study and related on-the-job kinds of training activities, with the emphasis on the home study portion. The goals of the basic training are to improve overall maintenance and construction practices, to improve employee morale, to decrease employee turnover and to increase the pool of promotable manpower. These goals are achieved by explaining the necessary technical information to prepare the apprentice to cope with the complexities of his job. Safety is impressed as is the successful completion of the assignments.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Schmidt, RL (Burlington Northern, Incorporated)

Association of American Railroads Tech Paper 1979, pp 122-139

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06 341244

EVALUATION OF SIGNAL/CONTROL SYSTEM EQUIPMENT AND TECHNOLOGY TASK 5: ECONOMIC STUDIES

Economics form an important aspect in the comparison of new technologies with those which are subject to possible replacement. This report presents an economic analysis of candidate state-of-the-art signal/control systems which were selected in preceding tasks of the project. The report focuses on passenger service improvements, capital and operating costs, reliability and maintainability, vandalism and the impact of standards. Consideration of these aspects leads to a cost/benefit analysis in which the technologies are configured in systems ranging in complexity from cab signaling with overspeed control to total monitoring and control from a remote point.

Taylor, SF Marshall, JF Schultz, CM Whalen, RB
STV Engineers, Incorporated, Kentron International, Incorporated, Dyer
(Thomas K), Incorporated, Federal Railroad Administration FRA-
/ORD-78/39.5, Dec. 1980, 141p, Figs., 3 App.

Contract DOT-FR-773-4236

ORDER FROM: NTIS

PB81-190209, DOTL NTIS, DOTL RP

06 341245

EVALUATION OF SIGNAL/CONTROL SYSTEM EQUIPMENT AND TECHNOLOGY TASK 6: SPECIFICATION DEVELOPMENT

Development of a signal/control system for high speed 255 Km/h (160 MPH) train operation must proceed in a logical sequence. One step is a comparison of alternative candidate systems representing state-of-the-art technology. This report presents a functional specification with which to measure the utility of selected candidates. Requirements are organized to permit growth from basic cab signaling to total monitoring and control from a single point. A functional path has been taken in order to provide the widest latitude in hardware design.

Taylor, SF Marshall, JF Hallmark, WC Whalen, RB
STV Engineers, Incorporated, Kentron International, Incorporated, Dyer

(Thomas K), Incorporated, Federal Railroad Administration FRA-
/ORD-78/39.6, Jan. 1981, 117p, 2 App.

Contract DOT-FR-773-4236

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PB81-194318, DOTL NTIS, DOTL RP

06 341246

RAILROAD ELECTROMAGNETIC COMPATIBILITY (EMC): PROCEEDINGS OF A SYMPOSIUM SPONSORED BY THE RAILROAD EMC WORKING GROUP--ASSOCIATION OF AMERICAN RAILROADS, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, AMERICAN RAILWAY ENGINEERING ASSOCIATION

The Symposium on Railroad Electromagnetic Compatibility (May 14-15, 1980) consisted of five technical sessions on electric traction power distribution systems, locomotive and other propulsion systems, communication and power lines paralleling the right-of-way, signal and control, and measurement techniques; a special session giving an overview of the Transportation Test Center; and a special session on the activities of the Railroad Electromagnetic Compatibility Working Group. This report consists of the twenty papers presented at the technical sessions, summaries of the discussions held during those sessions, the working group's activity report, and the text of the keynote speech delivered by Southern Railway System President H.H. Hall.

Symposium held May 14-15, 1980 at University of Southern Colorado in Pueblo, Colorado, and was hosted by the Federal Railroad Administration.

Elliott, P

Unified Industries, Incorporated, Federal Railroad Administration Final
Rpt. FRA/ORD-80/46, Jan. 1981, 219p

Contract DOT-FR-9044

ORDER FROM: NTIS

PB81-199333, DOTL NTIS, DOTL RP

07 315277

TRANSIT STATION USE BY THE HANDICAPPED: VERTICAL MOVEMENT TECHNOLOGY

Transit station use by the handicapped is one area of concern affected by Section 504 of the Rehabilitation Act of 1973. Within any given transit station facility, problems related to vertical movement of level change (i.e., stairway and ramp width, ramp grades, stairway tread, height of risers, and use of escalators and elevators), especially for the handicapped, can be most critical. The Reston conference addressed some of these problems in light of existing and potential vertical movement technology. New transit systems or modifications to existing systems can incorporate appropriate designs to solve level-change problems that will accommodate Section 504 requirements. Design solutions for new stations may also be applicable to the adaptation of older stations. (Author)

Proceedings of a conference held May 20-23, 1979 at the Sheraton International Conference Center, Reston, Virginia.

Transportation Research Board, Urban Mass Transportation Administration, (UR 14) Final Rpt. UMTA-DC-06-0149-80-1, Apr. 1980, 68p, 9 Fig., Refs.

Contract DOT-UT-80040

ORDER FROM: TRB Publications Off.

07 326476

IMPLICATIONS OF BART'S (BAY AREA RAPID TRANSIT'S) IMPACTS FOR THE TRANSPORTATION DISADVANTAGED

The project has examined the implications of the 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. This report integrates the study of BART's impacts on the transportation disadvantaged in each of four major impact areas examined in previous interim project reports--environmental, mobility, economic and land use. Findings are reported from the investigation of twenty-three issues related to the entire range of BART's impacts on the transportation disadvantaged. 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.

Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001642. Prepared by Urban Dynamics Associates, San Francisco, CA.

Donnelly, R Arguelles, J
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-12, Apr. 1979, 148p

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-118101, DOTL NTIS

07 328372

PREVALENCE, COSTS, AND HANDLING OF DRINKING PROBLEMS ON SEVEN RAILROADS

The report presents and discusses the results of Project REAP (Railroad Employee Assistance Project), an in-depth study of the size of the alcohol abuse problem in the railroad industry, the effects of the problem on companies and employees, and the effectiveness of methods currently used to combat the problem. Seven major railroads and their labor organizations participated in the study. The seven studied railroads employ 234,000 workers, about half of the work force in the country's entire industry.

Mannello, TA Seaman, FJ
University Research Corporation, Federal Railroad Administration Final Rpt. Dec. 1979, 252p

Contract DOT-TSC-1375

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-132516

07 330197

HERBICIDE EXPOSURE AND TUMOR MORTALITY. AN UPDATED EPIDEMIOLOGIC INVESTIGATION ON SWEDISH RAILROAD WORKERS

A group of 348 individuals has been followed through October 1978. In this updated analysis of the causes of death among railroad workers, the observed number of tumor deaths was higher than expected especially among individuals exposed in earlier years of the study to both amitrol and phenoxy acids. However, the excess tumor mortality among persons exposed to amitrol became more moderate, and the earlier, slightly increased tumor mortality among people exposed to phenoxy acids more pronounced. No specific type of tumor predominated. The result of the previous analysis of deaths among these railroad workers has been confirmed as to an excess of tumors, but the aspects of casual relationships to specific agent remain rather unclear, especially since workers exposed to a combination of amitrol and phenoxy acids seem to be the most seriously affected. However, the result being in agreement with animal data and other epidemiologic studies, suggests a need for the careful handling of amitrol and phenoxy acids as increasingly suspicious carcinogens.

Axelson, O Sundell, L *Scandinavian Journal of Work, Environment & Health* Vol. 6 No. 1, 1980, pp 73-79

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Institute of Occupational Health, Haartmaninkatu 1, SF-00290, Helsinki 29, Finland

07 330198

MEDICAL INFORMATION 1980 [Informations medicales 1980]

This special issue contains 14 papers by doctors from the DB, DR, FS, JNR, MAV, PKP, SNCB, SNCF and VR. [French/English/Ger]

International Union of Railway Medical Services UIC: Cat 17 0 3, 1980, pp 1-152, 13 Tab., 38 Phot., 76 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: International Union of Railway Medical Services, 85 rue de France, 1070 Brussels, Belgium

07 330663

AN EVALUATION OF MAKING RAIL TRANSIT SYSTEMS ACCESSIBLE TO HANDICAPPED PERSONS. A NATIONAL SUMMARY OF COST ESTIMATES

Section 321 of the Surface Transportation Assistance Act of 1978 required this study of rendering rail transit and commuter systems accessible to handicapped persons. Estimates of capital and operating costs were developed for rapid transit, light-rail and commuter rail modes, along with estimates of the demand for such service on light-rail and commuter operations and the benefits of such accessibility. An increased ridership of 0.6 percent was estimated annually for commuter and light-rail modes with costs per trip ranging from \$3 to more than \$50 and the average between \$10 and \$40. Operators predicted operating and capital costs of up to \$11.4 billion over 50 years; a consultant estimated about half this amount.

Transportation Systems Center, Urban Mass Transportation Administration Apr. 1980, 83p, 5 Tab., 6 App.

ORDER FROM: GPO

07 331217

MARTA'S EEO OFFICE: THREE COMPLEMENTARY/CONFLICTING ROLES

This report deals with three perspectives of MARTA's Equal Employment Opportunity (EEO) Office, which was established in the Spring of 1972. The three perspectives are: EEO's role as watchdog; its role as nurturer of minority business; and its complex roles in internal MARTA politics. The report also includes a general structure and orientation outline. This report contains references and Appendix 1: Excerpts from MARTA's "Invitation for Bids, Appendix A, Equal Employment Opportunity and Minority Business Utilization Responsibilities". (UMTA)

Golembiewski, RT Anderson, MJ
Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA-11-0006-81-9, July 1979, 35p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB81-157406

07 331218

RELOCATING THE ELDERLY: SIX CASES OF MARTA'S IMPACT ON PEOPLE

This study directs attention to the personal reactions of selected individuals to a social process, which is the unexpected and involuntary relocation of the elderly to another residence. More specifically, this report traces the impact on older people in six cases, both individuals and couples, who were relocated by MARTA between 1973 and 1975. The authors point out that these six cases are not necessarily representative in any strict sense, but they do suggest the range and intensity of impacts that relocation can have on people. The report concludes that as a result of earlier experience, it appears that MARTA is more cognizant of individual preferences and that relocated households have played a more active role in relocation decision-making. (UMTA)

Rothman, NC

Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA11-0006-81-10, July 1979, 16p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA

ORDER FROM: NTIS

PB81-157414

07 331222

MARTA AND THE 15¢ FARE: KEEPING "WHOSE" FAITH UNTIL MARCH 1979?

Following the defeat of a November 1968 Referendum, MARTA successfully implemented a strategy aimed at capturing the support of its two key constituencies in a 1971 Referendum. The two constituents can generally be described as largely inner-city Black and largely suburban White. These two groups held widely different views as to how to distribute the costs and benefits of the mass transit program. In response to the concerns of Black Atlanta leaders, MARTA officials began more minority hiring, promised the routing of a proposed rail system to Black neighborhoods, and also provided the 15 fare, which was to remain in effect until March 1, 1979, when a 5 increase would occur. The White constituency emphasized the need for more bus service and a rapid rail system to outlying areas, even if this meant higher fares and curtailment of services in Atlanta. MARTA promised to provide numerous service improvements to the suburbs. This report includes discussions of the legal battles surrounding the fare issue and its ramifications. The life of the 15 fare lasted through March, 1979, which is the date originally promised. However, the fare was increased by 25¢ instead of 5¢. (UMTA)

Proehl, CW, Jr Golembiewski, RT

Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA11-0006-81-14, July 1979, 22p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA

ORDER FROM: NTIS

PB81-157455

07 331483

DESIGN TOOL FOR ESTIMATING PASSENGER RIDE DISCOMFORT WITHIN COMPLEX RIDE ENVIRONMENTS

A series of experimental studies utilizing approximately 2200 test subjects has led to the development of a general empirical model for the prediction of passenger ride inputs. The ranges of vibration and noise stimuli used to derive the model included the amplitudes and frequencies that are known to most influence passenger comfort. The ride quality model accounts for the effects of combined axis vibrations (up to three axes simultaneously) and includes corrections for the effect of vibration duration and interior noise. Output of the model consists of an estimate of the passenger discomfort produced by a given noise and/or vibration environment. The discomfort estimate is measured along a continuous scale that spans the range from below discomfort threshold to values of discomfort that are far above discomfort threshold.

Leatherwood, JD (Langley Research Center); Dempsey,

TK Cleveson, SA *Human Factors* Vol. 22 No. 3, June 1980, pp 291-312, 31 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

07 331851

ELDERLY AND HANDICAPPED ACCESSIBILITY ON THE WASHINGTON, D. C. METRO: SOME LESSONS LEARNED

This paper presents selected results of a recently completed one year project designed around a case study of the Washington, D. C. Metropolitan Area rapid rail system (METRO). The objective of the research was to determine if the METRO subway is usable by the elderly and handicapped. This determination reflects upon the sufficiency of the design criteria instituted to insure accessibility by this population.

Coleman, DM (Howard University); Graye, ES *Journal of Advanced Transportation* Vol. 14 No. 2, 1980, pp 185-196, 24 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

07 334186

MAXIMUM DECELERATION AND JERK LEVELS THAT ALLOW RETENTION OF UNRESTRAINED, SEATED TRANSIT PASSENGERS

Three experiments performed to determine the maximum deceleration and associated rate of change of deceleration (jerk) that will allow the majority of potential users of automated guideway transportation systems to remain securely in their seats are described. In each experiment subjects representative of three anthropometric classes underwent various levels of deceleration and jerk. These experiments were performed in an instrumented vehicle controlled by an automated braking system. Seat sensors, movies, and subject ratings were employed to determine the deceleration at which subjects began to move off the seat pan. Subjects were decelerated while seated normally, sideways, and forward facing but tilted backward (facing forward with the seat pan tilted back 3, 9, or 12 deg). Subjects underwent jerk levels of 0.25, 0.75, and 1.25 g/s while seated normally only. Jerk was found not to affect maximum deceleration levels. Modifications of features common to transit seating were found to increase retention. The maximum deceleration allowing retention was determined for both forward-and side-facing seated passengers. These results are discussed and presented in tabular and graphic form. (Author)

This paper appeared in Transportation Research Record No. 774, Maintenance Management Systems and Transportation Ride Quality.

Abernethy, CN (Digital Equipment Corporation); Jacobs, HH (Dunlap and Associates, Incorporated); Plank, GR Stoklosa, JH Sussman, ED (Transportation Systems Center) *Transportation Research Record* No. 774, 1980, pp 45-51, 4 Fig., 3 Tab., 13 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

07 335834

THE USE OF THE UNDERGROUND SYSTEM BY PEOPLE WITH IMPAIRED MOBILITY

The terms of reference of the study are outlined, and a definition is given of those travellers whose mobility is handicapped. The scope of the existing underground system is described, and a list of disability organizations is presented together with their views on the problems confronting handicapped travellers. Details are given of the characteristics of specific disabilities and their consequences. Detailed measurements and observations were made at 8 underground stations representative of typical situations to be found throughout the system as a whole, so as to highlight the problems facing handicapped people. Suggestions are made for improvements.

Penton, JH (Penton & Smart)

London Transport Executive Monograph Sept. 1976, 68p, Figs., Photos., 16 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 254535)

ORDER FROM: London Transport Executive, 55 Broadway, London SW1H 0BD, England

07 337151

STUDY OF OPERATOR ABSENTEEISM AND WORKERS' COMPENSATION TRENDS IN THE URBAN MASS TRANSPORTATION INDUSTRY

This report examines and documents the nature, extent, and trends of absenteeism. The study was undertaken to identify ways of reducing the adverse impact of absenteeism on service quality and costs. A thorough review of the methods currently used in transit industry has been performed, and analysis has enabled the study team to make recommendations to assist

transit managers. This study concludes that absenteeism in transit is a severe and rapidly worsening problem. Effects of workers' compensation statutes on transit costs and quality of service are shown to be significant and increasing. The authors suggest reconsideration of these laws, particularly their administration.

Sponsored in part by Port Authority of Allegheny County, Pittsburgh, PA.

Hyde, D Hill, FN Goodman, P Stevens, J

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, Port Authority of Allegheny County Final Rpt. UMTA-PA-06-0050-80-1, Mar. 1980, 164p

Grant UMTA-PA-06-0050

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB31-180937

08 328851

THE EFFECTIVENESS OF FLASHING LIGHTS AND FLASHING LIGHTS WITH GATES IN REDUCING ACCIDENT FREQUENCY AT PUBLIC RAIL-HIGHWAY CROSSINGS, 1975-1978

The Highway Safety Acts of 1973 and 1976, and the Surface Transportation Assistance Act of 1978, provide funds to individual states to improve safety at public rail-highway crossings. The report was undertaken in support of a U.S. DOT effort to develop a resource allocation model designed to select and rank crossings, and recommend warning device improvements in a cost-effective manner. Input to the model included the effectiveness of active warning devices, flashing lights and flashing lights with gates, in reducing accident potential. The effectiveness is defined as the percentage of accident reduction at crossings which result from the installation of warning devices. The report is based on inventory and accident data available from computerized FRA data bases, and computes new effectiveness values in three categories: (1) flashing lights at formerly passive crossings, (2) flashing lights with gates at formerly passive crossings, and (3) flashing lights with gates at crossings formerly equipped with flashing lights only.

Sponsored in part by Federal Highway Administration, Washington, DC. Office of Research.

Morrisey, J

Input-Output Computer Services, Incorporated, Transportation Systems Center, Federal Railroad Administration, Federal Highway Administration Final Rpt. FRA-RRS-80-005, Apr. 1980, 28p

Contract DOT-TSC-1533

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-133886

08 328852

RAIL-HIGHWAY CROSSING WARNING DEVICE LIFE CYCLE COST ANALYSIS

The Highway Safety Acts of 1973 and 1976, and the Surface Transportation Assistance Act of 1978 provide funds to individual states to improve safety at public rail-highway crossings. This report was undertaken in support of a U.S. DOT effort to improve the efficient allocation and use of these Federal funds. The report describes the results of a study designed to collect, analyze, and document life cycle costs of active rail-highway crossing warning devices. Life cycle costs were determined from information on installation costs contained in the final billings of rail-highway crossing improvement projects and from data on maintenance costs provided by various states, railroads, and railway associations. Life cycle costs were analyzed by cost components for each of the five Federal Railroad Administration regions. Cost components included pre-engineering, labor, material, and equipment rental costs as well as maintenance costs. Cost variability due to several factors such as number of tracks, crossing location, type of train detection system, and combinations of these variables was analyzed.

Sponsored in part by Federal Highway Administration, Washington, DC. Office of Research.

Heisler, J Morrissey, J

Input-Output Computer Services, Incorporated, Transportation Systems Center, Federal Railroad Administration, Federal Highway Administration Final Rpt. FRA-RRS-80-003, Sept. 1980, 84p

Contract DOT-TSC-1533

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-133894

08 329039

GRADE CROSSING ACCIDENT INJURY MINIMIZATION STUDY

The purpose of this study was to identify and evaluate potential concepts for reducing injuries to highway occupants and train occupants in rail-highway grade crossing collisions. A review of railroad, highway vehicle, and aviation sources was made. The identified concepts were principally those from railroad crashworthiness and collision attenuation studies, plus some collision attenuation concepts from highway safety work. A list of concepts was developed and each approach evaluated for effectiveness according to a set of criteria based primarily on performance in normal operations and in accidents. The more effective concepts consisted of a hard-faced deflector covering the locomotive coupler to remove the highway vehicle from the tracks, a soft crushable collision attenuator to reduce impact accelerations and forces, and increased use of rail brakes in passenger cars.

Portions of this document are not fully legible.

Frey, EJ Teobald, CE, Jr

HH Aerospace Design Company, Incorporated, Federal Railroad Administration Final Rpt. FRA/ORD-80/87, Dec. 1980, 197p

Contract DOT-FR-8197

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-155236, DOTL NTIS

08 331489

COLORADO RAIL BYPASS FEASIBILITY STUDY COLORADO STATE RAIL PLAN

The study summarized examines a broad range of elements for assessing the feasibility and appropriateness of investing in a comprehensive project to alleviate the future unit train movements through the State of Colorado.

Balloffet, AF Hovey, GL *ITE Journal* Vol. 50 No. 8, Sept. 1980, pp 15-25, 6 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

08 334167

EVALUATING THE SAFETY BENEFITS OF RAILROAD ADVANCE-WARNING SIGNS

This paper presents the findings and conclusions of a study to develop an experimental design and analysis plan for field testing and evaluation of the accident-reduction potential of a proposed new railroad grade-crossing advance-warning sign. Several alternative sampling frameworks were initially developed to determine which might offer the most-efficient design in terms of required sample size. It was found that for a three-to five-year data collection period, the sample size required to detect even a 5 percent reduction in accident rate could exceed the total population of available sites. Therefore, an analysis was undertaken to determine the minimum relative reduction in accident rate that would economically justify deployment of the new advance-warning sign. The cost of undertaking the field studies and analyses was then evaluated so that it could be compared with the expected value or usefulness of the information to be derived from the study. The results indicated that the proposed accident study would be both experimentally and economically impractical. It was therefore recommended that an accident study not be undertaken. Several alternative policy options are then examined. (Author)

This paper appeared in Transportation Research Record No. 773, Grade Crossings, Devices, Visibility, and Freeway Operations.

Berg, WD Fuchs, C (Wisconsin University, Madison); Coleman, J (Federal Highway Administration). *Transportation Research Record* No. 773, 1980, pp 1-6, 1 Fig., 3 Tab., 11 Ref.

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DOTL JC

08 334168

NIGHT VISIBILITY OF TRAINS AT RAILROAD-HIGHWAY GRADE CROSSINGS. ABRIDGMENT

The problem of night visibility of trains at railroad-highway grade crossings is discussed. Current practice, the literature, and some laboratory experimental data are summarized briefly. Of grade-crossing accidents, 37 percent occur at night; of this 37 percent, 47 percent are accidents in which a vehicle runs into the side of a train. A rough estimate of the benefits of illumination is a 30 percent reduction in night accidents at crossings. A mail survey that had replies from 43 states, 20 railroads, and 119 cities and counties showed that there are no illumination standards now in use for railroad-highway grade crossings and that U.S. practice reflects a great diversity of opinion. Comments are made on field studies conducted in Portland, Oregon; Lincoln, Nebraska; Houston, Texas; and Modesto, California. The majority of grade crossings in Europe and Japan have gates; Swiss and German recommendations for lighting at grade crossings are given. Some scale-model illumination experiments are also reported briefly. (Author)

This paper appeared in Transportation Research Record No. 773, Grade Crossings, Devices, Visibility, and Freeway Operations.

Russell, ER (Kansas State University); Konz, S *Transportation Research Record* No. 773, 1980, pp 7-11, 4 Fig., 1 Tab., 18 Ref.

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DOTL JC

08 334342

THE 1980 NATIONAL RAIL-HIGHWAY CROSSING SAFETY CONFERENCE PROCEEDINGS

This record of the Conference held June 17-19, 1980, at the University of Tennessee, Knoxville, is divided into six major sections corresponding to the sessions into which the meeting was divided: National views; Administrative and legal concerns; Coordinated planning and project scheduling; Community relations; Driver considerations; and Future directions which contains also presentations at the workshops which were part of that session.

Tennessee University, Knoxville, Department of Transportation 1980, 112p, Figs., Tabs., Apps.

ORDER FROM: NTIS

PB81-196982, DOTL RP

08 334434

MANUFACTURER MAKES GRADE CROSSINGS SMOOTHER WITH EXTENDED LIFE SPAN

The railroad crossing industry is represented by a dozen or so companies each of whom manufactures products of admitted excellence. The trend appears to be in the direction of crossings constructed of modules or precast materials ready to install as they reach the site from the factory. This article discusses a proprietary, prefabricated crossing surface made of steel reinforced concrete construction. The modular unit is representative of the new approach to crossing smoothness and extended life to result in a highly satisfactory cost-effectiveness. The new type surfaces are more expensive than those previously used, such as bituminous, plank, gravel and similar low-cost materials. However, tests have shown that the annual maintenance cost is substantially lower while the extended life is such that the end result is substantial savings. Components of the crossing are described, along with installation, maintenance, and several application case histories.

Better Roads Vol. 50 No. 11, Nov. 1980, pp 13-14

ACKNOWLEDGMENT: EI

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DOTL JC

08 334697

SIGNALING INDUSTRY WORKS TO CURTAIN AUTO/TRAIN COLLISIONS

The article discusses crossing signals developed by Union Switch and Signal Company, which include passive devices (warning signs) to complex active systems including track and pavement sensors, flashers and warning bells. Innovations include centralized traffic control which improves railroad safety, increases train speeds, decreases operating expenses and reduces the chance of human error in determining the performance of electronic track sensors and warning devices. These centers work in conjunction with the grade crossing systems. In places where electricity is either unavailable or at a minimum, the company has developed solar-powered and thermal powered highway crossing warning systems. Examples of remote location installations are described.

Better Roads Vol. 50 No. 12, Dec. 1980, pp 30-32

ACKNOWLEDGMENT: EI

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DOTL JC

08 334710

AIRPORT RAILROAD CROSSINGS BEAR A HEAVY BURDEN

The paper discusses a modular crossing system manufactured from high density polyethylene (HDPE). The crossing modules are fastened directly to the ties and are interlocking and interchangeable. "Gage" modules fit between the rails, and "Field" modules provide vehicle approach on the outside of the rails. Preformed and counter-sunk holes align with the ties and provide a drilling template for the anchoring drive spikes.

Better Roads Vol. 50 No. 12, Dec. 1980, pp 16-17

ACKNOWLEDGMENT: EI

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DOTL JC

08 334943

CROSSING REHAB VIEWED FROM SMALL STATE SIDE

Vermont has participated in rail-highway crossing projects funded by the 1973 Federal Highway Safety Act by regularly providing its 10 percent

matching funding which has allowed systematic installation of automatic warning devices and improvement of crossing surfaces. The State Agency of Transportation is charged with identifying and prioritizing crossing improvements that utilize the federal and state funds. Most such projects are then accomplished by railroad and state forces working together; railroad funds are often expended to extend an improvement beyond the original scope to further enhance safety or reduce maintenance needs.

Tofani, RE *Railway Track and Structures* Vol. 77 No. 5, May 1981, pp 35-36, 3 Phot.

ORDER FROM: ESL

DOTL JC

08 335057

COMMUNITY/RAIL CONFLICTS: A NEW APPROACH

Increase in unit-coal-train traffic across North Dakota and Minnesota resulted in a study of the community impacts of frequent Burlington Northern train movements through municipalities of varying sizes. Seven impacts were identified: pedestrian safety; vehicle safety; emergency-vehicle delay; delays in traveling to work and school; environmental effects such as noise and air pollution; and community development. Six case-study communities were examined in Phase I. Phase II identified and evaluated low-cost alternative solutions; their effectiveness was measured in Phase III. A specific study of Moorhead, MN, is described.

Braun, RP McCrary, I, Jr (Minnesota Department of Transportation) *Railway Age* Vol. 182 No. 11, June 1981, p 30.

ORDER FROM: ESL

DOTL JC

08 335462

USE OF WIND ENERGY FOR POWERING AN AUTOMATIC-WARNING-LIGHT GRADE CROSSING [UTILISATION DE L'ENERGIE EOLIENNE POUR L'ALIMENTATION D'UN PASSAGE A NIVEAU A SIGNALISATION AUTOMATIQUE LUMINEUSE]

General outline of wind energy systems and a description of the experimental installation used for level crossing No. 30 on the Saintes-Royan line. [French]

Latarge, M *SNCF-Informations Tech-Direction de l'Equipement* No. 20, Dec. 1980, pp 53-59, 7 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Societe Nationale des Chemins de Fer Francais, 92 rue Bonaparte, 75 Paris 6e, France

08 335565

MOVING HIGHWAY VEHICULAR TRAFFIC OVER RAILROAD CROSSINGS

Operation of the Modern Approach Detector (MAD) for activating grade crossing protection devices is described. The system is designed so warning devices function in accordance with visibility, speed and proximity of approaching trains. Electronic equipment can sense train motion from minimum to maximum and assure a proper cycle for flashing lights or gates so that motorists will have confidence in the integrity of the indications. Basic functions of MAD and its circuitry are described.

Technical Papers presented at General Sessions and Committee Workshops 1980 Annual Meeting Communication and Signal Division, AAR, Washington Hilton, Washington, D.C., August 19-21, 1980.

Geiger, WL (Modern Industries)

Association of American Railroads Tech Paper 1980, pp 180-192

ORDER FROM: AAR

DOTL RP

08 335604

MODEL FOR ESTABLISHING PRIORITIES FOR RAILROAD GRADE CROSSING IMPROVEMENTS

This paper presents a model for allocating state and federal dollars to railroad grade crossing improvements in Colorado. Its novelty is derived from the fact that it looks at two new areas of application. First, it incorporates the inputs of the railroads more explicitly than before, and secondly, it examines the value of making improvements on a line segment basis. Although a standard integer programming technique is used, a new approach toward measuring the perceived "effectiveness rating" necessary for the technique to work is suggested.

Proceedings-Annual Meeting of the American Institute for Decision Sciences, 11th, v2, New Orleans, Louisiana, November 19-21, 1979.

Gordon, KR. (Colorado University, Boulder)
American Institute for Decision Sciences Proceeding 1979, pp 117-119

ACKNOWLEDGMENT: EI

ORDER FROM: American Institute for Decision Sciences, University Plaza, Atlanta, Georgia, 30303

08 341038

DATA COMMUNICATIONS NETWORK MANAGEMENT

A brief history of the National Rail-Highway Crossing Inventory System is presented. The actual use of the Inventory as a program management tool and a promotional aid at the Federal level, is illustrated. The importance of submitting changes to the Inventory and the current level of update activities are reviewed. The current efforts to upgrade and streamline the Update Processes are described.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Van Fleet, DL (General Datacomm Industries, Incorporated)
Association of American Railroads Tech Paper 1979, pp 72-90

ORDER FROM: AAR

DOTL RP

08 341039

AN UPDATE OF THE PROGRESS OF THE NATIONAL GRADE CROSSING PROGRAM

The Highway Safety Act of 1978 (Title 11, Section 203) authorizes the appropriation of \$760 million over the next four years for safety improvements at public highway-railroad crossings which have been identified and prioritized by the states. The grade crossing program got off to a slow start but progress is being made and the author reviews some of its recent developments.

Association of American Railroads 1979 Technical Papers and Commit-

tee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Amos, CL
Association of American Railroads Tech Paper 1979, pp 99-108

ORDER FROM: AAR

DOTL RP

08 341257

CONSTANT WARNING TIME CONCEPT DEVELOPMENT FOR MOTORIST WARNING AT GRADE CROSSINGS

One important improvement for achieving greater effectiveness in train-activated warning systems at railroad-highway grade crossings (RHGC) would be to provide a constant warning time (CWT) to the motorist of the impending arrival of a train. This report describes an investigation that was carried out to identify, evaluate and demonstrate the feasibility of concepts upon which a general purpose CWT system could be developed. The scope of the study includes train detection, signal transmission, and associated logic, but did not include motorist warning devices. Primary emphasis was placed on the development of CWT concepts rather than equipment for such systems. Train detection techniques with the greatest potential for application to CWT systems are described and evaluated. These include seismic, magnetic, and acoustic transducers; doppler, guided and two dimensional radars, video sensors, strain gages, and proximity switches. The most promising of these are shown to be based on magnetic and acoustic concepts. Field tests carried out to demonstrate the feasibility of these techniques are described and the data is analyzed. It is shown that a great deal of further testing and development will be required before either of those techniques can be incorporated into a working CWT system.

Monroe, RL Munsell, DK Rudd, TJ
Systems Technology Laboratory, Incorporated, Federal Railroad Administration Final Rpt. FRA/ORD-81/07, May 1981, 191p, Figs., 5 Tab., 6 Ref., 2 App.

Contract DOT-FRA-8042

ORDER FROM: NTIS

PB81-205684, DOTL NTIS, DOTL RP

09 324777

A NEW APPROACH TO CORROSION CONTROL

Methods of controlling the effects of corrosion on steel containers, caused by the harsh environment in which they spend a major portion of their life, have provided a challenge for coatings systems suppliers since the advent of containerisation. Despite the many advances made, the search for the optimum system continues. In this article, Eric Lynch, technical manager for International Paint Container Coatings, outlines the development of a new approach to corrosion control systems based on the utilization of controlled release polymers.

Cargo Systems International Vol. 7 No. 11, Nov. 1980, pp 77-79

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

09 328479

METHOD FOR ESTIMATING CRACK-EXTENSION RESISTANCE CURVE FROM RESIDUAL STRENGTH DATA

A method is presented for estimating the crack extension resistance curve (R curve) from residual strength (maximum load against initial crack length) data for precracked fracture specimens. The method allows additional information to be inferred from simple test results, and that information is used to estimate the failure loads of more complicated structures. Numerical differentiation of the residual strength data is required, and the problems that it may present are discussed.

Orange, TW

National Aeronautics and Space Administration NASA-TP-1753, E-439, Nov. 1980, 15p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

N81-11417/5

09 328686

THE SOLUTION OF FRACTURE MECHANICS PROBLEMS EXISTING WITH FINITE ELEMENT PROGRAMS

The finite element method is the best method available for the numerical and most of the engineering fracture mechanics problems. The finite elements programs do not give the exact results, they are idealization dependent and in fracture mechanics, dealing with singular stress/displacement fields, the effect of idealization is particularly strong. There is no direct method for the evaluation of the accuracy of the finite element calculation. Intuition or experience may help in the proper idealization of the problem, but it can be verified only by calculation performed with different idealization. In a case of enriched elements, it appears that there is an "ideal" size (not extremely large or extremely small) for a given fracture problem.

Presented at Ttcp Meeting, Ottawa, Aug. 1980.

Kacprzynski, JJ

National Research Council of Canada, National Aeronautics and Space Administration LTR-ST-1178, May 1980, 71p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

N81-10456/4

09 330154

ANALYSIS OF A PLATE FRACTURED WHEEL SUBMITTED BY NATIONAL RAILROAD PASSENGER CORPORATION

Amtrak submitted a plate cracked wheel to the AAR Technical Center for analysis. Metallurgical and chemical analyses concluded that the wheel was within the AAR specification requirements for Class C wheels. The fact that no evidence of fatigue was found indicates that the wheel was subjected to a high load (probably lateral) that produced yield level stresses at the point of initiation. These stresses cause a brittle fracture to form the stained crescent portion of the crack. The crack advance was arrested at this point, and at some subsequent time, the wheel failed when a substantially lower stress was applied. There is some evidence in the literature that decarburized surface layers can enhance crack formation. Additionally, the high sulfur content may be associated with evidence of surface nonmetallics found in the SEM examination.

Stone, DH

Association of American Railroads Technical Center, National Railroad Passenger Corporation Res Rpt. AAR R-448, Project H-210, Sept. 1980, 19p, 8 Fig., 2 Tab.

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

DOTL RP

09 331099

CORROSION PROTECTION OF STEEL CONSTRUCTIONS

New principles of construction, modern methods of assembling and new paints and coating procedures have led to further improvement of the corrosion protection of steel constructions in the last years. Now as ever passive corrosion protection procedures, metallic or organic protection coatings and the combination of these two kinds (duplex systems) are preferred at steel erections and bridges. Corrosion protection systems, which needs little maintenance, are in front. Ground coatings with cathodic protection effect and the choice of the top coats adequate to stress conditions are the most important criteria. [German]

Weber, K. Zimmer, R *DET Eisenbahntechnik* Vol. 28 No. 11, Nov. 1980, pp 440-443

ACKNOWLEDGMENT: British Railways

ORDER FROM: Atlas for Action Books, Incorporated, 162 Fifth Avenue, New York, New York, 10010

09 331480

MANUAL OF ENGINEERING PROCEDURES FOR FRACTURE-SAFE DESIGN

The Manual explains the engineering procedures for fracture-safe design, as applied to the guidelines system. Particular emphasis is given to aspects that involve the practical use of fracture mechanics principles. Methods for evolving practical solutions in fracture-safe design are explained. The discussions are intended to meet the information needs of design-specialist and general-interest audiences. The methods are based on procedures that are defined as design-by-analysis. The designer is not directed to achieve predefined solutions. He is provided the flexibility to independently evolve practical and economic solutions to specific problems. It is emphasized that the design procedures are not new or unique. The methods are validated by extensive service experience for a wide variety of structures. Thus, applications can be made with confidence, derived from general engineering experience.

Pellini, WS

Association of American Railroads Technical Center Res Rpt. AAR R-451, Nov. 1980, 98p, 33 Fig., 2 Tab., 4 App.

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

DOTL JC

09 331481

GUIDELINES FOR FRACTURE-SAFE DESIGN OF STEEL STRUCTURES

This report is presented in design-document form. It is intended for use as guidelines for fracture-safe design. The issue of a document on this subject is part of a broad effort by the Research and Test Department to introduce advanced analytical techniques. It is allied to objectives of developing improved performance specifications. The guidelines procedures are based on principles of fracture mechanics and follow methods defined as design-by-analysis. The designer or analyst is provided the flexibility to evolve practical and economic solutions to specific problems. The guidelines define methods of analysis as procedural standards. The intent is to satisfy functional requirements of performance specifications by numerical procedures. The design methods are validated by long-term engineering experience for a wide variety of structures. Thus, engineering applications can be made with confidence.

Pellini, WS

Association of American Railroads Technical Center Res Rpt. AAR R-455, Nov. 1980, 99p, 18 Fig., Tabs.

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

DOTL RP

09 334311

DEVELOPMENT OF INDUSTRIAL PRACTICE FOR PRODUCTION AND QUALITY MONITORING OF BASIC OXYGEN STEEL RAILWAY RAILS

Basic oxygen steel rails were equivalent to open-hearth rails as regards all properties studied and showed superior ductility, fatigue strength, and endurance.

Lempitskii, VV Kazarnovskii, DS Levchenko, NF Gordienko, MS Vinokurov, IY Vlasov, NN *Steel in the USSR* Vol. 10 No. 2, Feb. 1980, pp 101-104

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

09 334436

ULTRASONICS FREIGHT-TRAIN CORRELATOR

Ultrasonic return signals can be correlated with a bipolar digital representation of the broadcast waveform by means of a dual channel boxcar averager.

Stix, MS (Massachusetts Institute of Technology) *IEEE Transactions on Sonics and Ultrasonics* Vol. SU-2 No. 4, July 1980, pp 223-224, 5 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

09 334443

FATIGUE CRACK GROWTH AND FRACTURE MECHANICS CONSIDERATIONS FOR FLAW INSPECTION OF RAILROAD RAIL

The paper describes a simple crack growth analysis which, in view of the many uncertainties regarding input information, has been found to provide a reasonable approximation of the defect behavior actually observed in service. The analysis undertaken here will be applied only to defects growing transversely within the head of the rail. The analysis shows that rail inspection in curves--(sensitivity and frequency) based upon fatigue crack growth consideration are interrelated to the fracture properties of the rail steels, the characteristics of the track structure, and the type and level of service to be imposed upon the rails. Some preliminary stress calculations have suggested that the application of 20 kip lateral loads, such as might develop under steady state curving conditions, could more than double the peak tensile stresses applied to a subsurface gauge corner defect under the standard vertical load, material, and track characteristic conditions used in this analysis. This observation would imply a more severe defect growth situation in curves--an observation which is in line with the results of FAST tests.

Steele, RK (Federal Railroad Administration) *Materials Evaluation* Vol. 38 No. 10, Oct. 1980, pp 33-38, 21 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

09 334473

SYNTHETIC TIME HISTORIES FOR USE IN EVALUATING RAINFLOW COUNTING PROGRAMS

In order to properly evaluate the correctness of a rainflow counting program, used in fatigue life analyses, it was deemed necessary to construct artificial time histories that would cover every conceivable case. Ten synthetic time histories, covering all eight possible start-end situations, were prepared by using random numbers generated on a computer. These synthetic histories contained every pattern that could be present in actual histories. Pattern recognition was facilitated by use of the concept of modules, i.e., four point aggregates of reversals. The ten synthetic histories and their corresponding rainflow counts (given as range and mean) are tabulated in this report.

Opinsky, AJ Drish, WF Mattoon, DW
Association of American Railroads Technical Center Res Rpt. AAR R-430, Project Q-103, Aug. 1980, 32p, 9 Fig., 11 Tab., 1 Ref., 2 App.

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

DOTL RP

09 334476

PRELIMINARY EVALUATION OF RAIL VIBRATION TECHNIQUES FOR RAIL FORCE MEASUREMENTS

It has been postulated that the vibrational response of a railroad rail, subjected to a sharp mechanical impact, should vary according to the magnitude of the internal longitudinal force. In order to test this hypothesis, a series of tests were conducted at the A.A.R.'s Track Research Laboratory in Chicago, Illinois. These tests involved measurements of the complex acoustic spectra generated in a test rail section by sharp mechanical impacts to the head, as the longitudinal force levels were varied, in increments of about 12,500 pounds, from zero to approximately 200,000 pounds. Also studied were the feasibility of a rail-mounted accelerometer and microphone, located near but not in contact with the rail head, as response transducers, and the effects of changes in geometry between the points of impact (excitation) and response measurement. The results indicated that there were shifts in the relative magnitudes of specific frequency components, as the longitudinal force levels varied, but due to the complex nature of the vibrational responses, additional measurements and analyses are needed.

McEwan, WS Born, G
Association of American Railroads Technical Center Res Rpt. AAR R-437, Dec. 1980, 28p, 10 Fig., 2 Tab., 4 Ref.

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

DOTL RP

09 335851

BENDING FATIGUE CHARACTERISTICS OF ATMOSPHERIC-CORRODED RAIL

Although some data on fatigue strength of as-rolled rail are available, little was available on deterioration of fatigue strength in a corrosive atmosphere. The fatigue strength of rail decreases as the time after it has been laid increases. Tests were run on as-rolled rail with a bending fatigue machine and these results were compared with specimens which had been exposed in open air for periods up to five years.

Yamazaki, T *Railway Technical Research Inst, Quarterly Reports* Vol. 22 No. 1, Mar. 1981, pp 29-30, 6 Fig.

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

DOTL JC

09 335853

EXPERIMENTS ON HORIZONTAL CRACK PROPAGATION IN RAIL HEAD

Rail on the Shinkansen high-speed line has often developed fatigue failures with cracks propagating horizontally just under the rail head upper surface. Fatigue propagation tests were conducted with six different rail sections, which were of different alloys and/or were heat treated in various manners. Quenched and tempered rail gave indications of greater deformation and crack propagation than the other types.

Yamazaki, T Sugiyama, T *Railway Technical Research Inst, Quarterly Reports* Vol. 22 No. 1, Mar. 1981, pp 31-32, 5 Fig.

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

DOTL JC

09 335854

EXPERIMENTS ON CRACK PROPAGATION IN RAIL HEAD--GROWTH OF PRE-EXISTING CRACK

A bending fatigue test had produced a rail head crack under the contact area of the load device. When a rolling load test was then applied, a large slip ratio would produce a deep transverse crack while a small amount of slip would produce a longitudinal crack just beneath the rail head surface.

Sugiyama, T Yamazaki, T *Railway Technical Research Inst, Quarterly Reports* Vol. 22 No. 1, Mar. 1981, pp 33-34, 7 Fig., 1 Tab.

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

DOTL JC

09 337014

A FAILURE PREDICTION MODEL FOR WINDOW GLASS

An analytical method is presented to predict the strength of window glass plates subjected to lateral loads. The failure prediction model will be used

to assess glass plate strength to be used in designing window glass. The model relates the probability of glass plate failure to fundamental glass plate surface properties. It incorporates the following: (1) an analytical representation of the variation of glass strength with different environmental factors; (2) a geometrically nonlinear plate analysis; and (3) a statistical representation of glass plate surface flow properties. The model is formulated so that surface flow properties are dependent only upon the type and treatment of the glass, and are independent of factors such as plate aspect ratio, plate glass surface area, and load duration. Validity of the nonlinear plate analysis, incorporated in the model, was demonstrated by comparison of actual and theoretically derived glass plate stresses and deflections. It also was shown that surface flow parameters employed in the production model are independent of plate response. Hence, the failure prediction model was verified.

Beason, WL
Texas Tech University, National Science Foundation NSF/RA-800231,
May 1980, 229p

Grant NSF-PFR77-24063

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-148421

09 341264

**A METALLURGICAL ANALYSIS OF AN ASTM A212-B STEEL
TANK CAR HEAD PLATE**

The sample was taken from the A-head plate of tank car SOEX 3033 involved in an accident near Winder, Georgia. The A-head plate was reportedly produced to specification ASTM A212-65, Grade B steel. The results of laboratory check chemical analyses indicated that the plate sample met the chemical requirements of ASTM A212-65, Grade B steel. The results of ambient-temperature bend tests and tensile tests showed that the plate sample satisfied both the bend requirements and the tensile elongation requirements but failed to meet the minimum ultimate tensile strength and yield point requirements of ASTM A212-65, Grade B steel. The results of metallographic analyses revealed substantial variation in the microstructure in the plate thickness direction. The observed coarse prior austenite grain size and large ferrite grain size is consistent with the coarse-grain steelmaking practice allowed for ASTM A212 steel and a high finishing temperature during fabrication. Hardness measurements of the microstructure correlated well with the measured tensile strength properties. The nil-ductility transition temperature was determined to be 30 F, a value equal to the highest value reported for a group of tank car plate samples, including both accident samples and current and previously allowed tank car plate materials. The results of Charpy V-notch tests established that the 15 ft-lb energy absorption and 50% shear fracture appearance transition temperatures measured for both longitudinal and transverse specimens were all above 60F and within normal tank car service temperature range. The high transition temperatures are related to both the coarse prior austenite grain size and large ferrite grain size observed in the microstructure and the steel chemistry.

Early, JG
National Bureau of Standards, Federal Railroad Administration Final
Rpt. FRA/ORD-81/32, NBSIR 78-1582, Apr. 1981, 45p, 13 Fig., 8 Tab.,
14 Ref., 1 App.

Contract DOT-AR-40008

ORDER FROM: NTIS

PB81-205098, DOTL NTIS, DOTL RP

09 341265

**A METALLURGICAL EVALUATION OF TWO AAR M128 STEEL
TANK CAR HEAD PLATES USED IN SWITCHYARD IMPACT
TESTS**

The National Bureau of Standards correlated the mechanical properties and metallurgical characteristics of two steel head plate samples taken from tank cars subjected to switchyard impact tests. This metallurgical evaluation included determining whether the samples conformed with the appropriate specifications and to determine the impact test behavior of both plate samples. The results of check chemical analyses and ambient-temperature tensile tests indicated that both plates met the chemical, tensile strength, and tensile ductility requirements of AAR M128 steel. The results of metallographic analyses of both plates revealed extensive banding with alternate layers of ferrite and pearlite, typical of carbon-manganese steel in the hot-rolled condition. One sample also contained a microstructural anomaly near the inside plate surface, possibly related to prior thermo/mechanical processing of the plate. The nil-ductility transition temperatures were determined to be -20F and -40F for the plates, similar to the lowest values reported for a group of tank car plate samples. The results of Charpy V-notch tests established that the transition temperatures of these two plates are similar to one another, and are among the lowest of those measured for all other tank car plates tested at NBS. The comparatively low impact transition temperatures for both plates are related to the high manganese-to-carbon ratio and relatively fine ferrite grain size observed in the microstructures.

Early, JG Interrante, CG
National Bureau of Standards, Federal Railroad Administration Final
Rpt. FRA/ORD-81/33, NBSIR 80-2039, Apr. 1981, 58p, 15 Fig., Tabs.,
16 Ref., 1 App.

Contract DOT-AR-40008

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PB81-179483, DOTL NTIS, DOTL RP

09 341266

**THE NON-STEADY OUTFLOW OF PROPANE VAPOR FROM A
RAILROAD TANK CAR**

This report discusses the venting of vapors from rail tank cars. Two particular problem areas are addressed, namely the non-steady character of the flow in the final blow-down stage and the influence of real gas effects on flow predictions. Equations are developed with which the non-steady mass flow rate, the stagnation temperature and pressure drop and the mass left in the tank as a function of time can be predicted for vapor flow out of a finite-sized tank. The influence on the predicted flow rates due to the use of different equations of state (e.g. perfect gas equation, van der Waal's equation, Starling's equation) is shown and discussed. Example calculations are carried out for propane. The developed equations and calculation methods are valid for most other vapors and gases of industrial fluids commonly shipped in rail tank cars.

Sallet, DW Palmer, ME
Maryland University, College Park, Federal Railroad Administration
Final Rpt. FRA/ORD-80/61, Apr. 1981, 22p, 3 Fig., 4 Ref.

Contract DOT-FR-64181

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PB81-200594, DOTL NTIS, DOTL RP

10 053386

RAILWAY NOISE. PROPAGATION OF TRAIN RUNNING NOISE IN THE VICINITY OF RAILWAY TRACKS--MEASUREMENTS RELATING TO THE SOUND INSULATION EFFECT OF SCREENS FITTED ON THE BODY OF VEHICLES OR NEAR THE RUNNING GEAR

This report describes the different experimental solutions retained for verifying, on Commercial Service passenger vehicles or freight vehicles and on tractive vehicles, the advisability and acoustical effectiveness of an extension of the bottom part of the body between bogies and of shrouding arranged directly in front of the running gear. These special mounting arrangements, made within the limits of the UIC clearance gauge, have permitted the measurement, during train passage of the effect of these integral vehicle screening systems on the environment noise in the free-field at 25 m from the track.

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

International Union of Railways C 137/RP 13, Sept. 1980, 14p, 24 Fig., 2 Tab.

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10 053387

RAILWAY NOISE. REDUCTION OF ENVIRONMENTAL NOISE DISTURBANCES CAUSED BY THE WORK OF TRACK MAINTENANCE MACHINES

The report describes possible noise abatement measures to be applied to various types of track maintenance machines, thus reducing the effect on the environment and operators. Technical solutions and their effectiveness are described starting from the noise levels of machines without any noise reduction and an analysis of noise generation and propagation. The level reductions obtained by measures applied to the machines themselves and, possibly, ear guards for the operators ensure satisfactory conditions.

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

International Union of Railways C 137/RP 14, Sept. 1980, 29p, 12 Fig., 2 Tab.

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DOTL RP

10 053388

A CONTRIBUTION TO THE INVESTIGATION OF CORRUGATIONS ON THE WHEEL TREADS OF RAILWAY VEHICLES

This report summarises available data concerning the development and acoustic effects of corrugations on the wheel treads of railway vehicles. Investigations were carried out both in normal railway service and on test rigs, on block brakes with different types of blocks and also on disc brakes.

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

International Union of Railways C 137/RP 15, Sept. 1980, 25p, 20 Fig., 1 Tab.

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10 326441

MEASUREMENT AND DIAGNOSIS OF THE NOISE FROM A GENERAL ELECTRIC C36-7 DIESEL ELECTRIC LOCOMOTIVE

Measurements of the noise from a General Electric C36-7 diesel electric locomotive were performed with the locomotive stationary and attached to a load cell during powered and unpowered pass-by tests. The pass-by tests demonstrated that wheel/rail noise contributes little to both interior and wayside noise when the locomotive is operating under load at throttle 8. Stationary tests examined the directivity of noise around the locomotive and the contribution of the major sources to the noise signature. At throttle 8, under load and at idle, the exhaust and radiator cooling fan were the primary sources. At throttle 8, unloaded, the radiator cooling fan exhaust and equipment blower dominated the noise.

Remington, PJ Alakel, MN Dixon, NR Bolt, Beranek and Newman, Incorporated, Transportation Systems Center, Federal Railroad Administration Final Rpt. BBN-4167, DOT-TSC-FRA-79-26, Dec. 1979, 105p

Contract DOT-TSC-1580
ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-112914, DOTL NTIS

10 326474

ENVIRONMENTAL IMPACTS OF BART (BAY AREA RAPID TRANSIT)

This final report is one of a series and gives an overview of the San Francisco Bay Area Rapid Transit System's (BART) environmental impacts. The disruption of traffic and other activities during subway construction, traffic and parking problems at suburban stations, and train noise along aerial lines have been the most serious environmental impacts of the BART system. Beneficial impacts include its landscaping, linear park, encouragement of downtown street improvements, and generally excellent provisions for its riders. BART's future operational impacts, both beneficial and adverse, are not expected to change much from those to date. Contrary to some fears expressed during the planning process, BART has not generated significant automobile-related air pollution or noise at its suburban stations. Crime has not been a significant problem, either to patrons or station-area neighborhoods. Also, above-ground trackway functions do not apparently pose a serious barrier to cross-line movement. The natural ecosystems near BART facilities have not suffered; vibration from passing trains is not a problem; and the visual impacts of BART facilities have not been significant.

Also pub. as Department of Housing and Urban Development, Washington, DC rept. no. HUD-0001646. Prepared by Gruen Associates, Inc., San Francisco, CA., and DeLeuw, Cather and Co., San Francisco, CA.

Graff, DL Knight, RL
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-05, Apr. 1979, 157p

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
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PB81-118085, DOTL NTIS

10 326539

THE ENVIRONMENTAL IMPACT OF COAL TRANSFER AND TERMINAL OPERATIONS

This study was conducted to assess current environmental impacts, and to define potential control technology that will minimize the pollution resulting from coal transfer/terminal operations. Environmental impacts from coal transfer/terminal operations can be lessened by employing proper control methods, which should be incorporated into the early states of planning and design. Coal transfer is an expanding technology, and the construction, operation, and closure/abandonment of new transfer facilities should be monitored and reported. In addition, experiences related to the transfer of western coals should be monitored and reported, since a limited amount of experience has been reported on the handling of these coals.

Pelham, L Abrom-Robinson, LA Ramanathan, M Zimmora, D Hampton (Delon) and Associates, Environmental Protection Agency Final Rpt. EPA-600/7-80-169, Oct. 1980, 88p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-104747

10 326654

INVESTIGATION OF SELECTED POTENTIAL ENVIRONMENTAL CONTAMINANTS: STYRENE, ETHYLBENZENE, AND RELATED COMPOUNDS

This report reviews the potential environmental hazard from the commercial use of four related compounds: ethylbenzene, styrene, alpha-methylstyrene, and divinylbenzene. Both ethylbenzene and styrene are produced in 6-7 billion pounds per year while the other two compounds are produced in much smaller quantities. Ethylbenzene is used to produce styrene and styrene and the other monomers are used to make polystyrene and other resins, elastomers, and rubbers. Significant non-commercial sources of the compounds are also possible including automobile exhaust, gasoline, and other combustion sources. Ethylbenzene and styrene have both been detected in air and water samples. Information on physical and chemical properties, production methods and quantities, commercial uses and factors affecting environmental contamination and information related to health and biological are reviewed.

Santodonato, J Meylan, WM Davis, LN Howard, PH Orzel, DM,
Syracuse Research Corporation, Environmental Protection Agency Final
Rpt. TR-80-569, EPA-560/11-80-018, May 1980, 279p

Contract EPA-68-01-3250

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-102659

10 326903

DIESEL ENGINE EMISSIONS OF PARTICULATES AND ASSOCIATED ORGANIC MATTER. ANNUAL REPORT NO. 1

The objective of this phase of the CAPE-24 program was to develop and validate an analytical method for the analysis of PNA in diesel exhaust particulate. The first year of work included construction of a test engine facility, development of an analytical method for the measurement of PNA, and development of an exhaust tracer injection methodology. The method for the analysis of PNA in diesel exhaust was developed based on the use of stable isotopically labeled PNA as exhaust tracers. A tracer PNA injection method was developed to introduce the tracer PNA to the undiluted exhaust as vapors to insure that the tracer PNA would be subjected to the same temperature and dilution profile as the engine exhaust. Analysis of particulate filter samples indicate that the quantity of engine PNA was much lower than the quantity used to evaluate the analytical method. Although the analytical method was capable of analyzing the engine BaP, the method must still be evaluated for precision and accuracy using levels of PNA equal to the quantities measured in the particulate.

Petersen, BA Chuang, CC Kinzer, GW Meehan, PW Riggan, RM.
Battelle Columbus Laboratories, Coordinating Research Council, Incorporated July 1980, 84p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-221963

10 327078

NOX NATIONAL EMISSION INVENTORY ESTIMATES

This report presents the current and projected estimates of the national emissions inventory for oxides of nitrogen (NOx). A description of the methodology used to calculate the inventory is also provided. These inventories were used in the acid rain analysis performed in support of the Draft Regulatory Analysis, Environmental Impact Statement and Nox Pollutant Specific Study for Proposed Gaseous Emission for 1985 and Later Model Year Light Duty Trucks and Heavy Duty Engines. The emphasis of this report is on the projected change in national NOx emissions from 1977 to 1999. The impact of the proposed regulations on rain acidity is assumed to be proportional to total NOx emissions. While the inventories were used to support the draft regulatory analysis, they can also be used independently since an inventory is presented for the currently promulgated regulations as well as for the proposed regulations.

Wolcott, M
Environmental Protection Agency Tech Rpt. EPA-AA-TEB-80-19,
Aug. 1980, 32p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-224058

10 327108

EVALUATION OF THE CONTAMINATION EFFECTS OF DIESEL EXHAUST ON A CRITICAL FLOW SAMPLE SYSTEM

Testing has been conducted to determine (1) the effectiveness of complete diluted diesel exhaust stream filtering in preventing contamination of a CFV sample system, and (2) the effect of this filtering on diesel gaseous emission measurements. Contamination was evaluated by observing the repeatability of gaseous emissions measurements from a gasoline vehicle which was operating between each of several diesel test sequences.

Danielson, E
Environmental Protection Agency Tech Rpt. EPA-AA-SDSB-80-12,
May 1980, 14p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-217649

10 327388

DIOXINS. VOLUME II. ANALYTICAL METHOD FOR INDUSTRIAL WASTES

The overall objective of this research project was to develop a unified analytical approach for use in quantifying ppt levels of tetrachlorodibenzo-p-dioxins (TCDD's) in various chemical wastes. Waste samples from plants manufacturing trichlorophenol, pentachlorophenol, and hexachlorophene, and from processing wood preservatives were provided by the EPA. The extraction procedure developed for isolating the TCDD's from the various types of sample matrices is fully described. Analysis was accomplished using highly specific and sensitive coupled gas chromatographic-mass spectrometric (GC-MS) methods. Both low and high resolution MS techniques were employed. This methodology is also described in detail. The procedures presented in this report were acceptable for most of the industrial process samples provided.

Also available in set of 3 reports PC E13, PB80-220064.

Tiernan, TO Taylor, ML Erk, SD Solch, JG Van Ness, G
Pedco-Environmental Specialists, Incorporated, Environmental Protection
Agency Final Rpt. EPA-600/2-80-157, June 1980, 80p

Contract EPA-68-03-2659

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-220080

10 328229

NOISE IMPACT INVENTORY OF ELEVATED STRUCTURES IN U.S. URBAN RAIL RAPID TRANSIT SYSTEMS

This report presents the results of the third task of a five-task program dealing with the reduction of noise from elevated structures in use in U.S. rail rapid transit systems. This report is an inventory and impact assessment of the noise radiated by trains passing on these structures, insofar as this noise is experienced by nearby community residents. An overview is provided of the noise contributions from the various types of structures in nine existing or planned U.S. transit systems operating on 253 km (157 miles). These systems are: Metropolitan Atlanta Rapid Transit Authority (MARTA); Bay Area Rapid Transit District (BART); Chicago Transit Authority (CTA); Metropolitan Dade County (Metrorail-under construction); Massachusetts Bay Transportation Authority (MBTA); New York City Transit Authority (NYCTA); Port Authority Transit Corporation of Pennsylvania and New Jersey (PATCO); Southeastern Pennsylvania Transportation Authority (SEPTA); and Washington Metropolitan Area Transit Authority (WMATA). These structures are classified into 17 different categories, and noise emission characteristics are determined for each type, based on field measurements and/or published data. Day-night average sound levels are estimated for wayside locations near the elevated structures, and population data are used to evaluate noise impact in terms of the Sound Level Weighted Population (LWP).

Bolt, Beranek and Newman, Incorporated, Transportation Systems
Center, Urban Mass Transportation Administration Intrm Rpt.
DOT-TSC-UMTA-80-29, Sept. 1980, 199p

Contract DOT-TSC-1531

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-120958

10 328639

ENVIRONMENTAL CONCERNS INFLUENCING THE FUTURE DEVELOPMENT OF ENERGY MATERIAL TRANSPORTATION SYSTEMS: THE YEAR 2000 STUDY

This paper presents results of studies conducted to assess the potentially longer-range problems which could hinder the future development of safe and environmentally-acceptable energy material transportation systems. The purpose of this effort is to recommend appropriate action that contributes to the anticipatory management of possible future problems before they can have serious effects on the adequacy or acceptability of the system. Most significant future concerns in energy material transportation relate to potential institutional, legal, political and social problems. Environmental issues are involved in many of these concerns. Selected environmental concerns are discussed that may influence the future development of transportation systems for fossil and nuclear energy materials during the balance of this century. A distinction between potentially real and perceived concerns is made to emphasize basic

differences in the recommended approach to solutions of the respective type of potential problem. (ERA citation 05:035042)

US DOE environmental control symposium, Argonne, IL, USA, 28 Nov 1978.

DeSteele, JG

Battelle Memorial Institute/Pacific Northwest Labs, Department of Energy CONF-7811174-1, 1978, 11p

Contract AC06-76RL01830

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PNL-SA-7322

10 328912

SOFTWARE MAINTENANCE OF THE SUBWAY ENVIRONMENT SIMULATION COMPUTER PROGRAM

This document summarizes the software maintenance activities performed to support the Subway Environment Simulation (SES) Computer Program. The SES computer program is a design-oriented analytic tool developed during a recent five-year research project focusing on methods for environmental control in underground rapid transit systems. As discussed in The Subway Environmental Design Handbook, computer simulation was used to overcome the deficiencies of closed-form mathematical modeling, and was validated using scale models and field-testing. The Handbook was developed as a guide and reference for the planning, design, construction, and operation of environmental control systems for underground rapid transit. Shortly after the publication of the Handbook, SES was released to the rail transit community for the purpose of reducing the environmental problems of existing systems, and to help plan facilities and establish standard procedures for improved environmental control in new systems. This report is published in order to aid users of the program in realizing these goals.

See also report dated October 1975, PB-254790. Portions of this document are not fully legible.

Parsons, Brinckerhoff, Quade and Douglas, Inc, Urban Mass Transportation Administration, (UMTA-MA-06-0100) Final Rpt. DOT-TSC-UMTA-79-31, Dec. 1980, 239p

Contract DOT-TSC-1216

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-149775

10 330184

EFFECT OF PERCENT HYDROGEN IN FUEL ON SMOKE EMISSIONS OF A COMPRESSION-IGNITION ENGINE

Six diesel fuels, varying in percent hydrogen from 12.36 to 14.38 percent and in cetane number from 37.5 to 55.5, were evaluated for percent opacity as a function of fuel-air ratio--both at 800 and 1000 rpm--in a Waukesha CFR diesel engine. In both cases, at a given fuel-air ratio, the smoke emissions (measured by percent opacity) decreased with increasing percent hydrogen in the fuel. In these studies, percent hydrogen was both a satisfactory and a unique parameter, since neither cetane number nor volatility of the various fuels could be correlated with smoke emissions. In these studies, percent hydrogen is apparently the essential index of diesel fuel quality for satisfactory smoke emissions.

Voorhies, A, Jr (Louisiana State University, Baton Rouge); Daniel, LR, Jr Long, L *American Society of Mechanical Engineers Papers* ASME 80-DGP-15, 1980, 7p

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

10 330195

S-BAHN AND METRO TRACK, WITH SPECIAL REFERENCE TO STRUCTURE-BORNE NOISE [Oberbau bei Stadtbahnen und U-Bahnen unter besonderer Beruecksichtigung der Koerperschallemission]

If special measures are taken in relation to track construction technology, it should be possible to control the noise level and reduce the noise caused by underground railways which is disturbing in neighbouring buildings. This can be done by inserting the right kind of flexible lining under the ballast, or by designing the track configuration so as to provide a mass-suspension system with an inherent frequency of 8-14 Hz. [German]

Eisenmann, J *Eisenbahn Technische Praxis* Vol. 32 No. 3, 1980, pp 16-17, 2 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Gewerkschaft der Eisenbahner Deutschlands, Beethovenstrasse 16-18, 6000 Darmstadt 1, West Germany

10 330201

RAILWAY NEEDS IN TERMS OF LAND AND COMPATIBILITY WITH THE ENVIRONMENT [Gelaendebedarf und Umweltvertraeglichkeit der Eisenbahn]

The article examines the needs of the railway in terms of land and compatibility with the environment compared with other modes of transport. Specific examples are given with reference to new lines, suburban networks and marshalling yards on the German Federal Railway. [German]

Gruebmeier, J Werler, R *Eisenbahntechnische Rundschau* Vol. 29 No. 9, Sept. 1980, pp 601-609, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

10 330202

STUDIES BY THE DB AND OTHER EUROPEAN RAILWAYS ON THE REDUCTION OF RAILWAY NOISE BY MEANS OF SCREENS [Untersuchungen der DB und anderer europaeischer Bahnverwaltungen zur Minderung von Eisenbahngeräuschen durch Abschirmungen]

Noise levels have been measured on the 4-track Rheda line, to assess the influence of various noise protection screens. Measurements have also been carried out in cuttings. As well as the DB studies, the findings of BR and SNCF research are also given. On the basis of this work a procedure has been developed to make accurate forecasts of the effectiveness of protective screens. [German]

Hoelzl, G Hafner, P *Eisenbahntechnische Rundschau* Vol. 29 No. 9, Sept. 1980, pp 619-623, 6 Phot., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

10 330650

REDUCING THE NOISE NUISANCE FROM JAW-TYPE RAIL BRAKES

Since the Swiss Federal Railways' two large marshalling yards are situated close to residential areas and are particularly busy in the evening and night hours, very many people find the noise from the yards to be a disturbance. The dominant noise is the "screeching" which comes from the jaw-type retarders. By altering the brake materials and the jaw design the SBB have been able to reduce the noise intensity by about 30 dB and the noise frequency by about a factor of 30. [German]

Pfander, JP Schuepbach, HR *Eisenbahntechnische Rundschau* Vol. 29 No. 10, Oct. 1980, p 713

ACKNOWLEDGMENT: British Railways

ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

10 331112

HANDBOOK ON NOISE PROTECTION FOR ROADS AND RAILWAYS [Handbuch fuer Laermschutz an Strassen und Schienenwegen]

Starting from the basis that noise protection is a focal point of environmental policy, principles and detailed measures are described: noise and its evaluation; legal rules on noise protection; physical principles of noise protection; measures for decreasing noise emissions and emissions (walls, vegetation), noise protection on structures. An index of technical testing institutes is given, and of manufacturers of noise reducing walls and windows. The book includes an extensive bibliography. (TRRL) [German]

Krell, K

Otto Elsner Verlagsgesellschaft Monograph 1980, 445p, Figs., Tabs., Photos., Refs.

ACKNOWLEDGMENT: TRRL (IRRD 312433), Federal Institute of Road Research, West Germany
 ORDER FROM: Otto Elsner Verlagsgesellschaft, Postfach 40 39, Darmstadt, West Germany

10 331841

VENTILATING THE HONG KONG METRO

The environmental control system of the Hong Kong Mass Transit Railway tunnel adopted is described. This system, was designed while construction was in progress, retaining the existing ventilation shafts in the tunnels but abandoning the curtains at station ends.

Martin, D *Tunnels and Tunnelling* Vol. 12 No. 8, Sept. 1980, pp 54-55

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

10 334288

COMMENTS ON FINANCING OF RAILROAD POLLUTION CONTROL PROJECTS

Restrictions imposed by Environmental Protection Agency on railroads to achieve noise abatement and pollution control have required costly installations at yards and other facilities. While individual projects do not warrant external financing, the total for all such installations on a large system does produce a need for long-term borrowing. Family Lines, for instance, was simultaneously working on such environmental installations at more than 30 yards and shops in six states with a total cost of over \$50 million. The author explains how the expenditure of \$6 million at three locations in the State of Georgia was funded. Three localities created development authorities as authorized by Georgia legislation for general welfare and industrial development, enabling them to sell tax-exempt bonds and lend the proceeds of such sale to the railroads involved. This municipal borrowing was then guaranteed by modifying the railroad mortgages, although it is suggested that a better legal procedure would be a simple railroad guarantee of the authorities' revenue bonds.

Cremins, JS *ICC Practitioners' Journal* Vol. 47 No. 1, Nov. 1979, pp 69-72

ORDER FROM: Hein (William S) and Company, Incorporated, 1285 Main Street, Buffalo, New York, 14209

DOTL JC

10 334414

NOISE ABATEMENT FOR URBAN RAILWAY VEHICLES

Noise pollution has become a severe environmental problem. Although the equivalent noise levels of urban railway vehicles are lower than those of car traffic for the same transport capacity, further efforts are necessary for damping noise and vibrations. By means of systematic research and development work a reduction of noise generation from urban rail vehicles can be achieved. Measurements of the interior and outside noise levels have been taken on 30 vehicles of 17 different types in W. Germany. The average noise levels of tramway and light rail vehicles are 78 dBA outside (7.5 m distance) and 72 dBA interior, 3 dB lower than 1970, when the last systematic measurements took place. Underground railway vehicles have an outside average value of 76 dBA, 1 dB higher than 1970, the interior level did not change (64 dBA). By comparing the noise levels with technical data on the vehicles and tracks, the factors influencing noise generation and propagation have been analysed and possibilities of noise abatement are shown. This covers wheels, bogies, drive, gears, the floor and walls of the cars, as well as different types of tracks. Based on these dependencies some recommendations for noise abatement are given.

World Conference on Transport Research. Transport Research for Social and Economic Progress, April 14-17, 1980, Imperial College, London, England.

Blennemann, F. Gross, K.

Studiengesellschaft f. Unterirdische Verkehrsan eV Conf Paper 1980, p E-02

ORDER FROM: Studiengesellschaft f. Unterirdische Verkehrsan eV, Mathias-Brueggen-Strasse 41, 5000 Cologne 30, West Germany

10 334741

EVOLUTION OF HAZARDOUS MATERIAL SPILLS REGULATIONS IN THE UNITED STATES

After seven years in the preparation stage, the U.S. Environmental Protection Agency published, on August 29, 1979, its hazardous substances

regulations, setting forth which chemicals are considered hazardous to the environment, which are removable if spilled into a water body, and rate of penalties for spilling. This paper reviews the basis of the regulations (the Federal Water Pollution Control Act), the various drafts issued and withdrawn by EPA, the philosophy behind each and lastly details of the final regulations.

Bennett, GF Wilder, I *Journal of Hazardous Materials* Vol. 4 No. 3, Jan. 1981, pp 257-269

ACKNOWLEDGMENT: British Railways

ORDER FROM: ESL

DOTL JC

10 335069

ACOUSTIC SCREENS FOR RAILWAYS [ABSCHIRMUNGEN AN BAHNANLAGEN]

Extensive measurements made for the Bundesbahn on four noise protection walls of from 1 and 2 m high, on two shallow slots between 2 and 10 m deep and on two deep slots of 7 to 21 m deep are described and compared with computer results. For deep notches the calculation uses mirror-like reflections, but only the first needs to be considered. For more oblique sound incidence the measurement results of directional patterns are needed.

Kurze, UJ *Acustica* Vol. 45 No. 4, Aug. 1980, pp 304-315, 15 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

10 335278

CORRELATION STUDIES OF AN IN-LINE, FULL-FLOW OPACIMETER

In-line, full-flow diesel smoke opacity meters have been developed to avoid the many installation and operational problems of using the EPA required end-of-line (open stack) PHS smokemeter. Extensive correlation tests were run to establish relationships between the in-line and PHS meters. These correlation studies included determining the effect of emitted light wave length on particle absorption, effective optical path length measurements and correlation studies with other (Bosch and Hartridge) meters.

Green, GL Wallace, D *Society of Automotive Engineers Preprints* SAE 801373, 1980, 18p, 11 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

10 335461

PASSIVE NOISE PROTECTION MEASURES FOR THE WHEEL-RAIL SYSTEM DURING HIGH-SPEED WORKING [PASSIVE SCHALLSCHUTZMASSNAHMEN FUER DAS RAD/SCHIENE-SYSTEM BEI HOHEN GESCHWINDIGKEITEN]

The following studies have been carried out as part of the project: (1) Effect of synthetic foam rubber covering for wheels on vehicles equipped with shoe brakes; (2) Sound range of type 130 electric locomotive with shrouded trucks (anti-noise plates and rubber matting); (3) Noise reduction resulting from use of 7 types of soundproofed walls; (4) Study into the effects of noise reduction using 3 types of anti-noise device on coach trucks with the aid of an acoustic microphone fitted with a concave reflector. [German]

Bundesamt-Zentralamt Muenchen DB: Dok 3581, 1981, 135p, 2 Tab., 57 Phot., 5 Ref., 57 App.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Bundesamt-Zentralamt Muenchen, Munich, West Germany

10 335469

EVALUATION OF THE NOISE AND SOUND WARNING SYSTEMS EMITTED BY TRACK LAYING EQUIPMENT [BEURTEILUNG DES LAERMS UND DER AKUSTISCHEN WARNSIGNALE AN GLEISBAUMASCHINEN]

No Abstract. [German]

Symanowski, HM *DET Eisenbahntechnik* Vol. 28 No. 12, Dec. 1980, pp 504-506, 3 Fig., 6 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Atlas for Action Books, Incorporated, 162 Fifth Avenue, New York, New York, 10010

10 335855

HIGH FREQUENCY VIBRATIONAL CHARACTERISTICS OF OVERHEAD CONTACT WIRES

In investigating the acoustic noise from the Shinkansen current collection system, the vertical vibrations of contact wire under impulsive forces were measured to determine its vibrational characteristics. The observations were used to validate a mathematical model. Droppers in the catenary tend to attenuate vibrations through friction and by dispersing energy to the upper wires of the catenary structure.

Manabe, K. Morikawa, T. *Railway Technical Research Inst. Quarterly Reports* Vol. 22 No. 1, Mar. 1981, pp 40-41, 3 Fig.

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

DOTL JC

10 336258

SOUND SOURCE LOCATION MEASUREMENTS ON HIGH SPEED TRAINS

Measurements with two different directional microphone systems were made for the purpose of locating and identifying radiated noise sources on a high speed electric train travelling at speeds between 160 and 250 km/h. An acoustic mirror with 7 microphones positioned in the focal plane was used to measure higher frequency noise, while a linear array of 14 microphones was used for lower frequencies. Data recorded with the array were processed so as to allow the main lobe to either (1) focus dead ahead, or (2) be electronically slewed to track moving sound sources. Both wheel/rail and aerodynamic sound sources were investigated with the mirror and the array. The results of these measurements demonstrate the versatility and usefulness of directional microphone systems for locating and analyzing noise sources on moving vehicles.

Bechert, DW. King, WF. Grosche, FR. Stiewitt, H. Martin, A. *Deutsche Forschungs- u. Versuchsanstalt f. Luft- u. Raumfahrt, National Aeronautics and Space Administration* DFVLR-MITT-79-15, July 1979, 106p

Contract BMFT-TV-77230

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

N81-14791/0

10 337007

HEALTH HAZARD EVALUATION DETERMINATION REPORT NO. HE 77-41-505, GENERAL AMERICAN TRANSPORTATION CORPORATION, MASURY, OHIO

Environmental and medical surveys were conducted on April 4 to 7, 1977,

and June 7 to 9, 1977, to determine employee exposures to dust fumes, smoke and gases from welding and plasma arc cutting, isocyanate (661201) vapors and x-ray radiation at the General American Transportation Corporation (SIC-3743) in Masury, Ohio. Authorized representatives of United Steelworkers of America, Local 1534 and 2318, requested the evaluation on behalf of approximately 1000 affected workers. Twenty four of 52 employees were exposed to concentrations of fluoride (16984488), copper (7440508), iron oxide (1309371), nickel (7440020), chromium VI (7440473), vanadium (7440622) and total particulates in excess of OSHA standards. Concentrations of carbon monoxide (630080), formaldehyde (50000) and polymethylene polyphenyl isocyanate also exceeded current OSHA exposure limits. No abnormalities other than abrasions and burns associated with welding and heavy metal handling were found. The author concludes that excessive contaminant emissions are produced from welding, air arc repairing, chipping and gouging, bank cleaning and grinding. Local ventilation should be instituted to control excessive emissions, respiratory protection should be used, fibrous glass insulation treated with resin materials and used to seal annealing furnace doors should be substituted with a safer material, undue exposure to isocyanates should be avoided when handling urethane foams, and continuous surveillance should be maintained on all radiography equipment.

Price, JH

National Institute for Occupational Safety & Health NIOSH-HE-77-41-505, July 1978, 56p

ACKNOWLEDGMENT: NTIS

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PB81-150492

10 341261

RAILROAD CLASSIFICATION YARD TECHNOLOGY: NOISE CONTROL

This report provides the railroad yard designer with a basic understanding of the principles involved in controlling noise, either in the design of new yards or in revisions to existing yards. The material presented allows the designer to better understand information contained in more advanced noise control writings should he undertake detailed noise control designs or elect to interact with acoustic experts in the development of such designs. The report contains discussions of sound fundamentals, measurement and analysis instrumentation, measurement procedures, current regulations, railroad noise sources and noise control methods.

Stusnick, E. Montroll, M. Kohli, V.

Wyle Laboratories, Federal Railroad Administration. Final Rpt. FRA-ORD-81/18, Mar. 1981, n.p.

Contract DOT-TSC-1786

ORDER FROM: NTIS

PB81-199739, DOTL NTIS

11 327755

DOWNTOWN PEOPLE MOVER DEMONSTRATION PROGRAM. IMPACT ASSESSMENT PLAN: A GUIDE TO LOCAL EVALUATIONS

The purpose of the Downtown People Mover (DPM) program is to demonstrate, in the downtown setting, the feasibility of a form of automated guideway transit (AGT) technology known as Shuttle Loop Transit (SLT). The DPM program provides experience in the operation of SLT systems and serves as a basis for planning future urban applications of people mover technology. The report is a guide for the evaluation of DPM projects. Areas covered include the scope of the local evaluations, the schedule of evaluation activities, and the evaluation organization and administration. The DPM evaluations cover two basic areas of assessment: operational performance and system impacts.

Supersedes PB-270 614.

Laube, M Neumann, L Ruitter, E
Cambridge Systematics, Incorporated, Urban Mass Transportation
Administration, (UMTA-IT-06-0177) Final Rpt. 79034.01, UM-
TA-IT-06-0177-80-1, Sept. 1980, 159p

Contract DOT-UT-90074

ACKNOWLEDGMENT: NTIS
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PB81-117137

11 328220

PASSIVE VEHICLE-AUTOMATED GUIDEWAY TRANSIT. DOCUMENTATION OF PREVIOUS WORK AND ASSESSMENT OF IMPACT OF NEW TECHNOLOGY ON THIS CONCEPT

In the early 1970s, the Vought Corporation developed a small vehicle (three to six passengers) Automated Guideway Transit (AGT) system called LectraVia which utilized passive vehicles (PV) operating on an active guideway. This report documents the development of this PV-AGT system and assesses its potential as a concept that could provide technology to improve AGT system operational costs. The documentation includes a full description of the system, the application and cost studies performed, details of the control system, the 1/5-scale operational model, the results of the full-scale LIM motor thrust verification tests, fullscale engineering prototype system and test results. A cost/benefit analysis relative to conventional AGT systems is presented. Application study results are given which show the effect of vehicle size on costs, service, and performance. The technical and economic feasibility of modular construction of the Active Guideway System is also explored. The critical technology required for full development and deployment of passive vehicle systems is identified and a plan for implementation of this development is presented. This report not only describes the PV-AGT system concept in detail but also evaluates the economics of the system through a comparative analysis of the passive vehicle (LectraVia) versus the active vehicle (AIRTRANS) proposals made for the Las Vegas application. The results indicate that the passive vehicle has the advantage of superior system availability at equal or slightly lower costs than can be expected for the active vehicle systems.

Larson, AR, Jr Jacobsen, RS Hall, VW Randolph, DG, Jr
Vought Corporation, Urban Mass Transportation Administration, (UM-
TA-TX-06-0030) Final Rpt. UMTA-TX-06-0030-80-1, Aug. 1980, 133p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-117079

11 328926

MORGANTOWN PEOPLE MOVER ELECTROMAGNETIC COMPATIBILITY PROGRAM

Electromagnetic Compatibility (EMC) of a transit system is the absence of interference between all parts of the system, and between the system and the community which it serves. This report documents the EMC experience obtained during the design and development of the Morgantown People Mover (MPM) system in Morgantown, West Virginia. This report addresses background regarding the development of the MPM system and its current configuration as well as discussions pertaining to EMC. Conceptual and practical EMC requirement considerations and descriptions of the resulting requirements are presented. The analysis and testing performed to verify EMC is outlined and EMC problems unique to MPM are detailed. Refinement and extensions which might be considered for application to future systems are also discussed.

Herring, TH

Boeing Aerospace Company, Transportation Systems Center, Urban
Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt.
DOT-TSC-UMTA-80-35, Sept. 1980, 107p

ACKNOWLEDGMENT: NTIS
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PB81-148082

11 328932

MORGANTOWN PEOPLE MOVER REDUNDANT COMPUTING SYSTEM DESIGN SUMMARY

The purpose of this report is to describe the redundant computing system design used for the current 1980 Phase II Morgantown People Mover (MPM) system. The redundant computing system is that part of the control and communications system (C&CS) consisting of redundant computer hardware and software and the special purpose equipment (SPE) used to interface the dual computing system to the rest of the C&CS system. The Morgantown project, which began in 1969, is an Urban Mass Transportation Administration program that provides a personal rapid transit system between the central business district of Morgantown, West Virginia, and the widely separated campuses of West Virginia University. The MPM system is an automated, two-mode (schedule and demand) transit system that consists of a fleet of electrically powered, rubber-tired, passenger-carrying vehicles operating on a dedicated guideway network under the redundant computing system computer control. Since the MPM system was developed in three phases, this report presents some historical data leading to the current design. The report also includes results of experience with the redundant computing system, plans for potential system improvement, and recommendations so that future system designers can benefit from the experience gained in developing the Phase II MPM system.

Rucker, JI Hill, BJ

Boeing Aerospace Company, Transportation Systems Center, Urban
Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt.
DOT-TSC-UMTA-80-36, Sept. 1980, 159p

ACKNOWLEDGMENT: NTIS
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PB81-151367

11 328968

SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS: REPRESENTATIVE APPLICATION AREAS FOR AGT

The purpose of the Application Area Definition task is to define the travel demands and guideway networks for a set of representative AGT system deployments. These demands and networks, when combined with detailed descriptions of the systems and their operating characteristics, define the representative systems to be modeled and analyzed in other tasks within the SOS program. Results of the definition of representative AGT system deployments for analysis in the AGT-SOS program are presented in this report. Each deployment consists of a demand type, an AGT system, and a guideway network type. Seven demand types, including three metropolitan areas, two central business districts, and two activity centers are defined, and a representative locale of each type is chosen. Station-to-station demands generated after the process for generating zone-to-zone demands for the metropolitan area applications are also presented. The following seven guideway network types are defined: shuttle, loop, one-way loop, two-way loop, multiple loop, partially connected grid, and fully connected grid. Ten AGT systems have been defined in another phase of the AGT-SOS program. From among the possible combinations of demands, systems, and networks, 19 representative deployments are selected, and a network is presented for each. The results of network flow analyses, in which the compatibility between the network and the station-to-station demand is evaluated, are presented for the representative SLT deployments.

See also PB80-226509.

Cowan, R Bonderson, L Alberts, F

General Motors Corporation, Transportation Systems Center, Urban
Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt.
DOT-TSC-UMTA-80-30, Nov. 1980, 223p

Contract DOT-TSC-1220

ACKNOWLEDGMENT: NTIS
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PB81-154551

11 328973

MORGANTOWN PEOPLE MOVER COLLISION AVOIDANCE SYSTEM DESIGN SUMMARY

The Morgantown People Mover (MPM) is an automated two-mode (schedule and demand) transit system that consists of a fleet of electrically powered, rubber-tired, passenger-carrying vehicles operating on a dedicated guideway under computer control. The present operational MPM system consists of 5 stations, a vehicle maintenance facility with a small test loop, a central control facility, 73 electrically powered, rubber-tired vehicles. This report describes the Collision Avoidance System (CAS) design used for the current (1980 Phase II) MPM system. It presents historical data leading to the current design. The report also includes results of experience with the CAS, plans for system improvements, and recommendations for future designers of such systems. Identification of safety and operability requirements led to a unique implementation of a proven safety concept—block occupancy control. Problems encountered and the design solutions which evolved are discussed with emphasis upon fail-safe features. The resulting CAS design is assessed and found to be extremely safe. Possible improvements and extensions are discussed. Shorter headway and bi-directional operations are found to be feasible. This report contains a glossary of terms and many charts illustrating the elements of the MPM system.

Schroder, RJ Washington, RS

Boeing Aerospace Company, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt. DOT-TSC-UMTA-80-37, Sept. 1980, 167p

ACKNOWLEDGMENT: NTIS

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PB81-154858

11 330120

BETTER JUSTIFICATIONS NEEDED FOR AUTOMATED PEOPLE MOVER DEMONSTRATION PROJECTS

The Urban Mass Transportation Administration has established a program to demonstrate whether automated people mover systems are workable solutions to downtown transit problems. These systems are driverless vehicles operating on fixed guideways. The program includes nine projects with a potential cost to the Federal Government of nearly \$675 million. Four of these projects were added at congressional direction. The Federal agency states that four of the five projects that were not congressionally directed are needed to meet program objectives. However, it has not adequately clarified the unique contributions each project will make toward meeting the objectives or why fewer projects and existing information are not sufficient. In addition, the planned evaluation of these projects should be strengthened.

General Accounting Office CED-80-98, Aug. 1980, 31p, Photos., Apps.

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PB81-135873

11 330181

LIFT FORCE FLUCTUATIONS OF MAGNETICALLY LEVITATED VEHICLES WITH AN INTEGRATED SYNCHRONOUS LINEAR MOTOR AND THEIR SIGNIFICANCE FOR TECHNICAL SECURITY [Tragkraftschwankungen bei Magnetschwebfahrzeugen mit Integriertem, Synchronem Linearantrieb und ihre Sicherheitstechnische Bedeutung]

The influence of the motor current on the magnetic force is investigated by an analytical method. With the integrated synchronous linear motor the reactions of the current sheet on the excitation field depend on the pole angle and the amplitude of the current sheet. For an undisturbed operation—current sheet and induction wave in phase—the influence of the motor current on the magnetic force can be neglected. In case of a disturbed performance, i.e. when the pole angle is changing periodically, fluctuations of the magnetic force will be found. This effect has to be compensated by a reserve magnetic force in the levitation control. [German]

Mnich, P Huebner, KD *Archiv fuer Elektrotechnik* Vol. 62 No. 4-5, July 1980, pp 301-308

ACKNOWLEDGMENT: EI

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11 330654

MODELING AND DYNAMIC RESPONSE OF MAGLEV VEHICLES SUBJECTED TO CROSSWIND GUSTS

This paper presents a two-degree-of-freedom model for magnetically levitated finite-length vehicles incorporating sway and yaw dynamics.

Aerodynamic lateral forces and yawing moments on the vehicle resulting from constant speed wind gusts were computed using analytical techniques. Computer simulations were run for three vehicle speeds and three apparent mass factors.

Papers presented at the ASME Winter Annual Meeting, November 16-21, 1980; Dynamic Systems and Control.

Garg, DP (Duke University); Barrows, TM (Transportation Systems Center) *American Society of Mechanical Engineers Papers Conf Paper ASME 80-WA/DSC-8*, 1980, n.p.

ACKNOWLEDGMENT: Mechanical Engineering

ORDER FROM: ESL

11 330668

UK'S FIRST PUBLIC MONORAIL GETS OFF THE GROUND

Although it has been designed with a leisure application, the monorail system operating in Rhyl has attracted interest as the first such system in the UK. Developed by Metrim Precision Engineering, the system is described as structurally simple and is visually unobtrusive. The simplicity of design is reflected in the design of the trains constructed of steel, fibreglass, aluminium and plexiglass. The trains are composed of four 12-passenger and three power cars giving a carrying capacity of 1400 passengers per hour. Supported on rectangular hollow steel beams 9 ft off the ground level at 40 ft centres, the track structure is lightweight and adaptable to the existing urban area.

Transport Vol. 1 No. 4, Sept. 1980, pp 69-71, 1 Fig.

ACKNOWLEDGMENT: TRRL (IRRD 251560)

ORDER FROM: City Press, Fairfax House, Colchester, England

11 331095

DEVELOPMENT-ASSOCIATED SECURITY WORK FOR NEW MAGNETIC-LEVITATION TRACKED SYSTEMS

The article deals with the methods and principles of development-associated security work as employed for new maglev lines. These extend from the checking of the concept to the final acceptance procedures and include the appraisal of all important components and subsystems of the installation. In addition to checking that all data specifications are met, special importance is attached to the theoretical and practical investigation of the automatic train control equipment. The quality assurance measures are another important aspect since the strength of the load-carrying structures and hence the general safety of the whole installation depends on the quality of the construction work. The authors examine in detail the theoretical principles and also the nature and extent of the documents required for assessment, likewise the methods of testing. The concluded part-tests are each documented by the inspector and the tested parts and components are cleared for further use. The procedure concludes with a comprehensive report and the documented final acceptance reports which are the prerequisite for permission to operate the system being granted by the licensing authority. [German]

Jansen, H Mnich, P *Eisenbahntechnische Rundschau* Vol. 29 No. 11, Nov. 1980, p 761

ACKNOWLEDGMENT: British Railways

ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

11 331097

AN ACTIVE AND PASSIVE STEERING CONTROLLER STUDY OF RUBBER-TYRED AUTOMATED GUIDEWAY TRANSIT VEHICLES

A comparative study of an active and passive steering controller of a rubber-tired Automated Guideway Transit (AGT) vehicle excited by random guideway irregularities is discussed. The thirteen-degree-of-freedom vehicle model, which was previously developed for passively steered rubber-tired AGT vehicles, is modified to facilitate the coupling of the vehicle to an active steering controller. Vehicle performance with the active steering controller, as well as the passive one, is evaluated in terms of root mean square (rms) values of the system outputs of interest. For the same level of the average rms tracking error, a two-sensor proportional active steering controller can improve the ride quality (about 12 per cent reduction in lateral rms acceleration) compared to the present passive steering controller for a typical AGT vehicle with random guideway irregularity inputs.

Kwak, YK Smith, CC *ASME Journal of Dynamic Systems, Meas and Control* Vol. 102 No. 3, Sept. 1980, pp 168-173

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

11 331493

GAS-FLOW-CONTROLLED ARCS FOR POWER COLLECTION

Arcs in axial, free or constricted, gas flows are shown to be promising as a means of contactless power collection for high-speed ground transportation vehicles. Satisfactory current collection at speeds up to 250 km/h has been achieved with a 6-mm gap. Higher speeds or larger gaps, however, may require partial aerodynamic shielding or magnetic trapping of the arc column.

Klapan, D (Sheffield University, England); Hackam, R Benson, FA *Journal of Applied Physics* Vol. 51 No. 3, Mar. 1980, p 1410, 5 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 331541

THE LINEAR MOTOR IN DRIVE TECHNOLOGY

A general survey is given here of the development of linear motors--with special reference to the short-stator induction motor. The various types of construction are described and the operational behavior of this type of motor together with the features which distinguish it from conventional rotating machines is explained. Taking large linear motors already built as examples, their constructional features and the state of the art are described. In conclusion attention is drawn to the particular importance of the linear induction motor for future high-speed induction transport technology and its alternatives.

Kratz, G *AEG Telefunken Progress* No. 4, 1979, pp 95-104, 10 Ref.

ACKNOWLEDGMENT: EI
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11 331850

LEARNING--ITS EFFECT ON DOWNTOWN PEOPLE MOVER OPERATION AND MAINTENANCE TRENDS--A CASE STUDY

The paper documents some yet unpublished data from the Morgantown, West Virginia system regarding its operation and maintenance experience. The author presents the findings of an analysis on this data as it relates to the effect of learning on operation and maintenance trends.

Ward, RE (West Virginia University) *ITE Journal* Vol. 50 No. 10, Oct. 1980, pp 50-53, 10 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

11 331853

AUTOMATED GUIDEWAY TRANSIT: THE DUKE UNIVERSITY AUTOMATED PEOPLE/CARGO TRANSPORTATION SYSTEM

This report describes the installation of the automated people/cargo transportation system at Duke University in Durham, North Carolina, featuring the first automated guideway transit system to go into service which operates with linear induction motors together with air levitation.

Theumer, HA *Journal of Advanced Transportation* Vol. 14 No. 2, 1980, pp 161-176

ACKNOWLEDGMENT: EI
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11 334198

DESIGN APPROACH FOR THERMAL REMOVAL OF SNOW AND ICE ON AUTOMATED--TRANSPORTATION-SYSTEM GUIDEWAYS

A computer simulation technique is described for modeling dynamic heat-transfer processes that influence the snow and ice removal performance of guideway heating systems. A concrete-channel guideway section is modeled, and the analysis results are presented to demonstrate the potential of this technique as a design tool for evaluating and screening snow-removal concepts. A cost model of guideway heating systems is developed. The model includes delay costs incurred by riders when the transportation

system is unavailable as a result of snow or ice accumulation on the running surface. This cost is added to the capital, operating, and maintenance costs, and an optimum cost-design point is identified for an electrically heated concrete guideway. A comparison of the costs of field testing with those of environmental chamber testing is also presented. It is recommended that design verification tests be conducted under extreme operating conditions to identify potential inadequacies missed in computer modeling. This strategy favors the use of chamber testing, where extreme conditions can be simulated on demand. (Author)

This paper appeared in Transportation Research Record No. 776, Guideway Snow and Ice Control and Roadside Maintenance.

Kramer, TJ (Boeing Aerospace Company) *Transportation Research Record* No. 776, 1980, pp 1-8, 14 Fig., 1 Tab., 10 Ref.

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DOTL JC

11 334303

FUEL ECONOMY OF FREIGHT PIPELINE FOR TRANSPORTING COAL

It has been found that the most immediate application of HCP is coal transportation. It appears that when the transportation distance is 20-200 miles, coal can be transported by HCP at a cost less than by truck, rail, and even the slurry pipeline. The purpose of this paper is to present the findings of a recently completed study of freight pipeline which assesses the pipeline's fuel-saving potential and its feasibility for coal transportation.

Annual UMR DNR Conference on Energy, Proceedings, 6th, University of Missouri-Rolla, October 16-18, 1979.

Liu, H (Missouri University, Columbia); Assadollahbaik, M Missouri Department of Natural Resources Proceeding 1979, pp 115-120, 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: Missouri Department of Natural Resources, Jefferson City, Missouri

11 334424

CHARACTERISTICS OF A MAGLEV VEHICLE RUNNING ON ALUMINIUM SHEET GUIDEWAYS

Studies on the running characteristics of superconducting magnetic suspension, guidance and linear synchronous motor (LSM) systems for high-speed trains on aluminium sheet tracks are reported, comparing the theoretical results with experimental results obtained by a running test vehicle. The test vehicle can be suspended and guided magnetically, and driven by LSM with no contact.

Iwahana, T Iketani, T Fujimoto, T *Railway Technical Research Inst. Quarterly Reports* Vol. 21 No. 4, 1980, pp 174-179, 14 Fig., 2 Tab., 5 Ref.

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

DOTL JC

11 334699

CHARACTERISTICS AND DEVELOPMENT OF MAGNETIC LEVITATION TRANSPORT SYSTEMS IN 1980**[CARACTERISTIQUES ET DEVELOPPEMENT DES SYSTEMES DE TRANSPORT A SUSTENTATION MAGNETIQUE EN 1980]**

The article reviews recent experiments with magnetic levitation land transport systems, considers the possible theoretical technologies for the levitation, guiding and propulsion functions, and shows that in the final analysis there are very few coherent systems, in which the motor design is decisive. [French]

Lancien, D Moulin, R *Revue Generale des Chemins de Fer* Vol. 99 Nov. 1980, pp 633-646, 8 Ref.

ACKNOWLEDGMENT: EI
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11 334724

QUICK PASSENGER CONVEYORS. THE TRAX (RATP) [Les trottoirs roulants acceleres. Le Trax de la RATP]

This article describes the state of the art of rapid passenger conveyors, and the principles and performance of Trax which, very likely, will be the first rapid passenger conveyor in service in the world. It carries people at a speed of 12 km/h over several hundred meters. [French]

Patin, P *Revue Generale des Chemins de Fer* Feb. 1980, pp 87-102, 8 Fig., 13 Phot., 8 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 111104), Central Laboratory of Bridges & Highways, France, Institute of Transport Research
ORDER FROM: ESL

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11 335068

TRAFFIC CONTROL LEVEL OF THE H-BAHN RAPID TRANSIT SYSTEM

A new rapid transit system is described which is fully automatic and operates through the use of a coupled process computer system within the traffic control level. The safety level monitors the function of the traffic control level and exercises control action only in the event of malfunction. The operations control level with a central computer, which effects scheduling of all traffic, is superimposed on the traffic control level.

Ethevenaux, A Waechter, M *Siemens Power Engineering* Vol. 1 No. 7, July 1979, pp 213-216, 4 Ref.

ACKNOWLEDGMENT: EI
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11 335071

THREE-DIMENSIONAL ANALYSIS OF DOUBLE-SIDED LINEAR INDUCTION MOTOR WITH COMPOSITE SECONDARY

An analysis is made of the operating characteristics of DLIM with composite secondary consisting of an iron plate both sides of which are covered with aluminum sheets. It is found that if the secondary iron plate is thick, DLIM acts as a set of two independent SLIM's. Even if the secondary iron plate is so thin that it is saturated, the operating characteristics of DLIM are sufficiently good from practical viewpoints. The thrust-slip characteristics of DLIM with hollow aluminum secondary are poorer than those of DLIM with composite secondary made of iron plate and aluminum cover sheets.

Yamamura, S (Yokohame National University, Japan); Ito, N Masuda, H *Electrical Engineering in Japan* Vol. 99 No. 1, Jan. 1979, pp 100-104, 6 Ref.

ACKNOWLEDGMENT: EI
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11 335075

LINEAR SYNCHRONOUS PROPULSION WITH PERMANENT MAGNET EXCITATION

This paper deals with the performance characteristics of the propulsion concept using an iron-cored active guideway together with its energy supply scheme and their dependence on the operational speed and the most important design parameters. The use of Rare Earth Cobalt (REC) magnets has proved to be expedient in generating the (rate value) magnetic flux with minimum power outlay.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Weh, H

Institute of Electrical and Electronics Engineers Proceeding IEEE 80CH1555-2, 1980, p 1042, 16 Ref.

ACKNOWLEDGMENT: EI
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11 335076

TEST RESULTS OF HSST MAGLEV SYSTEM

HSST (High Speed Surface Transport) system has been developed by Japan Air Lines since 1974. Two vehicles, HSST-01 and HSST-02, were constructed and tested on a test track in Higashi-Ogishima, Kawasaki city. Tests were also carried out at Haneda test facilities on the "module" which is a combined levitation and propulsion unit to be incorporated in the high speed transport vehicle. This paper reports outline of the test results of the test vehicles and the module.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Nakamura, S Aizawa, H Enos, S

Institute of Electrical and Electronics Engineers Proceeding IEEE 80CH1555-2, 1980, p 1036, 5 Ref.

ACKNOWLEDGMENT: EI
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11 335077

SUBOPTIMAL SEMI-ACTIVE VEHICLE SUSPENSIONS

A two-degree-of-freedom model of a semi-actively suspended vehicle is used for the design of and optimal suspension where the optimization is performed with respect to a quadratic performance index which reflects the influence of suspension design constraints and ride quality requirements. For the constrained semi-active optimization problem, two numerical methods are proposed as approximate solutions. The justification for the methods is based on some recent existence theorems from stochastic optimal control theory. One of the proposed methods is applied to a sample problem.

Proceedings of the Joint Automatic Control Conference, An ASME Century 2 Emerging Technology Conference, v1, San Francisco, California, August 13-15, 1980. Published on behalf of the American Automatic Control Council.

Hrovat, D (Wayne State University); Hubbard, M Margolis, DL
Institute of Electrical and Electronics Engineers Proceeding IEEE 80CH1580-0, Paper No. WA 10-H, 1980, 3p, 8 Ref.

ACKNOWLEDGMENT: EI
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11 335078

RESEARCH AND DEVELOPMENT PROGRAM "MAGNETICALLY SUSPENDED TRANSPORT SYSTEMS" IN THE FEDERAL REPUBLIC OF GERMANY

The various modes of magnetic suspension and linear motor propulsion are described in brief. Details of the whole development program and the state of the art are given. The characteristics of magnetically levitated transport systems for two purposes and the prospects are shown.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Glatzel, K Rogg, D Schulz, H

Institute of Electrical and Electronics Engineers Proceeding IEEE 80CH1555-2, 1980, pp 763-774, 20 Ref.

ACKNOWLEDGMENT: EI
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11 335079

LOW-SENSITIVITY CONTROL SYSTEMS FOR MAGLEV VEHICLES

The control system for a single support magnet of a Maglev vehicle is considered. Optimal state feedback is applied regarding variations of the system parameters. A sensitivity model is used to analyze the sensitivity of controller and observer. To reduce the controller sensitivity, the sensitivity functions are fed back as well as the state variables. For the control system realization a state observer is needed, which usually deteriorates the sensitivity and leads to undesired couplings, so that the separation principle does not hold any more. However, a special observer design is presented which avoids these disadvantages.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Breinl, W (Technical University of Munich, West Germany)

Institute of Electrical and Electronics Engineers Proceeding IEEE 80CH1555-2, 1980, pp 786-792, 8 Ref.

ACKNOWLEDGMENT: EI
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11 335080

CONTROL SYSTEM SYNTHESIS FOR MAGLEV-VEHICLES

The principles of system-layout for high speed MAGLEV-vehicles are shown, considering the main design-criteria, vehicle-and control-concept, control system synthesis and minimum power design and the amplitude-response results of the operational vehicle TRO6 are compared with the physical boundaries for the response of this vehicle structure.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Craemer, W (Messerschmitt-Boelkow-Blohm GmbH)

Institute of Electrical and Electronics Engineers Proceeding IEEE 80CH1555-2, 1980, pp 780-785, 4 Ref.

ACKNOWLEDGMENT: EI
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11 335081
CONTROLLED PERMANENT MAGNET (CPM)
CONFIGURATIONS GENERATING FORCES FOR LIFT,
GUIDANCE AND THRUST

This report describes two possible methods for contactless guidance and lift of rapid transport vehicles using permanent magnets.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

May, H
Institute of Electrical and Electronics Engineers Proceeding IEEE
80CH1555-2, 1980, pp 793-800, 12 Ref.

ACKNOWLEDGMENT: EI
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11 335082
PASSENGER CARRYING VEHICLES USING CONTROLLED DC
ELECTROMAGNETS

Work at the University of Sussex which has been in progress for the past ten years has resulted in a 1-ton, 4-passenger vehicle operating on a 30-m track. In addition to this vehicle other smaller models have been produced with the low speed (up to 100 km/h) urban application in mind. Besides the special problems of dynamics control and passenger comfort constraints imposed by this application are seen as twofold: (i) ability of vehicles to cope with small radius curves in the track i.e. superelevated sections and (ii) ability to negotiate junctions or switches. Along with salient features of the author's developments on problems of control and hardware, solution to these two constraints are described in the paper.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Jayawant, BV (Sussex University, England)
Institute of Electrical and Electronics Engineers Proceeding IEEE
80CH1555-2, 1980, p 1013, 10 Ref.

ACKNOWLEDGMENT: EI
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11 335083
DYNAMICS OF MAGLEV VEHICLES ON ELEVATED
GUIDEWAYS

A short literature review is given on the dynamics of Maglev vehicles. Then, the mathematical model of the entire system is shown, comprising vehicle, suspension, and guideway dynamics. The result is a high order linear state equation with periodic time-varying coefficients and jumping states. However, the control system design calls for simple low order models which are approached in different ways. For the resulting closed-loop system a stability analysis is given and steady state responses to deterministic and stochastic disturbances are calculated using common numerical simulation techniques as well as procedures which are based on Floquet theory. The methods are demonstrated by an example which also shows the influence of the different design parameters. In the paper the basic ideas are emphasized rather than any computational details.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Popp, K (Technical University of Munich, West Germany)
Institute of Electrical and Electronics Engineers Proceeding IEEE
80CH1555-2, 1980, p 1018, 56 Ref.

ACKNOWLEDGMENT: EI
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11 335085
VEHICLE-GUIDEWAY DYNAMICS OF A HIGH-SPEED
MAGLEV TRAIN

During the past few years increasing interest has developed in new forms of high speed ground transportation systems. One of the best of several possibilities is to support the train with controlled electromagnets which pull vertically and sideways against armature rails. To enhance safety and to minimize land the guideway will be elevated and will use beam-type construction on discrete supports. The state of knowledge of vehicle/guideway interaction dynamics has advanced rapidly and many of the basic phenomena and associated design parameters are well understood. The

object of this paper is to study the dynamics of the KOMET, a MAGLEV test carrier.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Meisinger, R (Messerschmitt-Boelkow-Blohm GmbH)
Institute of Electrical and Electronics Engineers Proceeding IEEE
80CH1555-2, 1980, p 1028, 16 Ref.

ACKNOWLEDGMENT: EI
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11 335263
WORKING ON SOLUTIONS TO INTERMEDIATE TRANSIT
PROBLEMS

Canada's Urban Transportation Development Corp. is operating a full-scale test facility at Kingston, Ont., where its Intermediate Capacity Transit System (ICTS) is being tested. Components of ICTS include elevated structures, continuous welded rail secured directly to the concrete decks, an isolated power distribution system with dual contact rails, and 40-ft Advanced Light Rail Transit (ALRT) vehicles propelled by linear motors. The track contains an antenna system which provides automatic control and also functions for low-frequency inductive communication between vehicle and wayside. UTDC is working on revenue applications as downtown people movers.

Quigley, H *Mass Transit* Vol. 8 No. 7, July 1981, p 18, 1 Phot.

ORDER FROM: Mass Transit, 555 National Press Building, Washington, D.C., 20045

DOTL JC

11 335623
DYNAMIC CHARACTERISTICS OF A LONG TRAIN OF EML
VEHICLES OVER ELEVATED FLEXIBLE GUIDEWAYS

In designing electromagnetic levitation (EML) vehicles as a means of high speed ground transit, it is important to explore the dynamic interactions between a long train of EML vehicles and their guideways. For the numerical analysis of this system, the computer simulation program has been developed, in which vehicle equations are fully coupled with guideway equations through distributed suspension forces. Vehicle motion is assumed to consist of heave and pitch of the vehicle body and heave of two trucks. According to the analysis there is a difference between variations of the vibration of each truck or each vehicle body, especially in a high speed operation, depending on the velocity parameter, the truck intervals and guideway structures. In some cases, the variations of the vertical accelerations and the clearances between magnets and guideway surfaces at the following vehicles tend to increase to about twice those at the preceding one.

Nagai, M (Tokyo University of Agriculture and Technology); Iguchi, M
JSM E Bulletin Vol. 23 No. 184, Oct. 1980, p 1663, 4 Ref.

ACKNOWLEDGMENT: EI
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11 335831
BIRMINGHAM'S NEW PEOPLE MOVER

Britain's first magnetic levitation transport system (maglev), developed by British rail, is to be used for the 600 to 700 M link between Birmingham Airport, the mainline station Birmingham International, and the National Exhibition Centre. It will be constructed by a consortium of seven companies and the West Midland County Council and is expected to open in April 1984. The article describes the work in comparing bus and maglev for airport access. The current modal choice was examined in detail to forecast future usage and determine overall public transport patronage. Because of the differences in the journey patterns of those visiting the exhibition centre and those using the mainline railway station, a multi-modal model was used calibrated on data from a major survey of airport passengers. The advantage of maglev over the conventional bus service was found to be reduced operating costs and a higher level of service. It was found that the benefits of maglev would justify the high capital costs incurred in the original construction.

Surveyor Vol. 156 No. 4634, Apr. 1981, pp 12-13, 1 Fig., 2 Phot., 1 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 254384)
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11 335835

NEW MAGLEV LINK OPENS DOOR TO WORLD SALES

The magnetic levitation transit shuttle, linking Birmingham Airport with the International Railway Station, opening in 1984 will be the first revenue earning system of its kind in the world. It could handle 1500 people per hour in each direction, with a one-way travel time of 90 seconds over the 600 M journey. Small automatically controlled driverless vehicles, carrying 32 to 49 passengers are suspended above the rails set in a guideway. The system is based on a British rail design and is being constructed by a consortium of seven private companies and the county council. Preliminary investigations showed that magnetic suspension techniques were not efficient for high-speed applications, but had several advantages at low speeds. The levitation system was comfortable, quicker and will transport passengers directly from concourse to concourse. The absence of moving parts should keep maintenance costs to about 15 per cent of a conventional rail link.

Millbank, P *Electrical Review* Vol. 208 No. 10, Mar. 1981, p 21, 1 Fig., 2 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 254376)

ORDER FROM: IPC Business Press Limited, Quadrant House, The Quadrant, Sutton, Surrey, England

11 335838

BRITAIN'S FIRST MAGNETIC TRAIN TAKES OFF

The Department of Industry is providing a grant to cover 12 per cent of the cost of the magnetic levitation (maglev) rail-link from Birmingham Airport to the National Exhibition Centre. A private consortium, British Rail and the local council are providing the remainder of the capital for the 600 M line, which it is hoped will be in operation by 1984. The line will have two tracks and two vehicles will each carry 32 people at a time on the 90 second journey with a turn-round time of 20 seconds, so that the line will carry up to 190 passengers in each direction every 15 minutes. The magnetic forces that keep the car clear of the track are under full automatic control to compensate for variations in wind and payload. A linear induction motor drives each vehicle.

New Scientist Vol. 89 No. 1242, Feb. 1981, p 519, 1 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 254244)

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11 335849

OPERATIONAL EQUATION OF THE GUIDEWAY INSPECTION SYSTEM FOR LEVITATED GROUND TRANSPORTATION

The guideway for levitated ground vehicles differs from that for conventional railway track. For the development of a guideway inspection car, guideway irregularities are first defined and then appropriate methods for measuring them are discussed. Mathematical development of coordinate transformation and integration are presented.

Takeshita, K *Railway Technical Research Inst, Quarterly Reports* Vol. 22 No. 1, Mar. 1981, pp 2-5, 3 Fig., 2 Tab.

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

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11 336955

INDUCTIVE ENERGY TRANSFER IN TRANSPORTATION

The DOE program for studying the use of inductive energy transfer in transportation systems is reviewed. An inductive energy transfer system has an energy source consisting of insulated electrical conductors placed beneath the surface of a roadway, aligned with the direction of travel, and fed a relatively high alternating current. A vehicle, e.g., car, bus, or rail car, is equipped with a coil suitably wrapped around magnetic material and suspended beneath the vehicle a short distance from the road surface. The ac in the energy source produces an alternating magnetic field which couples inductively with the power pickup coil under the vehicle and results in vehicle propulsion. Investigations of this energy source for transportation in the US have considered the effect of its use on petroleum fuel consumption, system design and operation factors, adaptability to city and highway transportation, vehicle performance, and assessment of the application of this system to automobiles carrying auxiliary battery power equipment. These studies are briefly described. (ERA citation 06:006234)

UMTA R and D conference, Norfolk, VA, USA, 21 Nov 1980.

Walter, CE Salisbury, JD California University, Livermore, Department of Energy CONF-801162-1, Nov. 1980, 31p

Contract W-7405-ENG-48

ACKNOWLEDGMENT: NTIS

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UCRL-85141

12 198506

PHYSICAL PROTECTION OF SHIPMENTS OF IRRADIATED REACTOR FUEL; INTERIM GUIDANCE

During May 1979 the U.S. Nuclear Regulatory Commission approved for issuance in effective form new interim regulations for strengthening the protection of spent fuel shipments against sabotage and diversion. The new regulations will likely continue in force until the completion of an ongoing research program concerning the response of spent fuel to certain forms of sabotage. At that time the regulations may be rescinded, modified, or made permanent, as appropriate. This report discusses the new regulations and provides a basis on which licensees can develop an acceptable interim program for the protection of spent fuel shipments.

Kasun, DJ

Nuclear Regulatory Commission June 1979, 38p

ACKNOWLEDGMENT: NTIS

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NUREG-0561

12 323492

THE INVESTIGATION OF GRAIN ELEVATOR EXPLOSIONS

Grain-elevator explosions have become a problem of serious concern to a number of federal agencies and to the grain-handling industry. The explosiveness of grain dust when ignited in a confined space has been known for years. However, the conditions and sequence of events leading to an explosion, the point and cause of ignition, and the propagation of an explosion in actual occurrences have remained relatively unknown. Remedial action to reduce number and severity of explosions must be based on determination of these factors. This report emphasizes that previous investigations following elevator explosions have yielded little information other than that an explosion occurred and that damage was of a certain degree. The investigation of an explosion to obtain a complete understanding of the event requires a team having specialized skills and capabilities. Such teams do not presently exist. The need for such a team and its qualifications and operation are outlined in this report.

National Materials Advisory Board, Department of Labor Final Rpt.
NMAB-367-1, Sept. 1980, 20p

Contract J-9-F-8-0137

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12 326506

RAILROAD ACCIDENT REPORTS-BRIEF FORMAT, ISSUE NUMBER 1, 1979

The publication contains briefs of selected railroad accidents occurring in U.S. railroad operations during fiscal years 1977 and 1978. The brief format presents basic facts, conditions, circumstances, and probable cause (s) in each instance. Additional statistical information is tabulated by types of accidents and casualties related to types of accidents, carriers involved, and casual factors.

National Transportation Safety Board NTSB/RAB-80-3, Sept. 1980,
122p

ACKNOWLEDGMENT: NTIS

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PB81-108615, DOTL NTIS

12 326525

RAILROAD ACCIDENT REPORT-HEAD-ON COLLISION OF BALTIMORE AND OHIO RAILROAD COMPANY FREIGHT TRAINS EXTRA 6474 EAST AND EXTRA 4367 WEST, ORLEANS ROAD, WEST VIRGINIA, FEBRUARY 12, 1980

About 5:55 a.m., on February 12, 1980, two freight trains operated by the Baltimore and Ohio Railroad Company collided head-on at Orleans Road, West Virginia. Extra 6474 East was on track No. 2 traveling at 38 miles per hour as it passed the stop-and-stay signal at Orleans Road and entered a compound curve to the right, where Extra 4367 West was approaching at a speed of 32 mph. The fireman of Extra 4367 West was killed and the engineer and head brakeman were injured; the engineer, conductor, and brakeman of Extra 6474 East were injured. Property damage was estimated to be \$1,688,200. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the conductor of Extra 6474 East to see that the train was operated in accordance with the operating rules and the failure of the engineer and head brakeman to control the train

as required by the signal at Orleans Road. Contributing to the accident was the absence of an adequate safety control device on the locomotive.

National Transportation Safety Board NTSB-RAR-80-9, Sept. 1980, 30p

ACKNOWLEDGMENT: NTIS

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PB81-105702, DOTL NTIS

12 326543

RAILROAD ACCIDENT REPORT--DERAILMENT OF AMTRAK TRAIN NO. 7, THE EMPIRE BUILDER, ON BURLINGTON NORTHERN TRACK, GLACIER PARK, MONTANA, MARCH 14, 1980

About 4:00 p.m., on March 14, 1980, westbound Amtrak passenger train No. 7, the Empire Builder, derailed two locomotive units and eight cars while moving at 37 mph through a 6 deg. 8 min. curve on the Burlington Northern track at Glacier Park, Montana. Of the 170 passengers and 20 crewmembers, 115 persons were injured; 35 of the injured were hospitalized. Property damage was estimated to be \$546,800. The National Transportation Safety Board determines that the probable cause of this accident was the overturning of the outside rail of a 6 deg. 8 min. curve because the improperly maintained track could not sustain the lateral force generated by the acceleration of the locomotive in the curve. Contributing to the derailment was the failure of the railroad to issue a temporary slow order pending replacement of several defective rails.

National Transportation Safety Board NTSB-RAR-80-6, Aug. 1980, 36p

ACKNOWLEDGMENT: NTIS

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PB81-103376, DOTL NTIS

12 326571

SURVEY OF CURRENT STATE RADIOLOGICAL EMERGENCY RESPONSE CAPABILITIES FOR TRANSPORTATION RELATED INCIDENTS

The volume is the final report of a project to survey current state radiological emergency response capabilities for transportation related incidents. The survey was performed to provide the NRC with information useful in the development of guidelines for state organizations and planning for emergency response. The report includes the results of a mail and telephone survey of state emergency response officials; information gleaned from radiological emergency response plans and related official document; and some general conclusions and recommendations drawn in part from interviews conducted and site visits to selected states.

Mitter, EL Hume, RD Vilardo, F Feigenbaum, E Briggs, H
Indiana University, Bloomington, Nuclear Regulatory Commission Final
Rpt. Sept. 1980, 203p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

NUREG/CR-1620

12 326631

RAILROAD ACCIDENT REPORT-HEAD-ON COLLISION BETWEEN AMTRAK TRAIN NO. 82 AND SEABOARD COAST LINE EXTRA 2771 SOUTH LAKEVIEW, NORTH CAROLINA, APRIL 2, 1980

About 7:33 a. m., on April 2, 1980, northbound Amtrak Train No. 82 collided head-on with Seaboard's Coast Line (SCL) Extra 2771 South on the single track of the SCL Railroad at Lakeview, North Carolina, after train No. 82 overran a stop signal at the north end of the double track. Twenty-nine crewmembers and ninety-four passengers were injured, and damage was estimated at \$1,145,492. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer of train No. 82 to perceive and comply with the "approach" aspect of a signal and his continued operation of the train at a speed too high to stop before it overran a stop signal.

National Transportation Safety Board NTSB-RAR-80-8, Sept. 1980, 24p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-104085, DOTL NTIS

12 326906

RAILROAD ACCIDENT REPORT-HEAD-END COLLISION OF NINE BURLINGTON NORTHERN LOCOMOTIVE UNITS WITH A STANDING FREIGHT TRAIN, ANGORA, NEBRASKA, FEBRUARY 16, 1980

On February 16, 1980, Burlington Northern (BN) freight train Extra 2048 East (No. 178) stalled on an ascending grade about 4.7 miles west of Angora, Nebraska. The crew was instructed to uncouple the three-unit locomotive from the train and move it east to Angora to meet the six-unit locomotive of Extra 7814 West at Angora. The nine locomotive units were coupled together and moved westward on the descending grade toward the standing train. While moving at a speed of about 46 mph, the locomotive units collided with the standing portion of train No. 178. The head brakeman of train No. 178 and the engineer of Extra 7814 West were killed, and three crewmembers of Extra 7814 were injured. Damage was estimated at \$1,297,000. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer of train No. 178 to control the speed of the nine locomotive units on the return downgrade trip to the standing train. Contributing to the accident were the improper coupling of the nine locomotive units; the lack of sufficient supervision and instructions; the failure of the conductors of the two trains and the engineer of BN Extra 7814 West to perform their duties properly and the failure of the train dispatcher to issue adequate orders and instructions.

National Transportation Safety Board NTSB-RAR-80-7, Aug. 1980, 33p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-219082, DOTL JC

12 327127

RAILROAD ACCIDENT REPORTS-BRIEF FORMAT, ISSUE NUMBER 4, 1978 SUPPLEMENT

This publication contains briefs of selected railroad accidents occurring in U.S. railroad operations during fiscal years 1977 and 1978. The brief format presents basic facts, conditions, circumstances, and probable cause(s) in each instance. Additional statistical information is tabulated by types of accidents and casualties related to types of accidents, carriers involved, and causal factors.

National Transportation Safety Board NTSB-RAB-80-2, July 1980, 142p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-213598, DOTL NTIS

12 327407

THE CONSEQUENCES AND FREQUENCY OF SELECTED MAN-ORIGINATED ACCIDENT EVENTS

Data are compiled for man-caused accidents where there were ten or more fatalities, thirty or more injuries, or three million dollars or more in property damage for the period, 1953 through 1973. Data are also summarized in various classifications, such as transportation, hazardous materials, etc. A bibliography is included. Discussions are made of the limitations on use of the data, difficulties when comparing the data classes, and problems encountered in identifying voluntary or involuntary risks. This compilation may be quite useful as basic information for accident risk assessments. However, accidents caused by natural events are not included.

Environmental Protection Agency Final Rpt. EPA-520/3-75-016, June 1980, 233p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-211303

12 327534

REVIEW AND ASSESSMENT OF PACKAGE REQUIREMENTS (YELLOWCAKE) AND EMERGENCY RESPONSE TO TRANSPORTATION ACCIDENTS

Following the accidental spill of yellowcake in Colorado in September 1977, a U.S. Nuclear Regulatory Commission/U.S. Department of Transportation study group met to consider topics on yellowcake packaging and response to transportation accidents involving any radioactive material. The group concluded that in an accident the state and local government agencies are responsible for controlling the scene, that carriers are responsible for notifying authorities and isolating and cleaning up any spilled radioactive

material, and that shippers are responsible for informing others of hazards of the cargo. The group recommended that these parties prepare plans for carrying out these responsibilities. The group also recommended transportation data gathering programs, but, based on cost effectiveness arguments, did not recommend additional package requirements for yellowcake shipments.

Prepared in cooperation with Department of Transportation, Washington, DC.

Hodge, CV
Nuclear Regulatory Commission Final Rpt. July 1980, 329p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NUREG-0535

12 328228

PASSENGER VALUE STRUCTURE MODEL, AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY PROGRAM

The objective of this research was to develop a model of the passenger's value structure which would reveal the role and importance of perceived security and other system characteristics on the passenger's evaluation and use of transit systems. The goal is to provide AGT system planners with a tool for predicting the effects of system characteristics or changes in characteristics on the way the user perceives the security of the system. This report includes: a literature review on perceived security; (2) two models of perceived security; (3) an experimental test (description) of a crime countermeasure and its effect on perceived security; (4) a review of the results of two surveys; (5) refinement of the models based on the results of the experiments; and (6) a discussion highlighting certain findings and suggested future research. In this report, two models of perceived security were developed: one showing the effects of perceived security on transit choice and use; and the other describing the determinants of perceived security. An experiment and two surveys were done (1) to assess the effects on perceived security of a crime countermeasure; and (2) to provide data relevant to the models. Surveys of residents living near two subway terminals were conducted both before and after the experimental installations of a closed circuit TV surveillance system at one of the terminals.

Richards, LG Jacobson, ID
Dunlap and Associates, Incorporated, Transportation Systems Center,
Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-80-23, July 1980, 195p

Contract DOT-TSC-1314

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-120875

12 328402

ASSESSMENT OF THE RISK OF TRANSPORTING LIQUID CHLORINE BY RAIL

This report presents the risk of shipping liquid chlorine by rail. While chlorine is not an energy material, there are several benefits to studying chlorine transportation risks. First, chlorine, like energy materials, is widely used as a feedstock to industry. Second, it is the major purification agent in municipal water treatment systems and therefore, provides direct benefits to the public. Finally, other risk assessments have been completed for liquid chlorine shipments in the US and Europe, which provide a basis for comparison with this study. None of the previous PNL energy material risk assessments have had other studies for comparison. For these reasons, it was felt that a risk assessment of chlorine transportation by rail could provide information on chlorine risk levels, identify ways to reduce these risks and use previous studies on chlorine risks to assess the strengths and weaknesses of the PNL risk assessment methodology. The risk assessment methodology used in this study is summarized. The methodology is presented in the form of a risk assessment model which is constructed for ease of periodic updating of the data base so that the risk may be reevaluated as additional data become available. The report is sectioned to correspond to specific analysis steps identified in the model. The transport system and accident environment are described. The response of the transport system to accident environments is described. Release sequences are postulated and evaluated to determine both the likelihood and possible consequences of a release. Supportive data and analyses are given in the appendices. The risk assessment results are related to the year 1985 to allow a direct comparison with other reports in this series. (ERA citation 05:038886)

Andrews, WB
Battelle Memorial Institute/Pacific Northwest Labs, Department of Energy Mar. 1980, 189p

Contract AC06-76RL01830

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PNL-3376

12 328403

APPLICATION OF ALARA PRINCIPLES TO SHIPMENT OF SPENT NUCLEAR FUEL

The public exposure from spent fuel shipment is very low. In view of this low exposure and the perfect safety record for spent fuel shipment, existing systems can be considered satisfactory. On the other hand, occupational exposure reduction merits consideration and technology improvement to decrease dose should concentrate on this exposure. Practices that affect the age of spent fuel in shipment and the number of times the fuel must be shipped prior to disposal have the largest impact. A policy to encourage a 5-year spent fuel cooling period prior to shipment coupled with appropriate cask redesign to accommodate larger loads would be consistent with ALARA and economic principles. And finally, bypassing high population density areas will not in general reduce shipment dose. (ERA citation 05:036092)

Greenberg, J Brackenbush, LW Murphy, DWBRA Lewis, JR
Battelle Memorial Institute/Pacific Northwest Labs, Department of Energy TTC-0073, May 1980, 99p

Contract AC06-76RL01830

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PNL-3261

12 328456

PROGRAMS FOR ENSURING THE SAFE TRANSPORTATION OF HAZARDOUS MATERIALS NEED IMPROVEMENT

The Department of Transportation administers a program to protect the public from risks involved in the transportation of over 250,000 shipments of hazardous materials each day. The following improvements are needed to more effectively carry out this program: to obtain better data regarding the hazardous materials industry, improve DOT's hazardous materials information system, and better evaluate the risks associated with transporting these materials; to establish a systematic method for selecting companies for inspection, develop guidelines for determining when violations are to be developed into enforcement cases, and encourage States to expand their inspection and enforcement efforts; and to improve coordination of emergency response efforts with local government organizations and industry associations and ensure better dissemination of information to local emergency organizations.

General Accounting Office CED-81-5, Nov. 1980, 109p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-122970

12 328474

RADIOACTIVE WASTE MANAGEMENT INTEGRATED DATA BASE: A BIBLIOGRAPHY

The purpose of this indexed bibliography is to organize and collect the literature references on waste generation and treatment, characteristics, inventories, and costs. The references were captured into a searchable information file, and the information file was sorted, indexed, and printed for this bibliography. A completion of approximately 1100 references to nuclear waste management, the first of a series, is completed. Each reference is categorized by waste origin (commercial, defense, institutional, and foreign) and by subject area: (1) high-level wastes, (2) low-level wastes, (3) TRU wastes, (4) airborne wastes, (5) remedial action (formerly utilized sites, surplus facilities, and mill tailings), (6) isolation, (7) transportation, (8) spent fuel, (9) fuel cycle centers, and (10) a general category that covers nonspecific wastes. Five indexes are provided to assist the user in locating documents of interest: author, author affiliation (corporate authority), subject category, keyword, and permuted title. Machine (computer) searches of these indexes can be made specifying multiple constraints if so desired. This bibliography will be periodically updated as new information becomes available. In addition to being used in searches for specific data, the information file can

also be used for resource document collection, names and addresses of contacts, and identification of potential sources of data. (ERA citation 05:036100)

Johnson, CA Garland, PA

Oak Ridge National Laboratory, Department of Energy Sept. 1980, 192p

Contract W-7405-ENG-26

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

ORNL/TM-7385/V1

12 328967

FIRE PROTECTION SYSTEMS FOR RAIL TRANSPORTATION OF CLASS A EXPLOSIVES: INTERIM REPORT

As a result of several accidents involving fire induced detonation of military explosives during rail shipment, a research project, funded by the Federal Railroad Administration (FRA), was initiated at the Center for Fire Research (CFR) at the National Bureau of Standards (NBS). This project was initiated to evaluate various methods of protection of Class A explosives from fire, and to identify one or more cost-effective approaches which could be explored in greater detail in later studies. Active systems (detection, notification, and extinguishment) and passive systems (thermal insulating barriers) were evaluated regarding cost, feasibility and level of protection provided for the major hazard scenarios involved in rail shipment of explosives. The passive, thermal barrier approach was selected as the most reliable and less costly of the options studied while providing an acceptable level of protection. Small-scale and full-scale tests were conducted to obtain performance data on one specific thermal barrier material. Based on this data, a computer model was developed which can predict temperatures of the boxcar floor, top surface temperature of a thermal barrier, and casing/explosive interface temperature of a wood-pallet mounted bomb for a range of fire sizes. The model predictions compare favorably with measured results from a limited number of experiments. Further experimental data are needed to refine the model and establish an acceptable confidence level in the predicted values. The proposed work necessary to provide this refinement and verification is described.

Sponsored in part by Federal Railroad Administration, Washington, DC.

Bukowski, RW

National Bureau of Standards, Federal Railroad Administration
NBSIR-80-2170, Nov. 1980, 35p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-153975

12 330179

ASSESSMENT OF THE RISK OF TRANSPORTING PROPANE BY TRUCK AND TRAIN

The risk of shipping propane is discussed and the risk assessment methodology is summarized. The risk assessment model has been constructed as a series of separate analysis steps to allow the risk to be readily reevaluated as additional data becomes available or as postulated system characteristics change. The transportation system and accident environment, the responses of the shipping system to forces in transportation accidents, and release sequences are evaluated to determine both the likelihood and possible consequences of a release. Supportive data and analyses are given in the appendices. The risk assessment results are related to the year 1985 to allow a comparison with other reports in this series. Based on the information presented, accidents involving tank truck shipments of propane will be expected to occur at a rate of 320 every year; accidents involving bobtails would be expected at a rate of 250 every year. Train accidents involving propane shipments would be expected to occur at a rate of about 60 every year. A release of any amount of material from propane trucks, under both normal transportation and transport accident conditions, is to be expected at a rate of about 110 per year. Releases from propane rail tank cars would occur about 40 times a year. However, only those releases that occur during a transportation accident or involve a major tank defect will include sufficient propane to present the potential for danger to the public. These significant releases can be expected at the lower rate of about fourteen events per year for truck transport and about one event every two years for rail tank car transport. The estimated number of public fatalities resulting from these significant releases in 1985 is fifteen. About eleven fatalities per year result from tank truck operation, and approximately half a death per year stems from the movement of propane in rail tank cars.

Geffen, CA
Battelle Memorial Institute/Pacific Northwest Labs Mar. 1980, 211p

Contract AC06-76RL01830

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

PNL-3308

12 330191
SYSTEM SAFETY APPROACH TO THE DESIGN OF AN INTERMEDIATE CAPACITY TRANSIT SYSTEM

The most effective means of avoiding accidents during the operational phase of a new urban transit system is to eliminate or reduce hazards during its design and development. The system safety management and safety analysis methods adopted during the design phase of the Intermediate Capacity Transit System (ICTS) are examined in this paper. The ICTS concept has produced a compact, lightweight vehicle design, of some 12m in length and 2.5m wide. The vehicle will operate coupled semi-permanently in pairs, which in turn can couple to make longer trains of four or six car total length. Vehicles are supported on steel wheels with steerable axles to eliminate squeal and wear on curves. The track and guideway is standard gauge and continuously welded rail is anticipated. The guideway will be either at-grade, elevated or, if necessary, in tunnel.

Proceedings of the Canadian Reliability Symposium, Toronto, Ontario, May 16-17, 1980. Sponsored by the Society of Reliability Eng.

Rumsey, AF (Canadair Service Limited) *Microelectronics and Reliability*
Vol. 20 No. 1-2, Jan. 1980, pp 123-129

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

12 330222
CHEMICALS: AS TRAFFIC GROWS, SO DOES THE EMPHASIS ON SAFETY

Chemicals traffic in the US rose from 91.4 million ton/year in 1975 to 112.4 million ton/year in 1979. An increase of this size necessitates very strict safety measures. Various regulations are described, together with the organizations concerned.

Malone, F *Railway Age* Vol. 181 No. 16, Aug. 1980, p 24, 1 Fig., 3 Phot.

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

DOTL JC

12 330639
REVIEW OF US ACCIDENT/INCIDENT EXPERIENCE INVOLVING THE TRANSPORTATION OF RADIOACTIVE MATERIAL (RAM) 1971-1980

This paper analyzes the transportation accidents and incidents which have occurred in the United States in the period 1971-1980 based upon the information in the Radioactive Material Transportation Accident/Incident Data Base developed by the Transportation Technology Center (TTC) at Sandia National Laboratories. The accident/incident data base incorporates the files of the Hazardous Material Incident Report (HMIR) system operated by the Material Transportation Bureau of the US Department of Transportation (DOT) with additional information obtained from the files of the US Nuclear Regulatory Commission (NRC). A principal objective of this paper is to summarize US accident/incident experience for the past ten years, providing a concise statement of radioactive material (RAM) package failure description for the transport modes of truck, rail and air.

From 6th International Symposium on Packaging and Transporting Radioactive Material; Berlin, West Germany, November 10, 1980.

McClure, JD Emerson, EL
Sandia Laboratories CONF-801115-33, 1980, 6p

Contract AC04-76DP00789

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

SAND-80-0899C

12 331105
DISCOVER THE CAUSES OF ACCIDENTS AND OTHER HAZARDS THIS WAY

The author looks at a severely practical way of investigating accidents. He develops the concept that a logical sequence of questions which looks behind the superficial causes and consequences of an incident, is a technique which commends itself highly.

Lihou, D *Health and Safety at Work* Vol. 3 No. 4, Dec. 1980, pp 40-41

ACKNOWLEDGMENT: British Railways
ORDER FROM: MacLaren Publishers Limited, David House, 69-77 High Street, Croydon C9 1QH, England

12 331130
IN TERMS OF PUBLIC SAFETY RAILROAD RECORD IS BEST

There has been general improvement in virtually every phase of railroad safety over the past two decades and the specific cases of hazardous materials transport and grade crossings are examined in detail. Industry and government research activities are described. Appendices summarize accident statistics and other factors important in improving the safety picture.

Association of American Railroads No Date, 24p, 6 App.

ORDER FROM: AAR

DOTL RP

12 331502
NEW SAFETY REGULATIONS ON THE FRENCH NATIONAL RAILWAYS [La nouvelle réglementation de sécurité de la S.N.C.F.]

The author explains the structure and objectives of the general safety regulations which comprise documents containing 32 specific sets of texts, and comments upon the essential provisions. [French]

Huet, J *Revue Generale des Chemins de Fer* Vol. 99 July 1980, pp 407-426

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

12 331843
DECISION MAKING IN HAZARDOUS MATERIALS TRANSPORTATION

Two tools to determine the hazard presented by a large quantity of hazardous materials are the "Equivalent Safety Concept" developed by P. J. Danahy and B. S. Gathy and the "Population Vulnerability Model" developed by Enviro Control, Inc. The Equivalent Safety Concept is a noncomputer technique that develops indexes for cargo hazard, for vessel design, and port safety. These are used to assist in a judgmental decision of authorization of vessel transit. The Population Vulnerability Model is a computer simulation of a cargo spill integrated with census data. The damage to life and property are calculated using the census data and the cargo properties to determine the number of deaths and injuries to personnel and dollar loss from the cargo release. The results and relative hazards calculated using these techniques are compared and analyzed.

Luckritz, RT (United States Coast Guard Academy); Schneider, AL
Journal of Hazardous Materials Vol. 4 No. 2, Sept. 1980, pp 129-143

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

12 334446
GUIDE TO THE SAFE USE OF LASERS IN THE CONSTRUCTION INDUSTRY

The standard refers exclusively to safety matters associated with visible light lasers used for alignment, levelling, control and survey tasks in the construction industry. While the general requirements of AS 2211 apply to the design, manufacture and use of such lasers, this standard-(a) contains only those requirements pertinent to lasers used for alignment, levelling, control and survey tasks in the construction industry; (b) presents such requirements in terminology familiar to and/or understandable by tradesmen and non-professional persons who may operate lasers in the course of their employment; and (c) standardizes guidelines and syllabus for the training and certification of laser safety officers (Isos). Laser safety officers are persons trained in the theory and practical application of lasers and with authority and responsibility for ensuring that other persons do not receive harmful exposure to laser radiation.

Standards Association of Australia Monograph AS 2397-1980, 1980, 12p, 2 Fig., 1 Tab.

ACKNOWLEDGMENT: TRRL (IRRD 250479), Australian Road Research Board

ORDER FROM: Standards Association of Australia, 80 Arthur Street, North Sydney, New South Wales, Australia

12 334502

PROTECTING TRAINS AGAINST FIRE [La proteccion de trenes contra el fuego]

Protecting trains against fire is vital not only for ensuring quality of service but also for safety. The author analyses the behaviour of fire and fires in general, and points out the particular characteristics of railway stock which constitute a fire hazard. He then analyses the materials most commonly used for railway rolling stock and ways of reducing fire risk. [Spanish]

Lacosta, JM *AIT-Revista* No. 36, Sept. 1980, pp 23-38, 3 Phot., 12 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

12 334508

OCCUPATIONAL SAFETY IN CASES WHERE TRAFFIC IS NOT INTERRUPTED [De arbeids veiligheid nabij treinverkeer]

Working on the track when traffic is not interrupted involves risks. A knowledge of the risks can go a long way towards reducing them. [Dutch]

Deunhouwer, D *Weg en Werken* Vol. 27 No. 1, 1981, pp 6-15, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Kerckebosch, Julianalaan 67, 3708 BB Zeist, Netherlands

12 334958

EVALUATION OF RAILWAY SAFETY PROJECTS

Each year in Canada there are several thousand railway accidents, most of which are minor derailments or collisions which cause only a short delay to a single train. Some, however, result in injuries, loss of life and substantial property damage. In 1979, 4,634 "accidents" resulting in 118 deaths and 3,910 injuries were reported to the Canadian Transport Commission. One such accident in November 1979--which caused the evacuation of 250,000 residents of Mississauga because of possible leakage of chlorine gas from a derailed freight train--brought the issue of railway safety sharply into public view. This event, the ensuing commission of inquiry (Grange Commission), and a rash of other derailments both in Canada and abroad, have ensured continued media attention and public pressure for greater safety in railway operations. The Grange recommendations were made without reference to the cost of implementation or to the benefits--other than that of "greater safety". This report examines some of the major aspects of cost/benefit analysis required for evaluation of railway safety proposals.

Schwier, C Lake, RW King, AW

Canadian Institute of Guided Ground Transport, Canadian Transport Commission, (PRO-076) Final Rpt. CIGGT Rpt 80-19, Mar. 1981, 24p, Tabs., 2 App.

ORDER FROM: CIGGT

DOTL RP

12 335844

PHASE 02 REPORT ON EFFECTIVENESS OF SHELF COUPLERS, HEAD SHIELDS AND THERMAL SHIELDS

The Class DOT 112(114) tank cars retrofitted with shelf couplers, head shields, and thermal shields under HM-144 have now had sufficient service experience to permit an assessment of their effectiveness. Specifically, the fleet of 112(114) cars has had about 2-3/4 fleet-years experience with shelf couplers and 1-3/4 fleet-years experience with head shields and thermal shields. Accident data for the last 2-1/4 years (average fleet-years the cars have been equipped) are compared to accident data for the preceding 14 years. It is found that the frequency of head punctures has been reduced to about one-seventh the previous rate, and the frequency of fire induced ruptures has been reduced to about one-third the previous rate. Shell punctures have decreased, but the limited number of cases precludes quantifying the amount. Considering all cases of punctures and ruptures combined, and normalizing on the basis of car population, the frequency has dropped to about one-fourth the previous rate.

Phillips, EA Role, H

Association of American Railroads Technical Center Res Rpt. AAR R-482, RA-02-3-44, May 1981, 16p, 7 Fig., 2 Tab., 4 Ref.

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

DOTL RP

12 335856

VISIBILITY AND OPTICAL PERFORMANCE OF NEW-TYPE DISMOUNTABLE TAIL LIGHT FOR RAILWAY ROLLING STOCK

A dismountable tail light must be carried at the rear of all freight trains on Japanese National Railways. This battery-powered light was investigated on the basis of its basic optical performance and field tests were carried out to determine its visibility under day and night conditions.

Tanaka, H *Railway Technical Research Inst, Quarterly Reports* Vol. 22 No. 1, Mar. 1981, pp 45-46, 4 Fig.

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

DOTL JC

12 335857

SAFETY EFFECTIVENESS EVALUATION OF RAIL RAPID TRANSIT SAFETY

On July 28 and 29, 1980, the National Transportation Safety Board held a public hearing on rail rapid transit safety. Twenty-five witnesses testified during the hearing on fire safety issues, emergency evacuation from rail rapid transit systems and safety oversight of transit systems. The Safety Board examined fire safety issues involving transit car design; emergency exit from cars; emergency tunnel ventilation; evacuation from tunnels; emergency procedures including training, drilling, and testing; emergency communications, equipment, and mobility; and local/State/Federal safety oversight of rail rapid transit properties. The Safety Board issued urgent recommendations to the Urban Mass Transportation Administration for a survey of rail rapid transit systems to determine their capability for evacuation of passengers under various operational and passenger load conditions and to establish Federal guidelines for the elimination or minimization of combustible and toxic gas and smoke-generating materials in existing rail rapid transit cars. The Safety Board further recommended that the Secretary of Transportation propose Federal legislation which would explicitly authorize the establishment of safety standards for rail rapid transit systems. Other recommendations seek Federal guidelines for car and tunnel designs, safety equipment, and training; the need for 5-year safety and research and development plans; a fire research and testing program; a study of the need for fire suppression systems; and improved training for tunnel rescue efforts for employees and emergency personnel.

National Transportation Safety Board NTSB-SEE-81-1, Jan. 1981, 108p, Figs., 3 App.

ORDER FROM: NTIS

PB81-159188, DOTL NTIS, DOTL RP

12 335858

SAFETY EFFECTIVENESS EVALUATION--THE IMPROVEMENT OF NIGHTTIME CONSPICUITY OF RAILROAD TRAINS

The National Transportation Safety Board examined nighttime accidents in which highway vehicles strike trains that block grade crossings. There is adequate evidence to suggest that this type of accident is strongly influenced by motorists' inability to perceive the presence of trains in crossings because trains lack conspicuity within their environment. This type of accident results each year in approximately 1,800 collisions with 140 persons killed and 800 injured. The Safety Board reviewed pertinent research undertaken by the Federal Railroad Administration (FRA) on a known countermeasure--reflectorization. The Safety Board issued recommendations to the FRA to develop and issue an advance notice of proposed rulemaking within 6 months for the improvement of nighttime train car and locomotive visibility at grade crossings to aid in preventing accidents in which motor vehicles run into the sides of trains at night. Additionally, the Board recommended that the FRA cooperate with the Federal Highway Administration, the National Committee on Uniform Traffic Control Devices, and the Association of American Railroads to plan and institute a research program on criteria for the use of reflectorization devices and materials.

National Transportation Safety Board NTSB-SEE-81-3, Apr. 1981, 46p, Figs., Tabs., Refs., 3 App.

ORDER FROM: NTIS

PB81-196537, DOTL NTIS, DOTL RP

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-80-0904C

12 336075**SAFEGUARDS SUMMARY EVENT LIST (SSEL)**

The List contains nine categories of events involving NRC licensed material or licensees. It is deliberately broad in scope for two main reasons. First, the list is designed to serve as a reference document. It is as complete and accurate as possible. Second, the list is intended to provide as broad a perspective of the nature of licensee-related events as possible. The nine categories of events are as follows: bomb-related events; intrusion events; missing and/or allegedly stolen events; transportation-related events; vandalism events; arson events; firearms-related events; sabotage events; and miscellaneous events.

Davidson, JJ MacMurdy, PH
Nuclear Regulatory Commission Dec. 1980, 184p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

NUREG-0525-REV-3

12 336146**MODELLING OF POOL FIRE ENVIRONMENTS USING EXPERIMENTAL RESULTS OF A TWO-HOUR TEST OF A RAILCAR/CASK SYSTEM**

It was demonstrated that time and spatial variations in the local source temperatures, the radiant shielding of intervening structure and the effects of wind can significantly affect the amount of heat input to a large package in a simulated accidental fire. The pool fire provided a significantly non-uniform heat source to the package. Despite these effects, however, the amount of heat input to the package was generally equivalent to that which would be received from a regulatory 800 deg C uniform thermal source.

International symposium on packaging and transporting radioactive material, Berlin, F.R. Germany, 10 Nov 1980.

Hamann, JE Klein, DE Pope, RB Yoshimura, HR
Texas University, Austin, Sandia Laboratories, Department of Energy
CONF-801115-12, 1980, 8p, 7 Fig.

Contract AC04-76DP00789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-80-0906C

12 336147**FEDERAL LEGAL CONSTRAINTS ON STATE AND LOCAL REGULATION OF RADIOACTIVE MATERIALS TRANSPORTATION**

Within the last five years, the transportation of nuclear materials has experienced a rapid growth of state/local regulations. The federal government is responding to develop a legal basis for declaring these state/local regulations inconsistent and has proceeded to declare certain state regulations invalid. This paper summarizes the relevant legal doctrines, places these doctrines in the context of the federal regulatory framework and reaches conclusions about what forms of state and local regulation may be subject to possible preemptive initiatives and what regulations are unlikely candidates for federal actions. This paper also discusses an example of a preemptive initiative and a federal action. The initiative is contained in DOT's proposed rule on Highway Routing of Radioactive Materials. DOT's first general preemptive action under the Hazardous Materials Transportation Act is described with respect to decisions on Rhode Island's regulations regarding transportation of liquefied natural and petroleum gases. There are still some issues that have not been clarified: the role of the federal government in the development and support of emergency response capabilities for nuclear and other hazardous materials, detailed shipment information, and state requirements for prenotifications. (ERA citation 06:002048)

International symposium on packaging and transporting radioactive material, Berlin, F.R. Germany, 10 Nov 1980.

Reese, RT Morris, FA Welles, BW
Sandia Laboratories, Battelle Human Affairs Research Center,
International Energy Associates Limited, Department of Energy
CONF-801115-7, 1980, 7p

Contract AC04-76DP00789

12 336149**WASTE FORM CHARACTERIZATION AND ITS RELATIONSHIP TO TRANSPORTATION ACCIDENT ANALYSIS**

The response of potential waste forms should be determined for extreme transportation environments that must be postulated for environmental impact analysis and also for hypothetical accident conditions to which packagings and contents must be subjected for licensing purposes. The best approach may be to test materials up to and beyond their failure point; such an approach would establish failure thresholds. Specification of what denotes failure would be defined by existing or proposed regulations or dictated by requirements developed from accident analysis. Responses to physical and thermal insults are the most important for licensing or analysis and need to be thoroughly characterized. Others in need of characterization might be responses to extreme chemical environments and to intense and prolonged radiation exposure. A complete characterization of waste-form responses would be desirable for environments that are considered extreme for transportation accidents but which may be typical for processing or disposal environments. In addition, the characterizations that are performed must be completed in laboratory environments which can be readily correlated to accident environments and must be meaningfully conveyed to a transportation impact analyst: As an example, leaching data as commonly presented are not usable to the analyst and are obtained under conditions that are not directly applicable to conditions of most transportation accidents. Transportation analysts are in need of data useful for calculating environmental impacts and for licensing of packagings. Future waste form development programs and associated decisions should consider the needs of transportation analysts. (ERA citation 06:002044)

Alternate waste form information workshop, Gatlinburg, TN, USA, 13 May 1980.

Wilmot, EL McClure, JD
Sandia Laboratories, Department of Energy CONF-8005107-3, 1980, 15p
Contract AC04-76DP00789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-80-0813C

12 336211**RAILROAD ACCIDENT REPORT--DERAILMENT OF WESTERN PACIFIC RAILROAD COMPANY FREIGHT TRAIN EXTRA UP 3734 WEST (SEALAND 6), HAYWARD, CALIFORNIA, APRIL 9, 1980**

About 6:55 p.m., P.s.t., on April 9, 1980, Western Pacific Railroad Company westbound freight train Extra UP 3734 West (Sealand 6), had its caboose, a pusher locomotive behind the caboose, and seven freight cars derailed while crossing the Industrial Parkway overpass at Hayward, California. Of the nine crewmembers, two train crewmembers were killed and two were injured. Three locomotive units and the caboose were destroyed. Damage was estimated at \$1,382,000. The National Transportation Safety Board determines that the probable cause of this accident was the derailment of the caboose, which was caused by compressive forces resulting from excessive locomotive power applied behind the caboose on an undulating gradient. The derailment was the result of the failure of the assistant superintendent to insure that the crewmembers knew their train's correct tonnage and speed classification; and the failure of the Western Pacific Railroad management to insure that supervisors responsible for making critical operating decisions were properly trained for their roles. Contributing to the accident was the excessive speed of the train and the failure of the director of train operations to insure that the train had adequately fueled locomotive power.

National Transportation Safety Board NTSB-RAR-80-10, Sept. 1980, 37p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-140055, DOTL NTIS

12 336296**FIRE HAZARDS FROM COMBUSTIBLE AMMUNITION, METHODOLOGY DEVELOPMENT, PHASE I**

The initial phase of a program related to hazard classification of combustible munitions has been completed. This program has two overall objectives. The

first objective was to develop quantity-distance standards and criteria for combustible compositions assigned to classes 1.3 and 1.4. The second objective of the overall program is to develop standard test procedures to classify the materials with respect to the hazards that they present to exposed materials, structures, and persons during storage and transport. Based on this program, much was learned that can be applied to the development of a standardized classification test for characterizing the fire hazards of combustible munitions. The burning behavior of the materials is better understood, therefore more realistic quantity-distance standards can be developed.

Pape, R Waterman, TE Takata, AN
IIT Research Institute, (4A765805M857) Final Rpt. June 1980, 164p

Contract MDA903-79-C-0327

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A093317/6

12 336634

RADTRAN II: A COMPUTERIZED MODEL FOR RISK ANALYSIS OF TRANSPORTATION OF RADIOACTIVE MATERIAL

The RADTRAN computer code, which formed the basis for the 1977 US generic transportation risk assessment, has been extensively updated. The updated version of the code, denoted RADTRAN II, includes changes based on findings from other transportation risk studies as well as changes based on reevaluation of earlier assumptions, analyses, and computerization techniques. The environmental impact of the transportation of radioactive material can be envisioned as consisting of five components, incident free transport, non-radiological impacts, vehicular accidents, breaches of security/safeguards, and failures of quality assurance. RADTRAN II is designed to evaluate both the incident-free and the accident contribution directly and can be used to evaluate the contributions of breaches of security and quality assurances deviation if some alterations in coding are made. Non-radiological impacts are not addressed. (ERA citation 06:008645)

International symposium on packaging and transporting radioactive material, Berlin, F.R. Germany, 10 Nov 1980.

Taylor, JM Daniel, SL Biringer, BE
Sandia Laboratories, Department of Energy CONF-801115-39, 1980, 14p

Contract AC04-76DP00789

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

SAND-80-1804C

12 336660

RAILROAD ACCIDENT REPORT-REAR-END COLLISION OF SEPTA-CONRAIL TRAINS NUMBERS 406 AND 472 ON CONRAIL TRACK, NORTH WALES, PENNSYLVANIA, JULY 17, 1980

About 7:56 a.m., on July 17, 1980, Southeastern Pennsylvania Transporta-

tion Authority (SEPTA)-Consolidated Rail Corporation (Conrail) commuter train No. 472 struck the rear of SEPTA-Conrail commuter train No. 406 while it was standing on the No. 2 track east of the station at North Wales, Pennsylvania. The rear car of train No. 406 overrode and destroyed the empty lead car of train No. 472. Of the estimated 321 persons on the 2 trains, 64 passengers and 3 crewmembers received injuries. Damage to the equipment was estimated at \$1,475,000. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer of train No. 472, who was operating the train from the second car, to observe the roadway ahead and to keep the brakeman in the lead car in his view so he could receive the brakeman's hand signals to properly control the train, and Conrail's failure to take the malfunctioning equipment out of service when repairs could not be effected.

National Transportation Safety Board NTSB-RAR-80-11, Dec. 1980, 33p

ACKNOWLEDGMENT: NTIS
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PB81-163230, DOTL NTIS

12 336673

RAILROAD ACCIDENT REPORT-TRAIN ACCIDENT INVOLVING AMTRAK PASSENGER TRAIN NO. 225 AND AMTRAK WORK EXTRA NO. 4934, LINDEN, NEW JERSEY, JULY 9, 1980

About 6:30 p.m., on July 9, 1980, westbound Amtrak passenger train No. 225 was struck by a 15-foot section of rail that had been protruding from the side of a railcar on Work Extra No. 4934, an eastbound continuous welded rail train, at Linden, New Jersey. The rail penetrated the first car of the passenger train, struck and killed one passenger, and injured 17 others. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the track supervisor to instruct the maintenance crew and the failure of the crewmembers of Work Extra No. 4934 to remove and secure loose buffer rails when the train was being prepared for movement. Contributing to the accident were the failure of Amtrak to provide comprehensive instructions for unloading rails and the failure of Amtrak to provide qualified personnel to direct the unloading of continuous welded rail.

National Transportation Safety Board NTSB-RAR-80-12, Dec. 1980, 32p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-160780, DOTL NTIS

12 336723

RAILROAD ACCIDENT REPORTS-BRIEF FORMAT, ISSUE NUMBER 2- 1979

The publication contains briefs of selected railroad accidents occurring in U.S. Railroad Operations during calendar year 1979. The brief format presents basic facts, condition, circumstances, and probable cause(s) in each instance. Additional statistical information is tabulated by types of accidents and casualties related to types of accidents, carriers involved, and causal factors.

National Transportation Safety Board NTSB-RAB-80-4, Dec. 1980, 125p

ACKNOWLEDGMENT: NTIS
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PB81-156952, DOTL NTIS

13 053404

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. PART II--POWER TECHNOLOGY PROBLEMS. STUDY OF ADVERSE REACTIONS IN THE POWER SUPPLY SYSTEM

The disadvantages of the application of thyristors in respect of power systems are investigated in the present report. These disadvantages arise from undesirable effects in the traction current circuit and the power supply network as well as the loads connected to it. Both d.c. as well as a.c. traction systems are considered. The most important sources of interference are thyristor locomotives, but harmonics can be generated also in sub-stations with static converters. With a.c. traction the increased harmonics content in the current and the larger phase angle between current and voltage lead to a reduction of the power factor. As a result, the current increases accompanied by a voltage drop in the circuits, while the effective power remains unchanged, and the d.c. and eddy current losses are higher. The increased harmonics can also produce oscillations in the traction current circuit and the public power supply network. To obtain adequate electro-magnetic compatibility between the sources of the disturbance and the objects affected a number of measures can be taken (e.g. installation of filters, tuned circuits, introduction of active filters, careful termination of circuit ends, etc.). The decision on which of the measures should be used depends largely on the type of traction used and must be made from case to case taking into account cost-benefit considerations.

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

International Union of Railways Final Rpt. A 122/RP 24, Apr. 1980, 42p, 20 Fig.

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13 053405

APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. PART IV--FINAL CONSIDERATIONS. COMPARISON OF ADVANTAGES AND DISADVANTAGES

The present report gives an overall assessment of the problem area and describes the advantages and disadvantages arising therefrom. Furthermore, a brief description is given of the possible measures to obtain adequate electromagnetic compatibility and recommendations are made as regards future work. The different thyristor used on traction vehicles are compared with conventional tractive vehicle electrics as to their advantages in various aspects in two tables, one each for a.c. traction and d.c. traction. Many references to other documents published by the Committee are given in the text and the tables, where the corresponding problems were dealt with in greater detail. The Appendix to this report is a draft for a UIC leaflet about "measures for the prevention of interference with signal engineering installations."

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

International Union of Railways Final Rpt. A 122/RP 26, Apr. 1980, 50p, 2 Tab.

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13 053413

OSCILLATION PHENOMENA IN THE TRACTION CURRENT CIRCUIT

After describing the electrical parameters of the railway line, the substations and the open-air high-voltage lines, this Technical Document deals with methods for calculating the resonance frequency of different supply systems. Current and voltage conditions and natural oscillations in a single-phase supply system are then considered. Finally, to complete the Technical Document, some examples are given for calculating the resonance frequency of the supply system.

Restrictions on the use of this document are contained in the explanatory material. Compiled by the ORE Specialists Committee A 122.

International Union of Railways DT92 (A122), Dec. 1979, 71p, 11 Fig.

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13 330203

POSSIBILITIES OF POWER REGENERATION BY UNDERGROUND RAILWAY VEHICLES AND USE OF REVERSIBLE SUB-STATIONS [Posibilidades de recuperacion de energia por vehiculos metropolitanos y utilizacion eventual de subestaciones reversibles]

After stressing the necessity of saving energy, the author studies the possibilities of regenerating electric energy on underground railway vehicles during braking. He describes the principles of chopper equipment operation, during starting and braking, and gives information on the results obtained by several underground railway networks. He studies the advantages and drawbacks of using reversible sub-stations. [Spanish]

Hanocq, R. *AIT-Revista* No. 35, July 1980, pp 47-55, 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

13 330216

ELECTRIFIED RAILWAY SYSTEMS--TODAY AND TOMORROW [Elektrische Bahnssysteme--heute und morgen]

The era of electrified railways began with introduction of the first electric locomotive in 1879. A number of important historical events connected with railway electrification are recounted. Various advantages of electric traction are listed, describing it as a profitable solution to transport problems. Also mentioned are progress in semi-conductor technology, the importance of series commutator motors, optimal transport systems for short and long distance traffic, experiments with a new generation of 3-phase current propulsion vehicles, new railway technologies and new systems for the future. [German]

Kill, E. *Elektrotechnische Zeitschrift* Vol. 101 No. 16-17, Aug. 1980, pp 938-943, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: VDE-Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12, West Germany

13 331494

ELECTRIC TRACTION ON BRITISH RAILWAYS DURING 1977 AND 1978

Outstanding events in the field of electric traction in 1977 and 1978 are reported. About 130 route km have been electrified. At the end of 1978 the whole electrified network has been extended to about 3770 route km (25/6.25 kv 50-Hz single phase ac and 1.5 kv dc) comprising 21% of the whole network of BR. About 56% of all gross ton km have been hauled by electric traction. A survey of electrified lines deals with the dates when they became operational and with the lines actually being equipped. Stock numbers (312 electric locomotives, 2090 EMU), deliveries (133 EMU) and orders (201 EMU) of electric motive units are pointed out as well as their lines of structural development. The state and further development of traction power supply facilities are described. A survey is included of BR tests in electrical engineering and of its participation in national and international associations.

Taylor, K. *Elektrische Bahnen* Vol. 78 No. 5, May 1980, pp 114-123

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 331503

BORDEAUX-MONTAUBAN ELECTRIFICATION [L'electrification Bordeaux-Montauban]

The author lists and describes the engineering work and the signaling and electrification equipment that has been employed on this Bordeaux-Montauban track section which is electrified with 1,500 V d. c. current and has automatic block color-light signaling and free-level signal boxes. [French]

Lepy, JP. *Revue Generale des Chemins de Fer* Vol. 99 July 1980, pp 437-440

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 331509

THE SPREAD OF SINGLE-PHASE CURRENT (25 OR 50 KV) IN SOUTH AFRICA [A 25 ou 50 kV, la percee du monophasé en Afrique du Sud]

The first of a series of articles on South African Railways (SAR) which have a vast electrified network using 3 kV direct current. Recently they have also adopted 25 kV single-phase current ("coal line" from Broodspnyerplass to Richard's Bay) and 50 kV single-phase current ("iron line" from Sishen to Saldanha Bay), after realizing the value of single-phase electrification in terms of flexibility and performance. [French]

Also covered on pp 39-42, No. 1776, January 15, 1981 issue.

Vie du Rail No. 1775, Jan. 1981, pp 4-11, 1 Fig., 1 Tab., 27 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: French National Railroads, 610 Fifth Avenue, New York, New York, 10020

13 331512

EXPERIMENTAL VERIFICATION OF A MATHEMATICAL MODEL OF THE 2x25 KV TRACTION CURRENT SUPPLY SYSTEM [Eksperimental'naja proverka matematicheskoy modeli sistemy tjagovogo elektrosnabzhenija 2x25 kV]

The author presents a mathematical model of the 2x25 kV traction current supply system and the difference noted from a comparison with experimental data. [Russian]

Frolov, AV *Vestnik VNIIZT* No. 5, 1980, pp 16-18, 2 Fig., 3 Tab.

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

13 331521

OVERHEAD LINES ON MOBILE BRIDGES IN THE BREMEN/OLDENBURG AREA [Oberleitungsanlagen bei beweglichen Bruecken im Raum Bremen/Oldenburg]

No Abstract. [German]

Koswig, J Freidhofer, H *Elektrische Bahnen* Vol. 78 No. 10, Oct. 1980, pp 278-282, 9 Phot.

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

DOTL JC

13 331522

11,000 KILOMETRES OF LINE CONVERTED FOR USE OF ELECTRIC TRACTION ON THE GERMAN FEDERAL RAILWAY [11 000 Streckenkilometer bei der DB auf elektrischen Zugbetrieb umgestellt]

With the electrification of the Rheine-Emden-Norddeich line, the German Federal Railway's electrified rail network totals 11,000 km. The author uses this opportunity to discuss the characteristics and advantages of electric traction and stress its profitability. [German]

Harprecht, W *Elektrische Bahnen* Vol. 78 No. 10, Oct. 1980, pp 248-253, 9 Phot.

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

DOTL JC

13 331546

ALUMINUM/-STEEL CONDUCTOR RAILS IN RAPID TRANSIT AND SUBWAY SYSTEMS [Aluminium-Verbundstromschienen im S-und U-Bahnbetrieb]

Aluminum/steel conductor rails employed for the Hamburg rapid transit and Berlin subway system have been in service since 1978. The rails, made of 4 to 4.5 mm thick steel strip embedded in extruded aluminum sections, are made by a coextrusion process. This results in the electrical resistance between the components being about 1000 times smaller than in other rails. For the same electrical capacity the composite rail is lighter than all the other types of rail. Only light, plastic supports are needed to keep them in position, which makes the installation work easier. Unlike the steel rails, the new rails can be used not only for direct current but also for two-and three-phase alternating current. [German/French]

Mier, G *Schweizer Alumin Rundschau/Revue Suisse de Alumin* Vol. 30 No. 1, 1980, pp 9-13, 4 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

13 334295

WHAT'S BEING DONE ABOUT ELECTRIFICATION COSTS?

With increased interest in U. S. electrification, it is important that initial capital costs be minimized. Each of the principal components involved in high-voltage ac electrification is examined with the idea of employing the newest technology to reduce the costs of installation, operation and maintenance. Major changes have been substitution of sagged simple catenary for the more costly compound catenary and automatic tensioning which reduces wear on contact wire and pantograph. New wire metallurgy can reduce weight and permit higher tension with lower cost supporting structures; new designs and materials can reduce electrical clearances through bridges and tunnels; computerized design can reduce engineering costs. The pros and cons of 50 kV, as compared with 25 kV, are discussed; packaged substations can reduce the cost with either system. DC track circuits and 60 Hz carrier for cab signals complicate U. S. installations but technologies involving microwave and fiber optics offer the potential for more economical conversions. Locomotive technology is also changing to reduce the cost of new motive power.

Daniels, A *Progressive Railroading* Vol. 24 No. 4, Apr. 1981, p 56, 1 Tab., 5 Phot.

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

DOTL JC

13 334319

CENTRALIZED SUBSTATION CONTROL SYSTEM FOR RAILWAY

A large scale remote-control system is developed, which centralizes 40 traction substations utilizing computers. The hardware of the system are duplicated in order to maintain high reliability. By adopting programs of automatic control and conversational operation, the number of operations is reduced and wrong operations are prevented.

From Electronics to Microelectronics, European Conference on Electronics, 4th-EUROCON '80, Preprint, Stuttgart, Germany, March 24-28, 1980.

Kasahara, M
North-Holland Publishing Company IEEE 80CH1552-9, 1980, pp 404-406, 2 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: IEEE

13 334321

ELECTRIFICATION OF TRANSPORT

In the USSR, more than 40,000 km of main-line track have been electrified by now, nearly 35% of which works on 25 kV ac. The turn-over of freight, approximately 30% of the total world turn-over, is transported on electrified track in the USSR, in length less than 3% of the total rail network of the world. The electrified track of the USSR approximately 30% of the total track length, carries more than 50% of goods traffic of the USSR. An ac electrolocomotive of 7600 kW capacity is being developed for the Baikal-Amur trunk line. Work is under way to create electrolocomotives with brushless traction motors. The first batches of industrial shunting diesel locomotives of 2,000 HP (1471 kW), freight diesel locomotives of 4,000 HP (2942 kW), passenger diesel locomotives of 4,000 and 6,000 HP (2942 and 4413 kW) capacities have been built. A model of a freight diesel locomotive of 4,000 HP (TE120) capacity with ac transmission has been built and tested. Replacement of dc traction generators and motors by synchronous generators and induction motors, in this model, sharply raises the reliability and reduces the maintenance costs.

Voronovskii, GP *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 1-4

ACKNOWLEDGMENT: EI
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13 334326

RAILWAY ELECTRIFICATION

Basic stages in the introduction of electric traction in USSR and its technical and economic effectiveness are described. A short description of technical development of the main equipment for power supply and electrical rolling stock is given. Various considerations in the improvement of effectiveness of railway electrification are brought out.

Serdinov, SM *Soviet Electrical Engineering* Vol. 50 No. 2, 1979, pp 5-11

ACKNOWLEDGMENT: EI
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13 334334

ELECTRIFICATION GAINS MOMENTUM

With electric locomotives taking charge on the 120 km double-track Shijiazhuang--Yangquan line since June 1980, and over the 362 km between Ankang and Xiangfan from October, there are now 1 520 route-km electrified in China. Despite a 46 per cent increase in route-km in 1980 alone, the pace of conversion is accelerating. Work is actively in progress on about 1 000 km, with routes totalling 3 500 km completed or approved for conversion. Longer-term plans would extend electric traction from mountainous routes to overloaded trunk lines in the plans. China has ample coal and hydro power; but there are still technical problems to be solved before the full scope of electrification can be realised.

Xuexian, H *Railway Gazette International* Vol. 137 No. 1, Jan. 1981, pp 40-41

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

13 334421

REVIEW OF MAIN LINE ELECTRIFICATION: FINAL REPORT OF A JOINT STEERING GROUP

The important policy consideration and detailed plans for electrification of main line railways in the UK. The report not only goes into specific plans for implementation of this policy, it looks at the impact of electrification in broader terms, both financial, and its effect on the rest of British industry and the existing transport systems. The report concludes that such a program would be financially worthwhile and would have two distinct advantages: reduction of dependence on oil (the railways at present use about 3% of oil consumed by transport) and assistance of the UK manufacturing industry to win more orders overseas, in keeping with the government's policy of using public purchasing more effectively to enhance the competitiveness of British industry. A fundamental look at British Rail policy.

Palmer, J Posner, M
British Railways Board No Date, 96p, Tabs.

ORDER FROM: Pendragon House of Connecticut, P.O. Box 424, Mystic, Connecticut, 06355

13 334426

VOLTAGE FLUCTUATION CORRECTING SYSTEM FOR ELECTRIC RAILWAYS USING THYRISTOR-CONTROLLED REACTIVE POWER COMPENSATING APPARATUS

With large electric train loads at the ends of commercial power distribution networks, voltage fluctuation and phase unbalance can affect other consumers. Japanese National Railways has developed a method of voltage regulation using a thyristor-controlled reactive power compensating apparatus. This system is described and the simulator by which it was appraised are discussed.

Fujie, H *Railway Technical Research Inst, Quarterly Reports* Vol. 21 No. 4, 1980, pp 191-192, 2 Fig., 1 Tab.

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

DOTL JC

13 334428

FOLLOWING PERFORMANCE OF PS9020 SERIES TRIAL PANTOGRAPHS

To improve high-speed current collection on the Shinkansen, three types of pantograph other than that with coil-spring-mounted contact strips were tested. On a pantograph test machine, the time ratios of contact loss with two simulated trolley-wire profiles were determined for the alternate designs. A design incorporating leaf springs under the contact strips was found to be superior to all other designs.

Koyanagi, S *Railway Technical Research Inst, Quarterly Reports* Vol. 21 No. 4, 1980, pp 197-198, 6 Fig.

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

DOTL JC

13 334433

BIGGEST ELECTRIFIED NETWORK GIVES THE BEST RETURN

A three-year study of main line electrification shows that wiring up more than half of British Rail's 17,700 route-km would produce a real rate of return exceeding 11 per cent, and doing the job quickly improves the net present value. This study breaks new ground in demonstrating the case for coherent electrified networks designed to minimize the use of diesels under the catenary--as opposed to justifying conversion on a line-by-line basis. Most of the savings come from the use of electricity in place of oil, as a wide price differential is anticipated. If the government gives approval in principle this year, BR's aim would be to convert 400 to 800 track-km a year over a 20 to 30 year period, bringing electric trains from London into Sheffield by 1989 after minor additions to existing electrified routes had been completed.

Railway Gazette International Vol. 137 No. 4, Apr. 1981, pp 287-291, 2 Fig., 1 Tab., 3 Phot.

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13 334439

ELECTRIFICATION OF THE FINNISH STATE RAILROADS [Die Elektrifizierung der Finnischen Staatsbahnen]

Steps taken to expand the electrification program are reported. The fixed installations, the energy supply by the public electric power system and the tractive units are described. All tractive units are equipped with electronic control systems. The importance of energy supply to secondary consumers by the overhead system, due to the specific conditions in Finland, is pointed out. [German]

Körvola, H *Elektrische Bahnen* Vol. 78 No. 8, Aug. 1980, pp 204-208

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 334440

SYSTEM OF ELECTRICAL POWER SUPPLY FOR 25 KV A C ELECTRIFICATION ON BRITISH RAILWAYS

Some design aspects of the power supply system for 25 kv industrial frequency single-phase electrification on British Railways are discussed. The characteristics of the hv line, the transformers, grounding, measurements for suppression of interference, power supply tariff arrangements, the 25 kv distribution equipment with switchgear, protection equipment and supervisory control system and the maintenance of distribution equipment are described.

Howard, N (British Railways Board) *Elektrische Bahnen* Vol. 78 No. 8, Aug. 1980, pp 198-202

ACKNOWLEDGMENT: EI
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DOTL JC

13 334441

ELECTRIFICATION OF THE DANUBE VALLEY RAILROAD LINE

REGENSBURG-INGOLSTADT-DONNAUWOERTH-NEUOFFINGEN (WEST GERMANY) [Elektrifizierung der Donautalbahn Regensburg-Ingolstadt-Donauwoerth-Neuoffingen]

After three years of construction, the electrification of the Danube valley line Regensburg-Ingolstadt-Donauwoerth-Neuoffingen has been finished with the introduction of electric operation in June 1980. The 171 km single track railroad line has gained importance because of numerous refineries situated in its proximity. Their sidings will be electrified as a next step. The energy supply is guaranteed by the new substation Donauwoerth and the new sectioning points Regensburg-Pruefening and Neuoffingen. [German]

Fichter, D *Elektrische Bahnen* Vol. 78 No. 7, July 1980, pp 190-194, 1 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 334442

METHOD FOR THE EXACT CALCULATION OF THE ENERGY LOSSES IN A DC TRACTION NETWORK [Verfahren zur Genaueren Berechnung der Energieverluste in einem Gleichstrom-Traktionsnetz]

In order to decide whether or not regenerative braking should be used for rapid transit lines it is necessary to know the overall energy losses of the

traction system. The determination of the losses within fixed energy-supply installations is considered. A method is presented for the computation of the current and voltage distribution within the electric network taking into account the circuitry, including the position of the feeding and separating points and the position of trains on the line. [German]

Heijst, TCM van Hamels, D *Elektrische Bahnen* Vol. 78 No. 7, July 1980, pp 170-179, 9 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 334500
ELECTRIFICATION OF RAILWAYS IN THE USSR

The article deals with specific features of the operation of electrified railways in the USSR. It contains a summary of the operational experience gained as well as an assessment of the reliability and economic efficiency of electric traction. A comparative analysis is made of electric versus diesel-electric motive power in terms of fuel energy consumption. Ways and means are outlined to improve power supply installations and electric motive power. Also future possibilities of electric traction to increase railway carrying capacities are described.

Serdinov, SM *Rail International* Vol. 12 No. 1, Jan. 1981, pp 8-22, 5 Fig., 6 Tab., 9 Phot.

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

DOTL JC

13 334506
THERMAL OVERLOAD CAPACITY AND PERMITTED CURRENT LEVELS IN CONDUCTORS AND CONTACT LINE SYSTEMS [Pripustne tepelne a prudove zat'azenie vodivcov a zostav traknych vedeni]

On the basis of several measurements the maximum permitted limits for possible thermal overload capacity, were established also for current in conductors and catenaries on the CSD in different operating conditions. The author puts forward a method of calculation illustrated by diagrams. [Czech]

Cengel, L *Zeleznicni Technika* No. 4, 1980, pp 221-225, 3 Fig., 4 Tab., 8 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Nakladatelstvi Dopravy a Spoju, Hybernska 5, 115 78 Prague 1, Czechoslovakia

13 334511
ELECTRIFICATION OF THE TYNE AND WEAR METRO

Examines the power supply, overhead equipment and the general technical considerations governing the design of the power system & equipment.

Prickett, BR *Institution of Electrical Engineers, Proc Part B* Vol. 128 No. 2, Mar. 1981, 11p, 11 Fig.

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

DOTL JC

13 334512
LIVE WORKING ON HIGH-VOLTAGE LINES

Covers the two principal techniques for working on live, high-voltage power lines—"hot stick" and "bare hand".

Looms, JST *Institution of Electrical Engineers, Proc Part A* Vol. 128 No. 2, Mar. 1981, pp 89-106

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

DOTL JC

13 335058
MAINLINE ELECTRIFICATION: WHO WILL BE THE FIRST?

Southern, Union Pacific, Burlington Northern, Katy and Conrail have all been continuing to weigh mainline electrification; the relation between the costs of diesel fuel and electricity, along with capital requirements, will ultimately justify the installation of catenary. FRA has been fostering railroad consideration of electrification with its organization of industry finance, planning and technical groups. Southern has been most ready to discuss the planning process which it has under way for a decade.

Malone, F *Railway Age* Vol. 182 No. 11, June 1981, p 34, 1 Phot.
ORDER FROM: ESL

DOTL JC

13 335277
IMPROVEMENT TO THE BOOSTER TRANSFORMER/RETURN CONDUCTOR METHOD OF SUPPRESSING 50 HZ INTERFERENCE FROM A.C. ELECTRIFIED RAILWAY SYSTEMS

Improvements, which could result in a reduction of the cost of signaling and telecommunication cables, are theoretically obtainable in the suppression of 50 Hz interference from ac-electrified railroad systems using booster transformers and return conductors. A fundamental improvement results by increasing the height of the return conductors. A combination of return conductor only and return conductor/booster transformer suppression gives a method which, theoretically, is attractive for 4-track systems. A test has shown reasonable agreement between theory and practice.

Tierney, JR (British Railways Board); Turner, RJ *Institution of Electrical Engineers, Proc Part B* Vol. 128 No. 1, Jan. 1981, pp 61-66, 3 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 335279
INSTALLATION OF A RAILROAD TRANSMISSION LINE ON THE OVERHEAD LINE SUPPORT [Fuehrung einer Bahnstromleitung am Oberleitungsgestaeenge]

The newly electrified railroad line Rheine-Salzbergen-Emden-Norddeich in West Germany is considered. A separate right-of-way for the 110 kv one-phase ac line to connect the substation Emden with the railroad supply system could not be implemented. Therefore the transmission line was carried along the overhead catenary supports that used concrete poles. Due to adverse soil conditions, rammed steel piles were used for foundation. The wind speeds which are considerably high in the coastal area forced a reduction of the maximum span of the overhead catenary to only 65 m. The one-sided crossarms for the 110-kv conductors were fixed on the poles utilizing a special method. The erection of a 110 kv transmission line on the catenary supports can only be carried out in special cases because of the technical and economical disadvantages involved. [German]

Bauer, KH (Bundesbahn-Zentralamt, Munich, Ger); Kiessling, F *Elektrische Bahnen* Vol. 78 No. 10, Oct. 1980, pp 257-260, 3 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 335280
ELECTRIFICATION OF THE RAILROAD LINE SALZBERGEN-EMDEN-NORDDEICH (MOLE) IN WEST GERMANY [Elektrifizierung der Strecke Salzbergen--Emden--Norddeich (MOLE)]

The electrification of the line Salzbergen--Emden-- Norddeich (Mole) is of importance for the connection of the harbor Emden with the electrified rail network of the Ruhr area. A modification of the overhead line had to be carried out due to climatic conditions in this coastal region. For the bascule bridges, special designs of the overhead line had to be made. The design of the substations and the railroad transmission line are outlined. The importance of environmental aspects in connection with the electrification work is pointed out. [German]

Schaefer, HD *Elektrische Bahnen* Vol. 78 No. 10, Oct. 1980, p 265, 6 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 335281
110-KV RAILROAD TRANSMISSION LINE, CROSSING THE RIVER WESER NEAR BREMEN-MITTELSBUEREN IN WEST GERMANY [110-kV-Bahnstromleitung, Kreuzung der Weser bei Bremen-Mittelsbueren]

During the process of extending the 110-kv electric transmission line for the railroad electrification project, it was necessary to erect a transmission line crossing with the river Weser. The siting and the position of the crossing resulted from the present development and from the topography. The design

of the transmission line, the project and the calculation of the pylons and the foundations are outlined, with due consideration given to clearance for ocean going vessels, the climate and the difficult soil conditions. [German]
Koswig, J Meueler, W Schmidt, B *Elektrische Bahnen* Vol. 78 No. 10, Oct. 1980, pp 273-277, 5 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 335282

VACUUM SWITCHES IN THE SWITCHING STATION HUDE, WEST GERMANY [Vakuumschalter im Schaltposten Hude]

In order to avoid expensive compressed air plants for switch plants vacuum switches were developed for the West German Railroad System which can be used for 15-kv plants. The first of this kind were installed in the sectioning-point Hude. The truck-type switchgear has been designed in such a manner that it can be installed on the usual truck-type switchgear in each standard switchgear cubicle. [German]

Nissen, U (Brown, Boveri and Company) *Elektrische Bahnen* Vol. 78 No. 10, Oct. 1980, pp 283-285

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 335439

A NEW TYPE OF POLYMER FOR FIXING CATENARY SUSPENSION GEAR IN LIMITED GAUGE RAILWAY TUNNELS [Nov tip polimeren fiksator za kontaktna mreza v tunel s organichen gabarit]

The author describes the new teflon-based technology which has been recognised as an invention, for the production of insulating parts for catenary suspension gear. [Bulgarian]

Bakalov, Z *Zelezopaten Transport* Vol. 56 No. 2, 1981, pp 39-43, 1 Fig., 1 Tab., 3 Phot., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Ministry of Transport, 9-11 Levski Street, Sofia, Bulgaria

13 335624

NEW OVERHEAD CONTACT SYSTEM OF THE RAILROAD LINE BERN-LOETSCHBERG-SIMPLON (BLS) IN SWITZERLAND [DIE NEUE FAHRLEITUNG DER BERN-LOETSCHBERG-SIMPLON-BAHN (BLS)]

A project for the construction of a double-track railroad is reported. For the determination of the overhead line, increased demands due to higher traction performance, difficult conditions in tunnels and the technical stage of development of modern overhead systems had to be considered. The demands, including mechanization of the overhead system, have been formulated by a working party based on a system selection report. For the open line, an overhead system with tension-regulated catenary Cu 150 sq mm, tension-regulated contact wire Cu 150 sq mm and articulated brackets has been constructed, which is suitable for a maximum speed of 140 km/hr and electrical loads per quarter of an hour from 1500 to 2000 amp. [German]

Kocher, M Furrer, B *Elektrische Bahnen* Vol. 78 No. 11, Nov. 1980, pp 288-295

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 335625

PUTTING INTO OPERATION OF THE SUBWAY LINE U 8/1 IN MUNICH, WEST GERMANY [INBETRIEBNAHME DER U-BAHN-LINIE U 8/1 IN MUENCHEN]

The subway line U 8/1 with a length of 16 route kilometer of the Munich

underground system is described. Its operation, the surface bound traffic and the stations will be supervised from a newly constructed central control. It houses the switching station with a duplex computer system for the operation of the traction energy supply. Under normal operational conditions, the electric multiple units will be operated automatically by linear train control. [German]

Schemmel, H *Elektrische Bahnen* Vol. 78 No. 11, Nov. 1980, pp 295-301

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 335626

OPERATION OF ELECTRIC RAILROADS OF THE EAST GERMAN RAILROAD SYSTEM [DER ELEKTRISCHE ZUGBETRIEB BEI DER DEUTSCHEN REICHSBAHN]

Development work for the electrification of the system is reported. A survey is presented of present electrification projects and of electrification projects planned for the future. Classes, stock numbers and the essential characteristics of electric tractive units are dealt with. The traction power supply and the special importance of electric traction for the system are discussed. The dc operated rapid transit system in Berlin as well as electric island operations are described. [German]

Also covered in Vol. 78 No. 12, pages 301-308, December 1980 issue.

Rossberg, RR (German Federal Railway) *Elektrische Bahnen* Vol. 78 No. 11, Nov. 1980, pp 337-342, 23 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

13 335850

BALANCING METHOD FOR THREE-PHASE POWER SYSTEM SUPPLYING SINGLE-PHASE LOAD BY MEANS OF SCALENE SCOTT-CONNECTED TRANSFORMER ASSEMBLY

Methods have been examined for eliminating unbalanced currents in a three-phase power system supplying a single-phase load such as heating installations for snow melting or rolling stock layover. A scalene Scott-connected transformer requires the least total capacity of reactor and capacitor; experiments confirmed this using small-scale transformers. This method is expected to be applied to the new Shinkansen lines for rolling stock depots where load fluctuations are relatively small.

Arai, K *Railway Technical Research Inst, Quarterly Reports* Vol. 22 No. 1, Mar. 1981, p 10, 4 Fig., 3 Tab.

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

DOTL JC

13 341042

INDUCTIVE INTERFERENCE ASPECTS OF THE DECISION TO ELECTRIFY

The decision to electrify requires the evaluation of many technical and financial factors. One of these is inductive interference. There are three major aspects to inductive interference, which must be fully integrated with any electrification plans: safety to personnel, damage to equipment and incorrect data transmission. This paper treats the problem of inductive interference under the headings: Electrostatic and electromagnetic induction; voltage limitations and industry guidelines; power supply systems; shielding; protection devices; application of inductive coordination.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Avery, RM (Electrack, Incorporated)

Association of American Railroads Tech Paper 1979, pp 148-179, 19 Fig., 1 Tab.

ORDER FROM: AAR

DOTL RP

15 326472

THE LOCAL IMPLICATIONS OF BART (BAY AREA RAPID TRANSIT) DEVELOPMENT

The report presents the final results of the Local Policy Implications Work Element. The report assesses whether BART has achieved the original objectives of local communities. The report also outlines local policy implications in the form of practical guidelines for local government officials either considering an investment in rapid rail transit or in the process of designing and constructing a rapid rail transit system. Implications are presented for each of nine original community objectives for the BART system. This material is further organized into five chapters relating to major areas of local policy--transportation, land use, finance, economic development and environment.

Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001643. Prepared by Booz-Allen and Hamilton, Inc., San Francisco, CA.

Graebner, LS Giles, PB Higgins, TJ Jonash, RS Curtis, E Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-11, Apr. 1979, 158p

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-118069, DOTL NTIS

15 326475

THE ECONOMIC AND FINANCIAL IMPACTS OF BART (BAY AREA RAPID TRANSIT)

The economic impacts of the San Francisco Bay Area Rapid Transit System's (BART) capital and operating expenditures on the Bay area's regional economy are assessed. The hypothesis that rapid transit in the Bay area would have an impact on regional economic development was not supported. Capital expenditures on BART, however, have had a positive short-term impact on the region's economy. The cost of building and equipping BART was about \$1.5 billion, of which \$1.2 billion was spent in the nine-county Bay area. Including all secondary impacts of this construction, the total increase in goods and services purchased in the region was \$3.1 billion between 1964 and 1976. Construction expenditures increased employment opportunity for minorities in the construction trades, but did not necessarily enhance minority job skills. BART's transit expenditures will have a total impact on the regional economy, including all the secondary sales and income generated; of nearly \$149 million per year, including an increase of nearly \$52 million annually in personal income.

Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001647. Prepared by McDonald and Grefe, Inc., San Francisco, CA.

Grege, R McDonald, AN Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-04, Apr. 1979, 121p

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-118093, DOTL NTIS

15 326478

IMPACTS OF BART (BAY AREA RAPID TRANSIT) ON BAY AREA INSTITUTIONS AND LIFESTYLES

The report focuses on the effects of BART on the Social Institutions and Life Styles of Bay Area residents. The project addresses the impacts of BART on three primary institutional spheres and their clients: local political institutions including community responses to BART; Institutions of Higher Education and their students; and Health Care Institutions and their clients. The study of life style impact focuses upon direct and indirect impacts of BART upon the use and experience of different transportation modes, commuters, household routines, family routines, and the family as an institution. BART has had limited impacts on Bay Area life styles and social institutions. It has had the greatest impact upon commuters from suburban residential communities to the central business districts of San Francisco and Oakland.

Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001681. Prepared by Jefferson Associates, Inc., San Francisco, CA.

Minkus, D

Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-06, Apr. 1979, 113p

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-118127, DOTL NTIS

15 326479

LAND USE AND URBAN DEVELOPMENT IMPACTS OF BART (BAY AREA RAPID TRANSIT)

The report assesses the land use and urban development impacts of the 71-mile Bay Area Rapid Transit (BART) system, the first rail transit system to be built in the United States in 50 years. How and to what extent BART has influenced the spatial arrangement of people and activities in the San Francisco Bay Area is documented. All aspects of development that BART may have affected or potentially could affect are examined--including households' and workers' location decisions; development decisions of housing and commercial developers, retail trade and shopping patterns, and property values and rents. Changes attributable to BART are measured against pre-BART and no-BART alternatives using a variety of analytical techniques, surveys, statistical analyses and case studies. The report concludes with an assessment of the policy implications of the BART experience to date.

Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001682. Prepared by Blaney (John) Associates/-David M. Dornbusch and Co., Inc., San Francisco, CA.

Dvett, M Dornbusch, DM Fajans, M Falcke, C Gussman, V Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-09, Apr. 1979, 208p

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-118135, DOTL NTIS

15 327126

REGIONAL IMPLICATIONS OF THE INTERSTATE HIGHWAY NETWORK IN THE SOUTHEAST. TECHNICAL SERIES NO. 1

The 66,000-mile United States Interstate Highway System now nearing completion does not create a new network of transport access, but rather superimposes new capacity over main links of the existing rail and road system. This research is concerned with the impact of this enhanced accessibility on population redistribution in ten southeastern states, primarily during the 1960's, the decade during which most of the system was constructed, and for which, at this writing, data are most fully available.

Library of Congress catalog card no. 79-621610.

Kenyon, JB

Georgia University, Athens June 1978, 20p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-213606

15 327758

EMERGING TRANSPORTATION PLANNING METHODS

The U.S. Department of Transportation has sponsored research on new transportation planning techniques for several years. A number of significant advances have been made both in manual and computer procedures. Many of the new techniques were developed at universities and have distinct advantages over traditional methods. In 1976 the Office of University Research organized and conducted a 4-day seminar to instruct transportation planners in the theory, utility, and application of emerging transportation planning techniques and to encourage their widespread use. Three basic subjects were chosen for indepth examination: (1) Transportation demand forecasting techniques; (2) Transportation evaluation methods; and (3) Transportation/land use interactions. This book contains six state-of-the-art presentations and three papers summarizing the workshop discussions and question-and-answer periods.

Proceedings of the Seminar Held at Daytona Beach, Florida on December 5-9, 1976.

Brown, WF Dial, RB Gendell, DS Weiner, E
Department of Transportation DOT-RSPA-DPB-50-78-2, Aug. 1978,
188p

ACKNOWLEDGMENT: NTIS
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PB81-119133

15 329024

TRANSPORTATION AND THE CITIES

The purposes of the seminar were two: first, to evaluate how far conclusions and recommendations adopted by the first seminar have been accepted by governments and implemented in practice and, in doing so, to learn what lessons have been learned; second, to provide opportunities for further intergovernmental exchange of information and experience related to comprehensive approaches to planning and to management of urban transportation. The seminar dealt with the following specific topics: (1) the changing role of transportation; (2) urban transportation, policies, and objectives; (3) institutional competence, legislation, financial, and other socioeconomic measures to guide transportation developments; (4) community relations and citizen involvement in urban transportation planning and programming; (5) planning measures to promote a balance among traffic and transportation modes with special regard for the human scale; and (6) urban transportation research policies, planning, and assessment of technology.

Report on the Seminar (2nd) on the Role of Transportation in Urban Planning Development held in Washington, DC on June 13-19, 1976. Color illustrations reproduced in black and white.

National League of Cities, Urban Mass Transportation Administration
1976, 83p

Grant DOT-UMTA-DC-96-0007

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-154163

15 329168

IMPACT OF DEMOGRAPHIC AND MIGRATION TRENDS ON FUTURE TRAVEL IN METROPOLITAN AREAS

Transportation investment policies for the 1980's will be based on the expected changes in travel demand. The magnitude of travel demand (number of trips, miles of travel), the location of demand (city, suburb, rural, northeast, south etc.) and the mode of travel (transit, auto, bicycle, etc.) depends upon population, households, household characteristics, employment location, energy supply, and the cost of travel and other factors. Economic, demographic, migration, energy use and transportation trends observed during the 1970's are identified. Projections of demographic factors and resulting transportation demands are made to the year 2000. Issues are identified which could affect DOT investment policies during the next decade. These issues include continued large population growth in areas having suburban densities, the difficulty of providing added highway capacity or efficient transit service in suburban locations, possibility of sporadic interruptions of gasoline supply, demand for housing in multi-unit structures exceeding supply and continued increases in the operating costs of public transit.

Prepared in cooperation with Urban Inst., Washington, DC.

Spielberg, F Andrie, SJ Ernst, U Kemp, M
SG Associates, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. DOT-P-30-81-01, Dec. 1980, 210p

Contract DOT-OS-90050

ACKNOWLEDGMENT: NTIS
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PB81-173601

15 330171

JOINT DEVELOPMENT AROUND INTERMODAL TRANSFER FACILITIES

Efforts undertaken in the city of Baltimore to initiate joint development around transit stations are examined. Under the provisions of the 1974 amendment to the Urban Mass Transportation Act of 1964, the U.S. Department of Transportation could make grants or loans for the establishment of transit corridor development corporations and for the purchase of land and the development of property adjacent to transit stations. Baltimore was one of the first cities to apply for funds under the new legislation.

Although the Urban Mass Transportation Act of 1964 has since been amended to remove specific authorization for the funding of transit-corridor development corporations, the Urban Initiatives Program, established in 1979, provided funding for the Baltimore program. The key factors underlying the successful development of the Baltimore program are identified. Specific joint-development projects are examined, and the main points of the joint-development application are discussed. Observations are offered on the nature of contemporary joint development and the involvement of the public sector. (Authors)

This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.

Lutin, JM (Parsons, Brinckerhoff, Quade and Douglas, Inc); Walker, CA (Southeastern Michigan Council of Governments) *Transportation Research Record*, No. 760, 1980, pp 33-39, 6 Fig., 3 Tab., 6 Ref.

ORDER FROM: TRB Publications Off

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15 331228

ASSESSING ELECTORAL DEFEAT: NEW DIRECTIONS AND VALUES FOR MARTA

This case study report focuses on MARTA during the transition period, 1968-1971, which culminated in a successful referendum in November 1971 and propelled the Authority into complex engineering and construction projects. The report provides perspective on how MARTA turned the 1968 electoral defeat into success three years later. Three major sections introduce major features of this critical turnaround. First, the case reviews the 1968 Referendum. Second, attention is directed at MARTA's examination and assessment of the reasons for its failure. Third, the new emphasis and directions chosen by MARTA for its 1971 Referendum Plan are highlighted. (UMTA)

Almy, TA Hildreth, WB Golembiewski, RT
Georgia University, Athens, Urban Mass Transportation Administration,
(GA-11-0006) UMTA-GA-11-0006-81-2, July 1979, 23p

ACKNOWLEDGMENT: UMTA
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PB81-154783

15 331229

STRUCTURING INTERGOVERNMENTAL COORDINATION: MARTA AND THE CITY OF ATLANTA

This case study report addresses intergovernmental coordination between MARTA and the City of Atlanta. The report discusses how the City and the Authority established arrangements that would make it easier for MARTA to build its rapid rail system and Atlanta to protect the interests of its residents. The case provides one detailed perspective on one way that the street-level philosophy became institutionalized in the 1974 creation of a MARTA Coordinator in City Hall. Four features of this Coordinator's position are discussed: (1) the origin of the position is traced from the idea to the reality; (2) the organization of the office is reviewed; (3) the Coordinator's role in facilitating the interchange between Atlanta and MARTA is examined; and (4) observations of MARTA and the City Staff on the usefulness of the position are presented. Also highlighted herein are the events pushing for coordination. (UMTA)

Almy, TA
Georgia University, Athens, Urban Mass Transportation Administration,
(GA-11-0006) UMTA-GA-11-0006-81-3, July 1979, 24p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA
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PB81-154791

15 331230

THE MARTA RELOCATION APPEALS PANEL

This report discusses MARTA's Relocation Appeals Panel and its use to channel grievances. The report shows its impact on business and individuals and relates the experience and modification of the Appeals Panel by testing procedures within MARTA and the courts. The Urban Mass Transportation Administration's (UMTA) role in the appeals process is also discussed. Basically, this case study details three sets of events: (1) the several mandates--federal and state laws, and federal agency regulations--that were going into effect and required some sort of a procedure for appealing relocation decisions; (2) the citizens' group that was rallying support among

those to be relocated and urging resistance to all MARTA attempts to take property; and (3) the local group of lawyers that was questioning MARTA's settlement of the claims of relocated homeowners. These events helped to constitute the framework for the evolving development of MARTA policies and procedures for relocation. (UMTA)

Miller, GJ
Georgia University, Athens, Urban Mass Transportation Administration,
(GA-11-0006) UMTA-GA-11-0006-81-4, July 1979, 33p

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB81-154809

15 331839

COSTS AND BENEFITS OF EARLY REGULATION OF THE RAILROADS

In an earlier article R. M. Spann and E. W. Erickson (S-E) found that the welfare effects of early ICC regulations were negative. Their calculations fail to include part of the relevant welfare surplus and incorrectly apply demand elasticity estimates. Correct calculations, using S-E's basic data, result in positive welfare effects for 70 percent of alternative calculations across a range of assumptions. For the S-E central case correct calculations indicate positive changes in both producer and consumer surpluses. This ignores regulatory gains from price stability and fairness. The question remaining is how the long-run costs of ICC creation could have been avoided while obtaining the short-run gains.

Zerbe, RO, Jr (Washington University, Seattle) *Bell Journal of Economics*
Vol. 11 No. 1, 1980, pp 343-350; 17 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

15 335286

RAIL PASSENGER SERVICE AND SOCIAL NEEDS

In contrast to the nationalized rail service available in European countries, where passenger trains prove their energy-and cost-effectiveness, US private enterprises lose money on passenger service even though the return to urban centers will make rail transportation more feasible than automobile use. Railroads declined in the US in the late 1950s, when service was discontinued and the function was turned over to the airways and highways. Federal attempts to equip and route Amtrak fail largely because it is required to make a profit. Reforms to revitalize Amtrak should include a new infrastructure that will shift to electrification for heavily-traveled lines and dedicated rights-of-way; reopening the short-line and commuter runs that connect small towns; and a reduction of the top-heavy management structure. Cooperative arrangements with city, state, and regional agencies should make a national rail system manageable. The commitment to a national rail service should involve government support of stations and trackage as well as a positive relationship with the educational and industrial sectors.

Greisman, HC *Institute for Socioeconomic Studies. Journal* Vol. 5 No. 4,
1980, pp 63-76, 23 Ref.

ORDER FROM: Institute for Socioeconomic Studies, Airport Road, White
Plains, New York, 10604

15 335612

**POLITICAL ECONOMY OF A PUBLIC CORPORATION:
PRICING OBJECTIVES OF BART**

The revealed preference approach is used to identify the objectives implicit

in the fare structure of a rail mass transit system. A model assuming bureaucratic aggrandizement provided a better predictor of actual fares than a majority rule or interest group political model. Bureaucratic objectives work to the advantage of commuters from distant suburbs, who are relatively wealthy and young. The data are too weak to support firm conviction about these conclusions, but our methods contribute to quantitative political economy.

Cooter, R Topakian, G *Journal of Public Economics* Vol. 13 No. 3, June
1980, pp 299-318

ORDER FROM: North-Holland Publishing Company, P.O. Box 211, 1000
AE Amsterdam, Netherlands

DOTL JC

15 335633

**TRANSPORT AND SOCIETY. THE ROYAUMONT SYMPOSIUM,
26-27 APRIL 1978 [TRANSPORTS ET SOCIETE. COLLOQUE DE
ROYAUMONT, 26-27 AVRIL 1978]**

This symposium represents the first social and scientific evaluation of the 5-year programme of research on the socio-economic aspects of transport. There were 3 workshops: the first: "transport and socio-economic aspects" was devoted to the socio-political aspects of the transport of people. The second: "transport, space and way of life" analyses journeys and mobility as active parts of community life. The third: "freight transport and socio-economic developments" examines the consequences of the present economic crisis on the organization and operation of transport. [French]
ATP Socio Economie des Transports.

Economica, (0150-2336) Monograph 1980, 731p, Tabs., Refs.

ACKNOWLEDGMENT: TRRL (IRRD 111029), Institute of Transport Re-
search; Central Laboratory of Bridges & Highways, France

ORDER FROM: Economica, Rue Hericart 49, Paris, France

15 335841

COST AND SUBSIDY ISSUES IN URBAN PUBLIC TRANSPORT

This paper was presented at Session 6a: Rail costs and operations. Over the next decade there is likely to be a growing demand for the extension of and quality improvements in urban public transport services. It is also likely that the already significant levels of deficit incurred by such services will further increase, heightening pressures for a reduction in services. It is suggested that a solution to this conflict will only be found by clearly identifying the social objectives to be met through the provision of such services. This will enable the costs of particular policies to be determined and provide a defensible and identifiable basis for the determination of fare and subsidy levels. An example of the type of cost analysis necessary is given in outline in the paper. Attention is drawn to a number of conclusions that are made possible by the analysis (a). The number of the covering abstract of the forum is IRRD no. 250625.

6th Australian Transport Research Forum, Brisbane, 22-24 October,
1980. Forum Papers Queensland, Australia.

Brown, HP (Melbourne University, Australia); O'Rourke, MC (Broken
Hill Proprietary Company Limited)
Metropolitan Transit Authority, (0313-6655) 1980, pp 359-376, 3 Fig., 3
Tab., Photos., 11 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 250631), Australian Road Research
Board

ORDER FROM: Metropolitan Transit Authority, 230 Brunswick Street,
Fortitude Valley, Queensland, Australia

16 317907

NEW ENGLAND ENERGY CONGRESS, A BLUEPRINT FOR ENERGY ACTION

This report is the full report of a regional energy action plan for New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont). The report was prepared by the New England Energy Congress, a group which consists of 120 delegates from the six states and which developed the report over a 6-month period. The report includes analysis of and prescriptions for the current energy situation in New England.

New England Energy Congress, Economic Development Administration
Final Rpt. EDA-ERD-80-031, May 1979, 493p

Grant EDA-OER-645-G-78-34

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

16 326936

MODAL SHIFTS IN SHORT-HAUL PASSENGER TRAVEL AND THE CONSEQUENT ENERGY IMPACTS

A study was performed to evaluate the impacts of strategies to effect modal shifts in short-haul passenger travel (defined herein as intercity travel under 500 miles) from energy-intensive modes to those modes that are less energy-intensive. A series of individual strategies, ranging from incentives to the less energy-intensive modes (bus, rail) to penalties to the more energy-intensive modes (auto, air) was examined to determine energy saved and policy implications relative to strategy implementation. The most effective of the individual strategies were then combined in all permutations, and the analysis was repeated. As part of the analytical process, effects of factors other than energy (user cost and time, emissions, government subsidy, and travel fatalities) were examined in a benefit/cost analysis. Finally, energy savings, benefit/cost impacts, implementation considerations, and policy implications were evaluated to arrive at conclusions as to the effectiveness of the more-influential strategies and to the overall effectiveness of induced modal shifts. The principal conclusion of the study is that the maximum 1980 energy saving that might be realized by modal shifts, discounting the concurrent effects of demand suppression and improvement of mode efficiency, is approximately 83×10^{12} Btu (46,500 bbl gasoline per day), 3.8% of the total projected 1980 energy consumption in the short-haul transportation sector and 0.23% of the total US petroleum use. It was also concluded that strategies to achieve these small savings by modal shifts would result in significant economic, social, and business disruptions. (ERA citation 05:027331)

United Technologies Corporation, Department of Energy Mar. 1980,
209p

Contract AC01-76CS58439

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

DOE/CS/58439-1

16 327204

SHIPPER'S GUIDE TO ENERGY CONSERVATION

Recommendations are presented for money-saving tips for the shipping industry. Tips are included for the warehousing and distribution center management; transportation management; materials management for product packaging and shipping; and deployment and management of inventories sections in a firm. (ERA citation 05:026056)

Marien, EJ
Wisconsin University, Madison, Department of Energy Jan. 1980, 84p

Contract AC02-79CS50067

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

DOE/CS/50067-T1

16 328494

ENVIRONMENTAL READINESS DOCUMENT. TRANSPORTATION PROGRAMS, FY 1980: ALCOHOL FUELS; ORGANIC RANKINE CYCLE SYSTEM WORKING FLUIDS

This Environmental Readiness Document was prepared to assist DOE in evaluating the commercial readiness of two transportation programs technologies: alcohol fuels utilization and organic Rankine cycle system working fluids, with respect to environmental issues. An effort has been

made to identify potential environmental problems that may be encountered based on current knowledge, proposed and possible new environmental regulations, and the uncertainties inherent in planned environmental research. It is concluded that alcohol fuels, neat or mixed, appear to have a high probability of achieving environmental acceptability, and that the organic working fluids proposed for Rankine cycle systems for recovering heat from engines must be evaluated carefully for potential public health risks related to flammability, toxicity, mutagenicity/carcinogenicity, and ecological effects. (ERA citation 05:038348)

Department of Energy Sept. 1980, 113p

ACKNOWLEDGMENT: NTIS
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DOE/ERD-0027

16 328495

PROJECTING MARGINAL ENERGY COSTS USING THE MIDTERM ENERGY FORECASTING SYSTEM

A procedure has been incorporated into the Midterm Energy Forecasting System (MEFS) for projecting the marginal costs of producing, processing, converting, and distributing various forms of energy to users in each economic sector and DOE region. These costs are the amounts that consumers in each economic sector would have to pay for an additional unit of a given type of energy if current laws governing the energy markets were to remain in force through 1995. The report describes these procedures and provides sample results consistent with the Projection Series in the EIA's Annual Report to Congress, 1978. MEFS has been programmed to calculate and report marginal energy costs. Coal, oil, and natural gas are reported separately for each economic sector: residential, commercial, industrial, transportation, and raw materials. Electricity is reported two ways: by sector averaged over all categories of load (base, intermediate, and peak-load electricity), and by specific load category averaged over all sectors. (ERA citation 05:035020)

Walton, H Zalkind, J
Department of Energy Oct. 1979, 52p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

DOE/EIA-0184/17

16 328497

OPPORTUNITIES FOR COAL TO METHANOL CONVERSION

The accumulations of mining residues in the anthracite coal regions of Pennsylvania offer a unique opportunity to convert the coal content into methanol that could be utilized in that area as an alternative to gasoline or to extend the supplies through blending. Additional demand may develop through the requirements of public utility gas turbines located in that region. The cost to run this refuse through coal preparation plants may result in a clean coal at about \$17.00 per ton. After gasification and synthesis in a 5000 ton per day facility, a cost of methanol of approximately \$3.84 per million Btu is obtained using utility financing. If the coal is to be brought in by truck or rail from a distance of approximately 60 miles, the cost of methanol would range between \$4.64 and \$5.50 per million Btu depending upon the mode of transportation. The distribution costs to move the methanol from the synthesis plant to the pump could add, at a minimum, \$2.36 per million Btu to the cost. In total, the delivered cost at the pump for methanol produced from coal mining wastes could range between \$6.20 and \$7.86 per million Btu. (ERA citation 05:037796)

American Energy Research Company, Department of Energy Apr. 1980,
80p

Contract AC01-79CS50009

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

DOE/CS/50009-1

16 328631

AN EXPERIMENTAL STUDY OF METHANOL REFORMATION

Transportation vehicles' overall efficiency could be greatly increased if a hydrogen-air fuel cell served as the power source. Carrying hydrogen on board a vehicle presents immense weight and safety problems, however, and the fuel cell vehicle has so far been successful only in space or research study. Reforming of a source fuel into a hydrogen-rich gas offers a solution to the problems, especially if waste heat from the fuel cell can be used in the reforming. This paper discusses the ideas behind fuel cell vehicles, the choice

of methanol as the source fuel and the detailed design and construction of a reformer system to test the possibilities. The reformer system is now operating at the University of Arizona, and early data has provided successful results. The system was designed to be reliable and capable of testing methanol reforming using variables of temperature, pressure, methanol to water ratio, carbon buildup, flow rate and differing catalysts. Early results predict that at temperatures of 400 F and below a larger catalyst volume may be required to produce the volume of hydrogen needed at fuel cell maximum power. Ethanol research is proposed. (Author)

Shafer, JB
Air Force Institute of Technology MS Thesis AFIT-CI-79-240T, Dec. 1979, 110p

ACKNOWLEDGMENT: NTIS
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AD-A091412/7

16 330086
CONSIDERATIONS IN TRANSPORTATION ENERGY CONTINGENCY PLANNING

A conference was held in San Antonio, Texas, April 13-16, 1980, to focus attention on energy resources used for domestic transportation and the formulation of public policy related to contingency planning in the transportation life of the nation. This volume contains the proceedings of the conference. Part 1 takes note of the conference's aims and directions and includes the keynote addresses that dealt with overviews of energy issues and resource availability at home and abroad. Part 2 summarizes the conference's findings and recommendations and represents the distillation of the views expressed in the workshops and resource papers. Part 3 reports on the session and workshop discussion. Part 4 includes the resource materials and papers that were prepared for the conference and have been edited for inclusion in this report. Part 5 lists the participants and their affiliations.

Transportation Research Board Special Report No. 191, 1980, 169p, Figs., Tabs., Refs.

ORDER FROM: TRB Publications Off

16 330168
RAPID TRANSIT TIME AND ENERGY REQUIREMENTS (ABRIDGMENT)

The results of an analysis to compare the trade-off between time and energy in the propulsion of a rapid transit train are discussed. Faster schedules consume more energy but reduce other operating costs and are an asset in attracting riders. Methods of reducing energy consumption, mainly by recovery of all or part of the kinetic energy used, are also described. (Author)

This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.

Holden, WHT (Daniel, Mann, Johnson and Mendenhall) *Transportation Research Record* No. 760, 1980, pp 15-18, 3 Tab.

ORDER FROM: TRB Publications Off

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16 330187
ALTERNATE FUELS AND THE DIESEL ENGINE

The problem of burning coal-derived and other alternate fuels in combustion engines and turbines can be approached from two different directions; the raw fuels can be upgraded by relatively expensive and energy intensive hydrorefining, or engines can be developed which can burn cruder fuels directly, although perhaps at the cost of a reduced efficiency and increased maintenance costs. An approach to the problem of identifying the optimum compromise between these extremes is presented in the paper. Two criteria, engine output per unit of source energy supplied, and cost per unit of output are used in the analysis. Based on the present incomplete knowledge of costs and properties of alternate fuels and their effect on engine performance, the analyses favor the development of engines and turbines which can handle less highly refined alternate fuels.

Conta, LD *American Society of Mechanical Engineers Papers* ASME 80-DGP-37, 1980, 7p, 4 Ref.

ACKNOWLEDGMENT: EI
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16 330636
TECHNOLOGY ASSESSMENT OF ALTERNATIVE TRANSPORTATION FUELS. ANNUAL REPORT

A brief summary is presented of major accomplishments in a research program on the impact of synthetic fuels, electric vehicles, and railroad electrification on energy consumption by the US transportation sector.

SRI International Jan. 1978, 8p

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

DOE/CS/50115-T24

16 330637
TECHNOLOGY ASSESSMENT OF ALTERNATIVE TRANSPORTATION FUELS. MANAGEMENT REPORT NO. 17

A scenario is developed which depicts the transition, during the period from 1980 to 1997, of mainline freight railroads in the US from diesel to electric power. Progress in developing an econometric model of the market penetration of electric-powered vehicles in the US to the year 2010 is reported.

SRI International June 1977, 12p

Contract AT03-76CS50115

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

DOE/CS/50115-T25

16 330638
TECHNOLOGY ASSESSMENT OF ALTERNATIVE TRANSPORTATION FUELS. MANAGEMENT REPORT NO. 20

The outline is presented of a final report on the economic, environmental and government policy impacts of the commercialization of electric highway vehicles in the US and of railroad electrification.

SRI International Sept. 1977, 23p

Contract AT03-CS50115

ACKNOWLEDGMENT: Energy Research Abstracts
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DOE/CS/50115-T26

16 330640
MATERIALS SCIENCE AND TECHNOLOGY FOR MORE-ENERGY-EFFICIENT TRANSPORTATION

This workshop reviewed issues related to all major transportation systems-aircraft, railroad vehicles and powerplants, ships, automobiles, and buses, road and highway construction, and unconventional technologies such as electric vehicles. Also discussed were general problems relevant to all transportation technologies, e.g., the question of whether or not economy and energy efficiency can be reconciled in transportation; and socio-economic constraints that can hinder the introduction of more energy-saving materials. A clear interaction between energy-efficiency and materials utilization has been found in each transportation system although the tradeoffs and specific problems vary considerably between different systems. In fact, there is a large potential for energy saving through lighter and otherwise more-efficient materials. This potential often reaches 20% in case of railroads, even 50% of present energy requirements. Thus, the drive to save energy is one of the main reasons for the R and D effort and for a very fast rate of technical change in practically all transportation systems. Some concrete examples are presented on specific issues of each transportation system.

From International Congress on Materials Aspects of World Energy Needs; Reston, Virginia, 26 March 1979.

Ogle, IGC Steinberg, MA Wald, S
Canada Center for Materials & Energy 1980, pp 160-164

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: Canada Center for Materials & Energy, Ottawa, Ontario, Canada

CONF-7903123

16 331022
ASSESSMENT OF ENERGY AND PETROLEUM CONSUMPTION OF DIFFERENT TRANSPORTATION MODES IN THE BUFFALO AREA

This analysis evaluates the results of a local rail vehicle performance model. Line-haul travel calculations, operating energy consumption, and total

energy consumption, especially of petroleum energy, are calculated for an example situation in Buffalo, New York. The energy impacts that result from the implementation of a carpool and express bus system are also included. The comparison of these results with energy estimates by using average values indicates that the variance in urban rail system performance is too large for generalizations at the national level. A second reason for the promotion of local energy studies is the need to develop criteria to calculate the petroleum consumption of modes that do not burn petroleum products directly. The results of this study demonstrate that a light rail system in the example city will save energy; however due to the relatively small demand, the net energy and petroleum savings are rather small. Recent trends toward the purchase of foreign-manufactured light rail vehicles have a negative impact on energy savings. (Authors)

This paper appeared in Transportation Research Board Record No. 764, Transportation Energy: Data, Forecasting Policy, and Models.

Morris, M (North Central Texas Council of Governments); Talvitie, A (State University of New York, Buffalo) *Transportation Research Record* No. 764, 1980, pp 1-6, 1 Fig., 5 Tab., 22 Ref.

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16 331023

LONG-RANGE FORECASTS OF TRANSPORTATION ENERGY CONSUMPTION IN NEW YORK STATE

This paper summarizes the methods used by the New York State Department of Transportation to prepare long-range baseline forecasts of energy use in each of the subsectors of the transportation sector in New York. By use of a variety of techniques that relate energy to the economy, fuel price and supply, and vehicle efficiency, five-year forecasts to 1995 are prepared for trucks, passenger cars, aviation, rail, vessel, and transit modes. Within each group, separate forecasts are made for relevant segments (e.g., passenger rail). Results show that in 1995 total transportation energy in New York will expand by 13 percent from its 1976 level. Growth in air passengers of 108 percent, intercity rail of 10 percent, transit of 9 percent, and light truck of 59 percent will be offset by declines in passenger car fuel use of 24 percent. The latter are caused primarily by increasing vehicle efficiency. Gasoline use is projected to fall by 8 percent over the period; use of most other products will increase. The report concludes that growth will be moderate, generally even, tied to the New York economy, and highly dependent on increases in the efficiency of personal cars. (Authors)

This paper appeared in Transportation Research Board Record No. 764, Transportation Energy: Data, Forecasting, Policy, and Models.

Hartgen, DT • Erlbaum, NS (New York State Department of Transportation) *Transportation Research Record* No. 764, 1980, pp 7-16, 2 Fig., 11 Tab., 30 Ref.

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16 331031

DIRECT ENERGY ACCOUNTS FOR URBAN TRANSPORTATION PLANNING

Methods for computing accounts of direct energy consumption by urban person travel are described. These accounts are compiled by mode, trip purpose, time of day, and origin-destination pair and are designed to be compatible with the existing transportation planning software and data sets. For automobile trips, a program is used to trace equilibrium assignment paths and calculate zone-to-zone fuel consumption based on link speeds and distances. A similar program for public transit modes calculates zone-to-zone energy consumption based on modal vehicle kilometers per person trip along each minimum impedance path. The final accounts are separate matrices of zone-to-zone energy flows for both public and private modes that can be summarized in tables or displayed graphically. Results from a case study of the Chicago metropolitan area are briefly presented. (Authors)

This paper appeared in Transportation Research Board Record No. 764, Transportation Energy: Data, Forecasting, Policy, and Models.

Janson, BN Ferris, M (Illinois University, Urbana); Boyce, DE (Chicago Area Transportation Study); Eash, RW *Transportation Research Record* No. 764, 1980, pp 53-59, 7 Fig., 1 Tab., 15 Ref.

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16 331034

TRAVEL DEMAND AND ESTIMATION OF ENERGY CONSUMPTION BY A CONSTRAINED MODEL

A new model based on a theory of consumer behavior has been developed to aid transportation policy analysis. The model assumes that travelers attempt to maximize their spatial and economic opportunities, represented by the total daily travel distance, subject to constraints of time and money. The constraints are not identical for all travelers but depend on such factors as socioeconomic characteristics and transportation system supply. In this basic optimization travelers choose the number of trips, trip distances, and car-ownership levels by trip purpose and mode shares. All of these choices are determined through a feedback solution mechanism. Both urban and interurban travel can be treated by the model, although investigation of the interurban model has just begun. The model is useful for the analysis of policies that affect all travel decisions, such as increases in energy prices. It can treat the trade-offs travelers will make among their various trips and their decision to own cars. A simple analysis of the effect of raising fuel prices has shown that travelers will reduce their total amount of interurban travel and shift their mode shares. The energy savings from these responses appear to come mainly from the reduction in travel distance and only minimally from a switch to energy-efficient modes. (Authors)

This paper appeared in Transportation Research Board Record No. 764, Transportation Energy: Data, Forecasting, Policy, and Models.

Zahavi, Y Cheslow, MD (DHR, Incorporated) *Transportation Research Record* No. 764, 1980, pp 79-89, 11 Fig., 7 Tab., 15 Ref.

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16 331474

COMPARATIVE ASSESSMENT OF ALTERNATIVE ENERGY SOURCES FOR RAILWAY APPLICATIONS: DEVELOPMENT OF ALTERNATIVES AND EVALUATION APPROACHES

The first stage of an economic/financial assessment of energy sources for railway motive power—characterization of alternatives and assessment of evaluation methodology—is described. This assessment was suggested by the Strategic Studies Branch of Transport Canada under the federal Energy Research and Development Program and is a part of Canada's contribution to the Alternative Fuels for Medium Speed Diesel Engines (AFFMSDE) program, initiated by the United States and Canada in 1978.

Bunting, PM Cooper, GH
Canadian Institute of Guided Ground Transport, Department of Transport, Canada, (PRO-933-01) CIGGT 80-3, July 1980, 107p, 7 Fig., 9 Tab., 7 App.

Contract File No. 500-484-1

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16 331539

ENERGY CONSUMPTION SAVINGS AND RECOVERY IN AN ELECTRIFIED RAILROAD [Consumi, economie e recuperi di energia in una ferrovia elettrificata]

Wide adoption of electric traction leads to a considerable reduction of power consumption per unit. Between 1928 and 1978, power consumption per unit decreased from 0.370 to 0.063 kWh per virtual ton-kilometer of a complete train. The electric traction trains consume, on an average, 0.058 kWh/VT km CT and this value is expected to decline further. The locomotive control and braking energy recovery systems that can bring about such a reduction are examined. [Italian]

Mayer, L *Elettrotecnica* Vol. 67 No. 5, May 1980, pp 413-423

ACKNOWLEDGMENT: EI

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16 331550

RAILROAD UTILIZATION OF ALTERNATE FUELS

Faced with the dual problem of steadily increasing fuel costs and uncertainties regarding the future availability of fuel oil, the railroad industry is considering establishing an alternate fuels locomotive engine test facility. Through the proposed research program to be undertaken at this facility the possibility exists that railroads would be able to further conserve diesel fuel and to investigate the potential of alternate fuels. The overall proposed energy research program, as presently conceived, consists of three

major parts: short-term, medium-term, and long-term. A description is given of the three phases.

Utilization of Alternative Fuels for Transportation, Proceedings of the Symposium, University of Santa Clara, California, June 19-23, 1978. (AIAA Aerospace Assessment Ser Vol. 2).

Furber, CP (Association of American Railroads)
American Institute of Aeronautics and Astronautics 1979, pp 125-129

ACKNOWLEDGMENT: EI
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16 331845

TRACTION POLICY AND FUEL CONSERVATION IN INDIAN RAILWAYS

In broad terms, the traction policy of the Indian Railways, as of now, envisages use of steam locomotives till the end of their codal or economic life, for the present, extension of electrification on high density routes as predicted by economic and resource considerations and dieselization of the balance of services. The steam locomotive holding by 1992-93 would be around 5,000 units as against the present level of about 8,000. The diesel and electric locomotives, on the other hand, would increase from the present level of about 2,800 units to about 7,500 units during the same time span. The consumption of energy is expected to be of the order of 10 million tons of coal, 1.2 million tons of HSD oil and about 2,500 million kWh of electrical energy for traction purposes by 1988-89, though, as a proportion of national consumption, this would be an insignificant percentage, namely, 5 per cent of the national consumption of coal, 1.5 per cent of national crude demand and 2 per cent of the national power consumption.

Pande, M (Ministry of Railways, India) *Energy Management* Vol: 4 No. 1, Jan. 1980, pp 25-31

ACKNOWLEDGMENT: EI
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16 334302

RAILWAY LINEHAUL ENERGY INTENSITY: AN ANALYSIS LEADING TO DESIGN OF A TRAIN SIMULATION SOFTWARE PACKAGE

The feasibility of developing a computer program capable of accurately estimating railway linehaul energy use on a route and service-specific basis for both diesel-electric and electrified railways is investigated. A theoretical examination of the components of train resistance is made and the predictions compared with existing empirical formulae. Locomotive efficiency is investigated and the influences of driver behaviour analyzed. A simulation software package suitable for energy conservation studies and incorporating the above analysis is presented, as well as an analytic formulation for costing purposes. A validation and development program is outlined.

English, GW Young, JD Boumeester, H Schwier, C Roney,
MD Bunting, PM
Canadian Institute of Guided Ground Transport, Department of
Transport, Canada, (PRO-090) Final Rpt. CIGGT Rpt. 80-15, Feb.
1981, 200p, Figs., Tabs.

Contract OST80-00012

ORDER FROM: CIGGT

DOTL RP

16 334340

COAL AS A RAIL FUEL: AN ASSESSMENT OF DIRECT COMBUSTION

Railroads are critically important to the United States. More than one-third of the nation's ton-mileage goes by rail. Items such as food, fuels and manufactured goods which are crucial to maintaining a high standard of living and adequate national security depend on rail haulage. Yet, America's railroads are fueled almost exclusively by oil. Thus, railroads are an important segment of the nation's transportation system which should be considered for conversion from oil. Of the several alternatives available for reducing the rail system's dependence on oil, the possibility of converting to the direct combustion of coal has many attractive features. This report presents an assessment of economic and environmental factors involved in such a conversion. General engineering and environmental analyses are presented in which design parameters are taken to be those believed possible using modern technology. The use of coal is found to offer several direct

economic benefits to the operating companies as well as numerous indirect benefits to the entire nation. Analyses found that present federal environmental standards can be met by direct coal-fired locomotives provided that modern combustion and control technology are utilized. National security would be greatly enhanced by conversion of the rail system to coal as the fundamental fuel. Moreover, a switch to the direct combustion of coal is shown to offer the quickest possible large scale conversion from oil-an important economic and security consideration. Nineteen specific results are discussed briefly.

Aldridge, MD Campbell, TC Galli, A
West Virginia University 1980, 42p

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: West Virginia University, Morgantown, West Virginia,
26506

16 334451

LONG DISTANCE TRANSPORT IN THE FEDERAL REPUBLIC OF GERMANY UNDER CONDITIONS OF ENERGY SHORTAGE [Fernverkehr in der Bundesrepublik Deutschland unter Bedingungen einer Energieverknappung]

This extensive study is divided into the presentation of different energy scenarios and alternative investment strategies, particularly for the railways and their effects on the networks and also the effects of an energy shortage and cost increase on long distance passenger and freight traffic in the federal republic. The effect upon the volume of rail transport forms the main subject of the investigation. In the energy scenarios studies are made of cases where crude oil increases at the rate of 1.5% above the general rate of inflation until 1990 and where crude oil rises annually by 10% until 1990. A further alternative resulting from the shortage of energy is seen as the introduction of an international quota system. In the investment plans up to 1990 it is assumed that the construction measures included in the federal transport route plan will be implemented and that in the case of the railways additional work, particularly in marshalling yards, will be undertaken. The model investigations show that the investment measures have only a very slight effect on the volume of rail transport. Also the energy price rises produce only a very modest movement of traffic from road to rail. Only for a few journey-purposes in the case of passenger traffic and for a few groups of goods in freight traffic will there be a change in the choice by transport users. Based on 6 journey purposes for passenger transport and 12 goods groups for freight transport, the effects of the different planning variations are illustrated. Special value is laid upon the close intermeshing of these modified demand forecasts with forecasts produced earlier. [German]

Internationales Verkehrswesen Vol. 32 No. 3, 1980, pp 153-157

ACKNOWLEDGMENT: TRRL (IRRD 312371), Federal Institute of Road Research, West Germany

ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

16 334713

LIGHT RAIL/RAPID TRANSIT: NEW APPROACHES FOR THE EVALUATION OF ENERGY SAVINGS--2. ON THE RECEPTIVITY OF A TRANSIT SYSTEM

New approaches are presented for the determination and evaluation of regeneration in large transit systems. A specific definition of the receptivity of transit systems to available regenerative braking energy is presented, and the analytical base for receptivity evaluations is developed. Also described is the construction of a transit system operational model. This operational model is the mechanism by which the values required for the receptivity analysis are generated.

Forsythe, JB (AiResearch Manufacturing Company) *IEEE Transactions on Industry Applications* Vol. IA-1 No. 5, Sept. 1980, pp 665-678, 21 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

16 334714

LIGHT RAIL/RAPID TRANSIT: NEW APPROACHES FOR THE EVALUATION OF ENERGY SAVINGS--1. LIFE-CYCLE COST FROM SYNTHETIC ROUTES/OPERATIONAL MODELS

The energy-saving benefits of new traction technologies for light rail/rapid transit systems must be evaluated on the basis of life-cycle cost, which includes both purchase cost and energy consumption. Overall, a systematic

approach for comparing the energy consumption of different traction systems on the basis of equal work performed (operational model) is presented. The techniques described will allow a total cost figure based on purchase price plus energy consumption to be calculated for each type of transit car on a given property basis.

Forsythe, JB (AiResearch Manufacturing Company) *IEEE Transactions on Industry Applications* Vol. IA-1 No. 5, Sept. 1980, pp 655-665, 16 Ref.

ACKNOWLEDGMENT: EI
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16 334719

ENERGY AND TRANSPORT-BIBLIOGRAPHY [Energie et transport. Bibliographie]

The energy crisis gave use to a number of studies of the most economical transport modes as regards energy consumption. This bibliography contains references on recent work, classified per transport mode. A French/English index is included. [French]

Organization for Economic Cooperation and Development Monograph 1979, 172p, Refs.

ACKNOWLEDGMENT: TRRL (IRRD 111016), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

ORDER FROM: Organization for Economic Cooperation and Development, Suite 1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006

16 335053

ALTERNATIVE FUELS: A PROGRESS REPORT FROM SWRI

Southwest Research Institute, as part of its alternative diesel fuels project, is now ready to work with full-size medium-speed diesel engines and has made 10 specific recommendations for the next stage of the project, although funding cuts may interrupt progress. Among fuels being appraised are those with low cetanes, emulsified heavy and distillate oils, coal-derived liquids and hydrocarbons which may be burned in a dual-fuel mode.

Railway Age Vol. 182 No. 8, Apr. 1981, pp 36-37

ORDER FROM: ESL

DOTL JC

16 335269

NUCLEATED URBAN GROWTH EFFECTS ON TRANSPORTATION ENERGY CONSUMPTION

An aggregate digital computer simulation model was used to test the urban passenger transportation energy consumption associated with different patterns of nuclear growth in a hypothetical city. The model simulated the effects of various central and noncentral locations for residential, employment, and retail growth clusters. Centralized urban growth is more efficient, in terms of transportation energy consumption, than noncentralized growth. Off-center manufacturing employment clusters are the least energy efficient of non-centralized cluster, and clusters at the edge of the established urban area are less attractive for all land use types. The implications for near term urban decision making are explored.

Schofer, JL (Northwestern University, Evanston); Weisel, W Peskin, RL *ASCE Journal of Transportation Engineering* Vol. 107 No. 3, May 1981, pp 331-344, 6 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

16 335270

ASSESSMENT OF USED ENGINE OIL RECYCLING

Current used oil disposal practices and the choices of recycling used oil as a fuel supplement or a re-refined lubricant are discussed. Use as a fuel supplement for stationary combustion units has raised concern over lead emissions. However, reduced use of lead in gasoline in combination with current stack gas emission control systems should eliminate this concern. Although it is technically feasible to produce a high quality engine oil from re-refined base stocks, the acceptance of re-refined engine oils will depend upon the re-refiners ability to insure quality, from batch-to-batch.

For Meeting held October 20-23, 1980.

Stehouwer, DM (General Motors Corporation) *Society of Automotive Engineers Preprints* SAE 801381, 1980, 10p, 39 Ref.

ACKNOWLEDGMENT: EI
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16 335271

STATUS REPORT ON THE CHARACTERIZATION OF RE-REFINED LUBRICATING BASE OILS

The National Bureau of Standards has been working on the development of test procedures for recycled petroleum oils since 1976. The first phase involved development and evaluation of tests for characterizing used oil recycled as burner fuel, and has been completed. The second phase, on re-refined motor oil, involves development of a set of test procedures capable of monitoring the quality, consistency, and additive response of re-refined lubricating oil basestocks. Cooperative efforts include the ASTM/NBS Basestock Consistency Study (involving both re-refined and virgin lubricating oil basestocks), a study of engine deposits with the U. S. Army Fuel and Lubricants Research Laboratory, and micro-oxidation test research at Pennsylvania State University. This paper describes the current status of this program, and includes representative data obtained on re-refined oils.

Hsu, SM (National Bureau of Standards); Becker, DA *Society of Automotive Engineers Preprints* SAE 801382, 1980, 10p, 13 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

16 335272

FUTURE DIESELS MAY USE HYBRID FUELS

A variety of hybrid fuels could power future diesel engines. These fuels could use nontraditional fuel feedstocks to replace a part of present liquid fuels, whether derived from petroleum, coal, or shale oil. Direct application of primary components (biomass, coal, and oil shale) is impractical because they are solids and contain substances that are damaging to the engine--or don't contribute to the energy content. Thus, a certain amount of processing would be necessary to produce solutions, emulsions, or slurries that could be used in existing equipment.

Automotive Engineering Vol. 89 No. 1, Jan. 1981, pp 63-65

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

16 335273

SLOW-SPEED TWO-STROKE DIESEL ENGINE TESTS USING COAL-BASED FUELS

This paper describes recent performance tests of a diesel engine on coal-based fuels. The test fuels included two coal-derived liquids, a coal/oil slurry and a coal/water slurry. The concept of a coal-fueled diesel engine is not new. Direct combustion of coal dust and other dry fuels in diesel engines was investigated extensively in Germany prior to 1940. A number of small-scale experiments have also been performed in the United States since 1945. The present tests were run in a slow-speed two-stroke engine of the type used extensively for marine propulsion applications. Performance data are presented for each of the coal-based test fuels and compared with diesel fuel operation.

Dunlay, JB (Thermo Electron Corporation); Davis, JP Steiger, HA Eberle, MK *American Society of Mechanical Engineers Papers* ASME 81-DGP-12, 1981, 7p, 6 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

16 335609

TRENDS IN DIESEL ENGINE LUBRICATION REQUIREMENTS

Because of the enormous changes that have occurred in the diesel engine market, the methods of engine oil evaluation are reviewed. The evaluation procedures are assessed in terms of present and future requirements. It is shown that new engine test procedures are needed to aid in the development of the new generation of diesel engine crankcase oils. The problems inherent in the establishment of new test techniques will tend to slow the technical definition of the new engine oil category. The diesel engine oils produced during the 1980s will be strengthened with respect to high-temperature deposit control and in their ability to control oil consumption, ring wear, bearing corrosion, and the effects of high-sulfur fuels.

Proceedings of the American Petroleum Institute Refin Dep v59, Midyear Meeting, 45th, Houston, Texas, May 12-15, 1980.

Gergel, WC (Lubrizol Corporation)
American Petroleum Institute Proceeding 1980, pp 22-31, 18 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: American Petroleum Institute, 2101 L Street, NW, Washington, D.C., 20037

16 335629

PUBLIC AND PRIVATE TRANSPORT IN AUSTRALIAN CITIES: I. AN ANALYSIS OF EXISTING PATTERNS AND THEIR ENERGY IMPLICATIONS

Data from a wide range of sources have been collated to examine past trends and existing patterns of public and private transport in Australia's five biggest cities. Energy consumption by type of fuel has been used to compare modal energy efficiencies and per capita transport energy consumption in each city. Significant differences were found between the five cities in the level of private travel, provision of public transport, public transport patronage and transport energy consumption per capita. Much of the variation appears to be associated with the use of electrified fixed rail systems. Electric trains and trams were shown to be the most energy-efficient form of public transport in Australian cities, to attract the highest patronage and to use an insignificant amount of total transport energy. By contrast, cities with public transport based mainly on buses and diesel trains have lower public transport utilisation, perform less energy-efficiently and have higher transport energy consumption per capita due to greater private car usage. It is concluded that encouraging a well-integrated public transport system with electric trains and trams as a backbone has the potential to save significant quantities of liquid fuel. (a) (TRRL)

Newman, P Kenworthy, J (Murdoch University, Australia) *Transport Policy and Decision Making* Vol. 1 No. 2-3, 1980, pp 133-149, 3 Fig., 8 Tab., 15 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 253901), Institute for Road Safety Research

ORDER FROM: Martinus Nijhoff Publishers, P.O. Box 22, Dordrecht, Netherlands

16 335630

PUBLIC AND PRIVATE TRANSPORT IN AUSTRALIAN CITIES: II. THE POTENTIAL FOR ENERGY CONSERVATION THROUGH LAND USE CHANGE

An attempt has been made to explain observed difference in public and private transport and per capita energy consumption in five Australian cities by reference to a number of non-land use and land use variables. Non-land use variables were considered inadequate to explain the differences in transport and energy patterns. However, numerous significant correlations were found between the seven key transport parameters and various land use indicators representing density, centralisation and traffic restraint characteristics. The correlations suggest a key role for these three factors in giving a competitive edge to public transport and increasing the feasibility of cycling and walking. A policy combining densification, centralisation and traffic restraint measures is recommended as an effective way of promoting transport energy conservation in the short and long terms. (a) (TRRL)

Newman, P Kenworthy, J (Murdoch University, Australia) *Transport Policy and Decision Making* Vol. 1 No. 2-3, 1980, pp 149-167, 7 Tab., 57 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 253902), Institute for Road Safety Research

ORDER FROM: Martinus Nijhoff Publishers, P.O. Box 22, Dordrecht, Netherlands

16 336276

REDUCING US OIL VULNERABILITY: ENERGY POLICY FOR THE 1980'S

The US faces two critical tasks in energy: (1) to lead the world in the transition from an economy highly dependent on conventional oil resources to an economy based on careful use of energy sources with nearly unlimited potential; and (2) to manage our own oil vulnerability (both economic and strategic) during the time this transition will require- especially the next decade. This study included an initial request for ideas from the public on further steps to reduce our vulnerability, followed by a phase of intensive analysis of these ideas by the staff of the Office of Policy and Evaluation in the Department of Energy. This analytical report to the Secretary of Energy represents the views of the Assistant Secretary for Policy and Evaluation on the next agenda in US energy policy. Although the key individuals in this Department and selected officials in the Administration have been briefed on the study and have had the opportunity to review an earlier draft, the

conclusions are at this time strictly products of this office. Under current policies and programs the best estimate of this study is that oil imports, 7.9 million barrels per day (MMBD) in 1979, will rise to about 8.3 MMBD by 1985 but then decline to perhaps 6.7 MMBD in 1990. This best estimate is predicted on the following: (1) the economy will become more energy efficient; (2) by 1990, energy use in all sectors will decrease substantially; (3) use of coal will increase by 60% and nuclear power output will nearly triple by 1990; and (4) total US petroleum production will decrease by 20% by 1990. (ERA citation 06:002454)

Department of Energy Nov. 1980, 439p

ACKNOWLEDGMENT: NTIS

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DOE/PE-0024

16 336391

TRANSPORTATION ENERGY CONSERVATION DATA BOOK: EDITION 4

This is the fourth edition of the Transportation Energy Conservation Data Book, a statistical compendium compiled and published by ORNL for DOE. Secondary data on transportation characteristics by mode, on transportation energy use, and on other related variables are presented in tabular and/or graphic form. All major modes of transportation are represented: highway, air, rail, marine, and pipeline. The six main chapters focus on various characteristics of the transportation sector including (1) modal characteristics, (2) current energy use, efficiency and conservation, (3) projections of modal energy use, (4) impact of government activities, (5) supply and cost of energy, and (6) general demographic and economic characteristics. Included in the tables and figures are the following transportation stock and use statistics: number of vehicles, vehicle-miles traveled, passenger-miles and freight ton-miles, fleet characteristics, household automobile ownership, size mix of automobiles, vehicle travel characteristics, and commuting patterns. Energy characteristics presented include energy use by fuel source and transportation mode, energy intensity figures by mode, indirect energy use, production as a percent of consumption, imports as a percent of domestic production, energy prices from the wellhead to the retail outlet, and alternative fuels. (ERA citation 05:038279)

Kulp, G Shonka, DB Collins, MJ Murphy, BJ Reed, KJ
Oak Ridge National Laboratory, Department of Energy Sept. 1980, 397p

Contract W-7405-ENG-26

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

ORNL-5654

16 336434

ALTERNATE FUELS FOR INDUSTRIAL COMBUSTION ENGINES. FINAL REPORT ON TASK 018

In this study, the various options for producing alternate fuels (synfuels) for large industrial combustion engine use are examined from the standpoint of current fuel usage and future engine development trends. This general class of engine in sizes above 1500 horsepower is widely utilized in the utility, transportation and industrial sectors to meet a variety of mechanical power needs. Consequently, industrial engine fuel demands are expected to be an important consideration as to which alternate fuels are developed as well as their commercial properties. The broad conclusions of this study are: (1) The current emphasis on the development of various concepts for the processing of gaseous and distillate fuels from coal and shale will provide a reliable fossil fuel source for industrial engine utilization well beyond the year 2000. (2) Engine emission requirements will largely dictate the degree of upgrading (cost) of alternate engine fuels and their commercial specifications as well as the overall efficiency of the entire energy system from resource to engine output. (3) The present lack of sufficient quantities of alternate fuels for engine development implies a need for fundamental research leading to an improved understanding of fuel properties and their relationship in predicting emission performance and fuel flexibility of engine designs. (ERA citation 05:038349)

Thomas, RL
Engineering Societies Commission on Energy, Inc, Department of Energy
June 1980, 96p

Contract AC01-77ET10679

ACKNOWLEDGMENT: NTIS

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FE-2468-77

16 336601

ENERGY USE IN TRANSPORTATION. SELECTED REFERENCES

This is a selected, partially annotated listing of periodical articles, reports and books held by the Department of Transportation Library on the subject of energy use in transportation.

La Foy, AB

Department of Transportation Bibliog. DOT-OST-LIB-11, Aug. 1980, 85p

ACKNOWLEDGMENT: NTIS
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AD-A092157/7

16 336758

TRANSPORTATION ENERGY FLOWS FOR 1976

Highly graphic, condensed, and informative illustrations of the 1976 transportation energy flows are presented for each of the 50 states, the 10 US Federal Standard Regions, the Military, and the United States. Each diagram shows the energy flow from primary energies, to fuel types, to the modes of transportation, plus the pollution emissions produced by each mode. The diagrams are an initial attempt to provide a convenient overview and standardized framework of the transportation system. (ERA citation 06:007899)

Kidman, RB

Los Alamos Scientific Laboratory, Department of Energy Dec. 1980, 69p

Contract W-7405-ENG-36

ACKNOWLEDGMENT: NTIS
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LA-8641-MS

16 336862

CONSERVATION AND ALTERNATIVE FUELS IN THE TRANSPORTATION SECTOR

This report presents a set of new transportation energy conservation policy initiatives. From an energy efficiency viewpoint the efforts to improve the efficiency of automobiles, airplanes and trucks can be most effective. Likewise, shifting passengers from automobiles and airplanes to buses and trains, and shifting freight from aircraft and trucks to trains (and where practical, marine or pipeline modes) will provide the largest energy savings.

Solar Energy Research Institute Tech Rpt. June 1980, 439p

ACKNOWLEDGMENT: NTIS
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PB81-154098

16 341287

PART 1. INTERCITY PASSENGER TRANSPORTATION: ENERGY CONSUMPTION CHARACTERISTICS

The objective of this paper is to report energy consumption characteristics of Canadian intercity travel modes from a total energy viewpoint. For line haul as well as terminal access/egress operations, both the direct energy consumed for vehicle propulsion and the indirect energy required for the provision of intercity transportation services are investigated. In addition to a discussion of methods of estimating energy efficiency, factors affecting modal energy consumption are identified and the energy efficiency impact of technical developments are assessed. Energy efficiency information reported here is believed to be essential for planning, policy and conservation research at the disaggregated level. (Author/TRRL)

Khan, AM (Carleton University, Canada) *Transportation Planning and Technology* Vol. 6 No. 4, 1981, pp 249-262, 4 Fig., 7 Tab., 26 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 254250)
ORDER FROM: ESL

DOTL JC

17 330156

COMPUTERS FLAG CAR CONDITION

Chicago and North Western has expanded computerized interline car repair billing into an information system that makes possible the analysis of the condition of its own freight-car fleet. This involves capturing for computer storage mileage and all maintenance costs for system cars which means keying all manual bills not included in data exchange, as well as all system repairs made on line. With 3 years of information of 46,000 cars, it is now possible to retrieve data by car classes, by individual cars, and by car components for maintenance costing and service life.

Cunningham, FE *Progressive Railroading* Vol. 24 No. 2, Feb. 1981, pp 47-50, 4 Phot.

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

DOTL JC

17 330157

OPTICAL SCANNING RETURNS ... FOR CAR REPAIR BILLING

By adopting optical character recognition for decentralized inputting of car repair data into a microcomputer, Norfolk and Western has speeded the processing of 40,000 interline billings involving \$2 million in accounts receivable. New reporting forms were developed to cover all standard repairs. Information is now compiled also on system cars for analyzing car failure trends, cost of maintenance, and billing audits.

Progressive Railroading Vol. 24 No. 2, Feb. 1981, pp 61-62, 3 Phot.

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

DOTL JC

17 330175

DISAGGREGATE FILE OF COMMODITY ATTRIBUTES AVAILABLE FROM CTS

A listing of over 1200 specific commodities and their characteristics has just been compiled to aid in the formal study of logistics and the day-to-day operations of freight transportation. Chosen on the basis of how well they represent the universe of commodities that move in commerce, the commodities are listed in a decimal hierarchy by industry and sub-industry, and are described by truck and rail commodity identification numbers and description. Attributes listed for each commodity are: plausible packing types, LTL class, TL class, minimum weight for truckload, density, value per pound, five year price change probable LTL packing, probable TL packing, hazardous material symbol, special handling requirements, and shelf life. A partial STCC-SIC bridge is also included. It is designed for use both as a shelf reference and as a data input for modeling.

Kuttner, W
Massachusetts Institute of Technology CTS 79-12, No Date, n.p.

ORDER FROM: Massachusetts Institute of Technology, Center for Transportation Studies, Room 1121, Cambridge, Massachusetts, 02139

17 330190

DEVELOPMENT OF A MAINTENANCE PLAN FOR THE INTERMEDIATE CAPACITY TRANSIT SYSTEM

Maintenance would be much reduced if only that which is needed is carried out. Inspections and testing although necessary are time consuming; a good maintenance concept will limit this effect to that which is productive. This is attempted through integrating detection systems, scheduled equipment verification, and maintenance record monitoring to provide an efficient and effective detection of incipient faults.

Proceedings of the Canadian Reliability Symposium, Toronto, Ontario, May 16-17, 1980. Sponsored by the Society of Reliability Eng.

Keith, B (Canadair Services Limited) *Microelectronics and Reliability* Vol. 20 No. 1-2, Jan. 1980, pp 25-31

ACKNOWLEDGMENT: EI

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17 330642

TRANSPORTATION OF RADIOACTIVE MATERIALS: LEGISLATIVE AND REGULATORY INFORMATION SYSTEM

The transportation of radioactive materials, as well as hazardous materials in general, has been an issue of ever-increasing concern and an object of

numerous regulations and legislative actions worldwide. The Transportation Technology Center of the US Department of Energy's Sandia Laboratories in Albuquerque, New Mexico, is currently involved in developing a national program to assure the safe shipment of radioactive materials. At Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee, this overall effort is being supported in a specialized manner. As part of the Logistics Modeling program at ORNL, the Ecological Sciences Information Center has developed comprehensive data bases containing legislative and regulatory actions relevant to the transportation of hazardous materials. The data bases are separated according to status level of the legislation. The Current Legislation Data Base includes all new legislative actions introduced during the present year (1980) or those bills carried over from the previous year's sessions. The second data file, Historical Legislation Data Base, consists of all legislative actions since 1976 that have passed and become public laws, as well as those actions that were unsuccessful and were classified as denied by law. Currently the data bases include state-, local-, and federal, level legislation, with emphasis on the transportation of radioactive materials. Because of their relevance to the transportation issues, actions involving related subject areas such as, disposal and storage of radioactive wastes, moratoriums on power plant construction, and remedial actions studies, special agencies to regulate shipment of radioactive materials, and requirements of advanced notification, permits and escorts are also included in the data bases.

From 6th International Symposium on Packaging and Transporting Radioactive Material; Berlin, West Germany, November 10, 1980.

Fore, CS Heiskell, MM

Oak Ridge National Laboratory 1980, 5p

Contract W-7405-ENG-26

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: NTIS

CONF-801115-4

17 330662

MAINTENANCE OF WAY PLANNING: ONE VIEW OF THE ROLE OF THE COMPUTER...

Information systems have a growing role in railroad management and some specific problems of computer application to maintenance-of-way management are examined. After looking at a maintenance and engineering subsystem of an overall railroad functional information system, the importance of communication between m/w officers and the data processing department is emphasized. A specific application in engineering graphics--the use of a data base for constant updating of valuation maps and track charts--is discussed. Further applications in engineering drawing are also suggested.

Drogan, J *Railway Track and Structures* Vol. 77 No. 2, Feb. 1981, pp 28-30, 3 Fig.

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17 331460

HERE THEY COME

Management information services, now an accepted railroad function, have frequently become autonomous and moved from their original role as an adjunct of the accounting operation. The rate of change in computer hardware development has produced data system capabilities that far outstrip requirements; in the future mini and microsystems will increase so that larger systems are freed to become host processors. Their ability to provide information to support decision-making is now accepted. The ability of MIS staffs to fulfill their roles is discussed, along with the ways their users can better utilize new computer-system capabilities.

Mitchell, FS *Modern Railroads/Rail Transit* Vol. 36 No. 2, Feb. 1981, pp 29-32, 4 Phot.

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17 331858

AN INFORMATION SYSTEM IN THE FIELD OF MANAGEMENT [Informatsionnaya sistema v sfere upravleniya]

This book addresses problems in constructing an automated information system oriented toward control of the transportation process at the USSR Ministry of Railway Transport level. Discussed are the experience in developing an industrial branch automated information system, separate

decisionmaking processes, problems of information systems integration, the development of a man-machine dialogue mode, and the procedures for cataloging, storing, and retrieving computerized information. This book is intended for engineering technical employees involved in the management field, as well as in the development and introduction of the Automated Railroad Transportation Control System (ASUZhT). It also serves as a study aid for the teaching of management organization and provides ASUZhT-related information for use in skill-upgrading courses and in institutions of higher education. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D).

Kulaev, KV Tishkin, EM
Transport Publishing House 1978, 88p, 27 Fig., 39 Tab.

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

17 331862
IMPROVEMENT OF THE TECHNOLOGY OF THE TRANSPORTATION PROCESS--A PRIORITY TASK
[Sovershenstvovanie tekhnologii perevozchnogo protsessa--Glavnaya zadacha]

Provided is an overview of the USSR Ministry of Railway Transport (MRT) development of the Automated Railroad Transportation Control System (ASUZhT). It is stated that the aim of the creation of ASUZhT is to ensure the optimum use of the available physical plant and working resources in railroad transportation. The work is directed by the Main Department for Computer Technology of the MRT and includes three sets of tasks that are intended to improve control of the transportation process. These sets consist of (1) documents for plans and standards regulating the transportation process (the individual tasks are listed and new developments in primary data processing are discussed), (2) the operational control of the transportation process (the individual tasks are listed, and the automated information and planning systems are discussed), and (3) automated classification yard control systems (the individual tasks are listed). Note is made of the fact that the Byelorussian and October railroads are using a promising method of data collection for car loading and unloading based upon direct use of primary accounting documents--waybill duplicates and car lists. Emphasis is placed on the need for all railroads to comply with MRT directive No. 30Ts on the automation of recordkeeping of train and locomotive movements as well as car fleet allocations. Representative of the requirements of the directive are the creation of information bureaus servicing several enterprises in close proximity to the terminals (as is already done on the Byelorussian Railroad), and the use of an automated classification yard control system in data reduction and dissemination (using the experience of the Gorki Railroad). USSR railroad network automated system improvement needs are stated, as are the economic benefits from systems that are operational. The article also presents resolutions of the MRT Collegium, which has reviewed the progress in automated control systems, and areas in computer technology that shall see further development in the years 1978-1985. [Russian]

Abstract only available in English. Original documents, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D).

Khandkarov, YuS *Avtomatika, Telemekhanika i Svyaz* No. 7, July 1979, pp 1-4.

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

17 331863
BASIC TRENDS IN THE FUTURE DEVELOPMENT OF ASUZHT (AUTOMATED RAILROAD TRANSPORTATION CONTROL SYSTEM)
[Osnovnye napravleniya dal'neishego razvitiya ASUZHT]

Discussed are the basic trends in the future development of the USSR Ministry of Railroad Transport's centralized traffic management system known as the Automated Railroad Transportation Control System (ASUZhT). Ongoing activities of railroad computer centers in cooperation with Soviet railway research institutes and ministry departments are reviewed. A working group has been charged with the development in 1979-80 of an integrated system for processing waybills and waybill duplicates. Improvement of control of the transportation process is also

being realized through the creation of automated information/inquiry systems to solve operations control problems. The automated classification yard control system is intended to reduce the time cars spend in yards by automating car document and data processing and improving car blocking and train makeup planning. Sets of tasks are listed that constitute the work of computer center collectives for the years 1979-85 in the area of improvement of the transportation control process. In addition, inadequacies in present automated control systems are pointed out. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D).

Khandkarov, YuS *Zheleznodorozhnyi Transport* No. 6, 1979, pp 52-56

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

17 331882
TERMINAL COMPUTER CENTERS FOR RAILROAD TRANSPORTATION
[Uzlovye vychislitel'nye tsentry zheleznodorozhnogo transporta]

The USSR Ministry of Railway Transport (MRT) is developing a nationwide computer traffic management system known as the Automated Railroad Transportation Control System (ASUZhT). The system is being planned to operate at three basic levels--a main computer center at the MRT, railroad computer centers (one such center for each railroad), and terminal computer centers (several such centers per railroad). This proceeding presents four technical papers on the terminal computer centers: (1) Principles of Establishing Terminal Computer Centers for Railroad Transportation, (2) Functional Structure of the Automated Control System Used at a Terminal Computer Center, (3) Parameters of the Computer System and the Data Transmission Network of a Terminal Computer Center, (4) Mathematical Support of a Terminal Computer Center. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Trudy VNIIZT Proceeding No. 600, 1979, 62p, 10 Fig., 6 Tab., 7 Ref.

ACKNOWLEDGMENT: FRA
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17 331883
PRINCIPLES OF ESTABLISHING TERMINAL COMPUTER CENTERS FOR RAILROAD TRANSPORTATION
[Printsipy formirovaniya yzlovykh vychislitel'nykh tsentrov na zheleznodorozhnom transporte]

Presented are the essential principles for establishing the functional structure and informational and technical needs, as well as the data transmission network arrangement, of terminal computer centers. The results of research have shown that it is expedient to establish an average of three or four terminal computer centers per railroad, with each center serving railroad industrial enterprises on two or three divisions of the railroad. The essential workload of these computer centers consists of the direct technical control of classification yards, large freight yards, track sections, and locomotive and car depots. The terminal computer centers represent the lowest of the three levels of the nationwide traffic management system known as the Automated Railroad Transportation Control System (ASUZhT). [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Buyanov, VA Ratin, GS Vasyukov, SA *Trudy VNIIZT* Proceeding No. 600, 1979, pp 3-7, 2 Fig.

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

17 331884
FUNCTIONAL STRUCTURE OF THE AUTOMATED CONTROL SYSTEM USED AT A TERMINAL COMPUTER CENTER
[Funktsional'nyi sostav ASU na baze UVTs]

This paper describes the automated control system, which constitutes the heart of each terminal computer center. The terminal computer centers represent the lowest of the three levels of the nationwide traffic management

system known as the Automated Railroad Transportation Control System (ASUZhT). The principal activities of the automated control system are (1) classification yard operations, (2) freight yard operations, (3) work scheduling for locomotive and car shops, and (4) terminal operations. Data are provided on the cost-effectiveness of introducing the automated control system in railroad operations. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Buyanov, VA Vasyukov, CA Kazak, LA Mikheev, BA *Trudy VNIIZT* Proceeding No. 600, 1979, pp 8-26, 2 Fig., 1 Tab.

ACKNOWLEDGMENT: FRA

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17 331885

PARAMETERS OF THE COMPUTER SYSTEM AND THE DATA TRANSMISSION NETWORK OF A TERMINAL COMPUTER CENTER [Parametry vychislitel'noy sistemy i seti peredachi dannykh UVTs]

This paper describes the data processing capabilities of a terminal computer center, and is based on the results of an analysis of the activities of a hypothetical terminal computer center. The terminal computer centers represent the third and lowest level of the nationwide traffic management system known as the Automated Railroad Transportation Control System (ASUZhT). Discussed are the center's information storage and retrieval requirements and data transmission facilities. [Russian]

Abstract only available in English. Original document untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Ratin, GS Prusakova, SI Krutov, AS Vasyukov, SYa *Trudy VNIIZT* Proceeding No. 600, 1979, pp 28-52, 9 Fig., 5 Tab., 5 Ref.

ACKNOWLEDGMENT: FRA

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17 331886

MATHEMATICAL SUPPORT OF A TERMINAL COMPUTER CENTER [Matematicheskoe obespechenie UVTs]

This paper sets forth the principles for development of a data base for a terminal computer center, as well as for organization of the center's data processing activities. Terminal computer centers constitute the third and lowest level of the nationwide traffic management system known as the Automated Railroad Transportation Control System (ASUZhT). [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Buyanov, VA Ratin, GS Krutov, AS Prusakova, SI *Trudy VNIIZT* Proceeding No. 600, 1979, pp 53-63, 2 Fig., 2 Ref.

ACKNOWLEDGMENT: FRA

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17 331888

THE INTEGRATED UTILIZATION OF DATA IN RAILROAD COMPUTER CENTERS [Integrirovannoe ispol'zovanie dannykh v dorozhnykh vychislitel'nykh tsentrakh]

The results are given of an analysis of the information base for priority tasks in the transportation control process in phase 2 of the Automated Railroad Transportation Control System (ASUZhT). [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Tulupov, LP Krupin, AV Kalinin, OA Stepanov, VN *Vestnik VNIIZT* No. 1, 1979, pp 1-5

ACKNOWLEDGMENT: FRA

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

17 331889

AN INFORMATION MODEL ON THE CONDITION OF THE TRANSPORTATION PROCESS IN THE MAIN COMPUTER CENTER OF THE MINISTRY OF RAILWAY TRANSPORT [Informatsionnaya model' sostoyaniya perevozhnogo protsessa v GVTs MPS]

The basic principles are given for building an information model at the Main Computer Center of the USSR Ministry of Railway Transport on the condition of the railroad transportation process. The model uses operating data provided by the railroad network's computerized information system. It covers the operations of all the ministry's divisions and major traffic, freight, and locomotive departments. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Voronina, AA Shramov, AA *Vestnik VNIIZT* No. 1, 1979, pp 5-7

ACKNOWLEDGMENT: FRA

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

17 334216

THE 1977 CENSUS OF TRANSPORTATION: AN UPDATE

This paper reports on the status of the 1977 Census of Transportation, which consists of four surveys: National Travel Survey, Commodity Transportation Survey, Truck Inventory and Use Survey, and Survey of Nonregulated Motor Carriers and Public Warehousing. It deals with the methodology used in these surveys compared with that followed in the 1972 census. This report also examines the problems and benefits realized from the 1977 approach. Finally, it suggests additional improvements and alternative possible for future transportation census taking, particularly for the 1982 census. (Author)

This paper appeared in Transportation Research Record No. 779, Transportation Information Systems: Applications and Uses.

Torene, R Cannon, J (Bureau of the Census) *Transportation Research Record* No. 779, 1980, pp 16-21, 4 Ref.

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17 334472

STATUS REPORT: CAR MAINTENANCE COST DATA BASE

This report discusses the contents, structure, and potential of the Car Maintenance Cost Data Base. This data base contains monthly repair and mileage records beginning in 1976, on over 200,000 freight cars owned by four U.S. railroads. The sample results describe differences in maintenance cost by car type and car age. Further, the repair cost in each of nine freight car component categories is shown for four car types.

Guins, TS Hargrove, MB

Association of American Railroads AAR R-429, Apr. 1980, 21p, Figs., Tabs., 3 App.

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

DOTL RP

17 334705

DATA PROCESSING OF THE WEST GERMAN RAILROAD SYSTEM IN PROGRESS [Datenverarbeitung der Deutschen Bundesbahn im Wandel]

The extent and importance of the data processing are considered. The introduction of systematics for program development based on the operational system ORGWARE is dealt with. The continuously increasing requirements of data processing require a comprehensive participation of the railroad services with regard to programming and development of procedures and process classes in the field of data processing. [German]

Schenk, O *Elektrische Bahnen* Vol. 78 No. 9, Sept. 1980, pp 224-228, 4 Ref.

ACKNOWLEDGMENT: EI

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17 334706

AUTOMATIC ACQUISITION OF MEASUREMENT DATA WITH THE AID OF MICROCOMPUTERS [Automatische Messdatenerfassung mit Mikrocomputer]

Railroad systems make use of testing and measuring vehicles which automatically acquire and store measuring data. The possibilities offered by the use of microcomputers for this purpose are discussed. The necessary conversion of measuring data, the data selection and data storage are dealt with. [German]

Sliwa, H *Elektrische Bahnen* Vol. 78 No. 9, Sept. 1980, pp 235-239

ACKNOWLEDGMENT: EI

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DOTL JC

17 334738

MINICOMPUTERS TACKLE CAD/CAM

Finite-element analysis and other complex operations formerly required mainframe computers. But minicomputers have grown in power and are now taking on some of these big "number-crunching" jobs. They even demonstrate certain advantages over their larger counterparts.

Cokonis, TJ *Machine Design* Vol. 53 No. 1, Jan. 1981, pp 121-125

ACKNOWLEDGMENT: British Railways

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DOTL JC

17 341030

APPLICATION OF COMPUTERS TO TRAIN DISPATCHING

Current interest in computers to optimize dispatching operations has been motivated by potential productivity improvements, improved quality and consistency of dispatching decisions as well as ability to produce high quality information for railroad management. This paper presents a computer aided dispatching system now in railroad operation which performs the routine functions of driving displays, train tracking, automatic route setting, identification and optimal solution of conflicts between trains and the generation of management reports. The system thus frees the dispatcher to concentrate on the more critical decision oriented aspects of his job. The system accepts data from remote terminals to allow yard masters to input requests for switching movements which influence main line operations. At any time, the dispatcher can intervene to impose his own route setting or conflict decisions. Any individual control points within the controlled area can be switched from remote control to manual control. Techniques are used to enable the railway to handle certain safety related functions automatically, including supervision of blocked tracks and routing of oversized trains. The TRAIN OPERATION MANAGEMENT SYSTEM has been proven in revenue operation over the past several years, safely controlling more than 600,000 train movements through the controlled area.

Association of American Railroads 1979 Technical Papers and Committee Reports, 19th Annual Meeting, Chicago, Illinois, September 20-22, 1979.

Friesen, W (SEL Canada)

Association of American Railroads Tech Paper 1979, pp 1-16, 7 Fig.

ORDER FROM: AAR

DOTL RP

18 327763

MULTIREGIONAL METHODOLOGIES FOR RAILROAD ANALYSES. REPORT NO. 23

The purpose of the report is to describe the current state of the U.S. railroad industry and some of the regional methodologies that could be used to analyze it. Because the multiregional input-output technique permits an interindustry and interregional study of the railroad industry, this methodology was described in the greatest detail.

Sponsored in part by Federal Railroad Administration, Washington, DC.

Crown, WH Gallagher, JR

Massachusetts Institute of Technology, Economic Development Administration, Federal Railroad Administration EDA-ERD-80-167, June 1980, 82p

Grant EDA-OER-544-G-79-5

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-120099

18 327766

A DETAILED METHODOLOGY FOR RAILROAD COSTS. REPORT NO. 24

Expenditures by the railroad industry are estimated using the Multi-regional Input-Output Model (MRIO) format, thus making them useful for the study of changes in regional prices and quantity demanded. In order to be consistent with the national input-output table that has been constructed by the Bureau of Economic Analysis, the railroad estimates are made for the calendar year 1972. A detailed description of the methodology used in making these estimates is presented in this report. This is followed by a brief analysis of the interregional differences in railroad expenditures.

Sponsored in part by Federal Railroad Administration, Washington, DC.

Gallagher, JR DeVol, KR Crown, WH

Massachusetts Institute of Technology, Economic Development Administration, Federal Railroad Administration EDA-ERD-80-166, June 1980, 217p

Grant EDA-OER-554-G-79-5

ACKNOWLEDGMENT: NTIS

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PB81-121428

18 328714

CAPITAL REQUIREMENTS FOR THE TRANSPORTATION OF ENERGY MATERIALS: 1979 ARC ESTIMATES. DRAFT FINAL REPORT

This report contains TERA's estimates of capital requirements to transport natural gas, crude oil, petroleum products, and coal in the United States by 1990. The low, medium, and high world-oil-price scenarios from the EIA's Mid-range Energy Forecasting System (MEFS), as used in the 1979 Annual Report to Congress (ARC), were provided as a basis for the analysis and represent three alternative futures. TERA's approach varies by energy commodity to make best use of the information and analytical tools available. Summaries of transportation investment requirements through 1990 are given. Total investment requirements for three modes (pipelines, rails, waterways and the three energy commodities can accumulate to a \$49.9 to \$50.9 billion range depending on the scenario. The scenarios are distinguished primarily by the world price of oil which, given deregulation of domestic oil prices, affects US oil prices even more profoundly than in the past. The high price of oil, following the evidence of the last year, is projected to hold demand for oil below the recent past. (ERA citation 05:035041)

TERA, Incorporated, Department of Energy Aug. 1980, 153p

Contract AC01-80EI10617

ACKNOWLEDGMENT: NTIS

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DOE/EIA/10617-T1

18 330163

FREIGHT TRANSPORT REGULATION

While this work was completed in advance of actual deregulation of the railroad and trucking industries, the authors evaluate the consequences of such a step by means of a general equilibrium model which quantifies the efficiency and distributional effects of such a step. New econometric and analytical tools are used in the general equilibrium analysis with explicit

attention to tradeoffs between efficiency and distributive aspects of deregulation policies and the relationship between freight rates and regional incomes. The analysis recognizes interdependence among various railroad and trucking modes. By differentiating between short-run and long-run equilibrium, it takes into account changes in railroad infra-structure, balancing the huge costs of line maintenance against the savings of abandoning light-density routes. The book also tests a number of general hypotheses about the structure of cost and demand in the transport industries. It was found that public interest would be served by deregulation, particularly in less-than-truckload trucking of general commodities, allocating resources effectively and equitably and causing few disruptions of existing equilibrium. Although a movement toward competitive equilibrium in rail and truckload markets would generate aggregate efficiency and distributive benefits considerably in excess of costs, it was found likely that considerable income transfer would result from such changes. Although written from the viewpoint of the economist, transport and policy analysts also will find valuable information in this volume.

Friedlaender, AF Spady, RH

Massachusetts Institute of Technology Press 1980, 366p, Figs., Tabs., Refs., 5 App.

Grant DOT-OS-50239

ORDER FROM: Massachusetts Institute of Technology Press, 28 Carlton Street, Cambridge, Massachusetts, 02142

18 330678

THE FUTURE ECONOMICS OF COAL TRANSPORT

The report examines the future economics of all bulk coal transport modes likely to be important up to the year 2000: railways, slurry pipelines, inland waterways, roads, conveyor belts, bulk carriers, and self-unloading ships. The economics of transshipment (transferring coal from one transport mode to another) are also discussed. Chapters on each transport mode deal with current technology, the structure of the industry, capital costs and the components of the operating costs, the relationship between costs and prices, energy intensiveness, flexibility, potential developments and possible constraints. No absolute constraint is foreseen on the expansion of coal transport to any reasonable level up to the year 2000. At particular times and places there will be significant constraints which could cause delays but, in general, these can be overcome by extra investment to expand existing facilities or to build new ones, or by using a different transport mode.

Lee, HM

Economic Assessment Service EAS Rpt. D2/79, Nov. 1980, 90p, 5 Fig., 22 Tab., 72 Ref.

ORDER FROM: Economic Assessment Service, 14/15 Lower Grosvenor Place, London SW1, England

18 331462

USING OTHER PEOPLE'S MONEY...

While rolling stock leases did bring new money into the capital-short railroad industry, they have become less attractive recently. Now the potential is seen for leveraged and nonleveraged leasing of maintenance-of-way equipment. Suppliers of this equipment are already meeting such a requirement and it is speculated that ultimately the concept might be extended to the track structure itself.

Mitchell, FS *Modern Railroads/Rail Transit* Vol. 36 No. 3, Mar. 1981, pp 35-38, 4 Phot.

ORDER FROM: ESL

DOTL JC

18 331490

ON THE ECONOMICS OF RAPID-TRANSIT OPERATIONS

This paper develops and estimates a new cost function for rapid-rail properties in the United States and Canada. Its advantage over previously developed cost models lies in its being an approximation to an arbitrary cost function, and thus not subject to the restrictions inherent in other models. The characterization of the industry that emerges from this work differs in important respects from that previously reported. An application to Bay Area Rapid Transit system is also discussed.

Viton, PA (Pennsylvania University, Philadelphia) *Transportation Research. Part A: General* Vol. 14A No. 4, Aug. 1980, pp 247-253, 19 Ref.

ACKNOWLEDGMENT: EI

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DOTL JC

18 331849

PRODUCTIVITY IN U. S. RAILROADS, 1951-1974

This study develops estimates of U. S. railroad productivity by using methods based on the neoclassical theory of production. We find that railroad productivity grew at the average annual rate of 1.5 percent per year during the 1951-1974 period. Using conventional measurement procedures for comparison, we find productivity growth of 3.6 percent per year. The lower estimate of 1.5 percent is the result of using procedures which better represent the railroad production process. These include using (1) estimated cost elasticities, rather than revenue shares, as output weights, (2) actual cost shares, rather than national income shares, as input weights, and (3) input and output weights which change annually.

Caves, DW (Wisconsin University, Madison); Christensen, LR Swanson, JA *Bell Journal of Economics* Vol. 11 No. 1, 1980, pp 166-181, 21 Ref.

ACKNOWLEDGMENT: EI
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18 331897

MEASURING INDUSTRIAL STAGNATION: THE CASE OF THE US RAILROADS

This paper first applies to railroads the tools of modern fiscal risk analysis, using the long-term series of holding period rates of return on railroad shares to derive a measure of industrial stagnation. This analysis is then used to gain added insights into the industry's transition from growth to stagnation. While fundamental disequilibrium produces a continuing low rate of return, railroads have succeeded in raising substantial capital on a continuing basis despite frequent bankruptcies and financial crises by resorting to financial innovations. The equipment trust certificate is cited as an example, an investment instrument which effectively shields the investor from the riskiness of enterprise. This has enabled railroads to raise debt capital at a relatively low-risk premium.

Dunbar, RLM Sarnat, M *Journal of Industrial Economics* Vol. 28 No. 3, Mar. 1980, pp 255-268, 3 Fig., 2 Tab., 23 Ref.

ORDER FROM: Basil Blackwell Publishers Limited, 108 Cowley Road, Oxford OX4 1LR, England

18 331898

THE RATE STRUCTURE OF UNIT COAL TRAINS IN THE 1970S

Although railroads have aggressively attempted to exploit their potential monopoly power in moving Western coal, utility resistance and ICC constraints appear to have limited carrier ability to produce the potential net from unit train operation that should result if they were free to act as profit-maximizing monopolies. The authors' analysis shows a fundamental shift in rate-making from 1973 when a monopoly rate model fitted the data quite well to 1978 when it failed to give an adequate representation. With Western coal mining still in its infancy, it is suggested that the rate-making process will increasingly be a system of negotiations among parties with relatively equal bargaining powers, giving railroads more incentive to employ unit trains that will control costs and maintain their profit levels.

Friedlaender, AF Ferguson, WL Sloss, J *Journal of Industrial Economics* Vol. 28 No. 3, Mar. 1980, pp 269-286, 2 Tab., 17 Ref.

ORDER FROM: Basil Blackwell Publishers Limited, 108 Cowley Road, Oxford OX4 1LR, England

18 334413

A CONCEPTUAL FRAMEWORK FOR FINANCING RAIL BRANCH LINE OPERATION AND REHABILITATION

This paper develops a conceptual framework for financing branch line operation and rehabilitation. A related question is the pricing of branch line services. Increased motor carrier competition, due to technologies which were unknown during the railroad building era, has resulted in a decreased demand for rail branch line service. For rail branch lines where retention is desired, rehabilitation or upgrading may be required for continued use. These undertakings require large capital expenditures and are consequently pressing problems for transport policy makers. A recent Canadian Commission of Inquiry suggested that rehabilitation and upgrading funds are required for continued use of the Prairie grain gathering branch line system. Some federal funds have already been allocated for this purpose but almost \$1 billion will be required if the entire system is to be rehabilitated. A similar problem is addressed by the Railroad Revitalization and Regulatory Reform Act in the United States.

World Conference on Transport Research. Transport Research for Social and Economic Progress, April 14-17, 1980, Imperial College, London, England.

Wilson, WW Tyrczniewicz, EW
Manitoba University, Canada Conf Paper 1980, p B-02

ORDER FROM: Manitoba University, Canada, Department of Agricultural Economics, Winnipeg, Manitoba, Canada

18 334429

DEREG ANALYSIS

The Staggers Rail Act of 1980 is moving U.S. railroads into a new environment governed much more by competition and the principles of economics, a significant change from the regulated atmosphere that has prevailed for this century. Three articles analyze this new, less-regulated era. Loosening the Grip by F.S. Mitchell discusses the rate-making freedom which finds mixed reaction from shippers and optimism on the part of railroads. We Now Have the Tools by F. E. Shaffer examines contract rates; railroads are urging shippers to shop around but they must now have knowledge of their exact costs. Variable Costs Unlocking the Future by B. Paul describes the revenue-to-variable-cost ratio which gained an institutional role in the Staggers Act, telling why it is so important along with the ratio of variable-to-fixed costs. The Uniform Rail Costing System is replacing the Rail Form A method for determining costs.

Modern Railroads/Rail Transit Vol. 36 No. 4, Apr. 1981, pp 32-42, 3 Phot.

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18 334732

FINANCIAL AND PHYSICAL CAPACITY OF THE BURLINGTON NORTHERN RAILROAD TO MOVE WESTERN COAL

Burlington Northern coal revenues, which grew from 15 percent of all freight revenue in 1975 to 30 percent in 1980, are expected to represent 50 percent by 1990 if present trends continue. Debt service for capital programs for expanded capacity is expected to be adequately met from earnings for the remainder of this century for the low and medium-growth scenarios examined. While internally generated funds and long-term debt issues could be utilized for the two forecasts, for the high-growth scenario which was studied it would be difficult to generate adequate capital. Earnings would have to be much higher than are likely to be produced by the rate structures that would be permissible under current regulatory provisions.

Argonne National Laboratories, Peat, Marwick, Mitchell and Company, Department of Energy ANL/EES-TM-123, Oct. 1980, 52p, 6 Fig., 19 Tab.

Contract 31-109-38-5806

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18 334951

BUY OR LEASE? REDUCING THE GUESS WORK

Financing freight cars may involve either purchase or lease. With purchase, ownership and use involve the same party while in leasing ownership and use involve different parties. Decision makers must select financing that maximizes present value of net after-tax profit over the life of the equipment. Leasing involves a greater degree of complexity than outright purchase with leases classified by length of term and by which parties assume which ownership costs, other than financing. The ramifications of the various types--full-payout net lease, net operating lease, full-service full-payout leases and full-service operating lease are explained, along with examples of actual calculations. Some forecasts on the future of various types of cars and the methods for their acquisition are included.

Pogue, WH, Jr Rubel, JH *Railway Age* Vol. 182 No. 10, May 1981, p 32, 1 Phot.

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18 335063

RAILROAD RATES, PROFITABILITY, AND WELFARE UNDER DEREGULATION

Efforts to reform regulation of the railroad industry are supported by a substantial body of economic research which has described and measured the cost of the present regulatory regime. In focusing on the defects of the status quo, economists have neglected to give sufficient attention to

analyzing in detail the likely consequences of alternative regulatory policies, including deregulation. This paper draws on available estimates of the structure of rail demand and technology in an attempt to predict the impact of rate flexibility on rail prices, profitability, and economic welfare. The effects of deregulation are simulated under a variety of alternative assumptions concerning the elasticity of demand for rail services, the degree of interrailroad competition, the presence or absence of truck deregulation, and the magnitude of rail cost reduction attainable with enhanced commercial freedom. The principal object of this exercise is to ascertain whether rate deregulation is likely to restore the rail industry to financial viability by generating a cash flow sufficient to maintain adequately and improve the physical plant and to provide high quality rail service. A corollary aim is to determine whether present or potential railroad market power is sufficiently great to generate excessive increases in profits, prices, and associated static dead-weight losses.

Levin, RC (Yale University) *Bell Journal of Economics* Vol. 12 No. 1, 1981, pp 1-26, 1 Fig., 14 Tab., Refs.

ORDER FROM: American Telephone and Telegraph Company, 195 Broadway, Room 01-1940, New York, New York, 10007

DOTL JC

18 335064
THE WELFARE EFFECTS OF ICC RATE REGULATION REVISITED

This article analyzes the welfare effects of ICC rate regulation for the U.S. surface freight transportation system. An estimate of the deadweight loss under first-best and Ramsey pricing is provided. Various alternatives to current rate regulation are discussed including partial and complete rate reform. The major conclusion regarding piecemeal approaches is that solely deregulating motor freight will increase the amount of traffic misallocation. In the final analysis, the most desirable alternative appears to be deregulation of motor carrier rates accompanied by regulated rate reform in rail.

Winston, C (Massachusetts Institute of Technology) *Bell Journal of Economics* Vol. 12 No. 1, 1981, pp 232-244, 2 Fig., 3 Tab., Refs., 1 App.

ORDER FROM: American Telephone and Telegraph Company, 195 Broadway, New York, New York, 10007

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18 335635
ECONOMIC COMPARISON BETWEEN RAILWAY AND HIGHWAY TRANSPORTATION. APPLICATIONS FOR THE REGIONAL FLOW OF AGRICULTURAL FREIGHT [COMPARACAO ECONOMICA ENTRE TRANSPORTES FERROVIARIOS E RODOVIA-RIOS. APLICACAO PARA ESCOAMENTO REGIONAL DE CARGA AGRICOLA]

This book presents an analysis of evaluation methodologies involving the technical choices of evaluation, structures and methods for analysis, as well as economic evaluation through both costs and efficiency. It makes a study of both direct and indirect benefits upon the reduction of operation maintenance costs and presents a basic model. It also makes a study of an actual case simulating the traffic conditions, and presents a wide range of pertinent aspects, such as: capacity and daily traffic volume, costs of earth roads with primary surfacing, as well as paved ones. It makes an economic comparison of highway improvements according to the various types of finish. It also makes a study of investment costs, maintenance costs for using the highway, costs supported by goods being moved, investment costs for constructing a railroad, costs of railroad vehicles for maintenance purposes and costs justified by goods moved by the railroad. [Portuguese]

Costa, JIA Waisman, J
Instituto Militar de Engenharia Monograph 1979, 32p

ACKNOWLEDGMENT: TRRL (IRRD 254172)

ORDER FROM: Instituto Militar de Engenharia, Praca General Tiburcio, S/N Praia Vermelha, Rio de Janeiro, Brazil

18 335840
SECOND BEST PRICING FOR COMPETING MODES OF TRANSPORT

This paper was presented at Session 4: Pricing and Evaluation. A well known second best pricing rule for a decreasing cost public enterprise subject to a budget constraint (eg being required to break even) is that the revenue required over and above marginal cost should be obtained by allocating the additional charges in inverse proportion to demand elasticities. This rule,

which is essentially traditional value-of-service discriminatory pricing, breaks down when there are significant cross-elasticities. Thus, in some important transport cases a better rule is needed. This paper shows how the appropriate second best pricing rule can be applied to specific transport situations and demonstrates that the resulting prices can differ substantially from the simple elasticity rule. The extreme case of closely competing modes such as rail and road general freight are given particular attention, and it is shown that improved cost data together with better estimates of demand elasticities make rational public enterprise pricing a feasible policy (a). The number of the covering abstract of the forum is IRRD no. 250625.

6th Australian Transport Research Forum, Brisbane, 22-24 October, 1980. Forum Papers, Queensland, Australia.

Taplin, JHE (Tasmania University, Australia)
Metropolitan Transit Authority, (0313-6655) 1980, pp 199-206, Figs., Tabs., Photo., 11 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 250651), Australian Road Research Board

ORDER FROM: Metropolitan Transit Authority, 230 Brunswick Street, Fortitude Valley, Queensland, Australia

18 335859
ANALYSIS OF MORTGAGE-RELATED PROBLEMS IN THE FINANCIAL AND CORPORATE RESTRUCTURING OF RAILROADS. VOLUME 1

Impediments to change occurring within existing railroad financial structures are identified, with particular emphasis on long term financing by mortgage bonds. Characteristics of railroad mortgage bonds are summarized. Impacts of mortgage restrictions upon corporate restructuring proposals are identified. The feasibility of using mathematical models to estimate the fair market value of infrequently traded railroad bonds is assessed. Conclusions, recommendations, and analysis are presented in Volume I. Volume II of the report is a four part compilation of the characteristics of mortgage bonds outstanding on December 31, 1975.

Fuentevilla, W
Kidder, Peabody and Company, Incorporated, Federal Railroad Administration Final Rpt. FRA-OPPD-79-6-1, Sept. 1979, 116p, Figs.

Contract DOT-FR-75239

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18 335860
ANALYSIS OF MORTGAGE-RELATED PROBLEMS IN THE FINANCIAL AND CORPORATE RESTRUCTURING OF RAILROADS. VOLUME 2

Impediments to change occurring within existing railroad financial structures are identified, with particular emphasis on long term financing by mortgage bonds. Characteristics of railroad mortgage bonds are summarized. Impacts of mortgage restrictions upon corporate restructuring proposals are identified. The feasibility of using mathematical models to estimate the fair market value of infrequently traded railroad bonds is assessed. Conclusions, recommendations, and analysis are presented in Volume I. Volume II of the report is a four part compilation of the characteristics of mortgage bonds outstanding on December 31, 1975.

Fuentevilla, W
Kidder, Peabody and Company, Incorporated, Federal Railroad Administration Final Rpt. FRA-OPPD-79-6-2, Sept. 1979, 243p

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18 335861
RESTRUCTURING THE RAILROADS: COST SAVINGS FROM BRANCHLINE ABANDONMENTS

This study examines the economic viability of light density rail lines and attempts to measure the potential cost savings from the abandonment of unviable lines. Chapter II presents the economic factors which should be used in measuring viability and making disinvestment decisions. In Chapter III, regression analysis is performed to estimate the costs of providing rail service on light density lines; the regression results are compared to cost estimates derived from case studies. The role of branch rail lines is reviewed in Chapter IV, which presents statistics relating the origination and

termination of rail traffic, by state and commodity type, to the traffic density of the lines over which the traffic moves. Then, in Chapter V, the study employs a network simulation model of the rail industry to analyze the flow of traffic to and from branch lines and assess their economic viability. In the concluding chapter, the study summarizes the results of the analysis, reporting significant cost savings from abandonment of unviable branch lines.

Harris, RG
Federal Railroad Administration Final Rpt. FRA-OPPD-80-6, Dec.
1977, 91p, Figs., Tabs., 2 App.

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PB81-187759, DOTL RP

19 335066

THE CUMBRES AND TOLTEC SCENIC RAILROAD: THE HISTORIC PRESERVATION STUDY

The narrow-gauge line known today as the Cumbres & Toltec Scenic Railroad is the sole remaining link to a bygone age of railroad history. The 64 miles of track through the San Juan Mountains between Chama, New Mexico, and Antonito, Colorado, is a "living museum"--original rolling stock operating on a route opened in the early 1880s. Built to tap a mining boom, the line underwent hard times beginning with the collapse of silver prices in 1893. In 1967, owners announced plans to abandon it, and citizens

and lawmakers became concerned with preserving a functioning steam railroad. Today N.M. and Colorado own the line, which is operated on lease. This book, a comprehensive study of the present operation of the C&TSRR, inventories of the railroad's buildings and equipment. The text and photographs show the stabilization and restoration that have occurred, while providing plans for conservation.

Wilson, S. Glover, VJ

New Mexico University Press 1980, 170p

ORDER FROM: New Mexico University Press, Albuquerque, New Mexico, 87131

20 325782

FUTURE COAL PROSPECTS, COUNTRY AND REGIONAL ASSESSMENTS, REPORT OF THE WORLD COAL STUDY

This book is the second and final WOCOL report and contains the full texts of the reports prepared by the teams from each country in WOCOL as well as the specially commissioned studies of other regions.

Greene, RP Gallagher, JM Wilson, CL

Ballinger Publishing Company, Massachusetts Institute of Technology, 1980, 577p

Contract EX-76-A-01-2295

ORDER FROM: Ballinger Publishing Company, 17 Dunster Street, Cambridge, Massachusetts, 02138

20 326626

WESTERN ENERGY: THE INTERREGIONAL COAL ANALYSIS MODEL

This report describes a method for anticipating some of the impacts of coal development under different policy options. The Interregional Coal Analysis Model (ICAM) for the Western States, projects the likely shifts in the patterns of coal production, transportation, and utilization which might result from alternative policy strategies. It describes the structure of and the data in two models. The 1975 model describes the coal mining-large electrical generation plant interactions which existed in 1975. It develops a base solution against which alternative scenario solutions are compared. The 1985 model portrays a reasonable reference case for 1985. It also develops a base solution for use in comparing scenario analyses.

Green, JW

Economics, Statistics, and Cooperatives Service, Environmental Protection Agency TB-1627, EPA-600/7-79-139, Aug. 1980, 264p

ACKNOWLEDGMENT: NTIS

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PB81-106288

20 327632

FORECAST OF FUTURE OHIO RIVER BASIN, WATERWAY TRAFFIC BASED ON SHIPPERS SURVEYS

This report to the Corps of Engineers describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projections of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity group and origin-destination areas from 1975 to at least 1990. The three study projections, in conjunction with other analytical tools and system information, will be used to evaluate specific waterway improvements to meet short and long-term navigation needs. The output from these studies will serve as input to Corps' Inland Navigation Simulation Models to help analyze the performance and opportunities for improvement of the Ohio River Basin Navigation System. These data will be used in current studies relating to improvement of Gallipolis Locks, the Monongahela River, the Upper Ohio River, the Kanawha River, the Lower Ohio River, the Cumberland River and the Tennessee River, as well as other improvements.

Collis, H

Battelle Columbus Laboratories Sept. 1979, 215p

Contract DACW69-78-C-0059

ACKNOWLEDGMENT: NTIS

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AD-A087193/9

20 329061

REVISIONS TO THE WHARTON EFA AUTOMOBILE DEMAND MODEL: THE WHARTON EFA MOTOR VEHICLE DEMAND MODEL (MARK I)

The report documents revisions made to the Wharton EFA Automobile Demand Model to produce the Wharton EFA Motor Vehicle Demand Model (Mark I). Equations are reestimated for the total desired stock of autos and for desired shares by size class, including the foreign size classes. The automobile data was adjusted to exclude passenger vans, so equations for total new registrations, scrappage, and new registrations by size class are estimated. New data also allowed reestimated WEFA and EPA miles per

gallon equations in cross-section and time series. Vehicle miles traveled are estimated as the sum of urban and rural vehicle miles per car, which are the results of new behavioral equations. Consistent procedures are found for aggregation of vehicle miles and MPG's to produce average fuel economy and gasoline consumption. Automobile price equations and equations for related price indices are reestimated, as are equations for linkages to the WEFA Annual Model. Finally, a forecast through 1987 is presented and discussed.

Loxley, CJ Luce, P Osiecki, T Rodenrys, K Thanawala, S Wharton EFA, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-NHTSA-80-23, Dec. 1980, 177p

Contract DOT-TSC-1435

ACKNOWLEDGMENT: NTIS

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PB81-157703

20 329069

DEVELOPMENT OF POLICY SENSITIVE MODEL FOR FORECASTING FREIGHT DEMAND. REPORT ON PHASE 1

Freight transport demand is a matter that has received less than its share of attention both in the theoretical literature and in actual practice. The barriers to the development of appropriate freight transport demand forecasting techniques are developed and explained and methods for overcoming these barriers are suggested. The role of data both in the formulation and the use of the model is explained. Finally, a list of criteria for desirable features of a demand model are developed. Appendices present the specification of a model currently under development at MIT and a short review of the literature.

Roberts, PO Ben-Akiva, M Terziev, MN Chiang, YS Massachusetts Institute of Technology, Department of Transportation CTS-77-11, DOT/TPI-10-77-30, Apr. 1977, 133p

Contract DOT-OS-70006

ACKNOWLEDGMENT: NTIS

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PB81-159352

20 329129

EFFECTIVENESS OF COMPETITIVE FORCES TO LIMIT RAIL RATE INCREASES ON EXPORT WHEAT TRAFFIC

The report summarizes results of research conducted to determine the effectiveness of competition to limit increases in rail rate levels under conditions of rail deregulation. The study focuses on the ability of intramodal and intermodal competition to constrain rail rate increases on South Plains export wheat movement. In the intramodal analysis it is assumed that the dominant regional railroad alters its rates without any corresponding changes by other transportation firms. The intermodal competitive analysis centers on the ability of competing modes (truck and truck-barge combination) to constrain rail rate increases. In the intermodal analysis all railroads adjust rates in unison. The effectiveness of intermodal competition in restraining railroads is examined in a short- and long-run time frame. The long-run analysis permits new investment in river facilities to accommodate increased barge movement. The analysis is designed to measure the extent that dominant carrier (intramodal analysis) or all railroads acting in unison (intermodal analysis) could increase rate levels. The railroads are assumed to increase rate levels until revenue above variable cost commences to decrease.

Fuller, SW Shanmugham, CV Texas A&M University, Federal Railroad Administration Final Rpt. FRA-OPP-80-7, Oct. 1980, 59p

Contract DTFR-53-C-80-50003

ACKNOWLEDGMENT: NTIS

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PB81-162737

20 331545

PRODUCTIVITY PROBLEMS IN WESTERN SURFACE COAL MINING

The constraints to production which are discussed are: transportation, personnel, weather, geology, government programs and regulations.

Murray, RE (North American Coal Corporation) *Mining Congress Journal* Vol. 66 No. 8, Aug. 1980, pp 43-48

ACKNOWLEDGMENT: EI
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20 331556

NEW STRATEGY FOR AN OLD GAME

It is shown that to satisfy increased demand for coal, the United States and the electric utilities must face challenges in coal exploration, mining, labor, transportation, and regulation.

EPRI Journal Vol. 5 No. 8, Oct. 1980, pp 6-12

ACKNOWLEDGMENT: EI
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20 334289

FROM SHORE TO SHORE, THE EXPORT COAL FEVER SPREADS

The demand for export coal is producing either expansion or revival of certain U. S. ports' coal handling facilities and a planning of completely new ones elsewhere. The coal boom is marked by a demand for "steam" coal for electric power generation overseas; past demand was almost exclusively for "metallurgical" or coking coal. The article discusses factors such as ground storage for steam coal, car supply and utilization, financing, relations with inland waterway operations, environmental involvements and speculations on the ultimate size of the international coal market for U. S. and Canada.

Welty, G *Railway Age* Vol. 182 No. 4, Mar. 1981, p 26, 1 Phot.

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20 334312

COAL SUPPLY/DEMAND, 1980 TO 2000. TASK 3. RESOURCE APPLICATIONS INDUSTRIALIZATION SYSTEM DATA BASE. FINAL REVIEW DRAFT

This report is a compilation of data and forecasts resulting from an analysis of the coal market and the factors influencing supply and demand. The analyses performed for the forecasts were made on an end-use-sector basis. The sectors analyzed are electric utility, industry demand for steam coal, industry demand for metallurgical coal, residential/commercial, coal demand for synfuel production, and exports. The purpose is to provide coal production and consumption forecasts that can be used to perform detailed, railroad company-specific coal transportation analyses. To make the data applicable for the subsequent transportation analyses, the forecasts have been made for each end use sector on a regional basis. The supply regions are: Appalachia, East Interior, West Interior and Gulf, Northern Great Plains, and Mountain. The demand regions are the same as the nine Census Bureau regions. Coal production and consumption in the United States are projected to increase dramatically in the next 20 years due to increasing requirements for energy and the unavailability of other sources of energy to supply a substantial portion of this increase. Coal comprises 85 percent of the US recoverable fossil energy reserves and could be mined to supply the increasing energy demands of the US. The NTPSC study found that the additional traffic demands by 1985 may be met by the railways by the way of improved signalization, shorter block sections, centralized traffic control, and other modernization methods without providing for heavy line capacity works. But by 2000 the incremental traffic on some of the major corridors was projected to increase very significantly and is likely to call for special line capacity works involving heavy investment.

Fournier, WM Hasson, V
TRW Energy Systems Planning Division Oct. 1980, 166p

Contract AC01-80RA50211

ACKNOWLEDGMENT: Energy Research Abstracts
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DOE/RA/50211-T2

20 334324

COAL SUPPLY ALTERNATIVES FOR RURAL ELECTRIC G&T COOPERATIVES

The coal requirements of Generation and Transmission (G&T) rural electric cooperatives are expected to increase by an order of magnitude over the next 20 years. This report provides perspective and an analytic framework for G&T cooperatives to evaluate their individual coal procurement options. It identifies promising coal supply regions and key coal procurement issues; and evaluates alternative types of coal procurement strategies for rural

electric G&T cooperatives. Among the topics discussed are economic considerations in the choice of coal-type and supply region, economies of scale, alternative relationships with coal suppliers (e.g., spot purchases, contracts and captive operations), financing coal development, coal purchase contract terms, federal coal leasing, coal transportation, and the impacts of air quality regulations.

EPRI Report No. 1270, Jan. 1980, v.p.

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RAILROAD FREIGHT TRAFFIC FLOWS 1990

This study attempts to identify most probable future railroad flows between major origins and destinations to assist the railroad industry and government in planning to meet future requirements. The study concentrates on 14 major commodity groups, plus one "all other" group with the econometric models based on the 1949-1978 data from the Freight Commodity Statistics, supplemented by railroad data from other sources. Rail-handled coal is expected to more than double between 1978 and 1990, with smaller gains for chemicals, grain, forest products, nonmetallic minerals, pulp and papers, primary metals, grain mill products, transportation equipment and piggy-back. Losses are forecast for stone, sand and gravel, iron ore, cement, clay, glass and food products. It is concluded that coal will continue to be the railroads' major item of traffic; that substantial rail traffic will continue to move in the Northeast although that involving New England will be limited; that the Midwest will be marked by increased north-south flows; and that despite mergers the nature of traffic will still involve substantial interline movement.

Federal Railroad Administration No Date, 40p

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TWICE AS MUCH COAL BY 2000

Within 20 years coal output could be doubled or even trebled as a result of problems with oil and nuclear energy. Unless large sums are invested in rolling stock and infrastructure, lack of rail capacity will act as a brake on coal production, as trains are certain to remain the dominant transport mode. Peter James looks at studies carried out by international agencies, and concludes that scope for increasing the efficiency and productivity of unit trains is sufficient to ensure that they can remain competitive with barges and slurry pipelines.

James, P *Railway Gazette, International* Vol. 137 No. 2, Feb. 1981, pp 127-129

ACKNOWLEDGMENT: British Railways
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20 334956

FOR COAL INTERESTS, A TIME OF CHALLENGE AND OPPORTUNITY

An AAR-sponsored session on coal revealed that questions persist involving rates, environmental restrictions, and port congestion for export coal. While numerous new ship-loading facilities are planned as U.S. railroads look to growth of export coal traffic through traditional and new coal ports, this segment will remain a minor portion of total rail-handled coal. Controversy and negotiation continue over adequate rate levels for coal.

Railway Age Vol. 182 No. 9, May 1981, pp 42-44, 2 Phot.

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20 335335

MODELING US COAL SUPPLY AND DEMAND

Recent studies indicate that world oil production is likely to peak during the next 25 years, and nations may turn to coal as a major alternative fuel. In assessing the outlook for coal, one must carefully analyze the economics of mining, transporting, and burning coal as well as its political, social, and environmental implications. One effort to better understand the interplay of these forces is the Energy Modeling Forum study entitled, Coal in Transition: 1980 to 2000. In this project, a group of energy modelers conducted a comparative analysis of how various mathematical models treat the major forces affecting the outlook for coal supply and demand in the

United States. Designed to highlight the policy implications of alternative coal supply/demand scenarios, the analysis produced important insights on regional coal-production patterns, transport flows, and the requirements for coal infrastructure development in response to differing economic and policy assumptions.

From Energy Policy Modeling: United States and Canadian Experiences. Volume I. Specialized Energy Policy Models.

Griffith, ED (Atlantic Richfield Company); Ziemba, WT Schwartz, SL Koenigsberg, E
Martinus Nijhoff Publishing Company 1980, pp 228-241, 4 Fig., 4 Tab., 5 Ref.

ORDER FROM: Martinus Nijhoff Publishing Company, 190 Old Derby, Hingham, Massachusetts, 02043

20 335437

A STATISTICAL SKETCH OF THE DEMAND FOR RAIL TRANSPORT OF GRAIN AND SOYBEANS

This paper outlines the concept of elasticity of demand and makes estimates of elasticities as they apply to the transportation of soybeans and grain by rail. The methods applied can be applied to any mode or commodities for which data are available.

Fitzsimmons, EL (Union Pacific Railroad) *Transportation Journal* Vol. 20 No. 3, 1981, pp 59-65, 2 Tab.

ORDER FROM: Hein (William S) and Company, Incorporated, 1285 Main Street, Buffalo, New York, 14209

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20 335447

MACRO-ECONOMIC FORECASTING MODEL FOR FREIGHT TRANSPORT BY RAIL

MAPROG is a forecasting instrument. The forecasting formula is fairly simple; the role of the computer is confined to simulating distributions of probabilities. In addition, it is an objective instrument for short and medium term forecasts which nevertheless leaves enough room to deal with a certain number of elements of a subjective nature. Because the MAPROG model does not supply a single forecasting value, but a scale of possible values with the associated probabilities of realization, it is a practical model. In particular it allows for the important role played by change in the development and volume of rail transport in the Netherlands, and also attempts to quantify this uncertainty.

Remkes, A Donk, HA van der *Rail International* Vol. 12 No. 3, Mar. 1981, pp 131-137, 1 Tab., 1 App.

ACKNOWLEDGMENT: International Union of Railways, BD
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20 336027

BUREAU OF MINES STATISTICAL PROJECTION METHODOLOGY OF U.S. MINERAL CONSUMPTION BY END USE: ALUMINUM AS AN EXAMPLE

This Information Circular provides a detailed background documentation of how the Bureau of Mines projects U.S. mineral demand to the year 2000. These statistical projections serve as a quantitative basis for contingency forecasting of the low, high, and probable U.S. demand for nonfuel minerals by end-use categories and are published in the Bureau of Mines Mineral Commodity Profiles and Mineral Facts and Problems series. Aluminum is used as an example in this study.

Mo, WY Klein, BW
Bureau of Mines BUMINES-IC-8825, 1980, 118p

ACKNOWLEDGMENT: NTIS
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PB81-147415

20 336100

PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. EXECUTIVE SUMMARY

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projections of future traffic

demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity group and origin-destination areas from 1976 to at least 1990. (Author)

Nathan (Robert R) Associates Incorporated Final Rpt. Dec. 1980, 22p
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PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. VOLUME 17. GROUP XV. OTHERS, NEC

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

Nathan (Robert R) Associates Incorporated Final Rpt. Dec. 1980, 55p
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PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. VOLUME 16. GROUP XIV. MANUFACTURED PRODUCTS, NEC

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. VOLUME 15. GROUP XIII. NONFERROUS METALS AND ALLOYS, NEC

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. VOLUME 14. GROUP XII. RUBBER, PLASTIC, NONMETALLIC MINERAL PRODUCTS, NEC

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. VOLUME 13. GROUP XI. PETROLEUM PRODUCTS, NEC

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. VOLUME 12. GROUP X. WOOD AND PAPER PRODUCTS

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. VOLUME 11. GROUP IX. FEED AND FOOD PRODUCTS, NEC

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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PROJECTIONS OF DEMAND FOR WATERBORNE TRANSPORTATION, OHIO RIVER BASIN, 1980, 1990, 2000, 2020, 2040. VOLUME 10. GROUP VIII. IRON ORE, STEEL AND IRON

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

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Bureau of Mines BUMINESMYB197879VOL1, 1980, 1028p

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REPORT OF THE IEA COAL INDUSTRY ADVISORY BOARD

This is the text of a report presented of the governing board of the International Energy Agency (IEA) at the ministerial level on May 22-23, 1979. The coal action program is discussed. Increased coal production and use is an international objective. The role of the Coal Industry Advisory Board (CIAB) in meeting this objective is described. The recommendations of the CIAB to governments and industry are included. The executive summary of the findings of the CIAB working group in the areas of coal use, coal production, infrastructure, international trade, environmental issues, and research and development is presented. The text of the principles for IEA action on coal adopted by the governing board of IEA at their May 22-23, 1979 meeting is included. (ERA citation 06:009216)

U.S. Sales Only.

Organization for Economic Cooperation and Devel 1980, 53p

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**MINERALS YEARBOOK 1976. VOLUME II. AREA REPORTS:
DOMESTIC**

Contains chapters on the mineral industry of each of the 50 States, the U.S. inland possessions in the Pacific Ocean and the Caribbean Sea, and the Commonwealth of Puerto Rico. This volume also has a statistical summary, identical to that in Volume I.

Bureau of Mines BUMINES-MYB-1976VOL2, 1980, 848p

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**MINERALS YEARBOOK 1977. VOLUME I. METALS AND
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Bureau of Mines BUMINES-MYB-1977VOL1, 1980, 1075p

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TACTICAL PLANNING FOR COORDINATING RAILROAD OPERATIONS

Tactical (shift-by-shift) planning procedures for improving operations on the Grand Trunk Western Railroad are described. The tactical planning procedures are designed to improve the decision-making ability of dispatchers and yard-masters by explicitly requiring them to plan and coordinate their activities for the entire shift at the beginning of the shift. The procedures are centered around a systemwide nominal operating plan, which is adjusted during each shift on the basis of predictions of train and yard activities obtained from a simulation called the Dynamic Movement Predictor. Because of the systemwide planning and coordination inherent in these tactical planning procedures, the result should be improved labor productivity, car transit time, and trip reliability.

This paper appeared in Transportation Research Record No. 758, Surface Freight: Rail, Truck, and Intermodal.

Wong, PJ Conrad, B Johnson, JM Lay, N *Transportation Research Record* No. 758, 1980, pp 2-8, 4 Fig., 2 Ref.

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CONTAINER TECHNOLOGY STUDY. VOLUME I: TEXT

This report describes the results of an initial study to assess the technological and operational constraints on the development of a multimodal domestic freight container system. Under this program, the critical technological and operating constraints were identified, and the impact on shippers and operators was assessed. Key current investments in the freight transportation system were developed to evaluate the obsolescence of these investments due to the introduction of containers over a period of time. Also described are areas where further research is required to overcome the critical constraints identified during the study.

See also Volume 2, PB81-113268.

Bodenheimer, BA

Bodenheimer (BA) and Company, Incorporated, Transportation Systems Center Final Rpt. DOT/TSC/RSPA-80-8-1, Oct. 1980, 89p

Contract DOT-TSC-1761-1

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CONTAINER TECHNOLOGY STUDY. VOLUME II: APPENDIXES

Volume II has nine appendixes as follows: Appendix A- Railroad Flatcar Data; Appendix B-Calculations; Appendix C -Record of Telephone Calls; Appendix D-Industry Interviews; Appendix E-Field Trips and Conferences; Appendix F-Annotated bibliography; Appendix G-Patents Reviewed; Appendix H-Literature Reviewed; and Appendix I- Report of New Technology.

See also Volume 1, PB81-113250.

Bodenheimer, BA

Bodenheimer (BA) and Company, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-RSPA-80-8-2, Oct. 1980, 82p

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21 330027

INTERMODALISM AND IMPROVED TRANSPORTATION PRODUCTIVITY

The advantages of and prospects for water-rail movement of bulk commodities are briefly examined. It is concluded that cooperation between water carriers and the railroads will increase sharply in the 1980s as a result of the pressures of inflation, the need to improve productivity and capacity, anticipated cost and fuel savings, and the likelihood that intermodal cooperation will economically benefit both modes.

This paper appeared in Transportation Research Board Record No. 763, Inland Waterway Studies.

Kyle, RA (Federal Barge Lines, Incorporated) *Transportation Research Record* No. 763, 1980, pp 1-2

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21 330147

THE FINAL FRONTIER

Two approaches to improving the management of railroad freight equipment have recently been instituted by Chessie System and Milwaukee Road. While Chessie's car management is an operating department function, Milwaukee places this responsibility in its marketing department. Chessie division managers must now balance car costs along with expenses for crews, power and fuel, as well as non-operating costs. Extensive economic analysis has gone into the Chessie car management system and real-time feedback is essential to the concept. Milwaukee car management department is charged with maximizing revenue for each car while minimizing empty-movement and ownership or rental costs.

Shaffer, FE *Modern Railroads/Rail Transit* Vol. 36 No. 1, Jan. 1981, pp 39-41, 3 Phot.

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21 330162

INTERMODAL TRANSPORTATION FOR CONTAINERS AND TRAILERS--AN EXPLORATORY STUDY

This study examines the feasibility of introducing a unit train service for the transportation of domestic general cargo on a selected Canadian route, having particular regard to the potential costs and benefits which would derive from the introduction of such a service, and its marketability. A service concept is developed to match preliminary estimates of the volume of traffic that might switch to an attractive intermodal service, and the characteristics of such a service are summarized in an exploratory prospectus. The principal findings of the study are highlighted and conclusions drawn regarding the potential for expanded intermodal services in Canada, together with recommendations on what needs to be done next.

Helm, B Bish, L

Peat, Marwick and Partners, Transport Canada Research and Development Centre, Canadian Transport Commission Final Rpt. TP 2337, Sept. 1979, 138p, 3 App.

Contract 1 ST78-00164

ORDER FROM: Transport Canada Research and Development Centre, 1000 Sherbrooke Street, West, P.O. Box 549, Montreal, Quebec H3A 2R3, Canada

21 330193

FUNDAMENTALS OF TRANSPORTATION SYSTEMS ANALYSIS, VOLUME 1

This is the first basic textbook to treat transportation systems analysis as a single field of study with a unified theoretical foundation. Its approach incorporates concepts from economics, engineering, operations research and public policy analysis. Three case studies form a basis for practical exercises--in disaggregate prediction, carrier operations planning and network analysis--and a variety of study materials are included so that the material can be adapted for different course orientations.

Manheim, ML

Massachusetts Institute of Technology Press No Date, n.p.

ORDER FROM: Massachusetts Institute of Technology Press, 28 Carlton Street, Cambridge, Massachusetts, 02142

21 330645

TRANSPORT PROBLEMS ENCOUNTERED AND SOLVED AT THE SOUTH EAST COAL COMPANY

A report is presented on transport problems encountered and solved at the South East Coal Company. Because of a shortage of railroad cars at L and N, the company purchased cars which were inoperable and repaired them and put them into service using the L and N Railroad. With the improved car supply (700 cars in 3 years), production increased from 954,166 tons in 1975 to 1,544,008 tons in 1978. Inequities encountered with L and N are described.

From Coal Outlook Conference; New Orleans, Louisiana, November 5, 1979.

South East Coal Company CONF-7911117-6, 1979, 5p

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: South East Coal Company, PO Box 332, Irvine, Kentucky, 40336

21 330656

INTERMODAL TRAFFIC KEEPS ON GROWING DESPITE RECESSION

While the volume of German Federal's freight traffic is largely dictated by the state of the European economy, intermodal services have attained remarkably high growth rates, even at times of recession. Their potential for attracting new and winning back old customers was recognised by West Germany's transport policymakers in 1978, and since then investment has been channelled into terminals, containers and piggyback wagons. From May this year the number of overnight container trains will be stepped up, and maximum speed will later be raised from 100 to 120 km/h. By the end of the century DB's intermodal services may be carrying about 45 million tonnes of freight a year, but the potential is higher still.

Kracke, R Gaidzik, M *Railway Gazette International* Vol. 137 No. 2, Feb. 1981, pp 107-110, 2 Fig., 1 Tab., 7 Phot.

ORDER FROM: ESL

DOTL JC

21 330657

TRAINS ARE BACK IN THE MODERN CONTAINER PORT

Early on in the maritime container revolution the view in most ports was that rail and ship should be well separated, with road movement acting as a buffer between them. Latterly, opinion has swung in favour of reducing the number of lifts required, which normally means bringing the wagons closer to the quayside. Layouts adopted by port authorities differ widely, as optimum solutions are by no means self-evident, but the proportion of containers handled by rail is growing steadily.

Marsden, MB (Freightliners Limited) *Railway Gazette International* Vol. 137 No. 2, Feb. 1981, pp 111-114, 3 Fig., 5 Phot.

ORDER FROM: ESL

DOTL JC

21 330658

ROADRAILER BREAKTHROUGH IN INTERMODAL ECONOMICS?

Intermodal operators are offered substantial reductions in capital cost, maintenance and fuel consumption by the RoadRailer—essentially a strengthened road trailer fitted with couplings and a pair of flanged wheels for operation in dedicated trains. One disadvantage is an extra 2,300 kg tare weight when on the road, but otherwise the capacity of North American highway trailers is matched in all respects. Technical performance of prototypes has been excellent, and revenue service has commenced with the first of 250 RoadRailers now under construction.

Reebie, RS (Bi-Modal Corporation) *Railway Gazette International* Vol. 137 No. 2, Feb. 1981, pp 115-118, 4 Phot.

ORDER FROM: ESL

DOTL JC

21 331115

INTERMODAL TRANSPORT WITH AN HOURLY SERVICE. INTEGRATED TRANSPORT SYSTEMS USING A TRANSPORT CENTRE [Huckepack im Stundentakt. Integrierte Verkehrssysteme durch Verkehrszentren]

In focus during the eighties will be the further promotion of intermodal transport with the aim, from the individual and total economic viewpoint, of utilizing for any given stretch of transportation, whichever means is most technically and economically suitable. The basis for a proper intermodal transport service will be the so-called freight centres, for which, even today, the necessary areas of land on the outskirts of towns must be reserved. Freight will be collected in such centres. The railways provide their services as carriers outside the conurbations. Haulage to and from the distribution centre is then made by lorry. The railway would travel according to the transportation experts-only with light loadable and unloadable flat wagon trains between the distribution centres at regular intervals, similar to the inter-city time-table. Then it would be possible for contractors to undertake corresponding goods movement. With this distribution system it is necessary to change from regional to centre storage, to which the motto applies: movement instead of storage. High storage costs for the individual undertaking would be reduced, the immediate cost-and-time saving goods

exchange would enable a completely new calculation to be made. At this colloquium it was particularly stressed that no compulsion or prohibitory measures would be sought, but that the hauliers would continue to have freedom of choice. [German]

Friedrich, ME *Lastauto-Omnibus* Vol. 57 No. 3, 1980, pp 42-43

ACKNOWLEDGMENT: TRRL (IRRD 312224), 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

21 331477

MANAGING FREIGHT CARS IN A PERIOD OF SURPLUS: DOES UTILIZATION MATTER?

As 1980's recession cut into railroad traffic, freight car surpluses grew. The author examines the effects, primarily the higher ratio of empty to total car miles, and suggests that some of the traditional operating strategies at such times are unproductive—both for the individual railroad and for the industry as a whole. Examined are options such as the decision to load foreign in preference to system cars; which and how many cars should be stored; how should train service be reduced; how can revenue be generated from surplus cars; and how can the burdens of car surplus be shared with customers and other railroads. The author recommends that efforts must continue to improve freight car productivity.

French, PW (Association of American Railroads) *Railway Age* Vol. 182 No. 3, Feb. 1981, pp 34-38, 1 Phot.

ORDER FROM: ESL

DOTL JC

21 331478

FAMILY LINES BRINGS OPERATIONS TOGETHER

Operations of all corporate components of the 16,000-mile Family Lines System are now centralized in a headquarters center at Jacksonville, FL. A 40-ft status board is updated constantly to give the assignment and status of 2700 locomotives and 1300 cabooses while charting the progress of all road trains to give train directors and area transportation managers a visual abstraction of system operations. Locomotive assignment and operation are coming in for new attention; train performance simulation is widely utilized; and new routings and services are constantly analyzed. Now Family Lines is looking at closer integration of operations with its merger partner, Chessie System.

Armstrong, JH *Railway Age* Vol. 182 No. 4, Feb. 1981, p 25, 2 Phot.

ORDER FROM: ESL

DOTL JC

21 331482

ROAD/RAIL CONTAINER TRANSFER--BRIDGING THE EQUIPMENT GAP

Research being undertaken on the feasibility of a container transfer vehicle mounted on a standard gauge rail track is outlined.

Cargo Systems International Vol. 7 No. 8, Aug. 1980, p 49

ACKNOWLEDGMENT: EI

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21 331485

ELEVATED SYSTEM FOR HIGHER CONTAINER THROUGHPUTS

Elevated track system of handling for container terminals introduced by Japanese industries is outlined. The system features the use of computer-controlled container carrying cars running along an elevated trackway for the transfer of containers between the quayside and the landside storage areas.

O'Byrne, L *Cargo Systems International* Vol. 7 No. 8, Aug. 1980, p 57

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

21 331517

MULTIMODAL TRANSPORT: FROM COMPETITION TO COOPERATION

The author describes techniques used for multimodal transport and goes on to analyse the development of combined rail-road transport in France. He points out the advantages of the system for the trucker, the State, local

communities and even car drivers, and describes measures taken by the authorities to develop combined transport, such as financial support and tariff incentives. In conclusion he points to the marked growth of piggyback and container traffic in recent years.

Collet, C *Rail Engineering International* Vol. 11 No. 11, Nov. 1980, pp 621-625, 1 Phot.

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

DOTL JC

21 331523

THE "ROLLING ROAD"--AN IMPROVED SERVICE ON OFFER IN PIGGYBACK TRAFFIC [Die "Rollende Landstrasse"--ein verbessertes Angebot im Huckepackverkehr]

As a result of efforts to modernize combined transport, the German Federal Railway will extend its piggyback services in the spring of 1981 for complete road trains and semi-trailers. With 200 newly constructed Saadkms 690 type flat cars in service, four additional connections will be introduced on the "Rolling road". This new facility will be used in the same way for both domestic and international road freight traffic, which gives road transport enterprises the possibility of participating more intensively in combined railroad traffic without the need for the special internal adaptation measures previously required. [German]

Kloidt, N Lange, K *Die Bundesbahn* Vol. 56 No. 11, Nov. 1980, pp 781-784, 6 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

21 331855

AN INTEGRATED CONTAINER TRANSPORT SYSTEM [Edinaya konteiner'naya transportnaya sistema]

This booklet covers the appearance in recent years of a new trend in all modes of transportation, both in the USSR and other countries--namely, the development of containerization. In the USSR, the basis has been established for a nationwide, integrated container transportation system that includes railroad, maritime, inland waterway, and highway services. Increasing emphasis is being placed on express container service, and the USSR now has more than 900,000 containers in use and over 1,000 container terminals. Topics covered in the booklet include the modern technologies, methods of organization, and levels of development of container transportation systems in the USSR and other countries. Also discussed are the methods used for the technical/economic evaluation of the Soviet container system's effectiveness for the Soviet transportation industry and the economy of the USSR as a whole. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D.)

Deribas, AT
Transport Publishing House 1974, 64p, 11 Fig., 3 Ref.

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

21 331856

A MODEL TECHNOLOGICAL PROCEDURE FOR OPERATING A CLASSIFICATION YARD [Tipovoy tekhnologicheskyy protsess raboty sortirovochnoi stantsii]

Soviet researchers have developed an operational model for existing classification yards. This book describes such activities as receiving and breaking up inbound trains, classifying cars, and making up outbound trains, as well as the handling of run-through trains and also cars for local destinations. Special procedures are given for organizing the work of a yard in winter conditions. Information is provided on the control and analysis of performance of the classification yard. Appendix 1 gives brief instructions for the implementation of the new procedures described in the model. Appendix 2 presents the methodology for effective coordination within the classification yard, as well as with adjoining track sections. Appendix 3 provides the methodology for specialized yard operations. Appendix 4 covers the procedures of yardmaster schedule management. Appendix 5 provides the method for calculating a standard in-yard car detention time. Appendix 6 describes the recommended mechanization and automation of

yard activities. Appendix 7 sets forth the methodology for calculating unit costs of yard operations. Appendix 8 describes the recommended accounting procedures for a classification yard. [Russian]

Abstract only available in English. Original documents, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D)

USSR Ministry of Railways 1976, 104p, 17 Fig., 3 Tab., 8 App.

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

21 331857

FREIGHT TRANSPORTATION ON RAILROADS--REFERENCE BOOK [Perevozka gruzov po zheleznym dorogam--Spravochnik]

This reference book describes the basic operational procedures used by railroads, shippers, and consignees for the transportation of freight by railroad in the USSR. Topics covered include the planning and routing of freight shipments, general freight-handling procedures, accounting procedures, and shipping charges (for full-car loads, less-than-carload shipments, and container shipments). All the information provided in this reference book complies with the USSR railroad regulations and rules for freight transportation. The book is intended for the use of shippers, consignees, and railroad employees in engineering and technical areas. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D.)

Gundobin, NA
Transport Publishing House 1978, 456p, 5 Fig., 123 Tab.

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

21 331868

CONTAINER TRAFFIC DEVELOPMENT AND HOW TO INCREASE TRAFFIC EFFECTIVENESS [O RAZVITII KONTEINERNYKH PEREVOZOK I POVYSHENII IKH EFFEKTIVNOSTI]

A statistical summary is provided of the USSR railroad containerization system and recommendations are given on how to make it more effective. It is noted that there is a loss in capacity from using large-tonnage containers rather than box cars, but that this loss is compensated for by the benefits obtained from the improved safekeeping of loads and the higher productivity of loading operations. The article includes a proposal to manufacture, in the 5-year period 1981-85, new medium and large containers in which capacity will be increased by making the containers higher than previous ones. The article also covers such topics as the need for improved draft gear for the extra-length flat cars used to transport containers; the potential for increasing the number of containers per flat car; the improved handling of containers in facilities; and the improved communications systems needed for such facilities. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

Kogan, LA *Vestnik VNIIZT* No. 3, 1979, 14p, 3 Tab.

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

21-331887

THE SYSTEM OF RAILROAD AND MOTOR VEHICLE CONTAINER TRAFFIC AND ITS FUTURE DEVELOPMENT [Sistema perevozok konteinerov v zheleznodorozhnom i avtomobil'nom soobscheniyakh i perspektivy ikh razvitiya]

This paper prepared by TsNII (the All-Union Order of the Red Banner of Labor Scientific Railway Research Institute) presents general information on container traffic in the USSR. Topics covered include container designs, dimensions, and capacities, as well as container-handling techniques used by Soviet railroads. The paper states that containerization presently accounts for 70 percent of all less-than-carload freight shipments in the USSR and claims that this proportion could be increased to as much as 90 percent. [Russian]

Unpublished paper prepared for the Federal Railroad Administration. Abstract only available in English. Original document, untranslated as of

March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR & D)

USSR Ministry of Railways 1978, 7p

ACKNOWLEDGMENT: FRA

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

21 331895

THE TRAIN THEY CALL SPRINT

The development of Milwaukee Road's dedicated Chicago-Twin Cities piggyback service is described from its development under the aegis of FRA and AAR to the present unsubsidized operation which involves three departures in each direction almost every day on 11-hr schedules. Problems of operation, labor agreements, pricing, marketing and profitability are discussed along with a report of a typical westbound trip.

Dolzall, GW *Trains* Vol. 41 No. 6, Apr. 1981, pp 26-33, 17 Phot.

ORDER FROM: Kalmbach Publishing Company, 1027 North Seventh Street, Milwaukee, Wisconsin, 53233

DOTL JC

21 334305

SOLUTION OF A RAILROAD LOCOMOTIVE SCHEDULING PROBLEM

A method is described for finding a minimum cost set of schedules for railway locomotives to work a given set of trains. The times at which the trains start may be fixed or variable. A heuristic method, based on a linear programming model, is described. This gives good integer solutions to the problem.

Booler, JMP (Salford University, England) *Journal of the Operational Research Society* Vol. 31 No. 10, Oct. 1980, pp 943-948, 7 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

21 334452

THE FUTURE ECONOMICS OF COAL TRANSPORT

The report examines the future economics of the transport modes likely to be important for coal up to the year 2000. The transport modes covered include rail, slurry, pipelines, inland waterways, road, conveyors, bulk carriers and self-unloading ships. The report is concerned generally, with bulk transport rather than local distribution and includes a section on the economics of transferring coal from one transport mode to another. For each mode of transport, a description is given of current technology and cost estimates are compared. There is also a discussion of the energy intensiveness, flexibility, potential development and constraints which might affect each mode's ability to meet the anticipated increase in demand for coal transport.

Lee, HM

Economic Assessment Service Monograph EAS D2/79, July 1980, 85p, 7 Fig., 22 Tab., 72 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 252849)

ORDER FROM: Economic Assessment Service, 14/15 Lower Grosvenor Place, London SW1, England

21 334467

IMPLEMENTING AN OPERATING/SERVICE PLAN: A CASE STUDY OF THE BOSTON & MAINE. STUDIES IN RAILROAD OPERATIONS AND ECONOMICS, VOLUME 29

Boston & Maine has demonstrated how to implement an operating/service plan designed to improve service, car utilization, and profitability. The plan was developed by an interdepartmental service committee during the fall of 1978. Implementing the plan in 1979 required several major changes in train schedules, in yard activities, in car distribution, and in power utilization. In addition, B&M made important changes in information systems and in B&M organization to ensure proper implementation, evaluation and control. The report provides an overview of the planning process, a summary of the analysis of alternative plans considered by the committee, and an evaluation of the impacts on service, utilization and profits. It also documents car cost budgeting, the evolution of the service committee, and the use of the MIT Service Planning Model to set service standards. Development of an operating/service plan and the effective use of an interdepartmental service committee are the key to railroad's efforts to meet competition. In this

instance, new planning techniques allowed B&M to concentrate analysis in operating areas most critical to marketing priorities. As a result of this case study, B&M improved car utilization by 15% and \$3 million in on-line car costs in 1979 relative to 1978. Other railroads could benefit from both the planning process and the modeling techniques described in this report.

Operations and Service Planning, Task II-2.

Martland, CD Messner, MG Nowicki, V

Massachusetts Institute of Technology, Association of American Railroads Final Rpt. CTS 80-3, AAR R-416, Nov. 1980, 283p, Figs., Tabs., 4 App.

ORDER FROM: Massachusetts Institute of Technology, Center for Transportation Studies, Cambridge, Massachusetts, 02139

DOTL RP

21 334503

FORECASTING SEVERAL DAYS AHEAD FOR THE SUPPLY OF EMPTY CARS TO THE REGIONS [Mnogodnevnoe prognozirovanie postupleniya poroznih vagonov pod pogrutzku]

Results of a study conducted by the Leningrad Institute of Railway Research on the determination of the degree of fluidity of empty car flows, in order to plan their distribution to the different Regions several days ahead. The method provides for computer applications and may be implemented under the "DISKOR" system that has already been introduced. [Russian]

Kudrjavcev, VA *Vestnik VNIIZT* No. 8, 1980, pp 13-17, 1 Fig., 2 Tab., 3 Ref.

ACKNOWLEDGMENT: International Union of Railways, BD

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

21 334725

A MODEL EXAMPLE OF RAIL FREIGHT OPERATIONS

A model of rail freight operations is described which is designed to estimate costs of carrying a range of railway traffic. The model also examines the impact on these costs of changes in railway operating policies. The model, known as Railcost, developed for the Public Transport Commission of New South Wales, is intended to enable operating and marketing strategies to be tested e.g. The effect of replacing branch-line services with road services, or the effect of abandoning all low-volume, wagon-load traffic.

Bullock, RG Wardrop, AW Galbraith, RA *Transport* Vol. 2 No. 1, Jan. 1981, p 7, 2 Fig., 1 Tab.

ACKNOWLEDGMENT: TRRL (IRRD 253328)

ORDER FROM: City Press, Fairfax House, Colchester, Essex, England

21 334953

L&N: A NEW LOOK FOR MANUAL BLOCK

A Manual Block Visual Display Board has been developed on Louisville and Nashville to augment the manual-block operation of a 204-mile single-track territory across northern Florida. The board, generally resembling a CTC panel with its diagram of mainline and passing tracks, provides dispatchers with a picture of the location of all traffic on the line at a glance. The self-contained board is interlocked to signal any conflicts as the dispatcher plugs in the block clearances for which he plans to transmit authorizations to train crews or vehicle operators.

Armstrong, JH *Railway Age* Vol. 182 No. 10, May 1981, pp 60-61, 1 Phot.

ORDER FROM: ESL

DOTL JC

21 335338

TRANSPORT OF ENERGY BY RAIL

An examination of physical and operating problems of the mountain railroads of Canada indicates that rail capacity can be adequate to meet the potential demands for Canadian coal over the next fifteen years. As a fuel-efficient carrier, the railways will have an increasingly important role in transporting energy supplies, especially coal. High energy prices, however, will increase the base costs of railroads. Significant investment will be required for track improvements, siding and signaling on the existing main lines of Canadian National (CN) and Canadian Pacific (CP), to Vancouver and particularly for the CN Line to Prince Rupert (the former Grand Trunk Pacific).

From Energy Policy Modeling: United States and Canadian Experiences. Volume I. Specialized Energy Policy Models.

Armstrong, CF (Canadian National Railways); Ziemba, WT Schwartz, SL Koenigsberg, E Martinus Nijhoff Publishing Company 1980, pp 242-249

ORDER FROM: Martinus Nijhoff Publishing Company, 190 Old Derby, Hingham, Massachusetts, 02043

21 335442

USE OF CONSIDERABLE RESOURCES TO MEET THE DEMANDS OF INCREASED TRAFFIC VOLUME [Vazny] rezerv osvoenija rastuscih perevozok]

The author refers to measures designed to meet the demands of an increase in the volume of traffic and especially an increase in the tonnage and length of trains as well as line capacity, a reduction in running frequency and an increase in the productivity of the network as a whole. [Russian]

Paristyj, IL *Zheleznodorozhnyi Transport* No. 2, 1981, pp 10-16, 6 Phot.

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

21 335448

THE DEVELOPMENT OF HIGH CAPACITY FREIGHT OPERATIONS IN SOUTH AFRICA

South African Railways, with a 1065 mm gauge track, has made enormous efforts to develop high capacity freight operations. As a result, operating efficiency over the period 1973/74 to 1978/79 has increased by an average of 8.8 percent each year.

Loubser, JGH *Rail International* Vol. 12 No. 3, Mar. 1981, pp 99-104

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

DOTL JC

21 335459

CATCHING UP WITH CAPACITY DEMAND

After several years of gradual expansion, the South-African economy underwent a boom last year with the sudden rise in the price of gold. As a result, railway traffic reached record levels. Estimates of a 5 percent rise proved wrong, in fact railway traffic rose by 9 percent and was still rising at the end of the year.

International Railway Journal Vol. 21 No. 2, Feb. 1981, p 13, 3 Fig., 11 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
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21 335552

FREIGHT CAR UTILIZATION IMPACTS OF RAILROAD-CUSTOMER RELATIONSHIPS VOLUME 1: DEMAND-RESPONSIVE AND BACKHAUL PRICING. PHASE II--TASK FORCE 3

This volume is the first of four reports by Task Force 3 delineating and quantifying the car utilization impacts of selected marketing actions. For each of two pricing tools--demand-responsive pricing and backhaul pricing--it presents the conclusions and recommendations of the Task Force, an issue paper discussing problems and considerations, and a case study on how it has worked out in practice under existing conditions. The Task Force concludes that such pricing tools have considerable potential for improving car utilization and profitability and should be pursued aggressively, especially if regulatory constraints are relaxed. The regulations governing the use of such pricing tools may undergo significant change within the next year. Current rulemaking activity at the Interstate Commerce Commission and legislative activity on deregulation proposals appear likely to relax many of the constraints now in existence and to spur further peak and backhaul pricing in many areas. In that event, some of the problems described in this volume may become a thing of the past, to be replaced by new sets of problems in a more competitive market environment.

Association of American Railroads Final Rpt. AAR R-443, Sept. 1980, 69p, 1 App.

ORDER FROM: AAR

DOTL RP

21 335553

FREIGHT CAR UTILIZATION IMPACTS OF RAILROAD-CUSTOMER RELATIONSHIPS VOLUME 2: SUBSTITUTING FREE RUNNERS FOR ASSIGNED CARS. PHASE II--TASK FORCE 3

This volume is the second of four reports by Task Force 3 delineating and quantifying the car utilization impacts of selected marketing actions. It presents a set of Task Force conclusions and recommendations on the merits of substituting free runners for assigned cars, and three case studies on which the conclusions are based. The case studies show clearly that selective substitution of free runners for assigned cars offers significant potential for reducing empty crosshauls, and improving car utilization and railroad profitability. Substitutions have reduced empty car time on the order of 50% and long run expected car requirements on the order of 20%, while at the same time maintaining or improving car supply to the customers involved.

Association of American Railroads Final Rpt. AAR R-444, Sept. 1980, 51p, 1 App.

ORDER FROM: AAR

DOTL RP

21 335554

FREIGHT CAR UTILIZATION IMPACTS OF RAILROAD-CUSTOMER RELATIONSHIPS VOLUME 3: UNIT TRAINS AND MINI TRAINS. PHASE II--TASK FORCE 3

This volume is the third of four reports by Task Force 3 delineating and quantifying the car utilization impacts of selected marketing actions. For the two types of services--unit train and mini train (short unit trains)--it provides a set of conclusions and recommendations drawn by the task force and three case studies on which these conclusions are, in part, based. The Task Force concludes: (1) that unit train service has significantly improved freight car utilization and railroad profitability, and (2) that mini train service has the potential for dramatically improving freight car utilization and perhaps even for increasing railroad market penetration to a degree beyond that achieved by unit trains.

Association of American Railroads Final Rpt. AAR R-445, Sept. 1980, 48p, 1 App.

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21 335636

RAIL FREIGHT TRAFFIC ASSIGNMENT

This paper describes an algorithm for routing freight over a rail network whose tracks are controlled by several carriers in a manner that follows current industrial practices. In particular, the freight is routed to minimize the number of interline transfers and to maximize the revenue division for the originating carrier. The algorithm is based upon generalizing a shortest path algorithm to allow vector valued link impedances.(a)

Lansdowne, ZF (Stanford University) *Transportation Research. Part A: General* Vol. 15A No. 2, Mar. 1981, pp 183-190, 3 Fig., 7 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 254157)

ORDER FROM: ESL

DOTL JC

21 335862

THE PERFORMANCE OF CONTAINER CRANES AT THE DB'S CONTAINER TERMINALS

The great increase in the volume of combined transport will call in future for improved handling equipment. The author describes a method of calculating the capacity limit during the rush-hours which provides an adequately accurate estimate of the capacity of the container cranes examined and provides information on the effects of increasing the rate of work, on their mutual matching and on additional constructional measures. [German]

Schmidt, H *Eisenbahntechnische Rundschau* Vol. 30 No. 3, Mar. 1981, p 179

ACKNOWLEDGMENT: British Railways

ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

21 336794

**FUNDAMENTAL SCHEME FOR TRAIN SCHEDULING
(APPLICATION OF RANGE-CONSTRICTION SEARCH)**

Traditionally, the compilation of long-term timetables for high density rail service with multiple classes of trains of the same track is a job for expert people, not computers. We propose an algorithm that uses the range-constriction search technique to schedule the timing and pass-through relations of trains smoothly and efficiently. The program determines how the timing of certain trains constrains the timing of others, finds possible time regions and pass-through relations, and then evaluates the efficiency of train movement for each pass-through relation. (Author)

Fukumori, K
Massachusetts Institute of Technology AI-M-596, Sept. 1980, 25p

Contract N00014-75-C-0643

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A095522/9

21 341252

**RAILROAD CLASSIFICATION YARD TECHNOLOGY.
EVALUATION OF APPROACHES TO CAR PRESENCE
DETECTION**

The techniques utilized to detect the presence of railroad cars in Railroad Classification Yards are discussed. The report addresses application requirements, performance characteristics, life characteristics and failure modes for commonly used detector types. A study is presented on alternate techniques for detecting railroad cars, including field and laboratory evaluations. A Specification Guide defining the requirements for presence detectors, for use by the railroad industry, is appended to the report.

Wilson, DS Petersen, NJ
Shaker Research Corporation, Federal Railroad Administration. Final Rpt. FRA/ORD-81/01, Mar. 1981, 67p, 19 Fig., 11 Tab., 76 Ref., 2 App.

Contract DOT/FR-8199

ORDER FROM: NTIS

PB81-193286, DOTL NTIS, DOTL RP

21 341253

**RAILROAD ENERGY MANAGEMENT--TRAIN PERFORMANCE
CALCULATORS: A SURVEY AND ASSESSMENT**

This report presents a survey and assessment of train performance calculators (TPC) and train operations simulators (TOS). The purpose of the report is to increase the railroad industry's awareness of the present state of development, usefulness, and availability of these models.

Howard, SM Gill, LC Wong, PJ
SRI International, Federal Railroad Administration Final Rpt. FRA-
/ORD-81-02, Apr. 1981, 70p, 1 Fig., 1 Tab., 32 Ref.

Contract DOT-FR-9082

ORDER FROM: NTIS

PB81-234353, DOTL NTIS, DOTL RP

21 341262

**RAILROAD CLASSIFICATION YARD TECHNOLOGY
MANUAL--VOLUME I: YARD DESIGN METHODS**

This volume (Volume I) documents the procedures and methods associated with the design of railroad classification yards. Subjects include: site location, economic analysis, yard capacity analysis, design of flat yards, overall configuration of hump yards, hump yard track and switch layout, hump profile design, and hump trim-end design. Volume II is concerned with the design and specification of the yard computer systems, i.e., yard inventory and process control computer systems.

Wong, PJ Sakasita, M Stock, WA Elliott, CV Hackworth, MA
SRI International, Federal Railroad Administration Final Rpt. FRA-
/ORD-81/20.I, SRI Proj. 6364, Mar. 1981, 280p, Figs., Tabs., 1 Ref., 3 App.

Contract DOT-TSC-1337

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PB81-200560, DOTL NTIS, DOTL RP

22 322572

RICHARDS BAY COAL TERMINAL

It is essential in the conceptual design of such terminals that an overall view of the entire system of which they form a part is taken. Only in this way can it be ensured that the system will operate smoothly and without disruption, for, in the end such disruptions can have dramatic repercussions, both on the cost of the commodity in the market place and on production. In this respect, computer simulation is a useful tool in arriving at the optimum design for the system. The Richards Bay Coal Terminal provides a good example of such an approach. Commissioned in 1976 to handle 12 Mt per annum, it is now handling 24 Mt per annum, with plans for further expansion to 44 Mt per annum in the future.

Dunn, MB (Richards Bay Coal Terminal) *South African Inst of Mining & Metallurgy. Journal* Vol. 80 No. 1, Jan. 1980, pp 57-61

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 327122

ECONOMICS AND EMERGING ISSUES OF WHEAT TRANSPORTATION IN THE PACIFIC NORTHWEST

The study used the 1974 crop year in the Pacific Northwest as a means of reviewing the structure of the existing transportation systems. Specific attention was paid to the production region of the Pacific Northwest, the tidewater terminals, other marketing facilities, and the independent modes within the total transportation system. Finally, the impacts on Pacific Northwest wheat transportation of potential waterway user charges, the Pacific Northwest Grain Case, Lower Granite Dam, and other emerging issues to further describe the coming needs in transporting wheat were investigated.

Casavant, KL Thayer, R
Washington State University CIRC-612, Sept. 1978, 34p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-215346

22 327153

TRANSPORTATION ANALYSIS FOR THE CONCEPT OF REGIONAL REPOSITORIES

Over the past several years, planning associated with the National Waste Terminal Storage (NWTS) program assumed the use of one or two large, centrally located repository facilities. Recently, an alternative approach has been proposed which consists of the use of multiple, smaller regional repositories. In this report, several regional concepts were studied and the transportation requirements for the shipment of spent fuel to the regional repositories were estimated. In general, the transportation requirements decrease as the number of repositories increase. However, as far as transportation is concerned, the point of diminishing returns is reached at approximately one repository in each of three to four regions. Additional savings beyond this point are small. A series of sensitivity studies is also included to demonstrate the impact on the total transportation requirements of varying cask capacity, rail speed, or truck speed. Since most of the projected fuel shipments are to be made by rail, varying the capacity of the rail cask or varying average rail transport speed will have a major effect on overall transportation requirements. (ERA citation 05:026962)

Joy, DS Hudson, BJ
Oak Ridge National Laboratory, Department of Energy June 1980, 84p

Contract W-7405-ENG-26

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

ORNL/TM-7170

22 328718

METHOD FOR ANALYZING THE POTENTIAL FEASIBILITY OF COAL BROKERAGE OPERATIONS

There is one major prerequisite for unit train service. High volumes of coal are needed to make the operation both practical and economical. Many existing or potential coal users are too small to directly benefit from the cost savings and reliability of unit train service. If the demand for coal by a number of small users in a region could be aggregated so that the resulting volume was high enough to justify a unit train service, the users of the region could well be served through a single unit train receiving facility. Thus, coal

users individually too small to receive unit train shipments could capture cost savings associated with a larger volume operation. It is the intent of this thesis to study the feasibility of such an operation, hereafter referred to as a coal brokerage. The specific purpose is to develop and present an analytical framework for evaluating the long-run economic feasibility of a coal brokerage for a region. The analysis views the brokerage operator, or broker, as a firm, and focuses on the relationships between its long-run cost function and market demand function for coal. (ERA citation 05:034519)

Wilkie, K Vezeris, S
Argonne National Laboratories, Northwestern University, Evanston,
Department of Energy Thesis Aug. 1980, 104p

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

ANL/EES-TM-95

22 328759

RECENT DEVELOPMENTS IN COMPUTER IMPLEMENTATION TECHNOLOGY FOR NETWORK FLOW ALGORITHMS

The application of computer implementation technology to network optimization has brought about unprecedented advances in solution efficiency. The remarkable gains of the early to mid 1970's for solving transportation and transshipment problems are widely known, enabling network codes to out-perform LP codes by two orders of magnitude for these problems. The pioneering study by Gilsinn and Witzgall demonstrated that effective use of computer implementation technology could reduce solution times for shortest path problems from one minute to slightly more than one second, using the same general shortest path algorithm, computer, and compiler. The momentum launched by these studies has not dwindled, but continues into the present. New advances in all areas of network optimization have recently superseded the procedures previously found to be best. Latest computer implementations clearly outstrip the best codes of the recent past as our understanding of the important relation between algorithmic design and implementation continues to grow. We undertake to report on some of the major computer implementation studies of the past few years and to present preliminary results on the new developments. (Author)

Glover, F Klingman, D
Texas University, Austin CCS-377, July 1980, 36p

Contract N00014-80-C-0242

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

AD-A091215/4

22 328958

A SYSTEMS ANALYSIS FOR FREIGHT TRANSPORT WITH A VIEW TO ITS EXPLICIT CONSIDERATION IN TRANSPORTATION PLANNING PROCESSES. ISSUE NO. 237 [Systemtheoretische Erfassung des Gueterverkehrs zum zwecke seiner Expliziten Beruecksichtigung in Verkehrsplanungsprozessen]

A method is developed which enables to deal with freight transport as a separate component of overall transport within the general frame of transport planning. Freight transport follows specific rules and makes specific requirements on transport facilities. The planning procedure developed consists of the following functional elements: generation of the quantities of goods to be dispatched and received, classified according to categories of goods; distribution of the quantities of goods to be dispatched and received among the modes of transportation (modal split), according to affinities and qualities of accessibility; balancing of dispatch and receipt potentials by means of freight traffic, differentiated according to types of goods and modes of transportation; quantification of required transport capacities in order to evaluate freight traffic taking loading density, transport space utilization, and share of empty runs into account; quantification of vehicle requirements on the basis of the necessary transport capacity; relation of calculated numbers of vehicles to a dimensioning time interval; and assignment of vehicle streams to a transport network. [German]

Schmidt, HG
Bundesministerium fuer Verkehr 1977, 188p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-141715

22 330035

ECONOMIC FEASIBILITY OF TRANSPORTING WESTERN COAL ON THE NEW YORK STATE BARGE CANAL SYSTEM

The results of a comparative economic study of the feasibility of transporting western coal to New York State utilities via the barge canal system are presented. Three coal-supply regions are delineated: southwestern Pennsylvania and northern West Virginia, Wyoming, and Montana. Site-specific projections of potential coal consumption developed for coal from each region are presented. A costing framework that includes all unit operations in the mine-to-stack coal-use cycle is used in making economic comparisons of the use of the three coals at new generating stations. This framework is designed to account for major expenditures that vary as a function of the characteristics of coal quality, including (a) extraction costs, (b) distribution costs, (c) flue-gas-desulfurization system investment and operating costs, and (d) balance-of-plant investment expenditures. The methodology is applied to a comparison of the economics of using the three coals at a future mid-Mohawk River Valley generating facility.

This paper appeared in Transportation Research Board Record No. 763, Inland Waterway Studies.

Vitale, JE (State University of New York, Albany) *Transportation Research Record* N763, 1980, pp 27-34, 5 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

22 330176

CONSIDERATIONS FOR DESIGNING A SPENT-FUEL SHIPPING SYSTEM FOR COMMERCIAL LMFBR PLANTS

This paper identifies many factors which influence the design of a spent-fuel shipping system for commercial Liquid Metal Fast Breeder Reactors (LMFBR's). Appropriate consideration of these factors will result in a cost effective shipping system that maximizes safety and reliability and minimizes shipping time and radiation exposure to personnel. Existing spent-fuel shipping equipment is not appropriate for servicing future commercial LMFBR's. This is due primarily to two present-day conditions: first, without reprocessing and recycle in the US, there are presently no economic incentives for rapid low-cost spent-fuel shipping; and second, the early LWR's and LMFBR's were designed, and many built, without a spent-fuel shipping system design. LMFBR facilities can be decontamination of the cask's exterior surfaces and the from its railroad transporter for loading and the contamination of the cask's exterior surfaces and the subsequent cleaning. Loading of the shipping cask can be accomplished remotely, which eliminates almost all personnel exposure to radiation. Shipping spent-fuel in sodium eliminates a sodium cleaning operation at the reactor, saves time in preparing spent-fuel for shipment and reduces the accumulation of radioactive liquid waste at the reactor. A cask and canister design that provides double containment of spent-fuel during transit enhances safety and satisfies regulatory requirements. Sealed sodium-filled canisters for individual fuel assemblies provide primary containment. The sealed shipping cask closure provides secondary containment and heat dissipation. Criteria for minimizing fuel inventory casts require that spent-fuel shipping be integrated into the overall refueling and fuel recycle schedules. Cost savings are obtained by rapid cask turnaround and shipping fuel and radial blanket assemblies together in the same cask.

From 6th International Symposium on Packaging and Transporting radioactive material, Berlin, West Germany, 10 November 1980.

Davis, CR

General Electric Company Thesis CONF-801115-1, July 1980, 28p

Contract AT03-76SF70030

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: NTIS

GEFR-SP-204

22 330178

OVERVIEW OF UNITED STATES COAL EXPORT TERMINALS

Existing coal export ports in the United States are in general not designed to the standards compatible with the current state of the art. The United States has a current coal export capacity in the order of 83 million tons per year. This could be increased to 138 million tons per year through a process of modernization and expansion which would take about six to eight years for full realization. Even if this expansion program took place it would not result in an overall coal export system that was economically competitive due to the fact that our export terminals are generally outmoded and cannot

accommodate the large vessels engaged in the world coal trade and which can be accommodated at the major coal destination ports in Europe and Japan. In order for the United States to achieve an economically competitive posture in the world coal trade, new ports that will handle 150,000 to 250,000 DWT ships are needed. The new terminals must be designed to receive coal efficiently and minimize the demurrage costs for both railcars on the delivery side and ships on the load out side. There are port sites available in the US which could be developed to effectively handle the increased requirements. Each major new port could easily be designed to handle 20 to 50 million tons per year at ultimate capacity subject to the availability of coal from the source at a reasonable cost. New port construction is needed to satisfy the projected demand at a reasonable cost and to provide for the obsolescence of existing facilities. Decisions are needed now so that the ports will be operating 20 years from now and serve as replacements for present facilities which are becoming obsolete. The government of the United States can and must play a major role if success is to be achieved.

Soros Associates, Incorporated Sept. 1980, 57p

Contract AP01-80IA10066

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: NTIS

DOE/IA/10066-01

22 330182

GETTING THE LOAD OUT

In the batch weighing method, coal is fed at 3,000 tph into the surge bin; from there, it is fed alternately into one weigh bin and then weighted, while another weigh-bin discharges into the railcar.

Ward, P. *Coal Mining and Processing* Vol. 17 No. 5, May 1980, pp 64-66

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

22 330641

UTILITY VIEW OF COAL SHIPPING

Three methods of transport are described for the shipping of coal to a fossil-fuel power plant in Tampa, Florida. River transport is provided from Kentucky to New Orleans, a transfer company south of New Orleans provides transfer, storage and blending of the coal, finally the coal is shipped by barge across the Gulf of Mexico to Florida. The main concern in choosing a method for transport of coal to utilities is the economics. Rail transport and barge transport are discussed. Utilities support the proposed slurry pipeline to Florida.

From Coal Outlook Conference; New Orleans, Louisiana, November 5, 1979.

Vaught, WH

Tampa Electric Company 1979, 11p

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: Tampa Electric Company, Tampa, Florida

CONF-791117-1

22 330643

PREDICTING ROUTES OF RADIOACTIVE WASTES MOVED ON THE U.S. RAILROAD SYSTEM

Relative to the use of public roads, railroads offer several advantages for the movement of radioactive wastes. These include the ability to accommodate large, heavy containers, the ability to transfer large volumes in a single movement, and the safety of a dedicated, centrally controlled right-of-way. The principal disadvantage of railroads is that the shipper has considerably less freedom to specify the route a shipment will take. The lower density of the railroad network, the need to coordinate waste shipments with other traffic in the system, and the private ownership of the US network all reduce the shippers routing power. Although the shipper can dictate an exact route, this could require the use of a special train to move radioactive wastes, it is first desirable to determine how these materials would move as general rail traffic. This paper describes the development of a system to predict routes of general rail traffic at Oak Ridge National Laboratory (ORNL).

From 6th International Symposium on Packaging and Transporting Radioactive Material; Berlin, West Germany, November 10, 1980.

Hillsman, EL Johnson, PE Peterson, BE

Oak Ridge National Laboratory 1980, 7p

Contract W-7405-ENG-26

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

CONF-801115-5(Draft)

22 330644
PREDICTING ROUTES OF RADIOACTIVE WASTES MOVED ON THE US RAILROAD SYSTEM

One of the issues to be considered in the analysis of alternative repository sites for nuclear wastes is the pattern of shipments from reactors and other waste sources to the repository. In the United States, regulations and costs make rail shipments the preferred mode for high-level radioactive waste. The railroad network of the United States is owned by approximately 100 corporations that simultaneously compete for traffic and cooperate to move shipments that require carriage by more than one company. Because changing companies usually delays a shipment, there is a tendency to minimize the number of carriers involved in moving it. Moreover, when several carriers are required, the originating company (specified by the shipper) tends to retain the shipment on its portion of the network. These characteristics are nearly unique among the world's rail systems, and they must be recognized in any model of paths of future shipments through the network. This paper describes the development of a rail routing program that can be applied to the movement of radioactive materials throughout the United States. Shipments can be initiated at a specific location on a specific railroad. A route can be generated and displayed on a map of the United States. The particular route generated depends upon the emphasis placed on various classes of rail lines. Demonstration routings illustrate predicted routes of normal freight shipments, the effect of blocking passage through selected cities, and the effect that the existence of independent railroad companies can have on the patterns of shipments.

Hillsman, EL Johnson, PE Peterson, BE
Oak Ridge National Laboratory 1980, 10p

Contract W-7405-ENG-26

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

CONF-801115-23

22 330647
PROJECT TO DEVELOP AND DEMONSTRATE METHODS TO ELIMINATE FROZEN COAL HANDLING PROBLEMS. STATUS REPORT I

For too many years, problems associated with frozen coal have plagued the companies who mine it, the companies who handle it in transit and the utilities and other industrial concerns that finally burn it. But never before has the magnitude of the frozen coal problem been as great as it is today because of two primary factors, i.e. (1) the majority of coal currently transported and used has been ground to a very fine mesh that absorbs water readily, thus providing more surface area for freezing, and (2) the substantially increased importance of coal, indeed, the now critical necessity for more coal to be used in displacing dangerously uncertain foreign oil supplies that currently account for 50 percent of our daily domestic oil consumption. Frozen coal problems can and do have a devastating effect upon the ability to provide energy from coal during harsh winter months when it is most needed. The majority of these problems have been involved with removing frozen coal from rail cars. To allay the problem, numerous techniques have been tried, all with some measure of success. As an example, certain chemicals have been sprayed on the coal; another common treatment has been widespread use of thaw sheds, which, whether electrically or gas-fired, are all energy intensive, time consuming, hard on rail equipment and expensive to operate over long periods of time. From sledge hammers and crow bars to gas-fired jets and electric thaw sheds, available mechanical de-icing methods often damage coal handling equipment, are time consuming and, therefore, very expensive when demurrage losses must be added to significant investment and/or operating costs.

United Coal Company Sept. 1980, 30p

Contract AC22-80PC30076

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

DOE/PC/30076-T1

22 331092
PROCEEDINGS: WORKSHOP ON COAL TRANSPORTATION RESEARCH

This workshop presented previous and current EPRI transportation research to the utility industry and others. The proceedings consist of summaries of three presentations, a general discussion, and research recommendations. Previous transportation research at EPRI was discussed, including Coal Transportation Capability of Existing Rail and Barge Network, 1985 and Beyond (RP437); Cost Models for Coal Transportation by Common Carrier (RP866); Domestic Oil and Gas Supply, Implications for Electricity Demand (RP944); and Fuel Transportation Analysis (RP952). Current work was described in two presentations discussing separate contracts under Transportation Network: Changes and Their Effect on Energy Supply (RP1219). The consensus of this discussion was that additional research must be done to better understand the economics of coal transportation. Finally, a list of research recommendations was compiled that included projects to improve definition of rail and waterway capacity, analyze railroad cost and ratemaking procedures, develop information concerning alternative technologies such as the coal slurry pipeline, analyze impacts of legislation, and improve methodologies.

From Workshop on Coal Transportation Research; Palo Alto, California, January 31, 1980.

Riley, RE
Russian Hill Associates CONF-800150, Sept. 1980, 54p

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

EPRI-EA-1549

22 331487
TRANSPORTATION COSTS MAY DELAY UTILITY COAL USE

Escalating transportation costs from coal fields in the West to users in the South and Southwest are a continued problem. Some users are hinting at importing cheaper coal as transportation costs continue to rise. Federal goals are in conflict. The nation is committed by law to increase coal use to reduce dependency on oil and gas, but the nation is also committed by law to prop up its financially sagging railway industry. This is because the Energy Department, the Transportation Department, and the Interstate Commerce Commission are working at cross purposes. The Utilities are faced with escalating transportation cost increases with few viable alternatives, and the railroads are caught in a situation of having under-estimated the amount of traffic and the capital costs of keeping their service in condition to meet the increased usage. It is a "Catch-22" situation with the outcome yet to be resolved. The idea of importing coal seems ludicrous on the surface, but should the utilities be forced to pass cost increases along to the ultimate payer, the customer, maybe import competition could achieve an economic solution.

Miskell, JT *Energy* Vol. 5 No. 1, 1980, pp 10-11

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 331543
DIRECT AND INDIRECT ENERGY COSTS OF COAL TRANSPORT BY ALTERNATIVE BULK COMMODITY MODES

A framework for analysis is presented which is applied to the quantification of the energy costs associated with bulk commodity transportation modes. Energy costs considered included direct operating costs, indirect costs for goods, capital and services and an estimation of natural system impacts. In particular, the total energy costs per unit of coal energy delivered by the alternative means of barges, railroads, pipelines and high-voltage transmission lines were evaluated.

Zucchetto, J (Pennsylvania University, Philadelphia); Bayley, S Shapiro, L Mau, D Nessel, J *Resource Recovery and Conservation* Vol. 5 No. 2, July 1980, pp 161-177, 20 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

22 334325
MOVING COAL IN THE COLD

The article discusses design considerations for coal handling facilities to minimize winter problems.

Bation, L (Ebasco Services Incorporated) *Coal Mining and Processing* Vol. 17 No. 10, Oct. 1980, pp 71-74

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 334327

HANDLING WESTERN COALS AND LIGNITE

The electric utility industry's demand for Western coals and lignite for use in steam-electric generation increased from approximately 16 million (1,000,000) in 1968 to approximately 160 million tons in 1978, and is expected to continue to increase for the next 10 to 15 years. This rapid increase in demand and production has influenced the design of the fuel-handling facilities. Differences in fuel characteristics, methods of delivery, and the effects of Western coals and lignite are described. Problems of spontaneous combustion, fire detection and protection, and dust control are considered.

Johnson, AW
Illinois Institute of Technology Proceeding 1979, pp 594-600

ACKNOWLEDGMENT: EI
ORDER FROM: Illinois Institute of Technology, American Power Conference, Chicago, Illinois, 60616

22 334448

REPORT OF A STUDY GROUP ON THE INTERFACE BETWEEN ROAD AND RAIL FREIGHT

This report responds to the following terms of reference: (a) to investigate ways in which metropolitan authorities can by means of planning and other policies encourage the fullest development of rail freight facilities within their areas, and coordinate road and rail transport in meeting freight movement needs; and (b) to consider possible legislative and financial action to enable rail and road to play a full role in the transport system. The effect on transport policies of reduced dependence on oil, increased coal production and greater use of nuclear energy, is also discussed.

Association of Metropolitan Authorities Monograph Oct. 1980, 19p

ACKNOWLEDGMENT: TRRL (IRRD 252878)
ORDER FROM: Association of Metropolitan Authorities, 36 Old Queen Street, London, England

22 334491

COVERED HOPPERS: EASY IN, EASY OUT

A description of some modern unloading systems now in use in different American enterprises, for covered hopper cars which are unloaded at the bottom.

Malone, F *Railway Age* Vol. 182 No. 1, Jan. 1981, pp 32-34, 8 Phot.

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

DOTL JC

22 334712

INTERMODAL MODULE CONCEPT FOR FREIGHT

A concept is presented for a family of sturdy, lightweight, inexpensive, forkliftable freight shipping cartons for the smaller shipments, the less-than-truckload, less-than-containerload shipments making up the majority of air freight. Module suitability to small shippers and many transportation vehicles indicates potential applications and benefits could be far reaching throughout the transportation system. Prototype cartons have been built for demonstration.

For Meeting held September 30-October 2, 1980.

Folling, ND (Boeing Commercial Airplane Company); Peoples, PL
Society of Automotive Engineers Preprints SAE 801050, 1980, 14p

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

22 334737

FUNNEL FLOW IN HOPPERS

Detailed observations of funnel flows of dry granular materials in wedge-shaped hoppers of different geometries are presented. The variations of the flow regime with changes in the height of material in the hopper/vertical bin configuration, the width of the vertical bin, the hopper angle and the hopper opening width were investigated and a number of specific flow regimes identified (mass flow and several forms of funnel flow).

In the first part of the paper particular attention is paid to the conditions for transition from one flow regime to another; in particular it is shown that the existence of a funnel depends not only on the hopper angle but is also strongly dependent on the geometry of the hopper/bin system. In the second part of the paper the variations in the shape of the funnel near the exit opening are explored in detail.

Nguyen, TV *ASME Journal of Applied Mechanics* Vol. 47 No. 4, Dec. 1980, pp 729-735

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

22 335047

THE GRAIN BOOK-1981

This is a statistical compilation of data concerning the grain industry and grain transportation for the period 1970 through 1980. New emphasis on export grain during the decade placed demands for transportation to ports and on the port facilities. The sections include rail and barge grain traffic statistics, traffic flows by time periods, grain car fleet, rail-hauled grain exports, and grain production and grain storage data.

Thompson, W
Association of American Railroads 1981, v.p.

ORDER FROM: AAR

22 335065

APPARATUS FOR LOOSENING FROZEN COAL IN HOPPER CARS

Frozen lumps of coal in conventional hopper cars are loosened by lowering an assembly of vertically oriented probe elements into the car while simultaneously vibrating the assembly. The vibratory structure is mounted on a gantry arrangement which also supports a supplemental probe arrangement utilizing impact forces to loosen coal in hopper cars having interiors different from those of the cars operated on by the vibratory arrangement.

Kirwan, GB
Chesapeake and Ohio Railway Patent 4,221,521, Sept. 1980, v.p.

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: United States Patent Office, 2021 Jefferson Davis Highway, Arlington, Virginia, 22202

22 335290

DEMAND FOR FREIGHT TRANSPORTATION WITH A SPECIAL EMPHASIS ON MODE CHOICE IN CANADA

This study derives a freight transportation demand model consistent with neoclassical economic theory. A shipper is assumed to minimize total cost of production and distribution with a given output that is delivered to markets in various destinations. With some further assumptions concerning the shipper's production technology, it expresses the shipper's transportation sectoral unit cost as a function of freight rates, quality attributes of service, and length of haul. Four alternative forms of the transportation sectoral unit cost function are hypothesized. These cost functions are specified in translog form, and corresponding modal revenue share functions are derived. The study utilizes the data developed for Canadian inter-regional freight movements in 1970. It is perhaps the most definitive work of its kind.

Oum, TH
British Columbia University, Canada No Date, 204p, Tabs., Apps.

ORDER FROM: British Columbia University, Canada, Center for Transportation Studies, Vancouver V6T 1W5, British Columbia, Canada

22 335336

SIMULATION MODELING OF COAL TERMINALS

Coal terminals justify the effort and expense of simulation modeling because they are critical connectors between coal transport modes and have a strong influence on the end cost of coal. Three major factors in which coal terminals differ from other past models, to be considered by the modelers are: coal terminals have special characteristics in terms of queuing theory; they require modeling of commodity storage; and they have complex materials-handling facilities. As a cost study, Richards Bay Coal Terminals in South Africa illustrates a complex operational and corporate problem which presented a challenge to the simulation method of modeling.

From Energy Policy Modeling: United States and Canadian Experiences.

Volume I. Specialized Energy Policy Models.

Lauga, TJ Ziemba, WT Schwartz, SL Koenigsberg, E
Martinus Nijhoff Publishing Company 1980, pp 286-293

ORDER FROM: Martinus Nijhoff Publishing Company, 190 Old Derby,
Hingham, Massachusetts, 02043

22 335337

COSTING THE MOVEMENT OF WESTERN CANADIAN COAL TO THUNDER BAY: AN INCREMENTAL APPROACH

The problem of selecting the appropriate modes or combination of modes for the movement of western Canadian coal to Ontario through the year 2000 is studied. The analysis includes the development of coal demand and supply forecasts, and an assessment of rail traffic and line capacity in western Canada. Marginal capital and operating costs for four alternative systems--rail/lakeboat, slurry pipeline/lakeboat, high-voltage direct-current transmission, and coal gasification--are developed, and tariff schedules for each system through 2000 calculated using a discounted-cash-flow computer model. A sensitivity analysis on the model parameters and cost estimates is performed. Proposed amendments to the National Transportation Act (NTA) of 1967, which intended to maximize net economic benefits to the nation without particular concern for their distribution, merely shifts the emphasis in the mode selection process to establish a competitive rate.

From Energy Policy Modeling: United States and Canadian Experiences. Volume I. Specialized Energy Policy Models.

Boon, CJ (Queen's University, Canada); Ziemba, WT Schwartz,
SL Koenigsberg, E
Martinus Nijhoff Publishing Company 1980, pp 267-285, 2 Fig., 7 Tab.,
87 Ref.

ORDER FROM: Martinus Nijhoff Publishing Company, 190 Old Derby,
Hingham, Massachusetts, 02043

22 335445

LOGISTICS? [Logistik?]

The much-used but ambiguous term "logistics" is in this context understood to mean "optimization of freight rolling stock flow" within the overall system. Different methods exist, which take account of particular features of supply, production and distribution. [German]

Falz, E *Rationalisierung* Vol. 32 No. 1, 1981, pp 24-29

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Carl Hanser Verlag, Kolbergerstrasse 22, Postfach 860420,
8000 Munich 80, West Germany

22 335606

MODEL SIMPLIFICATION IN MULTICOMMODITY DISTRIBUTION SYSTEMS THROUGH AGGREGATION

Many logistics problems involve the distribution of multiple commodities. In many cases, problems of this nature can be modeled as multicommodity network flow problems which are specially-structured, large-scale linear programs. This paper discusses aggregation as a tool for simplifying models of this type. Two methods are discussed: structural aggregation, which involves aggregation of nodes and arcs in a network, and secondly, aggregation of commodities. In the first case, an error bound on the optimal solution can be developed. In the second, only a lower bound can be established. Methods of disaggregation and computational aspects are discussed.

Proceedings-Annual Meeting of the American Institute for Decision Sciences, 11th, v2, New Orleans, Louisiana, November 19-21, 1979,

Evans, JR (Cincinnati University)
American Institute for Decision Sciences Proceeding 1979, pp 77-79, 13 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: American Institute for Decision Sciences, University Plaza,
Atlanta, Georgia, 30303

22 335610

KAYENTA MINE: A STEADY, BIG PRODUCER

The Kayenta mine extracts bituminous coal from seams atop Black Mesa, a 2.1-million-acre highland in Arizona that lies within the borders of the Navajo and Hopi Indian Reservations. From the 7,300-ft-high rim of the mesa, crushed coal is transferred via a 7.3-mile conveyor system to storage silos on the valley floor, where it is loaded into unit trains for shipment to an in-state generating plant.

Carter, RA *Coal Mining and Processing* Vol. 17 No. 11, Nov. 1980, pp 56-60

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

22 335611

HOW TO SOLVE FROZEN-COAL PROBLEMS

The behavior of different kinds of coal in cold environments is described. The three freeze-control methods commonly used today are: heat, mechanical methods, and freeze-control agents (FCA). Some of the latter act as antifreeze, others weaken the crystalline structure of ice. There are three types: glycol-, oil-, and calcium chloride-based compounds. Application of freeze-control agents, coordinated with thermal and mechanical methods, helps utilities move coal smoothly from the railcar to the burner.

Baur, PS *Power* Vol. 125 No. 1, Jan. 1981, pp 57-59

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

22 335619

BULK HANDLING--ADVANCES IN MINING, TRANSPORTATION AND PROCESSING

The mining, transportation, and process industries have solved difficult problems. Innovations have replaced the horse and human hands with a multitude of possibilities. The application, behavior and combination of the most significant innovations are presented in this paper. Observations are made on both their development and future.

Yu, AT (Orba Corporation); Mahr, D *American Society of Mechanical Engineers Papers* ASME 80-WA/MH-9, 1980, 10p, 28 Ref.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

22 335827

RUNGIS 10 YEARS LATER--THE RAILROAD'S PLACE IN THE WORLD'S LEADING FOODSTUFFS MARKET [RUNGIS 10 ANS APRES--LE ROLE DU CHEMIN DE FER DANS LE PREMIER MARCHÉ MONDIAL DE DENRÉES PERISSABLES]

This eleventh quarterly report of Aviation Safety Reporting System (ASRS) operations contains a comprehensive study of near midair collisions in terminal airspace, derived from the ASRS database. It also includes a selection of controller and pilot reports on airport perimeter security, unauthorized takeoffs and landings, and on winter operations. A sampling of typical Alert Bulletins and their responses appears as the final section of the report. [French]

Moreau, G *Revue Generale des Chemins de Fer* Vol. 99 Dec. 1980, pp 669-680

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

22 335865

1980 NATIONAL CONFERENCE AND WORKSHOP ON COAL FREEZING

A national conference and workshop on problems of coal freezing were sponsored by EPRI in Cincinnati, Ohio, on March 31 and April 1, 1980. For each of the following topics, the report includes the formal papers, a summary of the workshop discussions, and conclusions: standards for frozen coal tests, application of freeze conditioning additives, transportation problems of frozen coal, consumer perspectives on frozen coal problems, and development of methods for unloading frozen coal. Over 130 persons participated, representing all of the industries concerned with aspects of freezing coal: utilities and other consumers, transportation, mining, and suppliers of freeze-conditioning additives. The conclusions reached included: methods for evaluating freeze-conditioning additives (FCA) and for sampling coal to detect FCA; guidelines for designing and using FCA-application systems, which must be custom designed; and a catalog of specific problems from frozen coal, with a list and evaluation of possible solutions. The report also includes the available records from the 1979 Seminar on Frozen Coal Problems, which was held in St. Louis. Twenty-four papers have been entered individually into EDB.

From Conference and Workshop on Problems of Coal Freezing; Cincinnati, Ohio, March 31, 1980.

Lansing, NF

Electric Power Research Institute CONF-8003133, Dec. 1980, 286p

ACKNOWLEDGMENT: Energy Research Abstracts
ORDER FROM: NTIS

EPRI-WS-80-119

22 335866

HOPPER POPPER

Experience in developing drilling equipment for drilling into the frozen coal (either in railway cars or stockpiles) and then loosening the coal by an air shot of about 400 cubic inches at 2000 to 8000 psi is described. It was difficult to drill into the frozen coal and to mount the drilling equipment so that it was stable. Previous methods of loosening frozen coal are discussed briefly.

From 71, Annual Conference of the International District Heating Association; Harbor Springs, Michigan, June 23, 1980; Section 22 of Proceedings of the International District Heating Association.

Hastings, MR

Long-Airdox Company Proceeding 1980, p 9

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: Long-Airdox Company, Oak Hill, West Virginia, 25901

22 335867

PROJECT TO DEVELOP AND DEMONSTRATE METHODS TO ELIMINATE FROZEN COAL HANDLING PROBLEMS. STATUS REPORT II

Extensive tests, utilizing the miniature rail hopper car, miniature shakeout facility and the freezer unit, were completed on some eight different major suppliers' freeze conditioning agents (FCA's), all of which are manufactured for the purpose of inhibiting the shear strength of frozen coal. Generally, the tests proved that these chemicals offer some relief to the problem up to a point. However, in sub-zero temperatures from minus 10 deg F and beyond, none of the FCA's tested proved very effective. In each instance, on each different FCA application, two pints per ton of the chemical were sprayed onto the coal as it was loaded into the miniature hopper car. Average cost of the FCA's is one dollar per pint, indicating the average charge to treat 100 tons of coal amounts to \$200.

United Coal Company Jan: 1981, 17p

Contract AC22-80PC30076

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: NTIS

DOE/PC/30076-T2

22 336193

SAXMAN VILLAGE PORT AND TERMINAL STUDY

The Saxman Village Port and Terminal (SVPT) constructed in 1964, provided rail-barge service to Southeast Alaska. Its operation provides a means of access to U.S. and Canadian transcontinental railroads. Recently, Foss Alaska Line, which carried an estimated 94 percent of the total waterborne commerce passing through the SVPT, terminated its preferential use agreement with the City of Saxman. The objective of this study was to determine the engineering and economic requirements for continuing the operations of or redeveloping the Saxman Village Port and Terminal at Saxman, Alaska. The study has evaluated the movement of waterborne commerce throughout Southeast Alaska, the Ketchikan area, and particularly the SVPT in order to project the potential demands for the continued use of the SVPT as a cargo handling facility.

Prepared in cooperation with CH2M/Hill, Bellevue, WA.

Economic Development Administration EDA-80-0193, Dec. 1980, 110p

Grant EDA-07-06-02133

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-142200

22 336224

AN EXPORT REFERENCE GUIDE AND RESOURCE DIRECTORY FOR THE GREAT LAKES STATES

This directory is intended to provide basic information about exporting and to provide a listing of the resource people in the six Great Lakes states where the firm interested in exporting can go for further information and assistance. While it is hoped that all potential exporters will benefit from this guide, it is especially intended to encourage smaller to medium-sized firms to realize that there are many good reasons to explore export markets and many resources available to them for assistance.

Sponsored in part by Economic Development Administration, Washington, DC., and Great Lakes Economic Action Committee.

Indianapolis Center for Advanced Research, Inc, Economic Development Administration EDA-80-0183; Oct. 1980, 154p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-136368

22 336329

TECHNICAL ASSESSMENT OF PATENTS RELATED TO UNDERGROUND COAL MINE HAULAGE. INTERIM REPORT, JUNE 30, 1976 TO OCTOBER 31, 1977

In this program over 67,000 patents were covered in four (4) classes: 105-Railway Rolling Stock, 198-Conveyors, Power-Driven, 238-Railways, Surface Track, 299-Mining or In Situ Disintegration of Hard Material. Of these 17,351 patents were examined and 515 detailed evaluations prepared. Brief descriptions of these patents are given in the report. The complete evaluations are presented in the Appendix. The report also presents concepts worthy of further consideration, and recommendations are given for other classes that should be reviewed. (ERA citation 06:000151)

Singh, MM Jaspal, JS LoPresti, R Hair, RT Yates, GA Engineers International, Incorporated, Department of Energy Feb. 1978, 93p

Contract AC01-76ET12480

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

TID-28233

22 336370

TRENDS IN FRESH FRUIT AND VEGETABLE TRANSPORTATION, 1963-75

Fresh produce hauling shifted substantially from railroads to trucks in deliveries to 41 major cities between 1963 and 1975. Trucks accounted for 64.3 percent of all tonnage in 1963 and 83.1 percent in 1973. Regional patterns of originations also changed considerably, especially from the Eastern region to Southern and Western regions, while terminal points showed the same regional changes, but on a smaller scale.

Boles, PP

Economics and Statistics Service ESS-1, Oct. 1980, 16p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-129850

22 336513

THE IMPACT OF DEMAND-SENSITIVE RAILROAD RATES UPON THE STORAGE AND TRANSPORTATION SYSTEM FOR U.S. FEED GRAINS

A storage and transportation model of the U.S. feed grain industry was developed to measure the potential impacts of demand-sensitive rail rates. At the national level, a 5 to 15 percent change in rail rates simultaneously increased rail revenue and traffic volume and reduced seasonality of rail demand. Incentives were created in lieu of immediate rail transportation. As a consequence, total costs of transportation, handling and storage increased. Regional results differed slightly.

Hoffman, LA

Economics and Statistics Service Staff Rpt. AGESS-801022.1, Oct. 1980, 34p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-134165

22 336654

FLOW OF GRANULAR MEDIA

Problems related to the flow of granular materials in hoppers were investigated. Analysis for the flow in conical hoppers was performed. The analytical predictions agree well with experimental measurements. Results have practical implications since bins and hoppers are the most common devices to store and handle granular materials. Extensive studies of factors governing "mass flow" and "funnel flow" demonstrate that the existence of each flow is principally dependent on only two parameters. Experimental observations address the question of symmetry and steadiness of the flow

field and the kinematics of material deformation. Three types of flow in the hopper are identified and classified. Observations show that the ratio of the height of the material in the vertical bin to the width of the bin must be used to obtain a complete picture of the flow field. Results are presented in graphic form, potentially useful in the design of hoppers. Additional investigations were initiated on non-steady flows in hoppers, analysis of studies of stagnant regions, and development of an appropriate constitutive relation for granular materials.

Sabersky, RH Brennen, C
California Institute of Technology, National Science Foundation Final

Rpt. NSF/RA-800245, Feb. 1980, 177p

Grant NSF-ENG76-15043

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-163693

23 322513

LOCATION OF RAIL STATIONS FOR MANY TO ONE TRAVEL DEMAND AND SEVERAL FEEDER MODES

Suburbs can be served by a railway line in a number of ways. What usually happens however is that the train travels to a large main station and stops at every station on the way. The aim of the study is to determine where to build new stations along the line.

Hurole, VF Wirasinghe, SC *Journal of Advanced Transportation* Vol. 14 No. 1, 1980, pp 29-45, 7 Fig., Refs.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Institute for Transportation, Incorporated, 1410 Duke University Road, Durham, North Carolina, 27705

23 326473

BART'S (BAY AREA RAPID TRANSIT'S) FIRST FIVE YEARS: TRANSPORTATION AND TRAVEL IMPACTS.

A final report is presented assessing the San Francisco Bay Area Rapid Transit System (BART) on transportation and travel in California. The 71-mile BART began passenger service in 1972. The final section, the transbay link between San Francisco and Oakland, opened in 1974. Ridership has grown to about 140,000 passenger trips per day, 60,000 of them transbay. BART's ridership and impacts have been less than predicted, which reflects the optimism of the predictions and the shortcomings of BART's current service. As intended, BART's most significant improvements in travel times have been for long-distance trips by transit, particularly transbay, to downtown San Francisco. BART carries 21 percent of transbay commuter trips. Areawide, BART's share of trips for all purposes is between 2 and 3 percent. Total bus ridership has changed little because the loss of riders from services paralleling BART has been offset by the use of buses to get to and from BART. Impacts on San Francisco-Oakland Bay bridge traffic have been less than expected, because new trips by car have appeared to replace those removed by BART. Implications for planning rail transit elsewhere are drawn.

Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001644. Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA.

Sherret, A
Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-08, Apr. 1979, 261p

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS
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PB81-118077, DOTL NTIS

23 326815

RAPID TRANSIT SYSTEMS. JUNE, 1976-MAY, 1980 (CITATIONS FROM THE ENERGY DATA BASE)

Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 094 citations.)

Sponsored in part by National Technical Information Service, Springfield, VA.

Van Put, W
New England Research Application Center, National Technical Information Service NERACEDBNT0666, June 1980, 108p

ACKNOWLEDGMENT: NTIS
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PB80-854961

23 326816

RAPID TRANSIT SYSTEMS. AUGUST, 1974-JUNE, 1980 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE)

Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 200 citations.)

Sponsored in part by National Technical Information Service, Springfield, VA.

Van Put, W
New England Research Application Center, National Technical Information Service NERACEI NT0666, June 1980, 196p

ACKNOWLEDGMENT: NTIS
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23 326817

RAPID TRANSIT SYSTEMS. SEPTEMBER, 1975-JUNE, 1980 (CITATIONS FROM THE NTIS DATA BASE)

Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 200 citations.)

Sponsored in part by National Technical Information Service, Springfield, VA.

Van Put, W
New England Research Application Center, National Technical Information Service NERACUSGNT0666, June 1980, 240p

ACKNOWLEDGMENT: NTIS
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PB80-854946

23 326818

RAPID TRANSIT SYSTEMS. JUNE, 1974-MAY, 1980 (CITATIONS FROM THE INTERNATIONAL AEROSPACE ABSTRACTS DATA BASE)

Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 189 citations.)

Sponsored in part by National Technical Information Service, Springfield, VA.

Van Put, W
New England Research Application Center, National Technical Information Service NERACIAANT0666, June 1980, 164p

ACKNOWLEDGMENT: NTIS
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PB80-854938

23 327761

PRELIMINARY REPORT TO CONGRESS AND THE PUBLIC: A REEXAMINATION OF THE AMTRAK ROUTE STRUCTURE

After 7 years of National Railroad Passenger Corp. (Amtrak) operations, Congress requested a reexamination of the Amtrak route structure. In response, the Department of Transportation conducted an evaluation of alternative national intercity rail passenger systems. Preliminary recommendations are presented in this report for public comment. The Department has also identified several policy issues which merit public scrutiny. Preliminary recommendations are presented in the following framework: There is a historical trend for long-term decline in the common carrier share of intercity passenger travel, and a precipitous downward trend in rail patronage. Chapter 2 reports on Amtrak's progress to date in reversing these trends. Chapter 3 describes and discusses the present intercity rail passenger service system and the operation of the system. Chapter 4 discusses the methodology which produced the 5 route structure alternatives that were analyzed in this report, and graphically portrays them. Chapter 5 presents the Department's recommended route structure, offers projections for its operating performance and financial results, and describes the rationale for its selection. Chapter 6 discusses the future funding consequences of the preliminary recommendations, along with possible means of meeting funding requirements. Chapter 7 broaches significant issues deserving of public scrutiny, reflection and comment. These issues include Amtrak fare policy, the market for intercity rail passenger service and the institutional framework of Amtrak.

Federal Railroad Administration FRA/RRI/001, May 1978, 165p

ACKNOWLEDGMENT: NTIS
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PB81-119752, DOTL NTIS

23 327762

FINAL REPORT TO CONGRESS ON THE AMTRAK ROUTE SYSTEM: AS REQUIRED BY THE AMTRAK IMPROVEMENT ACT OF 1978

The report, prepared in response to Sec. 4 of the Amtrak improvement Act of 1979, presents the recommendations of the U.S. Dept of Transportation regarding the route system that should be operated by the National Railroad Passenger Corp. (Amtrak). The report recommends several major policy objectives that must be achieved if the quality and financial performance of railroad passenger service in this country is to be improved significantly. In addition to presenting final recommendations on the system of routes and services which should be operated by Amtrak, this report also recommends policy changes required to improve the quality and financial performance of intercity railroad passenger service in general. Chapter 2 reviews Amtrak's financial and operating performance. Chapter 3 presents the Department's policy recommendations. Chapter 4 describes in detail the recommended route system and the methodology used to develop the system. Chapter 5 presents the Department's estimates of required funding for Amtrak for the next 5 fiscal years and discusses the savings to be achieved by implementing the recommended system.

Federal Railroad Administration FRA/RR1/002, Jan. 1979, 76p

ACKNOWLEDGMENT: NTIS
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PB81-119760, DOTL NTIS

23 328226

INTERCITY, BUS, RAIL, AND AIR SERVICE FOR RESIDENTS OF RURAL AREAS

This is a four part study which focuses on intercity passenger service for residents of rural areas, i.e., persons who live outside officially designated urbanized areas. Part I develops the analytical structure for the study and introduces a definitional structure designed to reduce the considerable semantic confusion surrounding the subject matter area. Parts II, III and IV examine the characteristics of bus, rail and air service, respectively, currently provided to rural residents. The bus findings were based partly upon case studies of rural areas in 10 states. The study concludes that the combination of bus and air service usually provides adequate intercity service for most rural residents, and that access to this service is not a major problem.

Wells, J Manion, J Connelly, M Johnson, K Kinney, M
International Business Services, Incorporated, Asst Secretary for Policy
& International Affairs Final Rpt. DOT-P-10-80-18, Jan. 1980, 346p

Contract DOT-OS-80082

ACKNOWLEDGMENT: NTIS
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PB81-120826

23 328235

RAIL TRANSIT WINTERIZATION TECHNOLOGY AND SYSTEMS OPERATIONS STUDY

The severe winters of 1977-1978 and 1978-1979 caused all snowbelt transit systems to experience a variety of problems which resulted in impaired service ranging from systems delays to complete system shutdowns. The scope of this report includes a summary of rail transit equipment problems encountered by transit authorities due to severe winter weather; hardware measures that have been implemented to combat the effects of severe winter weather; summaries of both technological and operational measures in current use by various transit systems, as well as information on their effectiveness; and an update of the 1978 Massachusetts Bay Transportation Authority (MBTA) study. Three background events preceded this study: (1) the 1978 study of rail transit's severe winter weather problems and some of the solutions undertaken by Alexander Kusko, Inc. (AKI) for the MBTA; (2) the severe winter experience suffered by the Chicago Transit Authority in 1978-1979; and (3) the formation of a special task force on rail transit snow and ice emergencies by the American Public Transit Authority. The conclusions are concerned with the measures and basic problems faced by transit authorities during severe winter weather. Recommendations are then provided on measures which UMTA and/or the transit authorities can support to minimize winter's impact on transit operations.

LaMarca, JL King, CM

Kusko (Alexander) Incorporated, Transportation Systems Center, Urban
Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt.
DOT-TSC-UMTA-80-34, Sept. 1980, 165p

136

Contract DOT-TSC-1773

ACKNOWLEDGMENT: NTIS
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PB81-122905

23 328236

CLOSED CIRCUIT TELEVISION IN TRANSIT STATIONS: APPLICATION GUIDELINES

It is intended that readers will acquire information from this document that will help in planning, designing, installing, operating, and evaluating the most appropriate CCTV transit surveillance system for their own purposes. This report is arranged to first identify key concepts in the main areas associated with CCTV transit station security systems, and then are focused individually on those main areas which include equipment, personnel, procedures, evaluation, and costs. Appendices which include lists of manufacturers of CCTV components, glossaries of terms and abbreviations, and a comprehensive bibliography are included in this report. The information for this study was obtained from literature surveys, suppliers, visits to existing transit CCTV installations, consultations with subject-matter experts, and the prior experience of the project staff.

Bloom, RF

Dunlap and Associates, Incorporated, Transportation Systems Center,
Urban Mass Transportation Administration, (UMTA-MA-06-0048) Fi-
nal Rpt. ED-80-1, DOT-TSC-UMTA-80-33, Aug. 1980, 209p

Contract DOT-TSC-1314

ACKNOWLEDGMENT: NTIS
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PB81-122913

23 328247

TRANSIT STATION DESIGN: CASE STUDIES OF PLANNING AND DESIGN METHOD

The application of a previously developed and documented transit station design methodology is described. Two example design scenarios, a central area bus terminal and a rail rapid transit station are illustrated. The experiences with the station design procedures have shown the method to be very useful in selecting and improving upon a station design that compares to the stated design objectives. Technically, many subjective decisions are required even with the formalized method and, thus, objectivity must be stressed in terms of procedure rather than practice.

Virkler, MR Demetsky, MJ Hoel, LA

Virginia University, Department of Transportation Final Rpt. DOT/R-
SPA/DPB-50-7914, Feb. 1980, 204p

Contract DOT-OS-50233

ACKNOWLEDGMENT: NTIS
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PB81-124786

23 328276

LIGHT RAIL APPLICATION AND DESIGN

The purpose of the report is to document an investigation of overseas Light Rail practice undertaken as part of the Preliminary Design of the Adelaide Northeast Light Rail Project. The report combines a broad appreciation of the application of Light Rail and other public transport modes in selected cities, with the investigation of design and other details of specific relevance to the Northeast project and other potential applications of Light Rail technology in Adelaide.

Norley, KT

South Australia Director-General of Transport Dec. 1979, 222p

ACKNOWLEDGMENT: NTIS
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23 328335

OVERVIEW OF ESCALATOR APPLICATIONS IN RAIL TRANSIT

New rail transit systems have made extensive use of escalators, increasing the importance of escalator reliability and cost. The project objectives were to determine the difference in operating environment and in construction between escalators in transit and non-transit use, the impact of recent escalator innovations, and areas which could benefit from UMTA sponsored

research and development. Several factors causing a more severe transit escalator operating environment were identified. There are no significant design differences between transit and non-transit escalators. Recent innovations that have affected performance and cost include outdoor escalators, extra flat steps at both landings, and modular escalators. Conventional escalators have one drive motor located at the top landing. Motors on a modular escalator are spaced at intervals along the truss. Data were collected by interviews at transit agencies.

Deshpande, G Rubenstein, L
Jet Propulsion Laboratory, Urban Mass Transportation Administration
Final Rpt. JPL-PUB-80-76, UMTA-CA-06-0116-80-2, July 1980, 50p

Contract DOT-AT-80015
ACKNOWLEDGMENT: NTIS
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PB81-128720

23 328942
COMMUNICATIONS ON RESEARCH AIMED AT IMPROVING TRANSPORT CONDITIONS IN CITIES, TOWNS AND OTHER BUILT-UP AREAS. STUDY OF THE OPERATION OF NEW SHORT-DISTANCE TRANSPORT SYSTEMS AND OF IMPROVED HIGH-SPEED RAILWAYS BY SIMULATION, INCLUDING THE ESTABLISHMENT OF BASES FOR PLANNING AND DECISION-MAKING. SPECIAL ISSUE NO. 25

[Mitteilungen ueber Forschungen zur Verbesserung der Verkehrsverhaeltnisse der Gemeinden. Untersuchung der Betriebsablaeufer neuer Nahtransportsysteme und verbesserter Schnellbahnen durch Simulation einschliesslich Erarbeitung von Planungs-und Entscheidungsgrundlagen]

Contents: Part I: Summary report (entire project)--Study of the operation of new short-distance transport systems and of improved high-speed railways by simulation, including the establishment of bases for planning and decision-making; and Part II: Urban transport research program--Classification of research and study assignments; and Survey of research projects commissioned since 1967. [German/English]

Bundesministerium fuer Verkehr 1979, 216p

ACKNOWLEDGMENT: NTIS
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PB81-154692

23 328969
PLANNING AND DESIGNING A TRANSIT CENTER BASED TRANSIT SYSTEM: GUIDELINES AND EXAMPLES FROM CASE STUDIES IN TWENTY-TWO CITIES

The purpose of this report is to examine the transit center concept to determine if and how it might be applied in American cities to provide more efficient and effective transit service on an areawide basis. Transit centers are interchange facilities that will be typically located in suburban areas at or near major activity centers and will serve as focal points for high levels of local, radial, and circumferential transit service. Bus/bus, bus/rail, and auto/rail transfers will occur there. In this report, present metropolitan travel patterns in American cities are examined. The inability of highly downtown-focused transit networks to meet metropolitan travel needs in American cities is discussed. In addition, the grid network approach to route planning is critiqued. A planning framework, consisting of 10 steps and designed to aid planners design transit centers, is presented. Each step of the process is illustrated with examples from 22 case studies which include four Canadian, one Indian, and one West German city. Abstracts of the case studies are included in Appendix A of this report. Regional shopping centers are suggested to be ideal sites for transit center locations. The transit center oriented network is assessed critically from an operational, financial, and political perspective. Sixty-two examples of areawide plans, location and design criteria, the physical design of downtown, freeway and suburban off-street transit centers and cost estimates are presented.

Schneider, JB Smith, SP Thompson, PD Heid, JL Ng, IW
Washington University, Seattle, Urban Mass Transportation Administration, (UMTA-MA-11-0007) UMTA-WA-11-0007-81-1, Sept. 1980, 133p

ACKNOWLEDGMENT: NTIS
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PB81-154569

23 329023
COGNITIVE ASPECTS OF TRANSIT USE IN AREAS OF HIGH AND LOW TRAVEL DENSITY

The report addresses several questions regarding the manner in which information on transit systems should be prepared and disseminated. The report is divided into six chapters, ranging in topics from the fundamental broad-based questions of how well urban residents understand their city and the transit system, to specific questions of what to include on a transit map. The report identifies the numerous steps a transit planner needs to consider in preparing a comprehensive information dissemination (marketing) program. In this report, the six studies of cognitive factors in mass transit use are reported, namely: (1) Interviewers posing as lost travelers gathered route information from fellow travelers; (2) Business establishments were telephoned and asked for route information/direction to their places of business; (3) Bus riders were surveyed to determine whether route names or route numbers were preferred; (4) Distance perception and "mental maps" of Chicago were studied in a sample of respondents; (5) Three varieties of transit route maps were tested for their utility to users; and (6) A literature survey of cognitive factors in transportation use was performed. All studies point out problems existing in the proper form and usage of transit route information by the public.

Soot, S Stenson, HH
Illinois University, Chicago, Urban Mass Transportation Administration, (UMTA-IL-11-0028) Final Rpt. UMTA-IL-11-0028-81-1, Dec. 1980, 79p

ACKNOWLEDGMENT: NTIS
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PB81-153959

23 329147
PATRONAGE IMPACTS OF CHANGES IN TRANSIT FARES AND SERVICES

The report presents information on public transit fare and service elasticities of demand. Data were obtained from a comprehensive review of studies performed in the United States and other countries, especially the United Kingdom. Estimates of individual fare and service elasticities were obtained from analyses of individual fare and service changes, and from direct-demand and mode-choice models based on time-series and cross-sectional data. This report confirms the fact that transit demand is inelastic with respect to fares and services; that is, the proportional change in transit patronage in response to fare and service variations is less than the proportional change in fares and services. More importantly, the data presented in this report reveal that there is a large degree of consistency in the aggregate system-wide demand elasticities. Although there is variation in the disaggregate elasticity values, this variation is reduced and remarkable stability emerges when the analysis focuses on individual disaggregate categories. This underlying consistency, which exists across many types of cities and even countries, suggests that significant shifts in patronage could result without a deterioration in revenues from manipulations in fare and service levels.

Mayworm, PD Lago, AM McEnroe, JM
Ecosometrics, Incorporated, Urban Mass Transportation Administration, (UMTA-MD-06-0054) Final Rpt. RR-135-1, UMTA-MD-06-0054-81-1, Sept. 1980, 246p

Contract DOT-UT-90014

ACKNOWLEDGMENT: NTIS
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PB81-167652

23 330165
BRITISH RAIL INVENTS THE TRAIN

British Railways' development of the railbus as a solution for service on light-density lines is examined. The research organization combined its high-speed, two-axle freight car running gear with a Leyland bus body to produce a low-cost vehicle for branch-line passenger service. Previous use of such vehicles in Britain is described and prospects for the replacement of the existing conventional rail diesel car fleet with the new railbus is considered in the light of reduced track maintenance now in effect for rural lines. FRA has sponsored a test of the vehicle in the U.S.

Hamer, M *New Scientist* Vol. 89 No. 1237, Jan. 1981, pp 208-210, 6 Phot.

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23 330166

SHORT-TERM IMPACTS OF A SUBURBAN RAIL RAPID TRANSIT STATION: STUDY RESULTS FOR SILVER SPRING, MARYLAND

Results of a before-and-after study for the Silver Spring station of the Washington, D.C., Metro rail rapid transit system are presented. The study focused on the short-term impacts on the Silver Spring business district of the initiation of rail service and coordinated changes in collector and community transit services. Findings are reported for several impact categories, including transit use, changes in travel habits, traffic and parking impacts, and the community's perceptions of Metro. There were significant initial increases in transit use in the station service area: about 100 percent for regional service and about 200 percent for local services. The percentage of transit work trips to Silver Spring increased from 10 to 13 percent. Approximately 40 percent of midday nonwork trips made by Silver Spring employees into the District of Columbia were made by Metro. Surveys at the station show that a significant proportion—approximately 60 percent—of Metro riders in the morning peak period get to the station by bus and another 16 percent walk. Parking became the most serious negative impact of the station; 1500 daily parkers were added to the parking supply in Silver Spring, which increased the peak-hour occupancy for long-term spaces from 80 to 92 percent. However, this was partly offset by increased use of transit to Silver Spring. Special attitudinal surveys of Silver Spring businesses and residents indicated that, in spite of short-term problems, the overall impact of the station was positive. (Authors)

This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.

Winick, RM (National Capital Park and Planning Commission, Md);
Smith, SA (JHK and Associates) *Transportation Research Record* No. 760, 1980, pp 1-7, 3 Fig., 5 Tab., 3 Ref.

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23 330167

PHILADELPHIA CENTER CITY COMMUTER RAILROAD CONNECTION

The city of Philadelphia has undertaken major construction to connect two separate commuter railroad systems in Center City to offer ubiquitous access to commuters. The rationale of such great investment in so small an area is explored. The basic theoretical justification is determined by the benefit/cost ratio, but physical impacts on passengers and service providers are also analyzed. Time saved is not evaluated in dollars. Commuter time savings produce no cash dollars to amortize costs but do generate more revenue and less expense, the net effect of which is favorable. The obvious direct advantages are not sufficient in themselves to fully justify the investment. The greater single positive factor is the revitalization of the Philadelphia central business district east of City Hall. This has already begun and is being coordinated with project construction. The city is expected to benefit by more than \$20 million/year in real estate and wage tax increases. Highway traffic will benefit from reduced congestion. Numerical values have been refined by various analysts over a period of 20 years. Data are based on final engineering plans, regional planning studies, and the author's work on the subject. To date, most of the actual construction bids have been near or below estimates, inflation notwithstanding. Double-digit inflation may change this, but 90 percent of the contracts have now been let. The strategic importance of careful operational implementation in achieving the best results is also analyzed. (Author)

This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.

Tennyson, EL *Transportation Research Record* No. 760, 1980, pp 8-15, 6 Fig., 6 Tab., 8 Ref.

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DOTL JC

23 330169

RATIONALE FOR SELECTION OF LIGHT RAIL TRANSIT FOR PITTSBURGH'S SOUTH HILLS

A project to update the 70-year-old South Hills electric railway system in Allegheny County, Pennsylvania, was among the first such projects to be

subjected to intense scrutiny as part of a federally mandated alternatives analysis. The rationale of the accepted solution is examined, and the technical process by which consensus was achieved is described. The data used was derived from the alternatives-analysis work of the consultants, from regional planning projections, and from the author's observations and experience in the area. The alternatives analysis did not include a final solution for the downtown Pittsburgh traffic problem, but the subsequent review process, based on good data, led to the conception and acceptance of the Sixth Avenue subway. (Author)

This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.

Tennyson, EL *Transportation Research Record* No. 760, 1980, pp 18-25, 3 Fig., 2 Tab., 2 Ref.

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DOTL JC

23 330170

PLANNING PROCEDURES FOR TRANSIT-STATION RENOVATION

The application of planning and design procedures to the problem of transit-station renovation is described. The process is illustrated by using as an example the 69th Street Terminal in Philadelphia, a complex transit terminal that handles many transfer movements and transit vehicle connections and has a variety of system elements that are badly in need of renovation. The performance of the existing station was evaluated based on selected objectives and criteria and in light of its conformance with current policy guidelines. A series of alternative renovation layouts was produced to improve the processing of passengers by reducing conflicts, trip times, and level changes. These plans included consideration of horizontal and vertical separation, station access for fare collection, passenger volumes on each transit line, and accommodations for the disabled. Each alternative renovation plan was then evaluated along lines similar to those for the evaluation of the existing station. The results indicated the priority of each interest group and showed where conflict existed. The next step in the process is the preparation of detailed architectural and structural design plans and specifications, cost estimates, and a financial plan. (Authors)

This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.

Griffiths, JR (Tri-County Metropolitan Transp District of Oregon);
Hoel, LA (Virginia University) *Transportation Research Record* No. 760, 1980, pp 25-33, 11 Fig., 2 Tab., 3 Ref.

ORDER FROM: TRB Publications Off

DOTL JC

23 330173

SECURITY CONSIDERATIONS IN THE DESIGN AND OPERATION OF RAPID TRANSIT STATIONS (ABRIDGMENT)

Design principles for rapid transit stations and off-peak transit ridership as a function of personal security are discussed. A survey was conducted at two rapid transit stations in Cleveland, Ohio, for the purpose of determining user attitudes toward personal security and developing station design principles based on the findings. The major finding is that a "critical mass" of station patronage seems to be required before people feel secure in rapid transit stations. People avoid underused stations (which exacerbates the problem of poor patronage) and avoid riding in off-peak time periods at all stations. In both cases, survey respondents stated that they feel vulnerable in a transit station when there are few people around. Ironically, poor station patronage, which is considered to be a security problem, is largely a marketing problem, and improving off-peak ridership, which is generally considered a marketing problem, is largely a security problem. People provide the best security. It is concluded that, although traditional security measures such as good lighting, well marked stations, and security patrols are beneficial, improved security and improved transit marketing are closely associated and should be considered together in transit planning.

This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.

Andrie, SJ Barker, B Golenberg, M (SG Associates, Incorporated);
Richards, LG (Virginia University) *Transportation Research Record* No. 760, 1980, pp 42-45, 1 Tab., 8 Ref.

ORDER FROM: TRB Publications Off

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23 330174

RELIABILITY OF FARE-COLLECTION SYSTEMS FOR RAIL TRANSIT: AN OVERVIEW

The present performance of graduated-fare automatic collection equipment is compared with that of similar fare-collection systems, desirable performance is estimated, and research and development needs are identified. A series of flowcharts for three actual rail systems that indicated the range of functions and approaches that could be incorporated into a fare-collection system were developed. Queuing models could not be used directly to estimate the impact of the collection system on passenger flow without developing a two-stage model by use of the binomial probability distribution. Reliability data were collected by using interviews and the review of operating records. The data-collection methods varied greatly. Mean transactions between failures was found to be a useful and practical measure for comparing equipment reliability. The operating costs of rail transit fare-collection systems vary between 7 and 31 percent of revenues collected. The reliability of fare-collection equipment varies between 40,000 transactions/failure for a token-accepting turnstile to several hundred transactions per failure for a stored-value farecard vendor. Improved performance is obtainable, but the potential extent is unclear. Systems with a combined reliability of 0.22 percent failures/passenger can function without station attendants. It is important to specify failures in terms of component replacement and in terms of clearing of jammed tickets or money. The results provide an initial basis for comparing the performance of alternate fare-collection systems and focusing development resources.

This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.

Rubenstein, L (Jet Propulsion Laboratory) *Transportation Research Record* No. 760, 1980, pp 46-53, 3 Fig., 5 Tab., 8 Ref.

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23 330630

SELF-SERVICE FARE COLLECTION: FUNCTIONAL SPECIFICATIONS

No Abstract.

Strickland, LR
Mitre Corporation, Urban Mass Transportation Administration UMTA-VA-06-0049-79-6, Nov. 1979, 64p

Contract DOT-UT-800047

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: NTIS

23 330631

SELF-SERVICE FARE COLLECTION: TICKETING PROCEDURES IN SELF-SERVICE SYSTEMS

No Abstract.

Deibel, LE
Mitre Corporation, Urban Mass Transportation Administration UMTA-VA-06-0049-80-1, Feb. 1980, 35p, Refs.

Contract DOT-UT-800047

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: NTIS

23 330632

SELF-SERVICE FARE COLLECTION--SYSTEM REQUIREMENTS

No Abstract.

Sulek, J
Mitre Corporation, Urban Mass Transportation Administration UMTA-VA-06-0049-79-7, Nov. 1979, 38p

Contract DOT-UT-800047

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: NTIS

23 330633

THE ENVIRONMENTAL IMPACTS OF BART: INTERPRETIVE SUMMARY

No Abstract.

Gruen Associates, Incorporated, De Leuw, Cather and Company, Department of Transportation DOT-BIP-FR-7-4-77, Sept. 1979, 20p, Refs.

Contract DOT-OS-30176

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: NTIS

23 330634

BART IN THE SAN FRANCISCO BAY AREA: THE FINAL REPORT OF THE BART IMPACT PROGRAM

No Abstract.

Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development DOT-BIP-FR-9-201-78, June 1979, 227p, Refs.

Contract DOT-OS-30176

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: NTIS

23 330635

BART IN THE SAN FRANCISCO BAY AREA--SUMMARY OF THE FINAL REPORT OF THE BART IMPACT PROGRAM

No Abstract.

Metropolitan Transportation Commission, Department of Transportation DOT-BIP-FR-11-3-78, Dec. 1979, 21p, Refs.

Contract DOT-OS-30176

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

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23 330660

AMTRAK: THE NATIONAL RAILROAD PASSENGER CORPORATION

This book deals with the system Congress inaugurated in 1971 to prevent the demise of the intercity passenger train. Operation of the trains by the federally established corporation, however, has not been a success. Trains have never carried more than a third of 1 percent of Americans traveling between cities, and the system has lost over \$1.8 billion. It is demonstrated that the program failed because of a fallacious interpretation of the decline of the passenger train. In general, the people who value time most were the first to desert the passenger train for alternatives, and consequently the demand for luxury accommodations declined more rapidly than did coach ridership. Many observers concluded that the railroads were discouraging use of the trains by downgrading the quality of the service. The Amtrak program was based on a presumption that ridership could be restored by improving the quality of service. Actually, the public has responded much more to fare reductions and to schedule frequency than to provision of luxury. It is concluded that Amtrak serves no useful function in the national transport network, but is rather a subsidy to a limited number of people who value rail travel as a form of consumption. By analogy to the similar subsidy of American flag passenger ships, he predicts that Amtrak will eventually pass out of existence.

Hilton, GW
American Enterprise Inst for Public Policy Res 1980, 80p

ORDER FROM: American Enterprise Inst for Public Policy Res, 1150 17th Street, NW, Washington, D.C., 20036

23 330664

PARK AND RIDE. TOWARDS A BETTER USE OF PUBLIC TRANSPORT. KEYLIST OF PROVISIONS FOR CAR DRIVERS [Parkeer en reis. Naar een beter gebruik van het openbaar vervoer. Toetsingslijst voor de automobilist]

The Department of Transport in the Netherlands is planning to draw up a national park and ride plan. The Dutch tourist office ANWB has made a key list of requirements which a park and ride system has to meet to get the p r symbol. This key list can be used to show the possible shortcomings in the layouts of parking places at public transport stations which are entitled to p r. Requirements for before-transport, p r selection, parking, walking distance, comfort, public transport mode and after-transport are highlighted. [Dutch]

Dutch Touring Club ANWB Monograph Oct. 1979, 12p, 14 Phot.
 ACKNOWLEDGMENT: TRRL (IRRD 251542), Institute for Road Safety Research
 ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands

23 330669

BRITISH RAILWAYS BOARD: LONDON AND SOUTH EAST COMMUTER SERVICES

In the report on rail commuter passenger services in south east England, the commission investigates whether the British Rail board could improve its efficiency and so reduce costs without affecting quality of services provided. Reference is made to the extent to which service deficiencies are the result of inefficiency, the scope for productivity improvements, and, the efficiency of the board in adjusting services to match demand and also whether greater efficiency would increase net revenue. Conclusions and recommendations are made covering financial framework; quality of service; manpower; industrial relations, matching supply and demand; fare structure; investment; and management. Finally some observations are made on commuter requirements, the complexity of financial constraints, and, future objectives.

Federal Water Pollution Control Administration Monograph No. 8046, Oct. 1980, 316p, Figs., Tabs.

ACKNOWLEDGMENT: TRRL (IRRD 251659)

ORDER FROM: Her Majesty's Stationery Office, Monopolies and Mergers Commission, 49 High Holborn, London, England

23 330670

FARES ELASTICITY OF SUBURBAN RAIL TRAVEL

This report describes the progress made so far in an attempt to determine elasticities of demand for suburban rail travel using British Rail's NPAAS (National Passenger Accounting and Analysis System) data—a four-weekly time series started in 1971 and giving passenger flows by ticket type. It describes the method of analysis used to determine the elasticity of rail travel demand with respect to the main types of fare used. The model used has been applied to a sample of sixty-two flows with origins outside greater London and with destinations at one of the main London terminals. The analysis has covered the period from the setting up of NPAAS to the middle of 1977. Elasticities of about -1.0 for reduced-fare tickets, -0.7 for full-fare tickets and between -0.2 and -0.4 for season tickets have been obtained. A similar model applied to a small sample of flows where there have been appreciable service changes showed no plausible frequency of journey time elasticities significantly different from zero. (Author)

Hughes, P

Transport and Road Research Laboratory, (0305-1315) Monograph TRRL SR614, 1980, 17p, 7 Fig., 4 Tab.

ACKNOWLEDGMENT: TRRL (IRRD 251389)

ORDER FROM: NTIS

PB81-133217

23 331019

ALTERNATIVE WORK SCHEDULES: IMPACTS ON TRANSPORTATION

This synthesis presents information on implementation of staggered and flexible work hours and compressed workweeks and on the impacts of such measures on highways, transit systems, and ride-sharing programs. Alternative work schedules can be used to manage transportation demand by shifting commuters away from the peak hours and by reducing the number of days that people need to travel to work. Evaluations of large-scale variable work hours programs show that peak-hour bus loads and automobile arrivals at parking garages decrease 10 to 20 percent, and peak-hour automobile traffic volumes on major approaches to work centers are reduced by 5 to 10 percent. Staggered and flexible work hours result in reduced travel times, reduced load factors, and thus less crowding on transit and less waiting time for elevators in buildings. It appears that flexible hours programs have a positive effect on transit and carpool use. Theoretical analyses indicate that compressed workweeks can significantly reduce peak-period work trips and congestion although there may be negative effects on carpooling and transit ridership. Implementation of an alternative work schedule program begins with the determination that there is a congestion problem that could be alleviated by shifting transportation demand to less congested periods. After commitments are obtained from public and private organizations, a lead agency should be established,

preferably the same one that is coordinating ridesharing. The following implementation steps are suggested: (a) high-priority employment locations; (b) obtain support for feasibility studies; (c) conduct work schedule and transportation surveys of employers; design work rescheduling plans; (e) obtain management decisions to implement; (f) provide implementation assistance; (g) evaluate impacts; and (h) refine and extend the program.

NCHRP *Synthesis of Highway Practice* No. 73, Nov. 1980, 54p, 30 Fig., 25 Tab., 31 Ref.

ORDER FROM: TRB Publications Off

23 331107

ATLANTA'S NEW CENTRAL PASSENGER TERMINAL

When the new Central Passenger Terminal Complex at the Hartsfield Atlanta International Airport opens in September, 1980, it will be the largest airport terminal complex in the world. Four principle elements comprise the design of this facility: (1) Two interconnected, landside terminal buildings; (2) four separate airside concourse buildings; (3) an underground, automated guideway transit and pedestrian mall system, linking the terminal buildings and concourses; and (4) the ground access system. The concept of a centralized terminal with satellite gates will most efficiently accommodate Atlanta's volume of transferring passengers, which accounts for 72% of all passengers arriving at the Hartsfield terminal.

Kortan, JF *ASCE Journal of Transportation Engineering* Vol. 106 No. TE.6, Nov. 1980, pp 765-774

ACKNOWLEDGMENT: British Railways

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DOTL JC

23 331116

A NEW MODE OF TRANSPORT IN HONG KONG: THE UNDERGROUND RAILWAY-STATIONS ON THE ISLAND [Un nouveau moyen de transport a Hong Kong: Le metro-les stations de l'ile]

The authors describe the construction of the underground railway and 3 stations: Pedder, Chater and Admiralty. The development of the project is outlined together with the principles on which the preliminary plan was based. Details are given of the main constructional problems: safety of the stations vis a vis the water level, construction of the foundations of a future building located north of Pedder. Attention is drawn to the 1,20 M thick slurry trench walls, geotechnical problems during the construction of station Chater in the vicinity of buildings, the hydraulic problem caused by the construction of the stations (dam effect). [French]

Hamon, P Baum, P Drye, H (Dragages et Travaux Publics) *Travaux* No. 537, Nov. 1979, pp 37-45, 10 Fig., 10 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 110257), Central Laboratory of Bridges & Highways, France

ORDER FROM: ESL

23 331120

BRITISH RAIL GOES LIGHTLY IN RURAL AREAS

The trial of the experimental British Rail Lightweight Railbus Vehicle (LEV1) on the line between Ipswich and Lowestoft is designed to provide user reaction before the railbus enters service in rural areas. The aim of the LEV project is to provide a low cost replacement for diesel multiple fleet. The LEV1 is based on two national bus bodies mounted back-to-back on an underframe. The lightweight design and high power-to-weight ratio provides performance with fuel economy. A similar lightweight railbus is described, based on the National 2 bus body, being developed by Wickham of Ware, Herts., for the Federal Railroad Administration. British Rail is intending to market such lightweight rail vehicles worldwide for use on mass transit systems.

Acton, P *Transport* Vol. 1 No. 5, Nov. 1980, p 21, 1 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 252474)

ORDER FROM: City Press, Fairfax House, Colchester, Essex, England

23 331128

A CROSS-LONDON RAIL LINK

This booklet is about a scheme conceived by British rail to link the main rail routes south of London with those to the north and west. It describes ways of crossing London today and possible through London routes, in particular a train service. Projections of traffic through the link in 1991 are made. The

scheme is evaluated by: (1) assessing the financial return to British rail, and (2) assessing the benefit to the economy as a whole. Relations with other major schemes, such as the channel tunnels, proposals to improve rail access to London airports, and electrification review, are examined. The possible effects of the scheme on the environment and London transport underground services are briefly mentioned.

British Railways Board Monograph Nov. 1980, 32p, Figs., Tabs.

ACKNOWLEDGMENT: TRRL (IRRD 252539)

ORDER FROM: British Railways Board, Euston Square, PO Box 100, London NW1 2DZ, England

23 331224

WHAT'S FAIR ABOUT LOW FARE? AN ECONOMIC ANALYSIS OF A POLITICAL DECISION

MARTA's political choice of a low bus fare to gain a local funding-base for mass transit also turned out to be shrewd public economics. This case study attempts to demonstrate this point through an analysis of costs and benefits for riders and nonriders from 1972 through 1977. The analysis will follow a brief description of the evolution of the financial arrangements and some observations on the immediate effects of low fare on ridership patterns. This analysis will estimate the "fairness" of the sales tax/low fare method of financing public transportation by comparison with two alternatives. A Technical Appendix: "Stratification of Ridership Volume and Estimation of Number of Transit-User Families by Income Group" included in the report, shows how some of the parameters are derived which are used in this study. (UMTA)

Bates, JW

Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA11-0006-81-16, July 1979, 22p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA

ORDER FROM: NTIS

PB81-157471

23 331225

MARTA ACQUIRES THE ATLANTA TRANSIT SYSTEM: WHO ASSIMILATED WHOM, AND TO WHAT DEGREE

In 1971, an agreement was made with the Atlanta Transit System (ATS) and MARTA for the purchase of ATS, which was at that time, a privately-owned bus company. Basically, this case study addresses important questions about this MARTA acquisition. The questions focus on the character and degree of integration of the two initially-separate organizations. This case deals with this one subtle aspect of the ATS acquisition, whose resolution was anything but clear at the time of purchase, as the authors point out. Numerous questions relate to this target-aspect, but a few bare illustrations suffice to suggest the broader universe. Just how would ATS be absorbed into MARTA? In what ways, and in what degrees? This report discusses these issues in detail. (UMTA)

Miller, GJ Golembiewski, RT

Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA11-0006-81-17, July 1979, 36p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA

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PB81-157489

23 331231

MARKETING IN MARTA: EVOLVING AN INNOVATIVE ROLE IN MASS TRANSIT

This report presents an analysis of transit marketing and provides some specific experience that may be instructive to transit properties gearing-up to a full marketing effort. The case study describes the growth of the marketing effort within MARTA. The case provides an opportunity to follow the evolution of one effort in public sector marketing--the consideration of the what and the how, as well as some guesses as to how the new era of transit marketing will fare. The analysis process focuses on: (1) MARTA's position in the market; (2) the environmental forces and factors that affect MARTA marketing; (3) the broader organization into which MARTA marketing must fit; (4) marketing functions and responsibilities within MARTA; (5) MARTA's marketing mix--the product, price, and promotion of transit in Atlanta; and (6) MARTA's methods and procedures

to market its product, some successes and failures, and plans for the future. (UMTA)

Bates, JW

Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA-11-0006-81-5, July 1979, 23p

ACKNOWLEDGMENT: UMTA

ORDER FROM: NTIS

PB81-154817

23 331232

DESIGNING THE WEST LAKE STATION AREA

This case study report addresses the problems associated with the designing of the MARTA West Lake Station Area. It describes the design and then construction of each MARTA station in terms of 3 stages that relate to track, station, and station area. Basically, the contention at West Lake centered around stage 3 design, which, in turn, impacted on the two prior steps. The West Lake Station Area reflected important elements of the evolving MARTA style of management, namely--that each MARTA station would be community-rooted. Each MARTA station would be different as required by diverse community needs, geography, and so on. This report also discusses the Transit Station Area Development (TSAD) program and states that the TSAD program has provided completed station area plans phased with detailed engineering so that MARTA system plans reflected local government and citizen involvement, preferences, and policies. (UMTA)

Golembiewski, RT

Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA-11-0006-81-6, July 1979, 36p

ACKNOWLEDGMENT: UMTA

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PB81-154825

23 331492

BOSTON'S SOUTHWEST CORRIDOR PROJECT

Drawing on experiences with the Massachusetts Bay Transportation Authority (MBTA) Southwest Corridor Project in Boston, Mass., the initial through final stages of organizing a design team are illustrated as Boston's Southwest Corridor is transformed from a proposed highway to a mass transit/commuter rail facility. The design team is faced with not only a challenging engineering task but also a very demanding political issue. Intense community participation and related social issues are reflected in working relationships and processes. The role of the MBTA affects the organizational structure. The scope of the work is defined as the engineering agreement and subconsultant agreements are negotiated. Estimates are prepared on costs and man hours. Organization for the project is also a prime concern. The Management Information System is also explained as an important aspect of the project's successful completion.

Hall, FX Shumway, LW *ASCE Engineering Issues-J of Prof Activities* Vol. 107 No. 1, Jan. 1981, pp 51-59

ACKNOWLEDGMENT: EI

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DOTL JC

23 331495

DEVELOPMENT OF THE LOCAL TRAFFIC SYSTEM IN THE REGION COLOGNE/BONN (WEST GERMANY) [Entwicklung des Nahverkehrssystems im raum Koeln/Bonn]

The underground system of Cologne guarantees a compatible connection with the network whenever a new section is put into service. Special attention has been paid to the transition to Stadtbahn (urban railroad) operation. The preliminary Stadtbahn operation distinguishes itself as an inexpensive and quick solution in order to utilize urban lines with a high supply quality. The longest Stadtbahn line from Cologne to Bonn is well utilized by the population in this area. It is served by Stadtbahn electric multiple units of modern design with double heading. [German]

Bollhoefer, D *Elektrische Bahnen* Vol. 78 No. 5, May 1980, pp 129-137

ACKNOWLEDGMENT: EI

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DOTL JC

23 331846

TYNE AND WEAR METRO

The recently opened first section of the Metro is part of an overall rapid-transit passenger system linking the urban areas north and south of the Tyne River in the U. K. This article discusses various aspects of the system and its design, including electrification, vehicles, control and operation, track and stations.

Scott, A *Engineering* Vol. 220 No. 9, Sept. 1980, p 961

ACKNOWLEDGMENT: EI
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DOTL JC

23 331852

STATUS OF GERMAN LIGHT-RAIL SYSTEMS--OPERATIONAL AREAS OF GERMAN LIGHT-RAIL SYSTEMS

Operational areas of German light rail systems are described and comparison is made of the operation of underground and light rail systems.

Scheelhasse, K *Journal of Advanced Transportation* Vol. 14 No. 2, 1980, pp 197-211.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

23 331894

A DESCRIPTION OF THE MARTA RAPID TRANSIT SYSTEM IN ATLANTA

Metropolitan Atlanta Rapid Transit Authority (MARTA), planned as an 81-km combination of aerial, surface and subway rapid transit, has had 22.1 km under construction since 1975 with initial revenue service starting in 1979. Details of planning, line construction, stations, yards, cars, fare collection, communications, train control and organization are included.

UITP Revue Vol. 29 No. 4, 1980, pp 273-277, 1 Tab.

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

DOTL JC

23 331896

ALTERNATIVES TO AIR: A FEASIBLE CONCEPT FOR THE TORONTO-OTTAWA-MONTREAL CORRIDOR-SUMMARY REPORT

An evaluation of the economic feasibility of high-speed guided ground passenger systems over selected routings linking Toronto, Ottawa, Mirabel and Montreal (CIGGT Report No. 80-4) is summarized. Three candidate ground systems--a 450 km/h magnetically-levitated (Maglev) system, a 260 km/h electrified high-speed railway (HSR) operating on a dedicated double track in a new right-of-way, and a 200 km/h diesel-electric intermediate-speed railway (ISR) operating on partial double track in a combination of new and existing rights-of-way--together with the air mode--conventional (CTOL) and short take-off and landing (STOL) are examined under different economic-activity and petroleum-availability assumptions. Schedules of full cost recovery ticket-cost equivalents are developed as the basis for evaluation. The results indicate that a high-speed ground system serving this corridor would enjoy a substantial (and growing) advantage over the air mode under the study assumptions.

Lake, RW Boon, CJ English, GW Schvier, C Fitzpatrick, C Bunting, PM Eastham, AR
Canadian Institute of Guided Ground Transport, Transport Canada
Research and Development Centre Summ Rpt. TP 2827, Nov. 1980,
28p, 10 Fig., 6 Tab.

Contract 4248

ORDER FROM: CIGGT

DOTL RP

23 334310

AIR/RAIL LINKS

Rail links between airports and city centers are being developed in response to the congestion of motorways that have traditionally provided such access. These rail lines can be integrated into the urban and suburban networks, but there is now a tendency to connect airport lines into the mainlines, thus extending rather substantially the area served directly by the air/rail services. This brochure gives an idea of the different systems adopted in 20 cities throughout the world and lists other projects which are in progress or are being studied. [French/German/Engl]

142

International Union of Railways, BD June 1980, 55p

ORDER FROM: International Union of Railways, BD, 14 rue Jean Rey,
75015 Paris, France

DOTL RP

23 334412

THE FUTURE OF PASSENGER TRAINS AND BUSES IN NORTH AMERICA

The case of passenger rail in North America is viewed as an issue in modernization. It demonstrates that even a most progressive and highly industrialized society may find it difficult to acknowledge obsolescence and substitute an appropriate, new technology. With development of highways and airlines, the traditional trains have become grossly uncompetitive, and their operation continues to incur mounting losses. Recent attempts to revitalize rail travel are examined and are shown to result in decrease of services and increase of losses. Detailed comparison of bus and train services shows that about 80 per cent of train routes are duplicated by buses, and that buses offer more frequent, faster, cheaper and essentially unsubsidized transportation; they are also about twice as energy efficient as North American trains. It is suggested that, except where no viable alternative to rail exists, traditional trains should be phased out and the traffic taken over by buses. The use of high-capacity buses (articulated or bi-level European designs) and "executive" buses is considered. It is noted that in Canada phasing out of uneconomic passenger trains was recommended in 1961 by the MacPherson Royal Commission on Transportation. Potential for application of other modes-fast, modern rail and STCL-to intercity travel in North America is evaluated.

World Conference on Transport Research. Transport Research for Social and Economic Progress, April 14-17, 1980, Imperial College, London, England.

Lukasiewicz, J

Carleton University, Canada Conf Paper 1980, p B-33

ORDER FROM: Carleton University, Canada, Faculty of Engineering, Ottawa, Ontario K1S 5B6, Canada

23 334447

THE DEMAND FOR PUBLIC TRANSPORT. REPORT OF THE INTERNATIONAL COLLABORATIVE STUDY OF THE FACTORS AFFECTING PUBLIC TRANSPORT PATRONAGE

This report analyzes the very large body of information available on the many different factors which affect the demand for public transport and draws conclusions which have a direct applicability to transport planning. This information refers very largely to studies carried out in developed western countries, and primarily to urban bus services; nevertheless the findings have considerable application to rail transport and rural areas also, and to the problems of developing countries. The findings of the study are organized under the following headings: public transport in a social context; present trends in public transport; methodology, models and data; the sociological approach to transport planning; effects of income and car ownership and other background factors; effects of fares; effect of quality of service; effect of land use and intensity of activities; effect of transportation policies on patronage. The costs of transit operations; interaction of supply and demand. The members of the working group came from the United Kingdom, Australia, Canada, France, the Federal German Republic, the Netherlands, New Zealand, Sweden and the USA.

Webster, FV Bly, PH

Transport and Road Research Laboratory Monograph 1980, 358p,
Figs., Tabs., 352 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 252840)

ORDER FROM: TRRL

23 334487

PREDICTION OF RAILWAY LINE AVAILABILITY:**APPLICATION TO THE NEW PARIS SOUTH-EAST LINE [Etude previsionnelle de la disponibilite d'une ligne ferroviaire: application a la ligne nouvelle Paris-Sud-Est]**

The article explains the application of computer-based methods of determining line availability and developing optimum strategies for handling traffic in case of breakdown or other incidents. [French]

Moulin, R Berguerand, A *Revue Generale des Chemins de Fer* Feb. 1981,
pp 71-84, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: ESL

DOTL JC

23 334698

TRANSIT RIDERSHIP RESPONSIVENESS TO FARE CHANGES

The principal focus of this paper has been on identifying the differences in fare elasticities of transit demand among market groups. Although system-wide elasticity values, such as the Simpson and Curtin formula, have been useful for predicting aggregate ridership changes resulting from changes in fares, these values do not provide reliable estimates of the ridership and revenue impacts of individually-targeted fare programs. The evidence currently available on disaggregated fare elasticities of demand are presented.

Lago, AM (Ecosometrics, Incorporated); Mayworm, PD Mcenroe, JM *Traffic Quarterly* Vol. 35 No. 1, Jan. 1981, pp 117-142, 26 Ref.

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

23 334702

SALE OF SNCF PASSENGER TICKETS. VENDING MACHINES CONSIDERED AS A LINK BETWEEN THE SNCF AND ITS CUSTOMERS

[Vente des prestations voyageurs à la SNCF. Les machines de vente, outil de dialogue entre la SNCF et sa clientèle]

After recalling French National Railways policy as regards the sale of tickets in stations, the article reviews the measures adopted for the installation of automatic ticket vending machines and machines operated by booking clerks; it explains how these new generation machines are involved in the dialogue between man and machine so that a ticket can be sold in the best way in line with the policy adopted. [French]

Baufine-Ducrocq, B *Revue Generale des Chemins de Fer* Vol. 99 Oct. 1980, pp 551-560

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

23 334707

INVESTIGATION PERTAINING TO TRAFFIC PROBLEMS IN ISTANBUL (TURKEY). THE H-RAILROAD AS A POSSIBLE SOLUTION OF THE PROBLEM [Eine Untersuchung ueber die Verkehrsprobleme in Istanbul--die H-bahn als Moegliche Loesung des Problems]

The inner urban traffic of Istanbul is characterized by the lack of high-capacity rail guided transport modes. At present line traffic operated taxis--the dolmuslar-- dominate the traffic. Taking into account the predicted growth of Istanbul's population an expansion of the present system would lead to a traffic chaos. Therefore the author has studied the qualification of the H-Bahn as a rail guided transport mode. It is concluded that the H-railroad is sufficiently efficient and requires smaller investments than a subway. [German]

Ural, A *Elektrische Bahnen* Vol. 78 No. 9, Sept. 1980, pp 239-244

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

23 334709

LIGHTING DESIGN--THE KEY TO MARTA'S NEW MASS TRANSIT SYSTEM

The MARTA (Metropolitan Atlanta Rapid Transit Authority) mass transportation system consists of two rapid rail lines: an east-west and north-south line. The longer of the two, the north-south, is still under construction. The east-west line is 11.8 miles long with 13 stations. A standardized but flexible lighting design in a "unique" rapid rail transit system helps save construction and maintenance costs without sacrificing individual station design creativity.

Lighting Design and Application Vol. 10 No. 8, Aug. 1980, pp 36-40

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

23 334715

LIGHT RAIL TRANSIT SETS BARGAIN PACE

The paper reports on the high speed construction of the San Diego's 16-mile light rail transit line between San Diego and San Ysidro at the Mexican border.

Engineering News-Record Vol. 206 No. 2, Jan. 1981, p 25

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

23 334718

REGIONAL PUBLIC TRANSPORT: COACH OR RAILCAR

[Transports collectifs régionaux: autocar ou autorail]

The author uses two examples in which projected costs were studied in detail. Taken from the public transport plan for the central region in France, these examples illustrate a method of modal choice. The comparative study demonstrates that in fact coach and railcar when appropriately utilised, are rarely competitive. Each has its own field of use, characterised by distance, number of users, and quality of the routes. Added to this, the comparison of transport costs shows that these two modes are more interdependent than rival. [French]

Villeneuve, M *TEC-Transport Environment Circulation* No. 37, Nov. 1979, pp 6-11, 3 Fig., 1 Tab., 3 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 105982), Central Laboratory of Bridges & Highways, France, Institute of Transport Research
ORDER FROM: Association pour Developpement des Techniques TEC, 11, Place Adolphe Cherioux, 75015 Paris, France

23 334721

THE RHEIN-RUHR URBAN RAILWAY; OPERATIONAL BEGINNING IN ESSEN [Stadtbahn Rhein-Ruhr Betriebsbeginn in Essen]

The structure of the Ruhr area required a regional traffic network linking cities. Furthermore, a situation developed where there were scarcely any specific routes for public transport, so that with the growth of car traffic a great deal of congestion developed. This situation caused the government of the land of North Rhine Westphalia to develop a regional urban railway in the Rhine-Ruhr area. The purpose of the new urban railway was to solve the problem of the divided public transport system in the region by means of a high capacity rail bound transport system. To achieve these aims some 13 Ruhr cities and the city of Dusseldorf set up an urban railway company, the main task of which was the standardisation of the system. The various stretches opened in different cities remain, however, under the control of the local transport operators. The function of the urban railway is to link the city centres with the adjacent areas; to take over the major portion of the transport between municipal areas by means of a network extending beyond city boundaries; and to link this network with the underground network and the main line network of the German Federal Railway (Deutsche Bundesbahn). [German]

Teubner, W *UITP Revue* Vol. 29 No. 1, Jan. 1980, pp 49-66, 6 Fig., 1 Phot.

ACKNOWLEDGMENT: TRRL (IRRD 312400)
ORDER FROM: International Union of Public Transport, Avenue de l'Uruguay 19, B-1050 Brussels, Belgium

DOTL JC

23 334946

RENAISSANCE FOR YESTERDAY'S TRAMS & BUSES

The traditional streetcar and trolley bus are regaining favor in many parts of the world. Completely new tram and light-rail systems are being established in four French cities and elsewhere in Europe while other existing tramways are being rehabilitated and extended in Europe, Africa, Asia and Australia. Many proven streetcar designs are finding application on new systems. British cities are looking at reestablishment of trolley bus service and new vehicle designs are in production for various European applications.

Goldsack, PJ *Mass Transit* Vol. 8 No. 6, June 1981, pp 6-9, 2 Phot.

ORDER FROM: Mass Transit, 555 National Press Building, Washington, D.C., 20045

DOTL JC

23 335056

MIAMI TRANSIT: ON SCHEDULE, ON BUDGET

Miami Metrorail is approaching the one-third point in its construction of its initial 20.5-mile route, most on aerial structures, with operation scheduled for 1984. Design and erection of the elevated structure, fare collection, power supply, car procurement and administration of the \$870 million project are described.

Middleton, WD *Railway Age* Vol. 182 No. 11, June 1981, pp 18-23, 3 Phot.

ORDER FROM: ESL

DOTL JC

23 335087

TRANSPORTATION MODE CHOICE

This paper presents a dynamic model of transportation mode choice and evolution of public transportation service based on some simple assumptions of individual behavior and economic necessities for providing transportation service. Critical values are shown to exist for the fares charged, for the cost of providing service, for the demand and supply of transportation (and for other parameters) at which the system will bifurcate to different possible states of the system; critical thresholds must be reached in the quality of the network to observe its growth. Also shown is the role of history and the role that fluctuations in individual behavior and mode strategy play in the way the system structures, that is, in the evolution of the relative number of users of each mode and in the level of service obtained.

Proceedings of the International Conference of the Cybernetics Society, Cambridge, Massachusetts, October 8-10, 1980.

Kahn, D (Transportation Systems Center); Deneubourg, JL De Palma, A

Institute of Electrical and Electronics Engineers Proceeding, IEEE 80CH1555-2, 1980

ACKNOWLEDGMENT: EI

ORDER FROM: IEEE

23 335283

URBAN RAPID TRANSIT SYSTEMS RHINE-RUHR-WUPPER RIVERS; PUTTING INTO OPERATION THE RAPID TRANSIT ROUTE SEGMENT DUESSELDORF MAIN DEPOT-SOLINGEN-OHLINGS, WEST GERMANY [S-Bahn Rhein-Ruhr-Wupper, Inbetriebnahme des S-Bahn-Streckenabschnittes Duesseldorf Hof--Solingen-Ohlings]

A project, begun in 1967, in the vicinity and the city of Duesseldorf is reported. The purpose was to link the Duesseldorf main depot with its airport. This project was planned in three stages. While the first stage has already been finished and the second stage is in the process of being finished in 1980, the third stage has only begun. Constructional details and aims are outlined. Electrification is used for the entire system. [German]

Eibenstein, A *Elektrische Bahnen* Vol. 78 No. 10, Oct. 1980, pp 285-286

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

23 335284

URBAN PUBLIC TRANSPORTATION--SYSTEMS AND TECHNOLOGY

This textbook covers engineering aspects of transit systems. The chapters are: History and Role of Transit in Urban Development, Urban Passenger Transport Modes; Vehicle Characteristics and Motion, Highway Transit Modes, Rail Transit Modes, New Concepts and Proposed Modes, Transit System Performance, and Paratransit and Specialized Modes. Theoretical aspects and practical applications are blended to produce a reference for academic use and for professionals in city planning, transit agencies, consulting firms and government agencies.

Vuchic, VR

Prentice-Hall, Incorporated No Date, 673p, 49 Tab., 125 Phot., Apps.

ORDER FROM: Prentice-Hall, Incorporated, Route 9W, Englewood Cliffs, New Jersey, 07632

23 335436

INSTITUTION-BUILDING AND EUROPEAN MASS TRANSIT: MYTHS AND REALITIES

An institution, as opposed to an organization, must create value for those who interact with it, and that value supersedes the mere technical function the organization performs. This paper is based on a 1978 study which examined aspects of mass transit systems in cities of various sizes in France, West Germany, England and Belgium. The study focused on notable characteristics in the planning, public policy, and financing of rapid transit systems. The purpose of this paper is to describe the institution-building processes of the cities visited, as well as some of the more promising innovations being tried abroad that may inspire American mass transit managers in their attempts to gain public support through the institution-building process.

Curtis, EF (Northeastern University) *Transportation Journal* Vol. 20 No. 3, 1981, pp 23-36, 1 Fig.

ORDER FROM: Hein (William S) and Company, Incorporated, 1285 Main Street, Buffalo, New York, 14209

DOTL JC

23 335438

SEMINAR ON THE INTERACTION OF AIR AND LAND TRANSPORT IN EUROPE, PARIS, 5-7 NOVEMBER 1980

[Séminaire sur l'interaction des transports aériens et des transports terrestres en Europe, Paris, 5-7 Novembre 1980]

The purpose of this seminar was to look for ideas and bases for decision-making with a view to determining how far land transport is liable to be affected by air transport. The proceedings are divided into three parts. The basic reports describe recent trends in the European airline network, and Professor Seidenfus discusses competitive factors in long-distance passenger traffic in ECMT countries. The second part is made up of contributions from various international professional organizations (International Road Federation, the IRU, UIC, etc.). The third section contains airport case studies. [French]

European Conference of Ministers of Transport SNCF Cat. 08 P 7, 1980, 295p, Figs., Tabs., Photos.

ACKNOWLEDGMENT: International Union of Railways, BD

ORDER FROM: Organization for Economic Coöperation and Devel, Suite. 1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006

23 335620

URBAN SUBWAY FOR THE CITY OF LILLE IN FRANCE [LE METRO DE LA COMMUNAUTE URBAINE DE LILLE]

The author explains the reasoning that has led to the choice of a pneumatic-tired small-gage (2.06-3.25 m) subway which is highly automated as regards running control as well as station design (sliding doors as in lifts). This article covers more particularly the civil engineering and town planning aspects. [French]

Guilleminot, B *Revue Generale des Chemins de Fer* Vol. 100 Jan. 1981, pp 1-14, 1 Fig., 16 Phot.

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

23 335628

SOME LESSONS FROM THE WASHINGTON METRO

No new public transport system ever becomes realised simply as an exercise in engineering, nor as a result of a single political decision. No plan can be divorced from the specific land-use characteristics of the city, nor from the behaviour patterns and wishes of the inhabitants. The interaction of factors that are different in kind must have a crucial effect on the success or otherwise of a new system. The objective of this paper is to examine what lessons transportation planners may draw from looking at the history of the development of the Washington Metro, with particular reference to some of the complex interactions between political, economic and social factors, seen in combination with such factors ranging from land-use patterns to simple accidents of history. Such an approach does not lend itself to the drawing of tidy, "scientific" conclusions, for the building of a new metro cannot be regarded as a regularly recurring event in a stable isolated system. If, however, we are content with more modest inferences, perhaps from Washington we can learn something about the importance of timing in the evolution of plans, and the role of various factors in the plan-making process.

We can make some limited inferences about the land-use impacts of a new metro, and the potential for two-mode journeys. Perhaps, too, the Washington Metro experience in provision for the disabled has lessons for transport planners.(a)

Truelove, P (Aston University, England) *Transport Policy and Decision Making* Vol. 1 No. 2-3, 1980, pp 121-132, 1 Fig., 2 Tab., 4 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 253900), Institute for Road Safety Research
ORDER FROM: Martinus Nijhoff Publishers, P.O. Box 22, Dordrecht, Netherlands

23 335828
IMPORTANT STAGE IN THE IMPROVEMENT OF TRANSPORT IN AND AROUND PARIS: THE UNDERGROUND SUBURBAN STATION AT PARIS-LYON IS OPEN [UNE ETAPE IMPORTANTE DE L'AMENAGEMENT DE LA REGION PARISIENNE: LA GARE SOUTERRAINE DE BANLIEUE DE PARIS-LYON EST EN SERVICE]

The article describes the new installations, which have been built as part of the complete renovation of Paris-Lyon station in France and gives some details of the major schemes in progress which will change the pattern of railroad services in the Paris area within the next years. [French]

Revue Generale des Chemins de Fer Vol. 99 Dec. 1980, pp 701-707

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

23 335830
WILL KILMACOLM LINE COME TO A DEAD-END?

A description is given of the railway line which runs from Glasgow Central Station westwards via Paisley to Kilmacolm, and its main use by peak hour commuters. Local authorities' provision of subsidies for financially unprofitable railway passenger services is discussed, and the events leading to British Rail's decision to withdraw these services on this line from 2 February 1981. The author considers the economics of providing alternative bus transport, and describes the efforts of the users' committee to save the line. The future of other suburban rail services is viewed in the light of the possible closure of the line to Kilmacolm.

Hayton, K (Glasgow School Of Art) *Surveyor* Vol. 156 No. 4638, May 1981, pp 8-9, 1 Fig.

ACKNOWLEDGMENT: TRRL (IRRD 254609)
ORDER FROM: ESL

DOTL JC

23 335836
THE GLASGOW RAIL IMPACT STUDY

The Glasgow rail impact study is a study of the effects of two rail improvements in the Glasgow area; the modernization of the underground, and the linking of the railway systems north and south of the Clyde by the Argyle line, which allows through journeys and provides new stations in the city centre. The rail improvements opened for passenger traffic in the winter of 1979/80. The study, which is being conducted by the Scottish Development Department, TRRL and Martin and Voorhees Associates, aims to assess the impact of the investment, including the social effects on different sectors of the population and to measure the effect of the changes in the transport system. The results from the study will be directly relevant to SDD, British Rail and greater Glasgow PTE in developing the best use of the new facilities, to central government in guiding future investment decisions, and to TRRL in research into forecasting methods. The main data source for the study is a series of "before" and "after" surveys covering households in the corridor affected by the new services, passengers on bus, rail and underground, and users of a range of activities including shopping, hospital visiting and outpatients, leisure and recreation, and employment.(a)

Gentleman, H (Scottish Development Department); Mitchell, CGB; Walmsley, DA; Wicks, J (Martin & Voorhees Associates)
Transport and Road Research Laboratory, (0305-1315) Monograph TRRL Supp Rpt. SR650, 1981, 12p, 2 Fig., 2 Tab., 1 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 254322)
ORDER FROM: TRRL

23 335839
THE HOME-INTERVIEW IN THE PARK AND RIDE CORRIDOR STUDY [DE HUISENQUETE IN DE CORRIDOR-STUDIE PARKEER EN REIS]

The introduction of special p & r railway stations in the Netherlands is accompanied by before-and-after studies. This article reports on a home interview which was carried out in October, 1979 among 200 car drivers and 400 train passengers living in the corridor between Amsterdam and Den Helder. Some major conclusions: mode choice is only to a minor degree subject to car competition within the households; delay by queues needs to increase considerably before car drivers will switch to public transport because of the fact that travel time on feeder services is so long. The authors give some suggestions on forecasting techniques and on the aspects and scores which are essential in the model. [Dutch]

Baanders, A; Bronner, AE; Vanner, AEB; Kroes, EP *Verkeerskunde* Vol. 32 No. 3, Mar. 1981, pp 114-117, 3 Fig., 4 Tab., 1 Phot., 4 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 254206), Institute for Road Safety Research
ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands

23 335842
AUTOMATIC FARE COLLECTION AND TICKETING SYSTEMS FOR PUBLIC TRANSPORT

There is an increasing use of microprocessor technology in automatic machines used for fare collection, ticket selling and ticket validation in the public transport field. However, no system has emerged that is ideal for all situations. The principles involved are presented through a description of the automatic system and components used on the eastern suburbs railway in Sydney. Potential future applications are briefly reviewed. The current system is being monitored and evaluated as a pilot project for possible extensions of automatic equipment to other parts of the network (a). The number of the covering abstract of the symposium is IRRD no. 250617.

National Conference Publication No. 81/1. Symposium on Computer Control of Transport 1981, Sydney, 19-20 February 1981.

Carlisle, JS (McLachlan Group)
Institution of Engineers, Australia No. 81/1, 1981, pp 7-14, 8 Fig., 3 Tab., 1 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 250618), Australian Road Research Board
ORDER FROM: Institution of Engineers, Australia, 11 National Circuit, Barton, A.C.T. 2600, Australia

23 336705
FURTHER IMPROVEMENTS ARE NEEDED IN AMTRAK'S PASSENGER SERVICE CONTRACTS, BUT THEY WON'T COME EASILY

Amtrak has made significant improvements in its contracts with other railroads for services that are essential for operating Amtrak trains. Further revisions in contract provisions are needed to provide better incentives for the railroads to operate the trains on time and to hold the line on costs. The railroads have generally not agreed to Amtrak's proposals for changing the contracts and Amtrak has limited options in this situation. The legally prescribed process for resolving such disputes--taking them to the Interstate Commerce Commission--has not been used frequently. Amtrak should use this process more to see if it works satisfactorily. If it doesn't, Amtrak should seek congressional guidance and action. Amtrak's standardized payments for certain services have been inequitable in some cases and Amtrak needs to change its policy for revising these payments.

General Accounting Office Cong Rpt. CED-81-35, Jan. 1981, 68p

ACKNOWLEDGMENT: NTIS
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PB81-159071

23 337127
FINANCING URBAN PUBLIC TRANSPORTATION: A COMPARISON OF U.S. AND FOREIGN CITIES

The report examines how cities in other Western nations attempt to solve many of the same financing problems facing American urban public transportation systems. The study includes both a survey of the financing characteristics of 23 cities in other nations and intensive case studies of innovative financing mechanisms in 6 cities: London, Paris, Munich, Hamburg, Vienna, and Stockholm.

Wolman, H Reigeluth, G
Urban Institute, Department of Transportation Final Rpt. 1327-01,
DOT-P-30-80-23, Apr. 1980, 172p.

Contract DOT-OS-90071

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-170706

23 337147

ALTERNATIVE CONCEPTS FOR UNDERGROUND RAPID TRANSIT SYSTEMS. VOLUME I: STUDY RESULTS

The objective of the study was to determine if construction costs and operating energy requirements of future high-performance underground rapid rail systems can be decreased while maintaining or improving service. The alternative design approaches studied were limited to well-established design concepts that differ from those used in BART (San Francisco), WMATA (Washington D.C.), and MARTA (Atlanta). The alternative design concepts investigated in this study are: gravity assist; over/under tunnels; vertically-oriented stations; subway train propulsion; and operational control policies. Comparisons were made of several system designs for a specific route and patronage structure. These comparisons indicate that it is practical to significantly reduce construction costs and operational energy requirements of modern underground systems while improving service by incorporating alternative concepts. Without any attempt at optimization, savings in capital costs in excess of 24 percent and savings in energy as high as 70 percent in traction effort, and 88 percent in braking are shown to be achievable.

See also Executive summary, PB-270102, RRIS 23 166482; Bulletin 7801.

Dayman, BJ Heft, RC Kurtz, DW Macie, TW Stallkamp, JA
Jet Propulsion Laboratory, Urban Mass Transportation Administration,
Office of the Secretary of Transportation Final Rpt. P-51-520-
77-2-VOL-1, UMTA-CA-06-0144-77-2, Mar. 1977, 107p

Contract DOT-AS-60019

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB81-180143

23 337148

ALTERNATIVE CONCEPTS FOR UNDERGROUND RAPID TRANSIT SYSTEMS. VOLUME II: SUPPORTING STUDIES. A. OPERATIONAL ASPECTS

The objective of the study was to determine if construction costs and operating energy requirements of future high-performance underground rapid rail systems can be decreased while maintaining or improving service. This part A of Volume II contains the basic information that was generated on the operational aspects of various alternative system designs: studies by JPL on performance and energy requirements; comments by the London Underground on the alternative approaches, as well as discussions on their related experiences.

See also Volume 1, PB81-180143, Volume 2B, PB81-180168, and Volume 2C, PB81-180176. Portions of this document are not fully legible.

Dayman, BJ Heft, RC Kurtz, DW Macie, TW Stallkamp, JA
Jet Propulsion Laboratory, Urban Mass Transportation Administration,
Office of the Secretary of Transportation Final Rpt. P-51-520-
77-3-VOL-2A, UMTA-CA-06-0144-77-3, Mar. 1977, 158p

Contract DOT-AS-60019

ACKNOWLEDGMENT: NTIS
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PB81-180150

23 337149

ALTERNATIVE CONCEPTS FOR UNDERGROUND RAPID TRANSIT SYSTEMS. VOLUME II: SUPPORTING STUDIES. B. PRESSURE PULSE ANALYSIS

The objective of the study was to determine if construction costs and operating energy requirements of future high-performance underground rapid rail systems can be decreased while maintaining or improving service. This part B of Volume II contains all of the basic information of the pressure pulse analyses that were performed on double-track tunnels and intervented pairs of single-track tunnels.

See also Volume 1, PB81-180143, Volume 2A, PB81-180150, and Volume 2C, PB81-180176. Portions of this document are not fully legible.

Dayman, BJ Heft, RC Kurtz, DW Macie, TW Stallkamp, JA
Jet Propulsion Laboratory, Urban Mass Transportation Administration,
Office of the Secretary of Transportation Final Rpt. P-51-520-
77-4-VOL-2B, UMTA-CA-06-0144-77-4, Mar. 1977, 200p

Contract DOT-AS-60019

ACKNOWLEDGMENT: NTIS
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PB81-180168

23 337150

ALTERNATIVE CONCEPTS FOR UNDERGROUND RAPID TRANSIT SYSTEMS. VOLUME II: SUPPORTING STUDIES. C. CAPITAL EQUIPMENT

The objective of the study was to determine if construction costs and operating energy requirements of future high-performance underground rapid rail systems can be decreased while maintaining or improving service. This part C of Volume II contains all the basic information generated on capital equipment of alternative approaches: design and cost estimates for underground structures, performance and costs of propulsion configurations and subway cars.

See also Volume 1, PB81-180143, Volume 2A, PB81-180150, and Volume 2B, PB81-180168.

Dayman, BJ Heft, RC Kurtz, DW Macie, TW Stallkamp, JA
Jet Propulsion Laboratory, Urban Mass Transportation Administration,
Office of the Secretary of Transportation Final Rpt. P-51-520-
77-5-VOL-2C, UMTA-CA-06-0144-77-5, Mar. 1977, 271p

Contract DOT-AS-60019

ACKNOWLEDGMENT: NTIS
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PB81-180176

23 337158

OVERVIEW OF RAIL TRANSIT FARE COLLECTION

A study was conducted of the performance of rail transit fare collection equipment. The results can be used to evaluate new and improved fare collection systems. Options in fare collection were illustrated by examining four transit systems. Reliability data, in terms of transactions per failure, were gathered for elements of these systems. Detailed investigations and subsystems failure analyses were conducted for two graduated, distance-related fare systems. Several models were developed for evaluating the impact of equipment reliability on operating costs and passenger delays. Those utilized the binomial probability distribution to calculate the incidence of simultaneous machine failures as a parameter in multi-server queueing and delay frequency models.

Rubenstein, L Land, J Deshpande, G Harrow, B
Jet Propulsion Laboratory, Urban Mass Transportation Administration
Final Rpt. JPL-PUB-80-89, UMTA-CA-06-0116-80-1, Aug. 1980, 152p

Contract DOT-AT-80015

ACKNOWLEDGMENT: NTIS
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PB81-182578

23 341286

MEASURING COMMUNITY REACTION TO URBAN TRANSPORTATION IMPACTS USING VON NEUMANN-MORGENSTERN UTILITY THEORY

This paper attempts to measure the impacts of urban transportation system improvements or changes on the community. The community's perceptions of the impacts are represented by its utilities (or disutilities) over various ranges of values of the multiple attributes representing these impacts. The utility technique used in the evaluation is based upon Von Neumann-Morgenstern (VN-M, 1947) utility theory, and is applied using Raiffa's (1970) fractile method. The paper specifically applies the technique to model the perceptions of five subgroups within a community to the impact of a new

light rail transit system that is being incorporated in the transportation system of the city of Calgary. Results of the modeling indicate explicitly how the community changes its perception over ranges of values of the attributes evaluated. Biases of various subgroups within the community over these attributes are also shown. Statistical tests indicate that aggregated utility perceptions can represent the utility perceptions of the individual subgroups quite reasonably. (Author/TRRL)

Bee, CK Sargious, MA (Calgary University, Canada) *Transportation Planning and Technology* Vol. 6 No. 4, 1981, pp 263-272, 12 Fig., 3 Tab., 13 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 254249)
ORDER FROM: ESL

DOTL JC

24 316371

RAIL INFRASTRUCTURE [Infraestructura vial ferrea]

This report describes the state of the art of railways in Colombia. The network is 3431 km long, 2797 km of which are opened to traffic, some of the lines having been closed. 20% of the network in service is in mountainous areas where difficult alignment, steep gradients and small radii of curvature (70 M) are prominent features. These factors together with instability problems inherent in the Andes region and the severity of the winters greatly complicate transport operations in general and rail operations in particular. For the covering abstract see IRRD abstract no 108676. [Spanish]

16th National Congress of Civil Engineering, October 4-8, 1978, Cali, Colombia.

Ramos, LG

Ministerio de Obras Publicas y Transporte Oct. 1978, 42p, 5 Fig., 2 Tab.

ACKNOWLEDGMENT: TRRL (IRRD 108685), Central Laboratory of Bridges & Highways, France, Ministry of Public Works, Spain

ORDER FROM: Ministerio de Obras Publicas y Transporte, Oficina de Planeamiento, Cali, Colombia

24 326454

SELECTING RAIL PROPERTIES FOR IMPROVEMENT: A PLAN FOR ANALYSIS

Section 901-(6) of the Railroad Revitalization and Regulatory Reform Act of 1976 (PL 94-210) calls for a listing and prioritization of rail properties to be improved to permit high-speed operations. This report identifies key factors entering the choice of links for such upgrading, and formulates an analytical methodology and implementation plan to support the decision process.

Schofer, RE Gilsinn, JF Hall, WG Johnson, CR McLynn, JM
National Bureau of Standards NBSIR-79-1724, Oct. 1980, 92p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-115941

24 328946

RAILROAD CORRIDOR CONSOLIDATION-ANALYSES AND IMPLICATIONS

The consolidation of railroad mainlines is analyzed in a benefit/cost format, from the viewpoint of (1) the railroad companies involved, (2) affected shippers and receivers, and (3) the general public. To the extent possible, the analysis is conducted in a quantitative manner. Methods for conducting the analysis are developed and described, in detail, in the form of a manual. The methods are applied to two case studies: one intra-railroad consolidation (on the Seaboard Coastline Railroad) and one inter-railroad consolidation (among the Rock Island and the Milwaukee). The results of the two case studies are documented. The methods presented are evaluated and several generalized observations are drawn.

Portions of this document are not fully legible.

Matzzie, DE Hillegas, BD Bell, TR

CONSAD Research Corporation, Office of the Secretary of Transportation
Apr. 1979, 253p

Contract DOT-OS-60154

ACKNOWLEDGMENT: NTIS

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PB81-156390

24 328982

IMPROVING RAILROAD TECHNOLOGY. A DIRECTORY OF RESEARCH AND DEVELOPMENT PROJECTS OF THE FEDERAL RAILROAD ADMINISTRATION

The FRA's Research and Development program has as its goals near-term improvements in products and processes which would enhance safety, improvements in the economic viability and efficiency of the Nation's railroad operations, and reduction of adverse environmental effects of railroad operations. The Office of Research and Development has responsibility for three major programs: (1) Track, Equipment and Personnel Safety, (2) Railroad Operational Improvements, and (3) Improved Passenger Systems. The Track, Equipment, and Personnel Safety Program is aimed at reducing the number and severity of railroad-related accidents. The Railroad Operational Improvement Program is aimed at improving freight classification and switching yards, promoting the exchange of technology and

information between railroad companies, improving intermodal equipment, facilities and operations, and conserving energy. The Improved Passenger Systems Program is designed to emphasize train technology and subsystem development.

Transportation Systems Center, Federal Railroad Administration FRA-
/ORD-81/14, 1980, 193p

ACKNOWLEDGMENT: NTIS

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PB81-172231, DOTL NTIS

24 330148

PRODUCTIVITY-NOT JUST JOB CUTS

While railroads have increased transportation productivity significantly over the past decade, the ratio of labor costs to revenues dropped only slightly. As the industry enters into its triennial negotiation of labor contracts, emphasis will be on continued productivity improvement. Federal Railroad Administration has sought to foster joint labor/management activities, including not only productivity but also training and alcohol/drug abuse.

Roberts, R *Modern Railroads/Rail Transit* Vol. 36 No. 1, Jan. 1981, pp 44-46, 1 Phot.

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DOTL JC

24 330153

CONRAIL FROM THE INSIDE OUT--1 AND 2

After over 4 years of Federally assisted rehabilitation, Conrail at least had begun to correct such conditions as the large volumes of unprofitable business, deteriorating right of ways, inoperative locomotives, bad-order freight cars and worsening service quality inherited from its seven bankrupt predecessors. Installment 1, Look before you laugh, discusses Conrail's top executives, describes how predecessor companies fit into the present structure, examines the complications of operating on a Northeast Corridor owned by Amtrak, looks at rehabilitation of mainlines and yards, and concludes with the road's study of extending electrification. Installment 2, Rebounding from the low point, tells of the activities of Conrail's strategic planning, marketing and sales organizations with the emphasis on certain traffic that is potentially or actually profitable and deliberate discouragement of other traffic that is rated as permanently unremunerative. Deregulation and additional government funding are also appraised.

Part 2, pp 44-49, Vol. 41 No. 4, February 1981 issue.

Frailay, FW *Trains* Vol. 41 No. 3, Jan. 1981, pp 33-41, 12 Phot.

ORDER FROM: Kalmbach Publishing Company, 1027 North Seventh Street, Milwaukee, Wisconsin, 53233

DOTL JC

24 330164

IMPACT OF WORK CUTBACKS ON NORTHEAST CORRIDOR IMPROVEMENT PROJECT

Work planned under the Northeast Corridor Improvement Project, to improve high-speed rail passenger service between Boston and Washington, has been cut back substantially to stay within the project's budget--now \$2.5 billion. According to project officials, reductions in planned work from January 1979 to the present will likely reduce ontime reliability; passenger comfort; passenger, crew member and public safety; and increase Amtrak maintenance costs. These officials believe that additional work cutbacks will probably be necessary.

This is an interim report on a forthcoming broader view of the Northeast Corridor Improvement Project. A previous report (CED-79-38, Mar. 29, 1979) covered changes in the project's planned work up to and including January 1979.

General Accounting Office Intrm Rpt. CED-81-23, Oct. 1980, 46p

ORDER FROM: GAO-Document Handling & Info Services Facility, P.O. Box 6015, Gaithersburg, Maryland, 20760

24 330214

DEVELOPMENT OF RESEARCH FOR IMPROVING TRANSPORT TECHNOLOGY [Razvitie issledovaniy v oblasti sovershenstvovaniya tehnologii perevozocnogo]

Main subjects of scientific research as determined by the Rail Transport Research Centre in the USSR in the railway operating sector, the application of which may improve rail traffic indices. [Russian].

Nikiforov, BD Sotnikov, EA *Vestnik VNIITZ* No. 6, 1980, pp 1-7

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

24 330651
PLANNING AND CONSTRUCTION OF THE RHEINE-SPELLE-FREREN RAILWAY EXPERIMENTAL FACILITY

As part of the railway section of the programme for "investigating technologies for transport and traffic systems", the Federal Ministry of Research and Technology is assisting the construction of the approximately 23-km DB line between Rheine and Freren in South Emsland as a railway experimental facility. Using specially developed vehicles, speeds of up to 350 km/h will be run here. The tests are aimed at confirming and extending the theoretical work and the test-rig experiments. The object of the overall programme is to investigate the technical and economic limits of the wheel/rail system. The author describes the tasks, project organization and the special problems in planning and building the test facilities. [German]

Affeldt, D *Eisenbahntechnische Rundschau* Vol. 29 No. 10, Oct. 1980, p 685

ACKNOWLEDGMENT: British Railways
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

DOTL JC

24 331096
INTERNATIONAL CO-OPERATION IN THE FIELD OF FREIGHT ROLLING STOCK TECHNOLOGY: A NECESSITY

More than in other spheres of the rail technology a co-operation in the field of freight rolling stock technology is a necessity resulting from unrestricted movements of the goods wagon fleets over all European and some extra-European rail systems. On the way towards a standard outer appearance of the stock a number of activities are still needed. Correlations and details of the pertinent work are depicted, and it is pleaded for these activities to be carried out. [German]

Jahnke, B *Eisenbahningenieur* Vol. 31 No. 11, Nov. 1980, p 475

ACKNOWLEDGMENT: British Railways
ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

24 331114
RECORD OF TRANSPORTATION DATA COMPILED BY THE FEDERAL MINISTRY OF TRANSPORT [Zahlenspiegel des Verkehrsgeschehens Zusammengestellt im Bundesverkehrsministerium]

In the first half of 1979 the positive trend in the growth of goods traffic (9%) continued. There were considerable increases in road haulage, rail freight, air freight and long distance pipelines. For internal waterways the growth rate was comparatively less. In the transport of passengers there were important rates of increase in private transport using cars and in air traffic. Local public transport showed no changes. Long distance travel by rail had low growth rates, whilst local rail travel remained below last years results. The number of road accidents again slightly exceeded the previous years: serious accidents continued to decrease. [German]

Internationales Verkehrswesen Vol. 31 No. 5, Sept. 1979, pp 300-301, 2 Fig.

ACKNOWLEDGMENT: TRRL (IRRD 312161), 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

24 331119
THE ALTERNATIVES-TUNNEL OR BRIDGE

This article, the first in a series of four on the possible effects of a fixed channel link, examines some of the options available. A recent report by the European channel tunnel group, prepared for the British and French authorities, recommends that bridge only or bridge-tunnel schemes are not viable at present. Of the five different forms of immersed and bored tunnel schemes that were investigated, the preferred solution was for a railway-only bored tunnel. This represents the lowest cost and would consist of a single passenger and freight line with a smaller service tunnel alongside. The merits of an alternative long-spanned bridge are discussed. It is argued that the carrying capacity of a single-line rail tunnel will soon become insufficient for the demand. It is suggested that a multi-span suspension bridge could be

built with a central series of 2 km long spans supported by eight piers in the shipping lanes. Shorter spans would be incorporated over the shallower inshore areas.

The remaining articles in the series are published in *Surveyor*, Vol 155, No 4597, pp 6-7; No 4598, pp 6-8; and No 4599, pp 5-8 respectively.

Brown, W (Freeman Fox & Partners) *Surveyor* Vol. 155 No. 4596, July 1980, pp 6-8, 2 Fig., 1 Tab.

ACKNOWLEDGMENT: TRRL (IRRD 252444)
ORDER FROM: IPC Building and Contract Journals Limited, Surrey House, 1 Throwley Way, Sutton, Surrey SM1 4QQ, England

DOTL JC

24 331220
FACILITATING TRANSITIONS TO THE SEVERAL MARTAS

From the beginning, MARTA sought to develop a management system that would facilitate the inevitable flow of today into a different organization in the future. This report deals with suggestions concerning facilitating transitions for public managers who are sensitive to current work structure design and operation to assist in a smooth transition so that future work demands can be realized. This report may also be of interest to managers contemplating a start-up of their own. (UMTA)

Golembiewski, RT
Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA11-0006-81-12, July 1979, 29p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB81-157430

24 331223
YOU SEEM TO HAVE GIVEN UP ON US..., YOU DON'T SEEM TO CARE FOR THE AUTHORITY

This report deals with MARTA's General Manager and his five-step procedure for appraisal and evaluation of executive performance. Over a year ago, the General Manager developed and implemented this more or less standard procedure which is outlined briefly as follows: (1) Concerns were aired, with each major subordinate in approximate weekly sessions; (2) Where concerns persisted or increased, a confidential letter to the executive was prepared by the General Manager detailing the employee's strengths, weaknesses, and special concerns about performance; (3) If problems persisted or worsened, the General Manager drafted a letter to the executive reaffirming the specific problems and setting a target date by which specific improvements were expected; and (4) If improvements did not occur by the target date, termination would follow. (UMTA)

Golembiewski, RT
Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA11-0006-81-15, July 1979, 35p

Contract GA-11-0006

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB81-157463

24 331233
THE MARTA CODE OF ETHICS: "CONFLICT BETWEEN PRIVATE INTERESTS AND PUBLIC RESPONSIBILITIES..."

This report deals with MARTA's experience with its Code of Ethics. In this case study, emphasis is placed on: (1) the development of the Code, which highlights major issues to be confronted; (2) a test of the Code, which illustrates how its prescriptions were applied in practice; (3) the details of the Code in Appendix 1, which provides the full text of the minimum ethical standards to be applied within MARTA, as well as numerous examples of what the Code intends to prescribe and prohibit; and (4) the Rules of the Board of Ethics in Appendix 2. (UMTA)

Golembiewski, RT
Georgia University, Athens, Urban Mass Transportation Administration, (GA-11-0006) UMTA-GA-11-0006-81-7, July 1979, 41p

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB81-154833

24 331234

REORGANIZING THE GENERAL MANAGER'S OFFICE

This report deals with the history and development of the MARTA management system from its beginnings as an embryonic organization in March 1972, through its many organizational changes over a three year period to April 1975. The case study report describes the 1975 reorganization as well as the issues and contending forces that impacted on three sets of actors--the Board, the General Manager, and the Senior Staff. This report contains charts that illustrate the many attempts to restructure the organization, as well as the 1975 restructuring of MARTA Executives. Appendix 1 of this report is a staff paper describing the organizational restructuring, and Appendix 2 is a status report describing the organizational restructuring. (UMTA)

Perkins, RF Golembiewski, RT
Georgia University, Athens, Urban Mass Transportation Administration,
(GA-11-0006) UMTA-GA-11-0006-81-8, July 1979, 40p

ACKNOWLEDGMENT: UMTA
ORDER FROM: NTIS

PB81-154841

24 331461

IT'S A CRIME

Vandalism and theft are growing problems for all railroads with personnel and the general public endangered as railroad and shipper property is damaged and lost. Labor and management are seeking tougher penalties as well as new police power for railroad forces to combat the crime wave; a series of other countermeasures are also described.

Shaffer, FE *Modern Railroads/Rail Transit* Vol. 36 No. 2, Feb. 1981, pp 42-44, 2 Phot.

ORDER FROM: ESL

DOTL JC

24 331463

TTX AT 25

Trailer Train is marking its first quarter of a century of corporate existence with 118,000 cars, one of the railroad industry's largest fleets. The years have been marked by steady expansion, development of new types of specialized cars, diversification of the TTX fleet and improved car control techniques. Now the effects of deregulation--both in the railroad and trucking industries--are being studied by this largest supplier of intermodal equipment.

Roberts, R. *Modern Railroads/Rail Transit* Vol. 36 No. 3, Mar. 1981, pp 42-45, 2 Phot.

ORDER FROM: ESL

DOTL JC

24 331479

MARKETING: DO RAILROADS REALLY KNOW WHAT IT'S ALL ABOUT?

Market research, introduced to railroading a quarter century ago, has made its greatest progress in the past five years. Deregulation brings new urgency to this link between shippers' needs and railroad response through asset management. Designing a transportation product requires an integration of service, pricing and other elements to produce something simultaneously salable, useful and capable of producing income that is greater than expense. Specific facets of the railroad marketing function are examined.

Malone, F *Railway Age* Vol. 182 No. 4, Feb. 1981, pp 38-41, 1 Phot.

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DOTL JC

24 331484

NATIONAL FREIGHT AND PASSENGER MOBILITY INDEXES

The primary objective of the study reported was to identify important parameters that characterize multimodal transportation networks and to combine them into a meaningful index of the adequacy of the transportation system. The resulting measure would include railroad, highway, air, and water transportation. An extensive investigation was made to determine the availability of statistics that could be used to describe transportation systems. The study included an examination of railroad, highway, air, water, and pipeline transport data. The information was classified into categories of inventory and performance.

150

Eck, RW (West Virginia University, Morgantown); Stafford, DB *Traffic Quarterly* Vol. 34 No. 4, Oct. 1980, pp 539-554, 23 Ref.

ACKNOWLEDGMENT: EI
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DOTL JC

24 331515

SYSTEM OF TRAINING OF SPECIALISTS AND SCIENTIFIC RESEARCH ON THE USSR RAILWAYS

The railways in the Soviet Union are considered the most efficient mode of transport and development of the main regional areas depends on them. This is why careful attention is paid to training specialists and developing scientific research.

Minin, GA Finitsky, SI *Rail Engineering International* Vol. 11 No. 12, Dec. 1980, pp 691-697

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

DOTL JC

24 331524

TRANSPORT FORECASTS AS THE BASIS OF DECISION-MAKING IN FORWARD PLANNING ON THE DB [Verkehrsprognosen als Grundlage von Planungsentscheidungen der Deutschen Bundesbahn]

Forecasts are the essential basis of forward planning and decision-making. This is true for the transport sector, especially for the railway, since the railways work mainly with materials which cannot be changed from one year to another, and they must therefore know future developments in transport demand as accurately as possible. An explanation is given on the preparation, structure, methods and classification of transport forecasts, the possibilities and limits of forecasters, and the compilation and application of transport forecasts in respect of the German Federal Railway. [German]

Kastner, J Bernges, H *Die Bundesbahn* Vol. 56 No. 11, Nov. 1980, pp 759-763, 1 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

24 331559

TRANSPORT, TRAFFIC AND BALANCES OF THE ITALIAN STATE RAILROAD NETWORK [Transporti, traffici e bilanci nella rete delle ferrovie italiane dello stato]

A survey is given on the units and intensities of transport and traffic, utilization, expenditure, revenues, and costs of these units of transport. An examination is made of the general pattern of transport, traffic, expenditure, revenue, balance sheets, number of personnel, from 1937/38 to 1977, with particular reference to financial years 1937/38-1950/51 and 1974, for which a comparison is made also of transport, traffic, costs and operation of the Italian (FS), French (SNCF), West German (DB), British (BR) and Swiss (CFF) railways. Chronic and excessive lagging behind of tariffs, which lies at the base of the operating deficits (past, present and foreseeable for the future) is noted. [Italian]

Riggio, A *Ingegneria Ferroviaria* Vol. 35 No. 4, Apr. 1980, pp 331-345

ACKNOWLEDGMENT: EI
ORDER FROM: ESL

DOTL JC

24 331840

"COMMUNICATION" AND FREIGHT TRANSPORT ON THE FRENCH NATIONAL RAILWAYS [La "communication" et le transport des marchandises a la SNCF]

This article concerns the principles followed by the French National Railways Freight Commercial Department in its promotional advertising campaigns and more particularly the "communication" sought with the "targets" of such campaigns. Examples are given of the graphical methods employed during a recent campaign. [French]

Redon, L Boutte, C *Revue Generale des Chemins de Fer* Vol. 99 Sept. 1980

ACKNOWLEDGMENT: EI
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DOTL JC

24 331859

RAILROADER'S ECONOMICS REFERENCE BOOK. PART I AND II [Economicheskiy spravochnik zheleznodorozhnika]

This reference book is published in two volumes, part I and part II. The topics covered in part I include railroad freight and passenger service planning; operations, and management; the automation of railroad transportation; the operational costs and unit costs of freight and passenger service; the principal assets of the Soviet railroads; and the cost restraints and economic effectiveness of new railroad technology. Information is also given in part I on the role of Soviet railroads within the national transportation system and that system's role in the national economy. The topics covered in part II include railroad productivity, labor organizational structure, labor management practices, employee wage and bonus systems, freight and passenger tariffs, financial planning and data analysis, economics of the railroad supply system, economics of railroad repair enterprises, and railroad statistics for selected foreign countries. This reference work is intended for general readers, engineering and technical employees of railroads, and students in professional technical schools and secondary school institutions. Second edition of a work first published in 1971. [Russian]

Abstract only available in English. Original document, untranslated as of March 1981, can be seen for reference purposes. (Contact Technology Planning Officer at FRA/OR&D).

Shafirkin, BI

Transport Publishing House 1978, 813p, 26 Fig., 743 Tab.

ACKNOWLEDGMENT: FRA

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

24 331891

DIVIDED LOYALTIES: WHISTLE-BLOWING AT BART

When three engineers of Bay Area Rapid Transit District were fired in 1972 for publicizing what they perceived to be safety defects in the automatic train control (ATC), it set off this study of a professional's relationship with his employing organization. The book, divided into four chronological parts, was not to develop a single explanation of events surrounding the incident. Each of four perspectives--those of the engineers, of BART management, of the BART board of directors, and of the professional societies--was researched and presented by a different author. To explore the phenomenon of "whistle-blowing", it is necessary to identify organizational conditions--authority structure, lines of communication, and opportunities to participate in decision making--that give rise to initial disagreement with some organizational practice. This social science research considers the roles of selling the BART project to the public, of political pressures, or inadequate funding mechanisms, and of consultants, concluding that technical professionals often ignore the importance of non-technical influences upon the decision-making process.

Anderson, RM PERRUCCI, R Scheudel, DE Trachtman, LE
Purdue University 1980, 407p

ORDER FROM: Purdue University, West Lafayette, Indiana, 47906

24 334292

TRACK RESEARCH--PART 1 SOUTHERN RAILWAY LAB: INDEPENDENT, NOT ALOOF

Southern Railway's Research and Test Laboratory maintains an intensive hands-on approach in assisting the road's operating departments. The laboratory is marked by the multi-discipline capabilities of its relatively small staff. While a need for establishing system-wide track standards was the basis for systematic track research 40 years ago, today the Research and Test group is responsible for all the road's technical investigations and materials qualification.

Railway Track and Structures Vol. 77 No. 4, Apr. 1981, pp 33-35, 4 Phot.

ORDER FROM: ESL

DOTL JC

24 334293

TRACK RESEARCH, PART 2--MAKING THEORY A MEASURE OF REALITY

Faced with quantifying the heavier loading environment to which its track components were being subjected, Portec built its suburban Chicago research center in 1975. In addition to improving designs, the facility also works in quality assurance and in product and manufacturing engineering.

Railway Track and Structures Vol. 77 No. 4, Apr. 1981, pp 36-38, 5 Phot.

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24 334294

M/W TRAINING--GREAT STRIDES MADE, MORE TO BE DONE

This survey of in-house and other training programs for maintenance-of-way employees discusses several major and smaller railroads. Increasing supervisory retirements, new operating circumstances, new track maintenance procedures and extensive track rehabilitation programs have required both formalized and on-the-job training; the facilities and organizations involved are also described.

Railway Track and Structures Vol. 77 No. 4, Apr. 1981, p 40, 7 Phot.

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24 334298

KEEPING THE RAILROAD RETIREMENT PROGRAM ON TRACK--GOVERNMENT AND RAILROADS SHOULD CLARIFY ROLES AND RESPONSIBILITIES

The railroad retirement program has evolved from an industry-funded plan for retired workers to one which contains both social security and private pension elements. Funds to finance these elements consist of taxes paid by railroad workers and employers, transfers from social security trust funds, and general revenue appropriations from the Federal Government. The Railroad Retirement Board predicts that it may not be able to pay total benefits by 1982. To ensure that railroad beneficiaries will receive, at least, the social security portion of the retirement benefits, the Congress should require that funds for that portion be used for that purpose only and that railroad employees and employers pay taxes for those benefits on the same basis as employers and employees under social security. To help ensure that total benefits will be paid, the Congress should decide to what extent the Federal Government will fund windfall benefits for dual beneficiaries. The Congress also should consider whether certain groups, such as railroad beneficiaries' remarried widows and divorced spouses, which are not covered under railroad retirement, should be.

General Accounting Office HRD-81-27, Mar. 1981, 41p, 1 Tab., 4 App.

ORDER FROM: GAO-Document Handling & Info Services Facility, P.O. Box 6015, Gaithersburg, Maryland, 20760

24 334300

MOPAC: WHERE GOOD RAILROADING AND GOOD MARKETING GO TOGETHER

Missouri Pacific is further enhancing the role of its marketing organization in the wake of the deregulation legislation of 1980. Traffic and customer needs are being examined as contract rates are being instituted. Pricing, service packages, operations and equipment planning are all examined as MP stresses interdepartmental cooperation. MP has specialized commodity marketing groups covering about 70 percent of its traffic, but looks closely at other products such as aggregates and wood chips, traditional low-rate commodities, which are now handled profitably. MP has weathered recent recession with revenue gains.

Malone, F *Railway Age* Vol. 182 No. 6, Mar. 1981, p 42, 1 Phot.

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DOTL JC

24 334336

EXPANDING THE NETWORK TO 80,000 KM

China's railways have been expanding at the rate of 1,000 km a year for three decades, but the pace is to increase with a further leap from 50,000 to 80,000 km planned by the end of the century despite increased emphasis on double-tracking of heavily-loaded trunk routes in the east. The broad strategy includes joining up lengths of existing line to form additional north-south trunk lines, paralleling the Beijing-Guangzhou artery to east and west, with improved links to the ports. But the greatest engineering challenge lies in the proposed link from Golmud to Lasa, much of which will be over 4,000 m above sea level.

Aiping, C *Railway Gazette International* Vol. 137 No. 1, Jan. 1981, pp 36-39

ACKNOWLEDGMENT: British Railways

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DOTL JC

24 334337

MORE TRAFFIC, MORE TRAINS, MORE TRACK

For the next five years Chinese Railways will concentrate on upgrading and electrification of existing routes in a determined effort to boost capacity without incurring disproportionate costs—a process in line with recent political reforms. From then on the long planned programme to build new lines will be reactivated with construction moving at the rate of 2,000 km a year. In the meantime Chinese engineers are investigating how best they can prepare for the future in terms of rolling stock design and production. Introduction of modern signalling and up-to-date maintenance techniques will follow as the equipment and methods most suited to China's unique circumstances are selected.

Weicheng, G *Railway Gazette International* Vol. 137 No. 1, Jan. 1981, pp 31-35

ACKNOWLEDGMENT: British Railways
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DOTL JC

24 334339

RAIL RENAISSANCE

At the Department of Transportation's Colorado Test Centre there is little work on exotic or far out concepts; the emphasis is on shaping up America's conventional rail network. Both government and industry are co-operating on a number of projects that emphasize basic problems of track and rolling-stock design.

Aronson, RS *Machine Design* Vol. 52 No. 25, Nov. 1980, p 18

ACKNOWLEDGMENT: British Railways
ORDER FROM: ESL

DOTL JC

24 334411

INVESTMENT EVALUATION IN RAILWAYS

Investment in conventional rail systems, both urban and inter-urban, has been proposed for a number of lines in the UK and Eire. The reasons are a combination of the need to replace existing assets, the need to cater for new demand or to relieve congested corridors. The paper discusses a number of studies that have been undertaken in the past 4-5 years and draws some conclusions of a general nature. The paper describes the methodology of each study, including data sources, model calibration (where appropriate) and the main financial effects that investment could induce. The operating and engineering constraints are also described. The planning horizon for the studies, which is typically 20 years, is discussed, as are the effect of assumptions in fuel prices, competition from other transport modes and population growth.

World Conference on Transport Research. Transport Research for Social and Economic Progress, April 14-17, 1980, Imperial College, London, England.

Ventham-Smith, P

Martin and Voorhees Associates Conf Paper 1980, p B-01

ORDER FROM: Martin and Voorhees Associates, 112 Strand, London, England

24 334464

INTERRELATIONSHIPS BETWEEN THE AMERICAN RAILWAY ENGINEERING ASSOCIATION, THE ENGINEERING DIVISION, THE ASSOCIATION OF AMERICAN RAILROADS, THE RESEARCH AND TEST DEPARTMENT, THE ASSOCIATION OF AMERICAN RAILROADS, AND THE TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMY OF SCIENCES

The American Railway Engineering Association, the Research and Test Department-AAR, the Engineering Division-AAR, and the Transportation Research Board all share a common concern with advancing knowledge regarding the fixed plant of the Nation's railroads, as to scientific and economic design, location, construction, operation, and maintenance. They serve the rail transportation industry in their respective areas of engineering, policy, considerations, research and technology transfer, and act in a cooperative and supportive role, each to the other. This report reviews the existing interrelationships between the organizations, their structure, goals and objectives, and methods of attaining them. Conclusions and recommendations are presented toward improving the effectiveness of their work on behalf of the rail transportation industry, and in turn, its effectiveness as a vital link in the national transportation network.

Hutcheson, TB

Hutcheson (Thomas B), Association of American Railroads Final Rpt. AAR R-408, Dec. 1979, 85p, Tabs., 22 Ref.

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

DOTL RP

24 334492

TRANSIT CAR PROCUREMENT: BREAKTHROUGH IN BUFFALO

The author describes how Buffalo organised negotiations with prospective suppliers of coaches for its urban and suburban transport network. A comparison with Cleveland and Philadelphia is given.

Ireton, ET *Railway Age* Vol. 182 No. 1, Jan. 1981, pp 23-27, 3 Tab., 1 Phot.

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

DOTL JC

24 334493

TWENTY YEARS ON: AIMING FOR HIGHER UTILIZATION OF TRACK, VEHICLES AND LABOUR

In this article the author, who is Head of Research for British Railways, examines future prospects in order to analyse the changes likely to occur on the railways in the next 20 years.

Wickens, A *International Railway Journal* Vol. 21 No. 1, Jan. 1981, p 27, 5 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013

DOTL JC

24 334494

DEVELOPMENT OF QUALITY ASSURANCE PROCEDURES ON BRITISH RAIL

The procedure for inspection of railway material at the supplier's work is described and its weaknesses contrasted with present-day quality assurance procedure, the case for which is argued.

Wise, S *Institution of Mechanical Engineers Proceedings* Vol. 194 No. 40, 1980, pp 383-389.

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

DOTL JC

24 334696

THE FUTURE ROLE OF RAIL

Charged with determining the role for rail in the Province for the remainder of this century and into the next, the Ontario Task Force on Provincial Rail Policy has made a series of recommendations which are seen leading to revitalization of rail as a major component of an integrated transportation system. The Report's 12 chapters: The Challenge to the Task Force; Fundamentals of the System; Passenger Rail—An Essential Service; Commuter Rail; Ontario's Local and Regional Services; The Special Requirements for Northern Ontario; Rail Freight; Issues of Railway Costing; Research, Development and Economic Opportunities; Railway Electrification and Alternative Fuel Strategies; Protecting the Public Interest; The Changing Roles.

Ontario Task Force on Provincial Rail Policy Final Rpt. Jan. 1981, 128p, Photos.

ORDER FROM: Ontario Government Book Store, 880 Bay Street, Toronto, Ontario M5S 1Z8, Canada

24 334733

CONRAIL AT THE CROSSROADS: THE FUTURE OF RAIL SERVICE IN THE NORTHEAST

Because Conrail cannot continue indefinitely as a private-sector enterprise dependent on public financing, it must achieve fundamental changes in its efficiency and cost structure. The Staggers Act required USRA to submit to Congress this report examining the effect upon Conrail, Northeast rail service, railroad employees, the regional economy and other rail carriers of (1) continued Federal funding; (2) reduced Federal funding; and (3) no

further Federal funding. The three analytical studies demonstrate that with proper changes in its cost structure and relief from statutory labor protection obligations, Conrail can become viable. Also examined was dissolution of Conrail with transfer of some of its lines and its traffic to other railroads which could be accomplished with little regional economic disruption if an orderly transition were to take place. USRA found little difference in funding requirements between breaking up Conrail and attaining a viable railroad; it found more benefit in a continuation of the present Conrail organization which, as a condition of its not being dissolved, would be required to achieve very substantial progress in a two-year transition period in increasing labor productivity, and in fleet planning, car utilization and plant capacity. If Conrail succeeds, the need for government funding will have been reduced or eliminated and the region will have been served; if Conrail does not then prove viable, the interval will have better prepared the property and all parties involved for an orderly dissolution.

United States Railway Association. Apr. 1981, 79p, Tabs.

ORDER FROM: United States Railway Association, 2100 2nd Street, SW, Washington, D.C. 20595

24 334952

MARKETING-MINDED CN RAIL LOCKS WEST

Canadian National marketing now depends largely on finding commodities for which railway operation is best suited and then pricing them properly. Because of legal limits on grain rates, CN Rail does not regard Western grain movements as a market target, concentrating instead on coal, potash, sulphur, lumber and petrochemicals which now produce their appropriate shares of necessary revenues. With its mainline capacity restricted in the West, CN seeks compromises between marketing criteria and operating efficiency. After Canada's deregulation of transportation in 1967, the railroads had to develop market expertise to augment the former transportation orientation of its staff. Ratemaking, including contract rates; relations with shippers, unit trains with backhauls; and proper mixes of intermodal service are among current marketing targets.

Malone, F. *Railway Age* Vol. 182 No. 10, May 1981, p 48, 2 Phot.

ORDER FROM: ESL

DOTL JC

24 334961

THE RAILROAD MERGERS AND THE COMING OF CONRAIL

This economic history describes the succession of U.S. railroad mergers occurring in the 20th Century. It begins with the Northern Securities case, which involved unsuccessfully the Great Northern, Northern Pacific and Burlington, and concludes with the first two years of the the Federally imposed merger of the Northeast bankrupts into Conrail.

Contributions in Economics and Economic History No. 19.

Saunders, R.
Greenwood Press 1978, 401p

ORDER FROM: Greenwood Press, 88 Post Road West, P.O. Box 5007, Westport, Connecticut, 06881

24 335049

LOUISIANA STATE RAIL PLAN UPDATE

The State's rail planning process, including benefit/cost analysis for light-density lines, is described in opening sections. This is followed by a description of major characteristics of the Louisiana rail network. There is then a line-by-line analysis of 11 marginal segments with facilities and traffic, present and future, analyzed. These are followed by a prioritization of the lines, indicating the desirability of government-funded track rehabilitation if continued operation is desirable.

CONSAD Research Corporation Jan. 1981, 13p, Tabs., Photos., 2 App.

ORDER FROM: Louisiana Dept of Transportation & Development, Capitol Access Road, Room 476, Baton Rouge, Louisiana, 70804

24 335051

THE ERA OF THE GIANTS--UP/MP/WP: A WHOLE GREATER THAN THE SUM OF THE PARTS

Union Pacific, Missouri Pacific and Western Pacific, three strong railroads, sensed trouble ahead if they pursued their independent ways in an era of deregulation. They desire to assure strength through merger. The possible roadblocks in this complex case could produce ICC's toughest decisions in many years.

Welty, G. *Railway Age* Vol. 182 No. 8, Apr. 1981, pp 20-26, 2 Phot.

ORDER FROM: ESL

DOTL JC

24 335055

WHAT CONRAIL WANTS FROM CONGRESS--AND OTHERS

The complex problems confronting Conrail management are discussed as the railroad comes under Administration limitations on further funding and its requirement that a nonviable Conrail be dismembered and sold. It is concluded that it is not possible to operate a conventional railroad with Conrail's obligations on a self-sustaining basis in Conrail's service area because of declining traffic base, labor and labor-protective requirements, passenger service obligations, and the nature of its government debt. Government policy decisions in these matters cannot be postponed.

Crane, LS. *Railway Age* Vol. 182 No. 8, Apr. 1981, pp 50-52, 1 Phot.

ORDER FROM: ESL

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24 335067

TEXAS RAILROADS: A RECORD OF CONSTRUCTION AND ABANDONMENT

Previously unpublished information on railroad construction and abandonment in the state. The author offers maps of rail networks from 1860-1980, describes the development of the rail networks in Texas, and comments on the situation at present.

Zlatkovich, CP
Texas University, Austin Mar. 1981, n.p.

ORDER FROM: Texas University, Austin, Bureau of Business Research, P.O. Box 7459, Austin, Texas, 78712

24 335264

WIDER HORIZONS FOR RAILROAD RESEARCH

While Santa Fe anticipates its research and test efforts will continue to focus on materials and components for rolling stock and track structures, greater consideration will have to be given to the economic pressures impinging on all railroads. Efforts are being broadened to include energy-and efficiency-related areas such as aerodynamic and lightweight design, fuel-efficient train handling, fatigue evaluation and equipment utilization. Fuel conservation, diesel locomotive performance, and failure of car and track components are being emphasized. Management planning and purchasing are major goals of the failure analysis program with line department input sought at all levels.

Kaelin, CR (Santa-Fe Railway) *Progressive Railroading* Vol. 24 No. 6, June 1981, p 35, 9 Phot.

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

DOTL JC

24 335288

RAILROADS FOR NATIONAL DEFENSE AND THE DOD RAIL CLEARANCE PROFILE

Department of Defense relies on our nation's railway network for movement of supplies, materials, and equipment vital to national defense. Rail lines important to the nation's defense include mainlines, connector lines and clearance lines.

Franz, RD. *TRANSLOG: Journal of Military Transportation Mgt* Vol. 12 No. 1, Jan. 1981, pp 7-9

ORDER FROM: GPO

24 335470

BR: POINT OF NO RETURN

In 15 years of investment, endeavor, criticism and cut-backs, long-term problem industries in the public sector have continued to put their political overloads on the spot and to slow national economic growth, states the author. In 1981, British Rail's needs and problems loom as large as ever. Will the investment be forthcoming?

Taylor, R. *Management Today* Apr. 1981, pp 42-49, 8 Phot.

ACKNOWLEDGMENT: International Union of Railways, BD
ORDER FROM: Management Publications Limited, Regent House, 54-62 Regent Street, London W1A 4YJ, England

DOTL JC

24 335829

POLICY OF THE FRENCH NATIONAL RAILWAYS AS REGARDS THE TRANSPORT OF FREIGHT BY ROAD [LA POLITIQUE ROUTIERE MARCHANDISES DE LA SNCF]

The author explains the historical and commercial factors that have led the French National Railways to participate--generally as a charterer and not as a carrier--in the three aspects of the transport of freight by road: long distance, short distance and cartage. [French]

Peter, J *Revue Generale des Chemins de Fer* Vol. 100 Jan. 1981, pp 15-22

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

24 335845

SANTA FE: MAKING (AND MEETING) MARKETING GOALS

Santa Fe has refined its marketing functions so that traffic forecasting, market planning and profitability are being enhanced in all significant freight traffic areas. Deregulation with its contracted transportation services, competitive mergers and the future role of non-railroad-owned freight cars are among the challenges which the road's marketing organization is confronting.

Welty, G *Railway Age* Vol. 182 No. 12, June 1981, pp 29-30, 5 Phot.

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DOTL JC

24 335847

RAILVIEW: TRAILER TRAIN'S NEXT 25 YEARS

Trailer Train goals of improving the profitability of its freight-car-pool participants and providing them with the equipment they will need are discussed. As TTX seeks the optimum intermodal car, it is also seeking to improve its own investment decisions and understanding of the changing world which surrounds today's railroads in the wake of deregulation, mergers and abandonments. Owners are seeking to focus scarce capital on their fixed plants, giving an increasing role to others for providing rolling stock.

Buford, CD (Trailer Train) *Railway Age* Vol. 182 No. 12, June 1981, pp 44-45

ORDER FROM: ESL

DOTL JC

24 336053

APPALACHIA RAILROAD BRANCHLINE CONDITION/BRANCHLINE STUDY. APPENDIX VOLUME

Rail branchlines in the 13-state area of the Appalachian Regional Commission (ARC) vary in traffic carried and therefore in relative profitability. Maintenance is deferred on certain of the less profitable lines which are still important to local economies and could be preserved by appropriate public action. Recommendations were prepared regarding possible ARC roles in this matter.

Zuelsdorf, R McIlwain, B White, J

Smith (Wilbur) and Associates, Appalachian Regional Commission Final Rpt. ARC-78-191/SC-6524, Nov. 1980, 170p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-135394

24 336054

APPALACHIA RAILROAD BRANCHLINE CONDITION/ABANDONMENT STUDY

Rail branchlines in the 13-state area of the Appalachian Regional Commission (ARC) vary in traffic carried and therefore in relative profitability. Maintenance is deferred on certain of the less profitable lines which are still important to local economies and could be preserved by appropriate public action. Recommendations were prepared regarding possible ARC roles in this matter. Factors considered included Regional rail demand and commodities carried; the maintenance posture of Regional branchlines (including a physical inspection and individual study of 14 sample lines) and examination of the impact of unit coal train operations on Regional branchline operations. The cost of upgrading Regional branchlines to FRA Class 2 standards (25 mph) was also estimated. The feasibility of improving marginal rail branchlines to FRA Class 2 standards was also examined, based on a sample of such lines. Existing rail assistance programs were also evaluated.

Zuelsdorf, R McIlwain, B White, J

Smith (Wilbur) and Associates, Appalachian Regional Commission Final Rpt. ARC-78-191/SC-6524, Nov. 1980, 235p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-135386

24 336214

TECHNICAL CHANGE IN THE RAILROAD INDUSTRY. EXECUTIVE SUMMARY REPORT

In the study of technical change in the railroad industry, service innovation, rather than technical innovation, is examined. Service innovation is subject to severe regulatory constraints in contrast to technical innovation which is not particularly subject to such constraints. By studying American and Canadian railroad operations, this project has attempted to isolate the economic and regulatory forces that may have impeded or promoted the utilization of specific innovative services in each country. Research in the following areas is summarized: differences in costs and technology between Canadian and U.S. railroads; the role of integrated transportation companies and rate freedom in utilization of intermodal services; and the role of rate freedom in the utilization of unit trains.

Friedlaender, AF

Massachusetts Institute of Technology, National Science Foundation NSF/PRA-7617394/3, Oct. 1980, 17p

Grant NSF-PRA76-17394

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-138463

25 326477

THE IMPACT OF BART (BAY AREA RAPID TRANSIT) ON PUBLIC POLICY

The report summarizes the findings and conclusions of the Public Policy Project and presents policy implications for other metropolitan areas planning for rapid rail transit development. Impacts of BART on public policy actions and decision-making processes are assessed in four areas--organization, finance, land use and transportation. These BART public policy impact findings are interpreted for each of three different types of communities--urban core, urban residential and suburban.

Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001641. Prepared by Booz-Allen and Hamilton, Inc., San Francisco, CA.

Graebner, LS Giles, PB Higgins, TJ Jonash, RS
Metropolitan Transportation Commission, Department of
Transportation, Department of Housing and Urban Development . Final
Rpt. DOT-P-30-79-07, Apr. 1979, 130p

Contract DOT-OS-30176

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB81-118119, DOTL NTIS

25 327527

TRENDS IN TRANSPORTATION REGULATIONS: RAILS, BUSES, TRUCKS

State transportation officials had an opportunity to meet and discuss contemporary problems at the Second Transportation Regulation Conference, co-sponsored by the Iowa and Minnesota Departments of Transportation, September 19-20, 1977. Too frequently the day-to-day work of state regulators prevent an analysis of issues affecting a state's transportation network. This conference was an attempt to bridge this gap through a series of presentations on railroads, the intercity bus industry and motor carriers. Informal discussions among the participants presented an opportunity to see how others are coping with the constantly changing and complex structure of the common carriers and their relationship to regulatory agencies.

Prepared in cooperation with Iowa Dept. of Transportation, Des Moines.

Minnesota Department of Transportation 1979, 25p

ACKNOWLEDGMENT: NTIS

ORDER FROM: NTIS

PB80-206972

25 328275

STUDY OF LIABILITY, INSURANCE AND INDEMNIFICATION PROBLEMS FOR FRA PROGRAMS

The report presents the findings, conclusions and recommendations of an extensive six-month study of liability, insurance and indemnification problems in certain FRA programs. To assemble this information, interviews were conducted, extensive legal research was performed, relevant literature was surveyed. Final recommendations include hiring of an insurance broker, statutory authority to indemnify R&D contractors, use of self-insurance and claim servicing organizations, and limitations on conduct of R&D projects outside the TTC. Attention is paid to: aspects of FRA R&D programs which may give rise to liability; the feasibility of various insurance and indemnification approaches; FRA potential liability for acts of contractors; loss experience projections; and estimates of premium rates.

Research Group International, Federal Railroad Administration June
1979, 327p

Contract DOT-FR-74300

ACKNOWLEDGMENT: NTIS

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PB81-124521

25 328453

INTRODUCTION TO EXEMPTIONS FROM THE FAIR LABOR STANDARDS ACT, WORKING PAPER NUMBER 9

Since its enactment in 1938, the Fair Labor Standards Act (FLSA) has contained provisions exempting specific groups of covered workers from minimum wage and maximum hour considerations. Currently, 42 exemptions completely exclude approximately 28 million workers from either the minimum wage and/or maximum hour provisions of the Act. In addition, approximately 700,000 workers, mostly full-time students, are legally hired

at subminimum wages under provisions of various certification programs and employers of three million hospital and nursing home workers receive a partial exemption from overtime provisions which make allowance for specialized working conditions in this sector. Major amendments have been added six times: in 1949, 1955, 1959, 1966, 1974 and 1977. Amendments eliminating existing exemptions and introducing new ones were enacted each time with the exception of 1955 when only minimum wage rates were increased.

Fritsch, CF

Minimum Wage Study Commission Sept. 1980, 19p

ACKNOWLEDGMENT: NTIS

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PB81-123309

25 328464

EXEMPTIONS TO THE FAIR LABOR STANDARDS ACT TRANSPORTATION SECTOR, WORKING PAPER NUMBER 10

The report will become a chapter in the MWSC technical report on Exemptions from the Fair Labor Standards Act. Discussion of 9 exemptions affecting the transportation sector identifies, when available, the number of employers and employees affected, the status of employee representation by labor organizations, employee earnings and direct wage increases resulting from removal of the exemption. A brief legislative history and unique structural or institutional aspects of each exempt sector are described to provide a further basis for evaluating the merits of each exemption. The report is not designed to develop an advocacy position for either retention or repeal of the exemptions under study.

Fritsch, CF

Minimum Wage Study Commission Sept. 1980, 65p

ACKNOWLEDGMENT: NTIS

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PB81-120255

25 330155

BENEFIT/COST ANALYSIS EFFICIENCY-EQUITY ISSUES IN TRANSPORTATION

This article examines the application of Benefit-Cost Analysis to public sector decision making, specifically in the area of transportation projects and to public choice in general. Section I discusses the theoretical problems in use of B/C as an efficiency measure while Section II (Bay Area Rapid Transit) and Section III (Tennessee-Tombigbee Waterway) describe public project examples. Section IV reviews the issue of equity as a factor in B/C analysis. Section V presents conclusions regarding the use of B/C in public choice.

Sagner, JS *Logistics and Transportation Review* Vol. 16 No. 4, 1980, pp
339-388, 3 Tab.

ORDER FROM: British Columbia University, Canada, Faculty of Commerce,
Vancouver V6T 1W5, British Columbia, Canada

DOTL JC

25 331093

TECHNOLOGY ASSESSMENTS IN TRANSPORTATION: SURVEY OF RECENT LITERATURE

A survey and an evaluation of recent studies of transportation systems done in a technology-assessment framework were undertaken as the basis for a detailed statement of work for a US Department of Energy technology assessment of transportation energy-conservation strategies. Several bibliographies were searched and numerous professionals in the field of technology assessment were contacted regarding current work. Detailed abstracts were prepared for studies judged to be sufficiently broad in coverage of impacts assessed, yet detailed in coverage of all or part of the nation's transportation systems. Some studies were rich in data but not comprehensive in their analytical approach; brief abstracts were prepared for these. An explanation of the criteria used to screen the studies, as well as abstracts of 37 reports, are provided in this compendium of transportation-technology-assessment literature.

LaBelle, SJ

Argonne National Laboratories Mar. 1980, 245p

Contract W-31-109-ENG-38

ACKNOWLEDGMENT: Energy Research Abstracts

ORDER FROM: NTIS

ANL/CNSV-TM-44

25 331475

COMPETITIVE EQUITY--THE FREIGHT RAILROADS' STAKE

This book is a response to charges leveled by the Water Transport Association that freight railroads have been recipients of massive federal aid, significantly in excess of Federal subsidies to barge lines. The thesis is that past subsidies are not a proper focus of economic analysis. Although previous Federal studies have concluded that railroads have more than repaid the Federal government for prior aid received and barge lines have repaid less than two cents of all past Federal aid dollars, it is not suggested that other modes now repay all the value of past aid. Future policy must require all modes to compete, not on the basis of subsidy but on the basis of resource costs in a market unfettered by regulation. Past and present components of Federal aid are detailed and the effects of that aid on railroads is discussed. It is contended that competitive equity must be considered in formulating future public policy alternatives.

Wilner, FN

Association of American Railroads Feb. 1981, 72p

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25 331486

ANALYSIS OF U. S. NATIONAL TRANSPORTATION POLICY ALTERNATIVES

This paper describes methods and procedures to determine the impact of various national transportation policy alternatives. Values held by the major groups involved are assessed and criteria applied to determine the relative importance of various values and policies to these groups.

Briggs, D (Department of Transportation); Bruno, L Levin, G *Transportation Research. Part A: General* Vol. 14A No. 4, Aug. 1980, pp 255-261

ACKNOWLEDGMENT: EI

ORDER FROM: ESL

DOTL JC

25 334328

TRANSPORTATION ISSUES IN THE 1980S

This study examines current and emerging transportation issues, with emphasis on congressional interests and concerns. It is based on GAO's plan for audits of Federal transportation programs. Topics discussed include: perspective on transportation issues; transportation policy; rail freight service; auto safety and fuel economy; highways; trucking and rail regulation; mass transit; rail passenger service; aviation; ocean shipping; energy, environment, and technology; and organizations involved in transportation issues.

General Accounting Office CED-80-133, Sept. 1980, 52p.

ORDER FROM: GAO-Document Handling & Info Services Facility, P.O. Box 6015, Gaithersburg, Maryland, 20760

DOTL RP

25 334341

THE FEDERAL INVESTMENT IN AMTRAK'S ASSETS SHOULD BE SECURED

As of fiscal year 1980, the Federal Government had given Amtrak \$3.2 billion for its capital program. Only \$2.5 billion of this amount is subject to Federal security arrangements; that is, this part of the Government's investment would be protected should Amtrak be liquidated. Because the Government has funded Amtrak's capital assets, the Government's investment should be fully secured. GAO recommends that legislation authorizing Amtrak's capital funding be amended so that any future Federal funding would be made available only after Amtrak and the Secretary of Transportation enter security agreements. These agreements would create a Federal claim and secure, in favor of the United States, all assets acquired in the past and future with Federal capital funding.

General Accounting Office PAD-81-32, Mar. 1981, 44p

ORDER FROM: GAO-Document Handling & Info Services Facility, P.O. Box 6015, Gaithersburg, Maryland, 20760

25 334430

MOBILITY IN CONNECTICUT

Connecticut Department of Transportation aims to provide a high level of rail service in a state where highway saturation already exists. ConDot aid for rail service finds the largest share going to the New Haven-New York

City commuter service; the second largest share goes to aid Amtrak intercity services in the State; the third share subsidizes branchline freight service. Commuter ridership has been growing at annual rates of up to 9 percent; ConDot is studying equipment needs for up to 15 years ahead.

Roberts, R *Modern Railroads/Rail Transit* Vol. 36 No. 4, Apr. 1981, pp 46-49, 3 Phot.

ORDER FROM: ESL

DOTL JC

25 334960

STAGGERS RAIL ACT OF 1980. AN ACT TO REFORM THE ECONOMIC REGULATION OF RAILROADS, AND FOR OTHER PURPOSES

No Abstract.

Government Printing Office 1980, 72p

ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO

ORDER FROM: GPO

25 334962

TAXATION OF AMERICAN RAILROADS. A POLICY ANALYSIS.

Beginning with a summary of the historical background to the present system, the author explains how, in the early years of railroading, many lines received tax forgiveness from localities desiring service. Today, that preferred treatment has been replaced by a combination of federal, state, and local taxes that can put the railroad at an unfair disadvantage. Taxing structures vary widely in different states and localities; inequalities abound. In many cases newer forms of transport, airports and highways, receive explicit or implicit preferential treatment. Thompson calls attention to existing taxing systems that are equitable, and he offers proposals for changing others.

Contributions in Economics and Economic History, No. 34.

Thompson, DE

Greenwood Press 1981, 186p, Figs., Tabs., Apps.

ORDER FROM: Greenwood Press, 88 Post Road West, P.O. Box 5007, Westport, Connecticut, 06881

25 335285

UTILITIES LOOK SKEPTICALLY AT RAIL DEREGULATION

Concern about the Staggers Rail Act of 1980, which deregulates rates, prompted the Tennessee Valley Authority to insert a protective clause allowing it to cancel coal contracts if rail rates go too high. Railroads will be allowed to charge an increasing amount, up to 175% of variable costs by 1984. Legislators were hoping to pass a slurry-pipeline bill to provide the competition that will protect consumers. Pipelines would carry less than 20% of the freight, but they would provide an efficiency and cost comparison. The Interstate Commerce Commission (ICC) has not been able to protect utilities, especially those relying on coal from the Powder River Basin. The new law could relieve railroads of enough regulatory cost burdens and promote competitive lines to hold down rates.

Electrical World Vol. 195 No. 1, Jan. 1981, pp 27-29

ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020

DOTL JC

25 335435

TRANSITIONAL ADMINISTRATION OF NATIONAL TRANSPORTATION POLICY

The gap between the explication of presidential goals and the objectives and actions of executing bureaucracies in transportation is examined, and measures that might bridge it are proposed. The paper includes a figure of the major Federal Transportation Functions (Economic Regulation, Social Regulation, Planning and Operation of Ways, Financing and Charges, Intervention in Operating Services, Research and Development, Administration) and New Policy Direction.

Hazard, JL (Michigan State University, East Lansing) *Transportation Journal* Vol. 20 No. 3, 1981, pp 5-22, 4 Fig., 1 Tab.

ORDER FROM: Hein (William S) and Company, Incorporated, 1285 Main Street, Buffalo, New York, 14209

DOTL JC

25 335613

INCENTIVE CONTRACTING FOR RAILROAD SUBSIDIES: A STATISTICAL APPROACH TO COST CONTROL

An optimal method of subsidy would necessarily entail methods of subsidy cost control. The purpose of this article is to develop and empirically evaluate the feasibility of such a method of control, which encourages subsidy cost limitation through performance incentives for subsidized carrier cost efficiency. Empirical findings suggest that a statistical approach to minimum necessary or "target" carrier cost estimation may make the suggested method of cost control applicable in a number of regulated sectors.

Hirschey, MJ *Land Economics* Vol. 56 No. 3, Aug. 1980, pp 366-379

ORDER FROM: Wisconsin University Press, P.O. Box 1379, Madison, Wisconsin, 53701

DOTL JC

25 335631

SUCCESS OF INVESTMENT IN LOCAL PUBLIC TRANSPORT IN GERMANY

Since 1967, substantial public funds have been made available by federal and state governments for construction work to improve local public transport in towns and cities. This has made it possible to implement large-scale projects -such as underground and commuter railway systems-and a large number of smaller schemes designed to improve urban traffic conditions. The present article describes the initial situation as well as the statutory bases for improving traffic conditions in towns and cities, and presents a survey of the investment and construction work being done in local public transport. This is followed by an analysis of the transport improvements

achieved so far as well as the consequences for urban planning and public policy in the social and labor market fields.(a) (TRRL)

Girnau, G Mueller, KW *Transport Policy and Decision Making* Vol. 1 No. 2-3, 1980, pp 253-265, 2 Fig., 7 Tab., 11 Ref.

ACKNOWLEDGMENT: TRRL (IRRD 253907), Institute for Road Safety Research

ORDER FROM: Martinus Nijhoff Publishers, P.O. Box 22, Dordrecht, Netherlands

25 336351

ICC'S ENFORCEMENT PROGRAM CAN BE EFFECTIVE IN HALTING VIOLATIONS AND PREVENTING THEIR RECURRENCE

Civil penalty settlements and court actions are the two most common methods used by the Interstate Commerce Commission to enforce compliance with interstate transportation regulations. Yet their effectiveness is limited by nonapplicability in cases involving many tariff-and service-related violations, small and untimely settlements, problems with U.S. attorneys' handling of referred cases, and lack of followup investigations. While proposals for regulatory reform may eliminate enforcement of certain regulations the need to deter violations of other regulations will remain. Thus, actions to strengthen ICC's enforcement program will be important. Congressional and agency actions are needed.

General Accounting Office Cong Rpt. CED-80-57, May 1980, 77p

ACKNOWLEDGMENT: NTIS

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PB81-135881

26 318508

INNOVATION IN PUBLIC TRANSPORTATION: A DIRECTORY OF RESEARCH, DEVELOPMENT AND DEMONSTRATION PROJECTS

This eighth annual directory contains descriptions of current research development and demonstration (RD&D) projects sponsored and funded by the Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation. The intent is to make public information regarding UMTA's RD&D activities. The directory focuses on activity that took place in fiscal year 1979. Programs relate mainly to technology development and deployment, service and methods demonstrations, transportation planning and management; other studies relate to local transportation (Technical Studies) and special planning studies; and programs of policy development and research (including University Research and Training Grant Program). The appendixes provide information about federal research and development in urban mass transportation grants and contracts. The document also provides an index of agencies/contractors, a project index, and a subject index.

See also report dated 1978, PB80-130818.

Urban Mass Transportation Administration UMTA/MA-06-0086-80-2,
1979, 245p

ACKNOWLEDGMENT: NTIS
ORDER FROM: NTIS

PB80-204142

26 331127

STATISTICAL YEAR BOOK. TRANSPORT, COMMUNICATIONS, TOURISM 1977 [Annuaire statistique. Transports, communications, tourisme 1977]

Statistical data are presented on railways, roads, inland waterways, merchant shipping, aviation, pipelines, post and telecommunications, and tourism for the Federal Republic of Germany, France, Italy, the Netherlands, Belgium, Luxembourg, the United Kingdom, Ireland and Denmark. [French]

Prepared in cooperation with the Luxembourg EUROSTAT Office, 5 rue du Commerce, BP 1003.

EUROSTAT Monograph 1980, 184p, Tabs.

ACKNOWLEDGMENT: TRRL (IRRD 252536)
ORDER FROM: EUROSTAT, P.O. Box 569, London, England

26 331890

INTERNATIONAL RAILWAY STATISTICS--STATISTICS OF INDIVIDUAL RAILWAYS--YEAR 1978

No Abstract.

International Union of Railways, BD 1978, 219p

ORDER FROM: International Union of Railways, BD, 14 rue Jean Rey,
75015 Paris, France

DOTL RP

26 334453

TRANSPORT STATISTICS GREAT BRITAIN 1969-1979

Data are presented in tabular form relating to the various modes of inland surface transport in Great Britain. The tables are arranged as follows: part 1-transport: an overall view. Part 2-road. Part 3-rail. Part 4- pipelines. Part 5-inland waterways. Part 6-sea transport. Part 7-air transport. Part 8-international comparisons. Within each part the tables have, as far as possible, been ordered to show the demand for transport first, followed by how that was met in terms of choice of mode, operator or vehicle and then by information about the infrastructure necessary to enable the movement of goods and individuals to proceed. Because of the large volume of transport by road, and consequently the large number of statistics collected on it, the road section has been explicitly sub-divided into the four sections-activity, vehicles and operators, infrastructure and social impact. Notes and definitions appropriate to each part are included.

Her Majesty's Stationery Office Monograph 1980, 225p, Figs., Tabs.

ACKNOWLEDGMENT: TRRL (IRRD 252970)
ORDER FROM: Pendragon House, Incorporated, P.O. Box 255, Old Mystic,
Connecticut, 06372

Ongoing Research Summaries

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. 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, CA Hare

HP&R D-4-115

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Apr. 1972 COMPLETION DATE: June 1982 TOTAL FUNDS: \$530,000

ACKNOWLEDGMENT: California Department of Transportation, Federal Highway Administration (111102353)

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 Tunnelling 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 Tunnelling Association (ITA) on behalf of the scientists, engineers, and technologists of the United States. The ITA was formed in 1974, and several cooperative projects are underway on such subjects as planning use of the subsurface, research needs, standardization, safety, contractual sharing of risk, and seismic effects.

PERFORMING AGENCY: National Academy of Sciences; National Academy of Engineering

INVESTIGATOR: Bangert, RL Tel (202) 389-6831.

SPONSORING AGENCY: Bureau of Mines

RESPONSIBLE INDIVIDUAL: Marchant, W Tel (202) 634-1140

Contract JO199025

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Mar. 1972 COMPLETION DATE: Dec. 1981

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 information 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: Marchant, W Tel (202) 634-1140

Contract JO199030

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Dec. 1967 COMPLETION DATE: Sept. 1981

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. 1980 START DATE: 1973 COMPLETION DATE: 1985 TOTAL FUNDS: \$30,000,000

ACKNOWLEDGMENT: UMTA

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. 1981 START DATE: Apr. 1978 COMPLETION DATE: Aug. 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. 1981 START DATE: July 1978 COMPLETION DATE: Sept. 1981 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 three phases of the 44 month program are: I. Laboratory Research and Development; II. System Engineering Design; III. System Development and Demonstration.

PERFORMING AGENCY: Foster-Miller Associates, Incorporated

INVESTIGATOR: Maser, KR 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. 1981 START DATE: Dec. 1977 COMPLETION DATE: May 1982 TOTAL FUNDS: \$2,287,101

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: Agbabian Associates

INVESTIGATOR: Balachandra, MB

SPONSORING AGENCY: National Science Foundation, Division of Applied Research, DAR 76-80044

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Oct. 1977 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$498,600

ACKNOWLEDGMENT: Agbabian Associates

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.

REFERENCES:

Field Evaluation of Advanced Methods of Subsurface Exploration for Transit Tunneling, Thompson, D; Humphrey, J; Young, L; Wall, C, June 1980

PERFORMING AGENCY: Bechtel Corporation

INVESTIGATOR: Sutcliffe, H Tel (617) 628-9600

SPONSORING AGENCY: Transportation Systems Center; Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Mattson, P Tel (617) 494-2431

Contract DOT-TSC-1570

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1978 COMPLETION DATE: July 1981 TOTAL FUNDS: \$411,000

ACKNOWLEDGMENT: Bechtel Corporation

00 185235

RAIL PHOTOLOG

The study is designed to develop, build, and test a hi-rail vehicle equipped with a photolog and track-measurement capability and to provide the ConnDOT with a film library of all trackage within the physical boundaries of the State of Connecticut. All rail lines in the state have been contacted and have, or will be, participating in the filming operations. The resulting film will be useful to engineers, planners, designers, and personnel concerned with the maintenance and inventory of railroads.

PERFORMING AGENCY: Connecticut Department of Transportation, Bureau of Planning and Research, 850-50

INVESTIGATOR: Bowers, DG Tel (203) 529-7741 X49 Hudson, JJ

SPONSORING AGENCY: Connecticut Department of Transportation

RESPONSIBLE INDIVIDUAL: Dougan, CE Tel (203) 529-7741 X76

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1978 COMPLETION DATE: June 1981 TOTAL FUNDS: \$200,000

ACKNOWLEDGMENT: Connecticut Department of Transportation

00 196750

NATM ALTERNATIVE DESIGN FOR CONSTRUCTION OF MT. LEBANON TRANSIT TUNNEL

This project will provide an alternative design for the construction of 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: Feb. 1981 START DATE: July 1980
 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$460,000

ACKNOWLEDGMENT: UMTA

00 196751

NON-DESTRUCTIVE TESTING FOR TUNNEL STRUCTURES

To develop an effective non-destructive method for testing the structural integrity of tunnels. The project consists of three phases: 1) current NDT technology will be researched with the data compiled and evaluated, 2) laboratory tests to research methods and modifying or developing necessary instrumentation to successfully test brick, homogeneous concrete, reinforced concrete, concrete encased steel, concrete lined tunnel sections, and for defining voids behind these structures; 3) field instrumentation to carry out various test procedures established in Phase II.

PERFORMING AGENCY: Port Authority Trans-Hudson Corporation, NY-06-0078; New York City Transit Authority
 INVESTIGATOR: Theofilos, LG Tel (201) 963-2701
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Butler, GL Tel (202) 426-0090

CONTRACT, NY-06-0078

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1979
 COMPLETION DATE: Apr. 1983 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: Completed NOTICE DATE: Aug. 1981 START DATE: July 1979
 COMPLETION DATE: June 1981 TOTAL FUNDS: \$145,000

ACKNOWLEDGMENT: UMTA

00 308316

SOIL AND BALLAST LABORATORY

In view of the importance of the soil and ballast properties in railroad track design and construction, it is important for the Association of American Railroads (AAR) Technical Center to have a soil and ballast laboratory both for the evaluation of necessary material property information and for the conduct of ongoing research in this important area. A soil and ballast laboratory was set up jointly by the AAR and the Civil Engineering Department of the Illinois Institute of Technology, located next to the AAR Technical Center. Material characteristic tests were conducted at the laboratory for some track foundation materials. Student fellowship programs to sponsor graduate research on soil and ballast were also planned.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Leshchinsky, D Tel (312) 567-3599

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Leshchinsky, D Tel (312) 567-3599

In-House

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1978
 COMPLETION DATE: Feb. 1982

ACKNOWLEDGMENT: Association of American Railroads Technical Center

00 308317

GROUND PENETRATING RADAR FOR TRACK FOUNDATIONS

In order to evaluate railroad embankments for the development of performance standards and for obtaining necessary data for condition surveys, information must be available on subsurface conditions. Soil borings, the traditional means of subsurface exploration, are expensive and time-consuming for railroads to incorporate into their maintenance programs. A promising alternative is the use of ground penetrating radar. Research was planned with the objective to field-test a ground penetrating radar for subsurface profiling of layers in the track subgrade.

REFERENCES:

Field Evaluation of a Ballast-Subgrade Radar System So, W; Hutcheson, TB; Breese, RF, RRIS Bulletin 8002, Apr. 1980, RRIS 00 312420

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Leshchinsky, D Tel (312) 567-3599

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Leshchinsky, D Tel (312) 567-3599

In-House

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1978
 COMPLETION DATE: Jan. 1982

ACKNOWLEDGMENT: Association of American Railroads Technical Center

00 308318

USE OF ENGINEERING FABRICS TO IMPROVE TRACK PERFORMANCE

In recent years, it has been found empirically that placement of a single horizontal sheet of civil engineering fabric on top of a soft foundation of a track increases the support capacity of the foundation. However, the exact fabric behavior and thus the fabric properties required for proper design are not clearly understood. A project was initiated to review and summarize the current state of the art in civil engineering fabric use. The goal was to draw conclusions on the suitability of the methods available for fabric selection, and on current methods of construction relative to their operational adequacy and usefulness and to develop preliminary guidelines for the selection and use of civil engineering fabrics to obtain improved track performance. Several railway field sites where civil engineering fabric was tried on an experimental basis were visited and conversation with railway personnel responsible for the conduct of the field demonstration provided useful information.

REFERENCES:

Use of Geotechnical Fabric in Railroad Operation: A State-of-the-Art Study, Haliburton, TA, Feb. 1981

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Leshchinsky, D Tel (312) 567-3599

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Leshchinsky, D Tel (312) 567-3599

In-House

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1978
 COMPLETION DATE: Jan. 1982

ACKNOWLEDGMENT: Association of American Railroads Technical Center

00 308321

DESIGN RECOMMENDATIONS FOR TRANSIT GUIDEWAYS

Prepare recommendations for design of elevated Transit Guideways; Scope: 1. Definition of Design Philosophy and limit State Concept; 2. Derivation of load and performance factors by a calibration process using probabilistic techniques similar to those used for the Ontario Bridge Code; 3. Integration of special structures, such as stations, switches, etc.; 4. Reference will be made to the OHBD Code in elements common to both bridges and guideways. The study will culminate in a set of design recommendations. Pertinent information will be supplied to American Concrete Institute Committees 358 (Concrete Guideways) and 443 (Concrete Bridge Design). Likewise, MTC will receive from them data for calibration purposes.

REFERENCES:

Review of Guideway Design Criteria in Existing Transit Dorton, RA; Grouni, HN, ACI Journal, Apr. 1978

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, Transit Systems Research and Development Office, 31217
 INVESTIGATOR: Grouni, H Billing, JR
 SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can, Transit Systems Research and Development

STATUS: Programmed NOTICE DATE: Feb. 1981 TOTAL FUNDS: \$56,000

ACKNOWLEDGMENT: Ontario Ministry of Transportation & Communic, Can

00 309940

AAR COMPUTER BRIDGE PROGRAMS

The AAR computer bridge programs are written in FORTRAN IV, and are intended to be used on a large scale computer, such as the IBM 360 or 370 and DEC-20 systems. A total of six programs are available, and are listed as follows: Program No. 1-Moment and Shear tables for Heavy Duty Cars on Bridges; Program No. 2-Analysis of Railway Truss Bridges; Program No. 3-Analysis of Pratt, Howe and Warren-type Railway Truss Bridges; Program No. 4-Rating of Railway Truss Bridges; Program No. 5-Analysis and Rating of Plate Girder Railway Bridges; Program No. 6-Analysis and Rating of Railway Bridge Floors, Programs No. 1, 2 and 3 have already been revised and updated to reflect the current AREA Specifications. Programs No. 4, 5 and 6 are in the process of being revised, and will be updated according to current AREA Specifications.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Singh, SP Tel (312) 567-3593

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Garg, VK Tel (312) 567-3596

In-House

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: June 1978 COMPLETION DATE: Dec. 1981

ACKNOWLEDGMENT: Association of American Railroads Technical Center

00 309945

SIGNAL ENHANCEMENT INTERPRETATION FOR DETECTION OF FLAWS IN REINFORCING STEEL PRESTRESSED CONCRETE BRIDGE MEMBERS

To upgrade existing prototype FHWA magnetic field disturbance (mfd) system to incorporate improved signature acquisition and processing capability and to provide immediate readout of physical condition of reinforcing steel.

PERFORMING AGENCY: Southwest Research Institute

INVESTIGATOR: Kusenberger

SPONSORING AGENCY: Federal Highway Administration, Structures and Applied Mechanics Division

RESPONSIBLE INDIVIDUAL: McGogney

Contract 80-C-00002

STATUS: Active NOTICE DATE: Mar. 1980 START DATE: Oct. 1979 COMPLETION DATE: Jan. 1981 TOTAL FUNDS: \$126,000

ACKNOWLEDGMENT: Federal Highway Administration (305029353)

00 309946

PRETHAWING OF PERMAFROST BY SURFACE MODIFICATIONS

To evaluate several different methods of solar heating for creating the deepest possible thaw zone during a one to two-year period prior to embankment construction.

PERFORMING AGENCY: Alaska Department of Transp and Public Facilities

INVESTIGATOR: Esch, DC Connor, BG Tel (907) 479-2241

SPONSORING AGENCY: Alaska Department of Transp and Public Facilities; Federal Highway Administration, Materials Division

RESPONSIBLE INDIVIDUAL: Fohs Chassie

HP&R 4000(1)F09142

STATUS: Active NOTICE DATE: Mar. 1980 START DATE: Oct. 1979 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$41,000

ACKNOWLEDGMENT: Federal Highway Administration (325019351)

00 309948

EVALUATION OF SITE EXPLORATION PREDICTIONS AND THE INSTRUMENTATION AND MONITORING OF SOFT GROUND TUNNELING

Design experiments and instrumentation plans, laboratory and field tests, and analyze information developed at the Mt. Baker Ridge tunnel site to evaluate methods for site exploration to determine if newly developed methods are superior to conventional ways of predicting soil-tunnel interaction.

PERFORMING AGENCY: Shannon and Wilson, Incorporated

INVESTIGATOR: Douglass

SPONSORING AGENCY: Federal Highway Administration, Structures and Applied Mechanics Division

RESPONSIBLE INDIVIDUAL: Sallberg, JR

Contract DOT-FH-11-9665

STATUS: Active NOTICE DATE: Mar. 1980 START DATE: Oct. 1979 COMPLETION DATE: Jan. 1984 TOTAL FUNDS: \$648,000

ACKNOWLEDGMENT: Federal Highway Administration (277039353)

00 316080

DEVELOPMENT OF IMPROVED PROCEDURE FOR SIMULATION OF EXCAVATION AND APPLICATION

Prediction of stability and integrity of excavated surfaces is an important engineering activity for tunneling, mining, or digging open cuts. Under this award an improved procedure based on the finite element method will be developed for simulation of underground and surface excavations. A number of factors that can cause difficulties in the implementation of the existing finite element procedure will be identified and analyzed on the basis of a comprehensive review of existing technology for analysis and design of underground structures. The proposed procedure will be based on the mixed finite element scheme, will include both stresses and displacements as unknowns, and will allow for strain-softening, loading and unloading, anisotropy and joints in the constitutive law, and effects of number of stages of excavations, and of existing structures. The numerical predictions will be compared with observations from available (field) tests. The results and the computer code will be detailed in order to facilitate applications for analysis and design of excavations and related structural elements.

PERFORMING AGENCY: Virginia Polytechnic Institute & State University

INVESTIGATOR: Desai, CS

SPONSORING AGENCY: National Science Foundation, Directorate for Engineering and Applied Science, DAR77-20500

STATUS: Active NOTICE DATE: June 1980 START DATE: Sept. 1978 COMPLETION DATE: Feb. 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (DO 465 1)

00 319917

COUNTERMEASURES TO REDUCE BRIDGE LOSSES ATTRIBUTED TO SCOUR AND BANK EROSION

This country has a vast inventory of bridges (about 50,000) over streams and most have been designed without the benefit of a good understanding of sediment transport phenomena. Man has been studying scour and erosion problems for as long as bridges have been built and will continue to do so in the future which is indicative of the uncertainties that must have accompanied existing bridge designs. The uncertainties that affect the safety of a bridge are not restricted to the original design of the bridge itself. Any channelization of flood control project within a river basin could have considerable impact on the stability of bridge foundations within that basin. An even bigger problem is that of coping with natural river morphology which in essence naturally tends to destroy every man-made structure placed in a flood plain. Average annual expenditures for bridge losses during floods is over 20 million dollars from emergency relief funds alone. To develop guidelines to assist design, maintenance and construction engineers in identifying instability problems, indicates when and where such problems may occur and in selecting measures that can be used to reduce bridge losses attributable to scour and bank erosion. (1) Make an initial survey to determine the range of variables, bridge loss experience and current practices relative to countermeasures. (2) Establish a preliminary stream classification system to reference instability problems. (3) Identify problems that affect highway bridges and categorize their seriousness. (4) Survey current practices to determine what countermeasures are available and how effective they have been used. (5) Evaluate instability problems and countermeasures

at selected sites. (6) Recommendations for future research and model testing. Case histories on hydraulic problems and countermeasures at 210 bridge sites have been written. Each case history includes geomorphic, hydrologic, and engineering data on the site, assignment of causes for the hydraulic problem, and (where possible) evaluation of the countermeasure used. Work has begun on summarizing the results. The project has been modified to include a study of the performance of channels straightened for purposes of bridge or highway construction.

PERFORMING AGENCY: Geological Survey, Water Resources Division
 INVESTIGATOR: Brice, JC
 SPONSORING AGENCY: Geological Survey, Water Resources Division, WR 76-153

STATUS: Active NOTICE DATE: Nov. 1980 START DATE: July 1975 TOTAL FUNDS: \$22,443

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (DO 298 2)

00 324946

STRESSES AND STRENGTH OF LONGITUDINAL GIRDERS AND CROSS GIRDERS OF BRIDGES

In this investigation, the calculation methods used for the longitudinal girders of bridges and then those used for the cross girders, as adopted by the various railways, are in the first instance listed and compared. It is then planned to establish a simple uniform calculation method for each case which takes into account the actual stresses and the actual three-dimensional bearing performance of the longitudinal and cross girders and of their connections in a better manner than hitherto. For this purpose, measurements on existing bridges are taken and later the new calculation methods will be experimentally checked on large bridge components.

Question D154.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Lamla, H Office for Research and Experiments
 STATUS: Active NOTICE DATE: Jan. 1981 START DATE: June 1979
 ACKNOWLEDGMENT: UIC

00 329565

DESIGN AND SPECIFICATION MANUAL FOR STEEL BOX GIRDER TRANSIT STRUCTURES

This project is to establish the Institute for Physical Science and Technology at the University of Maryland as a research center for elevated structure design. The project will develop an engineering design specification or standard for steel aerial structures, and to develop a design oriented computer program for use in the analysis of such structures.

PERFORMING AGENCY: Maryland University, College Park, MD-06-0076
 INVESTIGATOR: Heins, C Tel (301) 454-3104
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Spencer, PR Tel (202) 426-0090

CONTRACT UMTA-MD-06-0076

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: May 1980 COMPLETION DATE: May 1982 TOTAL FUNDS: \$89,000

ACKNOWLEDGMENT: Maryland University, College Park

00 329566

INVESTIGATION OF WASHINGTON METRO UNDERGROUND ENVIRONMENT

This project consists of studies which will investigate and provide solutions to a number of structural problems within Washington Metrorail tunnels. Studies which are to be undertaken in this project include calcification analysis, hydrostatic pressure relief, acid water analysis, and water leakage and waterproofing. The project will develop answers to problems which may also prove useful for other transit authorities that have similar construction characteristics.

PERFORMING AGENCY: Washington Metropolitan Area Transit Authority, DC-06-0347
 INVESTIGATOR: Garrett, V Tel (202) 637-1158
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Butler, G Tel (202) 426-0090

CONTRACT UMTA-DC-06-0347

STATUS: Proposed NOTICE DATE: Feb. 1981 START DATE: Feb. 1981 COMPLETION DATE: Feb. 1982 TOTAL FUNDS: \$205,000

ACKNOWLEDGMENT: Washington Metropolitan Area Transit Authority

00 329567

EVALUATION OF ROCK CHAMBER LINING PERFORMANCE--PORTER SQUARE STATION, MBTA

To observe and evaluate the performance of the innovative thin lining support system used in the construction of the Porter Square Station. The project will be conducted using data collected from construction control instrumentation supplemented by observations and convergence measurements made during construction. Through this project the validity of the design approach can be assessed and compared for future chamber design and construction.

PERFORMING AGENCY: Massachusetts Bay Transportation Authority, MA-06-0127

INVESTIGATOR: Wey, G Tel (617) 722-5914
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Butler, G Tel (202) 426-0090

CONTRACT UMTA-MA-06-0127

STATUS: Proposed NOTICE DATE: Feb. 1981 START DATE: Feb. 1981 COMPLETION DATE: Feb. 1983 TOTAL FUNDS: \$215,000

ACKNOWLEDGMENT: Massachusetts Bay Transportation Authority

00 329568

RESEARCH MAPPING DURING EXCAVATION OF WASHINGTON METRORAIL SECTION B-9

To provide an in-depth description of the characteristics of the geological material encountered during excavation including stand-up time, effect of water, and effect of excavation procedures during the excavation of Section B-9 of the Washington Metrorail system. The data developed during the study will be compared with similar materials encountered in other excavation projects with the final report containing a discussion on how weathering materials from regional metamorphic rocks can be described in terms of engineering behavior and excavated.

PERFORMING AGENCY: Washington Metropolitan Area Transit Authority, DC-06-0343

INVESTIGATOR: Garrett, V Tel (202) 637-1158
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Butler, G Tel (202) 426-0090

CONTRACT UMTA-DC-06-0343

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Jan. 1981 COMPLETION DATE: Jan. 1983 TOTAL FUNDS: \$55,000

ACKNOWLEDGMENT: Washington Metropolitan Area Transit Authority

00 331134

CONSOLIDATION, SWELLING, CREEP AND DETERIORATION OF CLAYS AND SHALES

This research, begun under ENG75-21406, examines these processes as they relate to mechanical properties. The consolidation problems under study are: (a) relationship of the end-of-primary void ratio-effective stress and secondary compression index to the duration of primary consolidation and (b) excess pore water pressures during consolidation. Undisturbed specimens of natural clays with different maximum drainage paths are tested. The pore water pressures and volume changes of four sublayers are measured separately. A theory of one-dimensional consolidation is used to study role of time-and effective stress-compressibilities on pore water pressure behavior during consolidation of natural clays. The swelling study includes one-dimensional and isotropic swelling tests with pore water pressure measurement on natural intact clay rocks with different degrees of diagenetic bonding. The measurements, in addition to time-rate of volume increase and pore water pressure equilibration, include lateral pressure measurements in a limited number of tests. The object of the creep study is to develop shear stress-strain time relations for soft clays as well as shales. The specific work includes: (a) a state-of-the-art review of creep behavior, (b) a limited number of creep tests on natural shales and mudstones and (c) analysis of existing data on creep of rock salt. Using environmental test chambers, natural clay rocks are subjected to relative humidity. Over 20 different natural shale and mudstones are being tested. In addition to the measurement of rock moisture content changes with time, visual observation of macro-structural change as well as microscopic examination of micro-structure are made. Undrained triaxial compression tests are performed after moisture equilibration.

PERFORMING AGENCY: Illinois University, Urbana, Department of Civil Engineering

INVESTIGATOR: Mesri, G
 SPONSORING AGENCY: National Science Foundation, Directorate for Engi-

neering and Applied Science, ENG78-20622

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: Apr. 1976 COMPLETION DATE: Aug. 1981 TOTAL FUNDS: \$64,363

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 5769 4)

00 335907

RAILWAY TRACK APPLICATIONS OF GEOTEXTILES

The overall goal is the development of a specification for the use of engineering fabrics (known as geotextiles) to railway track applications. The attainment of the goal will necessitate the identification of the types of in-track problems which fabrics may be able to solve and the identification of the fabric attributes which are most significant in the solution of each class of problem. This in turn will allow the development of trade-offs between various types and weights of fabric in different applications with respect to relative fabric life and effectiveness in solving the original problem. The

program will be chiefly concerned with: i) development and/or adaptation of suitable fabric characteristic test procedures; ii) the use of these procedures to evaluate a range of commercially available fabrics; and, on completion of i) and ii), iii) development of a geotextile use specification, which will match fabric properties with the load environment and position in the track structure.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-939

INVESTIGATOR: Raymond, GP Tel (613) 547-5777

SPONSORING AGENCY: Canadian National Railways; Canadian Pacific Rail; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Worth, A Pak, W Rowan, W

STATUS: Active NOTICE DATE: July 1981 START DATE: May 1980 COMPLETION DATE: Oct. 1981 TOTAL FUNDS: \$105,900

ACKNOWLEDGMENT: CIGGT

01 038973

RAILROAD TRACK STRUCTURE RESEARCH

The Transportation Systems Center (TSC) and The Association of American Railroads (AAR), the contractor, entered into a program to perform specific experiments related to Track Structure Research. The program used the Track Laboratory of the AAR which include a consolidation vehicle to study the effect of consolidation on vertical track modulus and lateral track strength. Additional experiments looked into the gage widening phenomenon and lateral track strength under various shoulder widths.

REFERENCES:

Widening Tests: Cycle Load Influence Choros, J, Technical Memo

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Zarembski, AM Tel (312) 567-3622 Choros, J Tel (312) 567-5795

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Kish, A Tel (617) 494-2649

Contract DOT-FR-30038 (CR)

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Feb. 1980 TOTAL FUNDS: \$823,097

ACKNOWLEDGMENT: Association of American Railroads Technical Center

01 038974

CONTINUOUS MEASUREMENT OF DYNAMIC COMPLIANCE CHARACTERISTICS OF RAILROAD TRACK. PHASE 3

The contract is for the design, fabrication, demonstration and furnishing of equipment for the continuous measurement of dynamic compliance characteristics of railroad track.

REFERENCES:

A Review of Measurement Techniques, Requirements and Available Data on the Dynamic Compliance of Railroad Track, Kaiser, WD 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

Design and Analysis of a Track Compliance Measurement System, Kaiser, WD, Nov. 1978, PB-297055/AS

PERFORMING AGENCY: Battelle Memorial Institute

INVESTIGATOR: Prause, RH Tel (614) 424-4505

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: O'Sullivan, WB Tel (202) 426-4377

Contract DOT-FR-30051 (CPFF)

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: May 1973 COMPLETION DATE: 1983

ACKNOWLEDGMENT: TRAIS (PR# RP-39)

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: Cecon, HL Tel (617) 494-2000

In-House

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Mar. 1974

ACKNOWLEDGMENT: FRA

01 099393

PROGRAM FOR INVESTIGATION OF RAIL FAILURES

The objective of this program is to evaluate the metallurgical and applied stress environment coincident with failures in conventional carbon steel rail and in other types. The following steps are involved: (A) Characterize in the laboratory, service-developed defects resulting in field failures in carbon steel rails with emphasis on short service life or premature failures; (B) Determine in the laboratory the chemistry, metallography and mechanical properties of carbon steel rails in service; (C) Determine in the field the state of stress in carbon steel rails in service under a wide range of conditions track and loadings; (D) Establish possible interrelationships of material properties, service stresses and service failures; (E) Promote similar laboratory and service evaluations of economically attainable variations in rail steel and treatments, consistent with progress of work performed on carbon steel rail. Specimens supplied consist of 8-foot rail sections containing a detected defect. These specimens are used to determine the spectrum of properties which possibly may be associated with each type of defect. Selected in-track sites are instrumented to determine service stresses associated with fatigue crack initiation. Relation between service-initiated failures and attendant stress is correlated. Work with steels other than the conventional carbon type is to be undertaken.

PERFORMING AGENCY: Association of American Railroads Technical Center

SPONSORING AGENCY: Association of American Railroads; American Iron and Steel Institute; Railway Progress Institute

RESPONSIBLE INDIVIDUAL: Garg, VK Tel (312) 567-3596

STATUS: Active

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

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

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. Research activities address track geometry measurement, rail flaw detection and track signal assessment systems and ancillary equipment.

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. 1980 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: Feb. 1980 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: Feb. 1981 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: Feb. 1981 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: Feb. 1981 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 crossties (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. 1981 START DATE: 1973

01 148355

ROAD MAINTENANCE COST MODEL-PHASE III

Development of wear models and cost functions for the replacement and cyclic track surfacing maintenance activities and an investigation of replacement value costing procedures for rails, ties and ballast so that the Road Maintenance Cost Model computer can predict both maintenance cycles and appropriate unit charges for any given traffic mix and track type.

REFERENCES:

Road Maintenance Cost Model Phase I-Rail Wear Modelling Roney, MD; Lake, RW; Schwier, C; Turcot, MC, 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 Birk, M Lake, RW McIlveen, ER Turcot, MC

SPONSORING AGENCY: Department of Transport, Canada

RESPONSIBLE INDIVIDUAL: Hawryszko, JW Tel (613) 992-9197

CONTRACT DGSR-15

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: Sept. 1978 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$39,260

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: Feb. 1980. START DATE: Nov. 1977 TOTAL FUNDS: \$167,262

ACKNOWLEDGMENT: CIGGT

01 170616

TRACK STRENGTH CHARACTERIZATION PROGRAM

The purpose of this 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 by using a track strength vehicle to measure the track integrity to lateral applied loads.

REFERENCES:

Preliminary Outline Track Strength Characterization Programs, Zarembski, AM, Sept. 1977

Track Strength Characterization Task Plan May 1978

Measurement of Gauge Restraints: Rail Spreader Tests Zarembski, AM, Dec. 1978

Preliminary Field Evaluation of a Track Strength Test Vehicle, Zarembski, AM; McConnell, DP; Lovelace, WS

Field Evaluation of Mainline Quality Track Using a Track Strength Test Vehicle, Zarembski, AM; Choros, J

PERFORMING AGENCY: Association of American Railroads Technical Center, K103

INVESTIGATOR: Zarembski, AM Tel (312) 567-3622 Choros, J Tel (312) 567-5795

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Zarembski, AM Tel (312) 567-3622

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Jan. 1978

ACKNOWLEDGMENT: Association of American Railroads Technical Center

01 170649

OPTIMUM ADAPTATION OF THE CONVENTIONAL TRACK TO FUTURE TRAFFIC

The studies of the relationship between traffic, track geometry and damage to stock have been completed. The optimisation of levelling and alignment operations has been studied: after an analysis of the work of tamping machines in Report No. 10 of October 1978, the Committee is preparing a report on the reliability of maintenance machines. The possibilities of improving the ballast by using chemical products are described in Report No. 11 of October 1978. Report No 12 of April 1979 shows the effectiveness of dynamic stabilisation of the ballast in restoring the lateral resistance of the track after a maintenance operation. The study of the hydraulic performance of track bed structures is described in Report No. 13 of October 1979; this study involved full-scale tests. Laboratory tests showing the influence of the water content on various soils will be the subject of Report No. 14 which is to be presented in September 1980. The influence of frost on track bed structures is dealt with in Report No. 15 which is to be presented in September 1980. Several other reports are in preparation based on Laboratory tests or in situ tests, the object being to define the dimensioning of railway track bed structures.

Fifteen reports have been published to date. Question D117.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Watecamp, A Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: 1970

ACKNOWLEDGMENT: UIC

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: Feb. 1980 START DATE: Sept. 1978 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.

PERFORMING AGENCY: Battelle Memorial Institute, G6632

INVESTIGATOR: Meacham, HC, Jr Tel (614) 424-4484

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: McConnell, DP Tel (617) 494-2596

Contract DOT-TSC-1595

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1978 COMPLETION DATE: July 1981 TOTAL FUNDS: \$465,545

ACKNOWLEDGMENT: Battelle Memorial Institute

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.

REFERENCES:

A Prototype Maintenance-of-way Planning System-Volume I Final Report (including Appendices A through E), Hamid, A; Sawyer, D; Kenworthy, MA; Rasmussen, K, Available from NTIS, FRA/ORD-80-47.1, Nov. 1980

PERFORMING AGENCY: ENSCO, Incorporated, 437

INVESTIGATOR: Kenworthy, MA 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: Feb. 1981 START DATE: Jan. 1978 COMPLETION DATE: Feb. 1981 TOTAL FUNDS: \$469,215

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 Track 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: Kish, A Tel (617) 494-2649 Herlihy, J Tel (617) 494-2579

Contract DOT-TSC-1541

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Jan. 1979 COMPLETION DATE: June 1981 TOTAL FUNDS: \$316,190

ACKNOWLEDGMENT: Association of American Railroads Technical Center

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: Gamache, LW Tel (212) 330-3757 Lapinski, R
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Nickles, JE Tel (617) 494-2204

Contract DOT-TSC-1635

STATUS: Active NOTICE DATE: Aug. 1980 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: Feb. 1981 START DATE: Mar. 1978 COMPLETION DATE: Dec. 1982

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: Feb. 1981

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 308309

CONCRETE TIE AND FASTENER PERFORMANCE AND CORRELATION ANALYSIS

Evaluate the performance of concrete and wood tie track at FAST and four revenue service sites to determine FAST track correlation with Revenue Service track. This evaluation would be based upon the results of visual inspections and analysis of data from track instrumentation. FAST and Revenue Service Track performance will be made by direct comparison, regression analysis and analytical simulation.

REFERENCES:

Measurement and Correlation Analysis Plan for Concrete Tie and Fastener Performance Evaluation, Dean, FE; Prause, RH; Harrison, H; Selig, ET, Nov. 1979

PERFORMING AGENCY: Battelle Columbus Laboratories
 INVESTIGATOR: Prause, RH Tel (614) 424-6424 Harrison, HD Selig, ET

SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Moody, HG Tel (202) 426-4377

Contract DOT-FR-8164

STATUS: Active NOTICE DATE: Feb. 1980 START DATE: Sept. 1979 COMPLETION DATE: Nov. 1982 TOTAL FUNDS: \$1,102,777

ACKNOWLEDGMENT: FRA

01 308319

MAINTENANCE OF WAY: TRACK LAYING SYSTEMS (TLS) ECONOMICS AND ECONOMICS OF WOOD TIE REUSE; PHASE 2

This project is a continuation of the Phase I effort under Contract DOT-FR-8046. This project will complete the analysis of Track Renewal Systems and Wood Tie Reuse by emphasis on the development of an overall economic analysis framework for comparing the track renewal system of track maintenance and the traditional selective maintenance system, along with the net economic effect that wood tie disposal would have on the overall economics of using track renewal systems.

REFERENCES:

Track Renewal Systems: A Survey Report Cataldi, GR; Elkaim, DN; Larsen, KW, FRA/ORD-79/43, July 1979, PB-300866/AS

Wood Tie Reuse: A Survey Report Cataldi, GR; Elkaim, DN; Larsen, KW; Elliott, P, FRA/ORD-79/44, Aug. 1979, PB80-114044

Track Renewal System and Wood Tie Reuse Analysis Cataldi, GR; Elkaim, DN, FRA/ORD-80-63, Oct. 1980, PB81-125510

PERFORMING AGENCY: Unified Industries, Incorporated
 INVESTIGATOR: Elkaim, DN Tel (703) 750-3282

SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Orth, CL Tel (202) 755-1877

CONTRACT DOT-FR-9044

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Aug. 1979 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$177,747

ACKNOWLEDGMENT: FRA

01 308639

DEVELOPMENT OF GUIDELINES FOR THE USE, DESIGN AND INSTALLATION OF RESTRAINING RAIL ON TRANSIT TRACK

This research effort identified and evaluated all of the significant factors relating to the use of restraining rails in rapid transit tracks (heavy rail

systems) in the U.S. It included operational, economic, and environmental considerations as well as dynamic forces and structural factors. The end product of the study was guidelines intended to optimize design and installation of restraining rail.

PERFORMING AGENCY: ENSCO, Incorporated
 INVESTIGATOR: Cunney, EG Tel (703) 321-9000
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Saulnier, G Tel (617) 494-2006

Contract DOT-TSC-1771

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: Aug. 1979 COMPLETION DATE: Jan. 1981 TOTAL FUNDS: \$141,700

ACKNOWLEDGMENT: TSC

01 319079

STABILIZATION OF RAILROAD TRACK SYSTEMS USING GEOTEXTILES

Research centers on extensive monitoring of the response of rail track systems stabilized with commercial geotextiles. Long term performance data is being obtained to quantify fabric abrasion due to service and tamper vibrations. Parallel program of finite element analysis will use measured data as benchmark. Extrapolation to general subgrade conditions will then be made utilizing numerical analysis.

PERFORMING AGENCY: Civil Engineering & Applied Research, Incorporated

INVESTIGATOR: Richardson, GN Tel (919) 851-6260 Hulsey, LJ
 SPONSORING AGENCY: Monsanto Triangle Park Development Center, Inc; Southern Pacific Transportation Company
 RESPONSIBLE INDIVIDUAL: Knudson, P Newby, J

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Sept. 1977

ACKNOWLEDGMENT: Civil Engineering & Applied Research, Incorporated

01 319916

STUDY OF HOMOPOLAR PULSE RESISTANCE WELDING PARAMETERS FOR RAILROAD RAILS AND AUTOMOTIVE PARTS

Welding is one of the basic joining processes for metal fabrication and is vital to almost all industrial processes. Recent studies at the University of Texas at Austin have shown that the very high current peaks of a homopolar generator can be harnessed for resistance welding. This megajoule (and gigajoule) pulsed power source provides the potential for resistance welding beyond current capabilities. This very high-current, low-voltage generator makes it possible to resistance weld very large cross-sectional areas and permits new design approaches to the fabrication of products. The initial research that established the feasibility of using a homopolar generator for resistance welding was funded by the Division of Applied Research with a National Science Foundation Grant (DAR 77-23874). This research builds upon these previous results and is studying those variables for a welding process for industrial consideration. The variables of the welding parameters for the joining of railroad rails and automotive components are being studied and used as examples to determine if the resultant process is industrially cost-effective.

This Technology Innovation Project is being cost shared with the Federal Railroad Administration, the Association of American Railroads, General Motors Corporation, and Ford Motor Company.

PERFORMING AGENCY: Texas University, Austin, Department of Mechanical Engineering

INVESTIGATOR: Rylander, HG
 SPONSORING AGENCY: National Science Foundation, Directorate for Engineering and Applied Science, ISP80-05918

STATUS: Active NOTICE DATE: Nov. 1980 START DATE: Mar. 1978 COMPLETION DATE: Feb. 1982 TOTAL FUNDS: \$343,345

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (DL 164 2)

01 324948

STUDY OF MEANS TO IMPROVE THE QUALITY OF RAILS

The object is to define practical measures enabling a better straightness of the rails to be obtained and thereby an improvement of the geometric quality of the track. The investigations, conducted in the works and in the rail depots, involve statistical study of the faults occurring during alignment and welding. Existing rail quality control systems are compared with a view to arriving at recommendations concerning the automatic control of rails. The

performance of rails in the track is studied for determining the maximum permissible faults in relation to maintenance operations, for determining the influence of periodic faults, and for evaluating the cost of maintenance as a function of the rail faults. In addition, the Committee has conducted an enquiry into means of improving the rail quality.

Question D148. Two reports have been published to date.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Wattecamp, A Office for Research and Experiments

STATUS: Active NOTICE DATE: Jan. 1981 START DATE: 1978

ACKNOWLEDGMENT: UIC

01 324950

DEVELOPMENT OF APPARATUS FOR MEASURING THE LONGITUDINAL FORCE IN RAILS LAID IN THE TRACK

The ORE D 150 Specialists Committee was charged with investigating the possibility of finding a practical method for determining the longitudinal force in rails. The ideal specification for the apparatus has been prepared and several techniques for non-destructive force measurements have been investigated. In addition methods of measuring rail temperature have also been studied. A majority of the systems considered have been rejected either due to practical problems or due to the fact that they can only measure surface strains. Two of the investigated techniques have been selected for further development, rail flexural response and magnetic parametric methods. The third technique based on magneto-mechanical acoustic emission is being kept in reserve.

Question D150. One report has been published to date.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Korpanec, I Office for Research and Experiments

STATUS: Active NOTICE DATE: Jan. 1981 START DATE: Feb. 1979

ACKNOWLEDGMENT: UIC

01 329553

AAR USE OF RMCM

Evaluation of data resources of up to three U.S. railroads (to be designated by the AAR) in the light of the CIGGT Rail Wear Model in the form developed in conjunction with the Track/Train Dynamics program. Calibration, validation and improvement of the Rail Wear Model so that it can be applied to track maintenance costing and planning activities in the U.S. rail system. Specific effort will be directed toward the characterization of track maintenance costs by the categories of rail, ties and other track maintenance.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-022

INVESTIGATOR: McIlveen, ER Tel (613) 547-5777 Lake, RW; Birk, AM

SPONSORING AGENCY: Association of American Railroads
 RESPONSIBLE INDIVIDUAL: Hargrove, MB Tel (202) 293-5027

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: June 1980 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$35,000

ACKNOWLEDGMENT: CIGGT

01 329554

CN ENGINEERING USE OF RMCM

First phase of what is expected to be a continuing project employing the CIGGT Rail Wear Model to predict rail life cycles and to investigate the effect of different rail metallurgies, lubrication and grinding on these rail life cycles. Data from the CN Ashcroft Subdivision, a high curvature, heavy traffic region, is used as a basis for this investigation.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-006

INVESTIGATOR: McIlveen, ER Tel (613) 547-5777 Birk, AM

SPONSORING AGENCY: Canadian National Railways
 RESPONSIBLE INDIVIDUAL: Fields, N Tel (514) 877-5572

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Oct. 1980 COMPLETION DATE: 1981 TOTAL FUNDS: \$6,470

ACKNOWLEDGMENT: CIGGT

01 329560

**MAINTENANCE-OF-WAY LONG-TERM PLANNING
TECHNIQUE DEVELOPMENT PROGRAM**

To expand the Maintenance-of-Way (MOW) Research generated under Federal Railroad Administration Contract DOT-FR-64113, Task 437, and develop a long-term MOW planning evaluation technique that utilizes FRA's track geometry cars and other related track (traffic, physical, maintenance, etc.) data and in turn develop an analytical basis for planning expenditures for basic maintenance for standard track. A two phase 32 month program has been planned. Phase I is scheduled to be completed in approximately 8 months.

PERFORMING AGENCY: Little (Arthur D), Incorporated, 85721

INVESTIGATOR: Bing, A Tel (617) 864-5770

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Gross, A Tel (202) 755-1877

CONTRACT DOT-FR-53-80-C-00024

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Nov. 1980 TOTAL FUNDS: \$733,520

ACKNOWLEDGMENT: FRA

01 329564

**EVALUATION OF TRACK FIXATION SYSTEM NOISE
REDUCTION MEASURES IN EXISTING SUBWAYS**

This project is providing a systematic study of reducing patron noise exposure in railcars and in stations through in-service prototype installation and testing program regarding the use of resilient rail fastening systems including direct fixation on concrete invert, concrete ties on ballast, and resiliently supported ties on concrete invert and to evaluate the structural behavior of the track structures. The results of this study can be applied to design considerations for new and/or rehabilitation of existing systems.

PERFORMING AGENCY: Chicago Urban Transportation District, IL-06-0042

INVESTIGATOR: Bolden, J Tel (312) 744-6772

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Butler, G Tel (202) 426-0090

CONTRACT UMTA-IL-06-0042

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: Aug. 1981 COMPLETION DATE: Apr. 1981 TOTAL FUNDS: \$700,000

ACKNOWLEDGMENT: Chicago Urban Transportation District

01 335474

**FIELD ELECTRO-OPTICAL INSPECTION OF PORTAL CRANE
TRACKAGE**

Develop electro-optical concepts to remotely detect and measure anomalies and other weaknesses which can lead to railcar and crane derailment. Site inspection of portal crane tracks will be conducted to establish mechanics of derailment. Concepts for detecting and measuring railway deterioration and weaknesses will be developed which exploit load-displacement (stiffness) characteristic of the trackage. It is envisioned that the concepts will have the capability to continuously and remotely monitor the one or more of the displacement freedoms of the railway-lateral and vertical translation or rotational. The concepts will rely on state-of-the-art electro-optic technology in unique applications.

PERFORMING AGENCY: Naval Construction Battalion Center

INVESTIGATOR: Warren, GE Johnson, FR

SPONSORING AGENCY: Naval Construction Battalion Center, DN087322

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1980 COMPLETION DATE: Nov. 1982

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQN 87322 1)

01 335870

**FUNDAMENTAL PROBLEMS IN RAILROAD TRACK
MECHANICS**

This research program consists of several projects. They are: (1) The determination of safe temperature increases for curved tracks. An extension of the study presented by A. D. Kerr in Proceedings AREA, Vol. 80, September-October 1978. (2) An experimental validation of recently derived equations for the track response in the lateral plane. This study is conducted on a track with fasteners of adjustable torsional stiffness, (3) An analytical study of beam lift-off problems, and (4) A study of rail creep and its effect on the rail forces.

PERFORMING AGENCY: Delaware University, Newark

INVESTIGATOR: Kerr, AD Tel (302) 738-2756

SPONSORING AGENCY: National Science Foundation

RESPONSIBLE INDIVIDUAL: Goldberg, J

Contract CME 8001928

STATUS: Active NOTICE DATE: July 1981 START DATE: Aug. 1980 COMPLETION DATE: Sept. 1982

ACKNOWLEDGMENT: Delaware University, Newark

01 335871

**CHARACTERIZATION OF RAIL DISTRIBUTION IN THE
NATIONAL TRACK SYSTEM**

As part of developing new recommendations for track performance safety standards, it is necessary to assess future impact were such standards to become effective. In the case of a proposed requirement affecting the inspection, detection and disposition of defective rail, it would be of use, for example, to know how rail is distributed throughout the national running track network in terms of size, age, authorized train speed, occurrence on curves or grades of varying severity, etc. From such a characterization it would be possible to determine the impact on the railroad industry were a certain rail class to become a candidate for specific regulatory treatment due to a hypothetical proneness to defect. The contractor has access to track charts and operating time-tables from most Class I railroads. The information that will enable the expression of rail quantities by track-mile, in terms of the distribution factors cited above, is being extracted from this data base. The contents of the FRA Office of Safety track inspection reports will be correlated to track segments of Section 503 of the 4R Act. Network abstractions will be demonstrated. Main line track defects can then be discretely located within the national railroad systems. Data files containing the above-described correlations will be provided.

PERFORMING AGENCY: Texas A&M Research Foundation

INVESTIGATOR: Porterfield, CJ, Jr

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: O'Sullivan, WB Tel (202) 426-4377

Contract DTFR53-80-C-00119

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1980 COMPLETION DATE: Oct. 1981 TOTAL FUNDS: \$74,300

ACKNOWLEDGMENT: FRA

01 335872

LONGITUDINAL RAIL FORCE MEASUREMENT

Measurement of track strength includes an evaluation of the imminence of lateral track buckling or the probability of rails pulling apart at welds or other junctures. Buckling is generally associated with warm temperatures and wheel/rail interaction particularly related to uni-directional traffic. Conversely, pull-aparts usually occur in cold weather. Both effects involve longitudinal rail force, either compressive or tensile. No means exist today to conveniently measure the absolute longitudinal force level in the rails at a location of interest. At the request of FRA, the National Materials Advisory Board assembled a panel of experts familiar with the various techniques for nondestructively assessing stress levels in metals. From the continued deliberations of this panel will come recommendations that can guide future FRA development of one or more techniques specifically applicable to railroad environment use.

PERFORMING AGENCY: National Academy of Sciences

INVESTIGATOR: Lane, J

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: O'Sullivan, WB Tel (202) 426-4377

Contract DTFR53-80-C-00043

STATUS: Active NOTICE DATE: July 1981 START DATE: Feb. 1980 COMPLETION DATE: Aug. 1981 TOTAL FUNDS: \$66,000

ACKNOWLEDGMENT: FRA

01 335879

**NONDESTRUCTIVE EVALUATION OF LONGITUDINAL RAIL
FORCE BY ACOUSTIC EMISSION METHOD**

The objective of this study is to obtain a framework and basic design data for a nondestructive method of rail force measurement. To accomplish this, the study develops a test method which measures longitudinal stress in long lengths of welded rails. This method is based on the phenomenon of magnetomechanical acoustic emission, which arises from the sudden motion

of a magnetic domain boundary. The study develops a prototype instrument that measures, nondestructively, the longitudinal stress in rails, using the magnetomechanical acoustic emission techniques. Both laboratory and field testing are to be performed to evaluate the capabilities and limitations of this approach and the performance of the prototype instrument. The information will be useful to improve rail inspection equipment and techniques. The application of better inspection techniques should improve the operating safety of U.S. railroads by helping to reduce the train derailment potential.

PERFORMING AGENCY: California University, Los Angeles, School of Engineering and Applied Science

INVESTIGATOR: Ono, K

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Cecon, HL Tel (617) 494-2373

Contract DT-RS-56-80C-00009

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1980 COMPLETION DATE: Aug. 1981

ACKNOWLEDGMENT: DOT

01 335881

OPTIMIZATION STUDY FOR ULTRASONIC FLAW DETECTION IN RAILROAD RAIL

The problem of rail failures has received considerable attention in recent years. This project addresses the transverse defect and detail fractures which constitute the second largest cause of rail failures in the United States. The specific problem to be studied is the ultrasonic beam refraction pattern in the head of railroad rail. The objective of the research is to use the beam refraction data to establish the effectiveness of current ultrasonic rail flaw detection systems, and to propose test methods that might significantly improve that effectiveness. The results obtained will be used for improving inspection equipment design and use. The development and application of better inspection techniques will improve the operating safety of U.S. railroads and should have a positive effect on reducing the train derailment rate.

PERFORMING AGENCY: Texas A&M University

INVESTIGATOR: Bray, DE

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Cecon, HL Tel (617) 494-2677

Contract DT-RS-56-80C-00032

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1980 COMPLETION DATE: 1981

ACKNOWLEDGMENT: DOT

01 335882

RELIABILITY OF ULTRASONIC WELD INTERROGATION METHODS

The objective of this research involves a study of the general nature of the available weld interrogation procedures and to assess their usefulness in terms of their reliability of producing valid flaw characterization--e.g., size, orientation and location. The most promising techniques will be explored in detail and means sought to increase their reliability as flaw detection processes. Special attention will be given to those methods that are amplitude independent. Both analytical and experimental phases with simulated weldment flaws will be involved. The results of this research will be useful in rail inspection as well as in other weld applications.

PERFORMING AGENCY: Lowell University, Department of Mechanical Engineering

INVESTIGATOR: Serabian, S

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Ryan, RP Tel (617) 494-2348

Contract DOT-RC-92014

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1979 COMPLETION DATE: 1981

ACKNOWLEDGMENT: DOT

01 335894

MAINTENANCE-OF-WAY LONG-TERM PLANNING TECHNIQUE DEVELOPMENT PROGRAM

This maintenance-of-way (MOW) research program is a cooperative FRA/Conrail program that uses Conrail's test track and data to: develop track quality indices (TQI's) from track geometry car data that relates to track safety and performance requirements; utilize TQI's to predict future

years track degradation based on projected and/or existing traffic, track structure and maintenance data; and develop an analytical basis for planning and optimizing expenditures for track maintenance.

PERFORMING AGENCY: Little (Arthur D), Incorporated

INVESTIGATOR: Bing, A Tel (617) 864-5770 x2552

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Gross, A Tel (202) 755-1877

Contract DTFR 53-80-C-00024

STATUS: Active NOTICE DATE: July 1981 START DATE: Nov. 1980 COMPLETION DATE: July 1983 TOTAL FUNDS: \$733,520

ACKNOWLEDGMENT: FRA

01 335901

TRACK STRUCTURES METALLURGY SUPPORT

The objectives are to: 1) establish, by use of metallurgical analyses, the characteristics of selected metallic track components which influence safety and serviceability; 2) using fatigue damage criteria and concepts of cumulative damage, make life predictions of track components under service environments considering both the initiation and growth, and based on these, conceive of one or more effective inspection rationales; and 3) design and implement experiments and/or studies related to material behavioral characteristics (and analyze data therefrom) generating information supporting improved track component safety and serviceability.

PERFORMING AGENCY: Battelle Memorial Institute

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Orringer, O Tel (617) 494-2419

Contract DOT-TSC-1708

STATUS: Active NOTICE DATE: July 1981 START DATE: May 1979 COMPLETION DATE: June 1982 TOTAL FUNDS: \$590,056

ACKNOWLEDGMENT: TSC

01 341059

FATIGUE PERFORMANCE OF RAILROAD RAILS

Detailed failure analysis will be made of rails which have been tested on the Fast Track at the Transportation Test Center. Measurements will be made of the fatigue properties of different grades of rail. The data will serve as a basis for life prediction of rails in service.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Pelloux, R

SPONSORING AGENCY: Transportation Systems Center

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: 1981 COMPLETION DATE: 1982

ACKNOWLEDGMENT: Massachusetts Institute of Technology

01 341063

INDUSTRIAL ENGINEERING SUPPORT FOR TRANSIT TRACK MAINTENANCE

This project involves the development and deployment of a track maintenance management information system (TMMIS), a track maintenance training program, and an evaluation of the project's effectiveness in improving track maintenance and maintenance work productivity. The final task also includes the preparation of an integrated package of industrial engineering support for transit track maintenance for use by other transit properties, with appropriate modifications to suit local conditions.

PERFORMING AGENCY: Washington Metropolitan Area Transit Authority

INVESTIGATOR: O'Donnell, TJ Tel (202) 635-4379

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Fateh, MA Tel (202) 426-0090

Contract DC-06-0333

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: June 1981 COMPLETION DATE: Sept. 1983 TOTAL FUNDS: \$1,200,000

01 341071

RAILROAD MAINTENANCE-OF-WAY DATA PROFILE

Sufficient information is not available at this time to analyze the complex decisions used by rail carrier managers in allocating funds for maintenance-of-way (MOW). This contract was designed to define typical allocation procedures for MOW expenditures, develop average unit costs for labor, materials and equipment, and explore the priorities perceived between top-down and bottom-up oriented personnel.

PERFORMING AGENCY: Boston and Maine Railroad
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Hollyer, M Tel (617) 494-2599

Contract DOT-TSC-1704
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Apr. 1979
COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$28,688
ACKNOWLEDGMENT: TSC

01 341072
TRACK BUCKLING TEST SUPPORT
The necessary field support will be provided to implement the track buckling

tests designed to develop the relationship between buckling load and safe temperature increase.

PERFORMING AGENCY: Southern Railway Company
SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Kish, A Tel (617) 494-2649

Contract DOT-TSC-8076
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: May 1980
COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$35,195

ACKNOWLEDGMENT: TSC

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: Feb. 1981 START DATE: July 1976 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$2,300,000

ACKNOWLEDGMENT: FRA

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: Bakken, GB Tel (303) 697-4500

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Tsai, NT Tel (202) 426-0855

CONTRACT DOT-FR-742-4277

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1977 COMPLETION DATE: July 1981 TOTAL FUNDS: \$4,006,244

ACKNOWLEDGMENT: FRA

02 139178

FACILITY FOR ACCELERATED SERVICE TESTING (FAST)

FAST provides a controlled environment for accelerated service testing of track and rolling stock components and systems. The objective of the testing is to provide the railroad industry with timely and significant technological findings which improve safety, increase performance, and reduce costs. The FAST Track is a 4.8 mile loop divided into 22 sections, with experiments on rail metallurgy, ties (hardwood, softwood, concrete, steel), ballast (different materials, depth, shoulder width), etc. The FAST consist is made up of 4-axle locomotives pulling a 9,500-ton train of mostly 100-ton cars. The train averages 42 mph around the loop for 16 hrs/day, five day/week. The other 8 hrs/day is used for maintenance and measurements. Operations began September 1976. As of January 1, 1981, 540 MGT and 314,000 miles have been accumulated. FAST includes a system for management and control of test data, conducting appropriate data analysis and evaluation, and the reporting of results.

As of January 1, 1981, FAST has published five formal Technical Reports and 35 Technical Notes and Test Memorandums. Several additional reports are currently in preparation.

PERFORMING AGENCY: Federal Railroad Administration, Transportation Test Center

SPONSORING AGENCY: Federal Railroad Administration, Transportation Test Center; Association of American Railroads; Railway Progress Institute

RESPONSIBLE INDIVIDUAL: McIntosh, GP Tel (303) 545-5660 X501

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Nov. 1976 COMPLETION DATE: Aug. 1982

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 Mechanical and Aerospace Engineering

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: Feb. 1981 START DATE: July 1977 COMPLETION DATE: Feb. 1981 TOTAL FUNDS: \$203,000

ACKNOWLEDGMENT: TSC

02 170644

PREVENTION OF DERAILMENT OF GOODS WAGONS ON DISTORTED TRACKS

At its 84th meeting in October 1979 the ORE Control Committee approved a two-year extension of the period of investigation. There were mainly 2 reasons why the B 55 Committee had applied for an extension, namely: the recommendations set out in RP 6 for the construction of vehicles are considered too stringent when applied to the existing rolling stock; taking into account the frequency of derailments caused by distorted track in actual service. This contradictory state of affairs required clarification for legal and economic reasons; furthermore, investigations with a view to formulating recommendations for track cant as a function of curve radius had proved to be very difficult and tedious, because the varying conditions on the different railways made it difficult to find a common factor. By extensive evaluation of test results, statistical investigations, as well as the development of a complementary model of probability theory for the estimation of derailment frequency, it has meanwhile been possible to apply more realistic conditions to existing rolling stock, thus facilitating the design and maintenance of vehicles, without reducing safety. All this leads to recommending $u = f(r)$ as a practical solution, including as it does track distortion, and not only covering actual track conditions but also demonstrating compatibility with the vehicle. Judging from the current position of work, the B 55 Committee should be able to conclude most of its investigations this year. After the relevant departments and the testing stations of the member Railways have checked the results, the final version of the final report of the B 55 question should be prepared and submitted in 1981.

Seven reports have been published to date. Question B55.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Schenk, M Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: 1965 COMPLETION DATE: Sept. 1981

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. The synthesis Report No. 15 contains the most significant results of the starting and braking force measurements, carried out on different railway bridges. The experimental and theoretical studies of the different parameters have led to the establishment of new rules, permitting the performance of railway bridges to be better defined taking into account the starting and braking forces. The study has primarily been focused on the following parameters: the vertical load, the opponent coefficient of adhesion, the influence of rails, the type of bearing devices and the length of the bridge structures.

Sixteen 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: Dec. 1980 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 optimisation of track parameters. These long-term tests will not be completed until 1981; they consist in studying the wear of wheels with a given profile running on tracks laid with cant of 1/20, 1/30 and 1/40.

Nine 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: Dec. 1980 START DATE: 1970
ACKNOWLEDGMENT: UIC

02 170657

EFFECT ON THE TRACK OF RAISING THE AXLE LOAD FROM 20 TO 22 T

For dealing with the problem of the effect on the track of raising the axleload from 20 to 22 t, the D 141 Committee, in conformity with its Programme of Work, simultaneously carried out the following studies: 1) A statistical study of the evolution of rail fatigue defects as a function of the axleload. This study has been dealt with in Report D 141/RP 1; 2) Simulation tests by BR and PKP. These have been dealt with in Report D 141/RP 2; 3) Tests on the VELIM circuit, organised jointly between the D 141 and B 142 Committees, for 3 series of tests with 50 Mt, with 22 t axleload. The description of these tests and the account of the results obtained are dealt with in the appended Report D 141/RP 3. Compared with the runs at 20 t axleload carried out earlier at VELIM the tests on the same circuit with the running of a train loaded to 22 t axleload did not reveal any new phenomena which could have resulted in a fatigue stressing of the track leading to failure. However, a quantitative comparison of the results will only be possible at the end of the 22 t axleload tests. It is for this reason that it is planned to carry out two tests of 50 Mt with 20 t axleloads on the VELIM circular test track.

Three reports have been published to date. Question D141.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Jutard, M Office for Research and Experiments
STATUS: Active NOTICE DATE: Dec. 1980
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) confirmation of the S value given by Prud'homme for a single axle (RP 1) and for a bogie (RP 4). No significant effect of speed (RP 5); 2) Y/Q is an important parameter but it is not the only one involved; the duration of application of Y and the angle of attack also have to be taken into account. Several tests in progress will be treated statistically. Line tests are essential. 3) by calculations and bench

tests. Development of an analytical method which is simpler than the finite element method. Fairly close agreement between the calculated results and the bench measurements in spite of the fact that it was impossible to take into account the stresses in the Hertzian zone (RP 2). Study of the influence of various parameters: sleeper spacing, track stiffness, type of rail (RP 6).

Six reports have 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: Dec. 1980

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. 1981 START DATE: 1978

ACKNOWLEDGMENT: AAR

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

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: Feb. 1981 START DATE: Jan. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 308322

TRANSIT TRUCK TESTING

The purpose of this project is to gather experimental dynamics data for a rail transit vehicle and to compare it with theoretical predictions from various analytical models. The aim is to validate MTC lateral stability and curving models.

REFERENCES:

- Investigation of Stability and Curving of a Rail Transit Vehicle, Volume 2: Instrumentation and Testing, Hsu, D; Skelton, S, 79-LAB-3, July 1979
- Investigation of Stability and Curving of a Rail Transit Vehicle, Volume 4: Nonlinear Curving Model, AppaRao, TA, TS-79-101, Feb. 1979

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can

INVESTIGATOR: Young, JA Tel: (416) 248-3771 AppaRao, TA

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

STATUS: Inactive NOTICE DATE: Feb. 1981 START DATE: May 1977 TOTAL FUNDS: \$80,000

ACKNOWLEDGMENT: Ontario Ministry of Transportation & Communic, Can

02 308326

WHEEL/RAIL PROFILE MEASUREMENTS

A survey of the wheel tread and rail head profile characteristics for the Toronto subway system has been carried out. Precision measurement equipment (wheel and rail profilometers) were designed and constructed for this purpose. Profile measurements have been made for 20 wheelsets and for 20 track locations (tangent track only). Computer analysis using this profile data will be carried out to establish typical in-service values for subway vehicle effective conicities and gravitational stiffness on tangent track.

REFERENCES:

- Wheel/Rail Profile Investigation-Interim Report No. 1 Jackson, JD, Feb. 1977
- Wheel/Rail Profile Investigation-Interim Report No. 2 Jackson, JD, July 1978
- Wheel and Rail Profile Measurements for Urban Rail Transit Systems, Jackson, JD, Presented at ASME Winter Annual Meeting, Dec. 1978

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, Transit Systems Research and Development Office, 3117

INVESTIGATOR: AppaRao, TA Tel (416) 248-3771

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can, Transit Systems Research and Development Office

RESPONSIBLE INDIVIDUAL: AppaRao, TA Tel (416) 248-3771

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: June 1976 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$27,000

ACKNOWLEDGMENT: Ontario Ministry of Transportation & Communic, Can

02 308330

RESEARCH LOCOMOTIVE AND TRAIN HANDLING EVALUATOR

The objective of this project is to design, fabricate, and install a Research Locomotive and Train Handling Evaluator.

PERFORMING AGENCY: Teledyne Ryan Aeronautical

INVESTIGATOR: Juberg, E

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

Contract DOT-FR-9142

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1979 COMPLETION DATE: Sept. 1982

ACKNOWLEDGMENT: FRA

02 309937

DYNAMIC INTERACTION BETWEEN RAILWAY BRIDGES AND MOVING VEHICLES

Using the displacement approach a mathematical model has been developed to evaluate the dynamic interactions between railway bridges and moving vehicles. The bridge model consists of a lumped mass system, with vertical degrees-of-freedom, whereas the vehicle is represented by three degree-of-freedom: bounce, roll and pitch. The resulting, equations of motion for the vehicle/bridge system, including the interactive forces, are developed and numerically solved to generate the dynamic impact factors for selected bridge member forces and nodal deflections. A parametric study is also performed to evaluate the influence on the impact factors of the number of vehicles on the span, span lengths, vehicle speeds, vehicle mass and suspension characteristics, and its initial roll and pitch motions. The impact factors obtained from the simulations are compared with the American Railway Engineering Association (AREA) recommendation, based upon field test data.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Singh, SP Tel (312) 567-3593

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Garg, VK Tel (312) 567-3596

In-House

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Sept. 1979 COMPLETION DATE: June 1981

ACKNOWLEDGMENT: Association of American Railroads Technical Center

02 319080

FRATE MODEL (RAILCAR LADING RESPONSE)

The objective of the project is to obtain information required to effect a reduction of railcar lading damage in boxcars. This will be done through determining the dynamic characteristics of boxcars and developing lading damage statistics. The FRATE model is to be modified for a 70-ton boxcar with complaint lading and modify the model for an empty boxcar including center plate separation in roll. A validation plan is to be prepared for validation of the revised FRATE model. The model will be used to develop track geometry descriptors based upon vehicle performance.

Final Report, Revised FRATE User's Manual is being prepared for publication.

PERFORMING AGENCY: Mitre Corporation

INVESTIGATOR: Kachadourian, G Tel (703) 827-6903

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Orth, CL Tel (202) 755-1877

Contract DOT-FR-54090

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: Feb. 1980 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$299,626

ACKNOWLEDGMENT: FRA

02 323378

TRACK TRAIN DYNAMICS

This project involves the following tasks: 1) to develop a mathematical rail failure model based on mechanical and metallurgical characteristics of rails when subjected to high axle loads; 2) to investigate wear and fatigue characteristics of wheels in order to recommend design improvements to promote safety and reduce costs associated with maintenance and replacement of railcar wheels; 3) to investigate the potential for producing an

experimental rail curve grease formulated to inhibit crack nucleation and resultant fatigue cracking; 4) to measure comparative wear patterns and study the fracture characteristics of wheel profiles as applied to 100-ton capacity cars in unit train service; 5) to obtain quantitative data on comparative performance of conventional trucks, self-steering trucks and forced steering trucks; (6) to support the design and fabrication of a rolling laboratory test apparatus the interaction between wheelset and rails in curves or on tangent track and to provide the test data acquisition system; and 7) to investigate the dynamic effects caused by vehicle track interaction on-track structure component life expectancy and maintenance as related to high speed traffic.

PERFORMING AGENCY: Canadian Pacific Limited, Q011IE
SPONSORING AGENCY: Canadian Pacific Limited
RESPONSIBLE INDIVIDUAL: Bethune, AE

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: 1973

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 323381

TTC SUBWAY RAIL LOAD TESTING

The purpose of the project is to measure vertical and lateral loads in the rails of the TTC subway due to passage of various types of car.

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, O030GE
SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can
RESPONSIBLE INDIVIDUAL: Billing, JR

STATUS: Active NOTICE DATE: Dec. 1980 COMPLETION DATE: 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 323383

COMPARATIVE ANALYSIS OF RAIL VEHICLE TRUCKS

This project examines the effects of parametric and configuration changes on the stability and curving performance of rail vehicles. Conventional rigid frame trucks, self-steering trucks with inter axle connections, and forced steering trucks with body to axle linkages are included in this study.

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, O029GE
SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can
RESPONSIBLE INDIVIDUAL: AppaRao, TA Tel (416) 248-3771

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Oct. 1979 COMPLETION DATE: Apr. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

02 324944

QUANTITATIVE EVALUATION OF GEOMETRIC TRACK PARAMETERS DETERMINING VEHICLE BEHAVIOUR

The ORE C 152 Specialists Committee was set up in October 1979 to deal with this question. The main objectives of this question is to define the methods of measuring track geometry and the methods for processing these measurements, which would be most suitable for predicting certain reactions of vehicles, with a good correlation between the actual track geometry and the vehicle behaviour. At present the co-ordinated measurements of track geometry and vehicle response are being prepared and corresponding methods for their evaluation are being developed.

Question C152.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Korpanec, I Office for Research and Experiments

STATUS: Active NOTICE DATE: Jan. 1981 START DATE: Oct. 1979

ACKNOWLEDGMENT: UIC

02 324947

PROBLEMS CAUSED BY TRAIN TRAFFIC AT VERY HIGH SPEEDS IN TUNNELS

Railway modernisation and the steady increase in the maximum permissible speed on lines in operation or under construction (approaching 200 km/h, or above) makes it essential to have detailed and thorough knowledge about the aerodynamic effects occurring in tunnels as a result of such higher speeds. It has been found that the aerodynamic processes of trains in tunnels affect

not only passenger comfort and the safety of staff working in tunnels but also the stresses to which the rolling stock is exposed. The object is thus to provide the railway Administrations with a tool for studying these problems, while at the same time minimizing the duplication of work by the various administrations.

Question C149. One report has been published to date.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Savarit, R Office for Research and Experiments

STATUS: Active NOTICE DATE: Jan. 1981

ACKNOWLEDGMENT: UIC

02 325715

MEASUREMENT OF RAIL LOADS ON THE TTC SUBWAY

Wear patterns have developed on certain portions of the TTC subway which correspond to the hunting characteristic of some classes of subway cars. Two pieces of track, one new and the other worn, were instrumented with strain gauge arrays to measure vertical and lateral rail loads under all classes of cars. Statistical analysis of L/V ratios then provides insights into the causes of wear and assists in determination of remedies for cars and/or track.

REFERENCES:

Measurement of Rail Heads on a Subway System Presented at Int'l Conf on Wheel/Rail Load & Displ Meas Tech, Billing, JR

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, 31145

INVESTIGATOR: Billing, JR Tel (416) 248-3771

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can; Toronto Transit Commission

RESPONSIBLE INDIVIDUAL: Hendry, IG Tel (416) 534-9511

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Apr. 1980 COMPLETION DATE: Apr. 1981

ACKNOWLEDGMENT: Ontario Ministry of Transportation & Communic, Can

02 325943

FIELD ELECTRO-OPTICAL INSPECTION OF PORTAL CRANE TRACKAGE

Develop electro-optical concepts to remotely detect and measure anomalies and other weaknesses which can lead to railcar and crane derailment. Site inspection of portal crane tracks will be conducted to establish mechanics of derailment. Concepts for detecting and measuring railway deterioration and weaknesses will be developed which exploit load-displacement (stiffness) characteristic of the trackage. It is envisioned that the concepts will have the capability to continuously and remotely monitor the one or more of the displacement freedoms of the railway-lateral and vertical translation or rotational. The concepts will rely on state-of-the-art electro-optic technology in unique applications.

PERFORMING AGENCY: Naval Construction Battalion Center

INVESTIGATOR: Warren, GE Jahnson, FR

SPONSORING AGENCY: Naval Construction Battalion Center, DN087322

STATUS: Active NOTICE DATE: June 1981 START DATE: June 1980 COMPLETION DATE: Nov. 1982

ACKNOWLEDGMENT:

02 329549

SCALE MODEL DERAILMENT STUDIES

The objective of this research is to provide validation of analytical models of wheel/rail interaction and of performance indices that can be used to predict wheelclimb derailments. A scaled model of a single wheelset is used to establish the fundamental mechanics of the wheelclimb process. A detailed treatment is given to quasisteady wheelclimb in which lateral velocity is negligible and the yaw angle remains essentially constant and to single degree-of-freedom wheelclimb in which velocity effects are important but yaw angle remains essentially constant.

PERFORMING AGENCY: Princeton University, Department of Mechanical and Aerospace Engineering

INVESTIGATOR: Sweet, LM Tel (609) 452-5305

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Lee, HS Tel (617) 494-2266

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Nov. 1978 COMPLETION DATE: Dec. 1981

02 329557

APPLICATION OF ACTIVE AND PASSIVE SUSPENSION TECHNIQUES TO IMPROVE HIGH-SPEED GROUND VEHICLE PERFORMANCE

The purpose of the proposed research is to develop and evaluate active and nonlinear passive suspension solutions to high-speed passenger vehicle problems and to assess their practicality. Such recent advances in control hardware as the availability of inexpensive and reliable microprocessors, and such advances in control theory as improved estimation and identification offer important potential solutions to ground vehicle ride quality, stability, and curving problems. In the first year, active and improved nonlinear passive suspension designs for the lateral ride quality problem will be evaluated. Ride quality models will be extended to include essential nonlinearities and then validated with measurements taken aboard an AMTRAK vehicle. The validated model will then be used to evaluate active and passive suspension alternatives. Along with the ride quality analysis, the potential improvements to lateral stability and curve negotiation will be evaluated. The second year of the research consists of comparing the active and improved passive designs and the evaluation of alternative hardware configurations such as pneumatic and hydraulic actuators. The third year consists of a prototype design and total simulation of the proposed configuration and recommendations for revenue application.

PERFORMING AGENCY: Massachusetts Institute of Technology
 INVESTIGATOR: Hedrick, JK Tel (617) 253-6257 Wormley, DN
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Scharr, RL Tel (202) 426-9665

Contract DT-RS-56-80C-00018

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1980

ACKNOWLEDGMENT: Massachusetts Institute of Technology

02 329569

LABORATORY INVESTIGATION OF THE WEAR OF RAILS AND WHEELS

To improve understanding of the effect lubrication, mechanical and operational variables or material properties may have on various forms of rail/wheel wear. A 1/8 scale wheelset/pair of rail discs wear test apparatus including accessories and microprocessor control and data logging equipment has been built. It will be used as a basic scientific instrument to study creepage-traction force relationship, wheelset steady state curving, curving resistance, etc., and as a practical rail material, wheel material or lubricant tester.

REFERENCES:

The Use of Angle-of-Attack Measurements to Estimate Rail Wear Under Steady State Rolling Conditions, Ghonem, H; Kalousek, J, Proc Int Conf on Wheel/Rail Load & Displacement Meas Techn

Development of 1/8 Scale Dual Disc on Disc Rail - Wheel Wear Testing Facility --, Kalousek, J, Canadian Metallurgical Quarterly

PERFORMING AGENCY: National Research Council of Canada, DME-78-L-16
 INVESTIGATOR: Kalousek, J Tel (604) 542-4704
 SPONSORING AGENCY: Government of Canada

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: 1977

ACKNOWLEDGMENT: National Research Council of Canada

02 329572

ANALYTICAL AND EXPERIMENTAL FACILITIES FOR RAIL VEHICLE RESEARCH

To investigate both experimentally and analytically the dynamic response of rail vehicles and loading to real and simulated on-track operating conditions, and to develop improved systems. Facilities: include impact ramp, car compression frame, instrument cars, full scale curved track dynamic simulator, dynamic vehicle tester, mathematical models. Activities: include fundamental and applied research and development under contract or cooperatively with rail equipment manufacturers, users and railway companies.

REFERENCES:

Facilities at NRCC for the Railway Vehicle Designer Smith, CAM; Bowler, EH, DME/NRC Transportation Newsletter, Vol 12, No. 1, Aug. 1980

PERFORMING AGENCY: National Research Council of Canada, DME-78-L-29 DME-78-L-32 DME-78-L-37

INVESTIGATOR: Smith, CAM Tel (613) 998-9638

SPONSORING AGENCY: Government of Canada

STATUS: Active NOTICE DATE: Feb. 1981

02 335477

INVESTIGATION OF THE ABILITY OF IRRADIATED CANDU FUEL TO WITHSTAND TRANSPORTATION SHOCK AND VIBRATION ENVIRONMENTS

Ontario Hydro is producing irradiated CANDU fuel bundles at a rate of 36,000/year and this is expected to increase to about 100,000/year by the year 1990. At some time in the future these bundles will have to be shipped off-site. All road, rail and barge modes of transportation are being investigated although road and rail transportation are receiving the most analysis. The objective of the current program is to assess the ability of the CANDU irradiated fuel bundles to withstand the shock and vibration environment that they will be subjected to during transportation. The program started in 1975 with a review of the existing relevant work and the conceptual design of suitable transportation systems. The irradiated fuel storage and transportation systems have gradually been refined until the current proposals call for the irradiated fuel bundles to be stored in a stainless steel module which is suitable for shipping. The module consists of 48 horizontal tubes supported on two tube sheets. Each tube holds two irradiated fuel bundles. Two shipping flasks are being considered, one for use on a railcar and one for use on a truck. These flasks will hold four modules (maximum) and one module respectively. Preliminary tests to determine the shock and vibration environment that will be encountered in Canada when using typical transportation systems have been completed. Impact and vibration tests on irradiated fuel bundles to determine their strength properties have also been completed. The on going program is intended to optimise the shock and vibration capabilities of the transportation systems. Conceptual designs of flask and vehicle systems will be developed together with further investigation of vehicle characteristics and availability.

PERFORMING AGENCY: Ontario Hydro, Department of Nuclear Systems
 INVESTIGATOR: Souther, DW Tanaka, JF Knight, DJ Lowewen, T Forest, JW

SPONSORING AGENCY: International Atomic Energy Agency, 2715/CF

Contract

STATUS: Active NOTICE DATE: July 1981 START DATE: Dec. 1980 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FR 190)

02 335873

ENGINEERING AND MANAGEMENT SUPPORT FOR SAFE PROGRAM

Engineering support services will be provided on demand in the areas of rail vehicle and track dynamic characterization, safety assessment test development, and track facility design.

PERFORMING AGENCY: Kaman Science Corporation
 INVESTIGATOR: Baxter, BW Tel (303) 599-1500
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Hazel, M Tel (617) 494-2233

Contract DOT-TSC-1799

STATUS: Active NOTICE DATE: July 1981 START DATE: Sept. 1979 COMPLETION DATE: Sept. 1982 TOTAL FUNDS: \$126,523

ACKNOWLEDGMENT: TSC

02 335874

ENGINEERING AND MANAGEMENT SUPPORT FOR SAFE PROGRAM

Engineering support services will be provided on demand in the areas of rail vehicle and track dynamic characterization, safety acceptance test development, and track facility design.

PERFORMING AGENCY: ENSCO, Incorporated
 INVESTIGATOR: Kesler, JK Tel (703) 321-9000
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Hazel, M Tel (617) 494-2233

Contract DOT-TSC-1798

STATUS: Active NOTICE DATE: July 1981 START DATE: Sept. 1979 COMPLETION DATE: Sept. 1982 TOTAL FUNDS: \$133,861

ACKNOWLEDGMENT: TSC

02 335875

ENGINEERING AND MANAGEMENT SUPPORT FOR SAFE PROGRAM

Engineering support services will be provided on demand in the areas of rail vehicle and track dynamic characterization, safety assessment test development, and track facility design.

PERFORMING AGENCY: Analytic Sciences Corporation
 INVESTIGATOR: Blader, FB Tel (617) 944-6850
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Hazel, M Tel (617) 494-2233

Contract DOT-TSC-1797

STATUS: Active NOTICE DATE: July 1981 START DATE: Sept. 1979 COMPLETION DATE: Sept. 1982 TOTAL FUNDS: \$131,619

ACKNOWLEDGMENT: TSC

02 335892

TEST REQUIREMENTS, DATA REDUCTION AND ANALYSIS FOR SAFE

The objectives are to provide quick response, to develop test requirements, reduce and analyze data from multiple instrumented rail/vehicle inputs and produce dynamic and operational characterization of normal and degraded vehicles by analysis of test data.

PERFORMING AGENCY: Little (Arthur D), Incorporated
 INVESTIGATOR: Boghani, AB Tel (617) 864-5770
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Ehrenbeck, R Tel (617) 494-2000

Contract DOT-TSC-80111

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1980 COMPLETION DATE: June 1984 TOTAL FUNDS: \$438,640

ACKNOWLEDGMENT: TSC

02 335893

RDL/RDU AND VTU DEMONSTRATION PROGRAM

The TTC in Pueblo, Colorado will examine the capabilities of the RDL/RDU and VTU to test and evaluate the dynamic stability characteristics of a typical freight vehicle. The RDU test program will have four objectives: 1) to demonstrate the use of the RDU facility for determining hunting characteristics of a TTAX flatcar; 2) to provide data for correlation of a truck hunting mathematical model developed by Track Train Dynamics (TTD)/AAR personnel with test data; 3) to explore the effect of operating and design parameters on truck hunting behavior; and 4) to obtain track test data for comparison of truck hunting dynamics on tangent track versus RDU. The VTU test program will have three objectives: 1) to demonstrate the use of the VTU facility for determining the dynamic characteristics of a freight car (100-ton high side gondola car) and to reduce the experimental data for design purposes; 2) to provide test data for comparison with responses obtained with mathematical models developed by the track/train dynamics (TTD) program, and with selected field tests; and 3) to establish the range of strains occurring during dynamic conditions for estimates of the fatigue life of critical structural elements. Upon completion of the RDU/VTU tests, TTC will prepare technical test reports. At contract completion, TTD will prepare final test/analysis reports.

PERFORMING AGENCY: Transportation Test Center
 INVESTIGATOR: Dorland, W Tel (303) 545-5660 Punwani, J Tel (312) 567-3601
 SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads Technical Center
 RESPONSIBLE INDIVIDUAL: Gross, A Tel (202) 755-1877

Contract DOT-PR4498

STATUS: Active NOTICE DATE: July 1981 START DATE: Dec. 1979 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$74,533

ACKNOWLEDGMENT: FRA

02 335900

SCALE MODEL SUPPORT FOR ASSESSMENT OF RR STRUCTURAL SAFETY OPTIONS

Engineering support will be provided in the area of scale model testing for assessment of railroad structural safety options. The efforts of the contractor are expected to support TSC in conducting rapid evaluations of the crashworthiness capabilities of the structural concepts identified by parallel studies as potentially viable options.

PERFORMING AGENCY: Southwest Research Institute
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Orringer, O Tel (617) 494-2419

Contract DOT-TSC-8086

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1980 COMPLETION DATE: June 1983 TOTAL FUNDS: \$463,442

ACKNOWLEDGMENT: TSC

02 335902

TRACK/VEHICLE SYSTEMS STRUCTURE SUPPORT

This contract will provide short-notice response to the demand for engineering support services in the areas of quantification of service environment, analysis of track/vehicle system and components, experimental validation and feasibility assessment.

PERFORMING AGENCY: Battelle Memorial Institute
 SPONSORING AGENCY: Transportation Systems Center
 RESPONSIBLE INDIVIDUAL: Kish, A Tel (617) 494-2649

Contract DOT-TSC-80110

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1980 COMPLETION DATE: June 1982 TOTAL FUNDS: \$485,003

ACKNOWLEDGMENT: TSC

02 341054

THE BUDD COMPANY TILT SYSTEM DEMONSTRATION

For any specified lateral acceleration limit, a tilt-body passenger coach will negotiate a given curve with greater passenger comfort than a non-tilt passenger coach. Curve negotiations of passenger trains at speeds higher than presently allowed are thus possible. For this reason, tilt-body technology has the potential to significantly reduce passenger train trip times, not only on the NEC, but on any passenger route in the country which possesses a significant number of curves. The Budd Company, under this contract, has independently conducted analyses of carbody tilting systems developed by other manufacturers throughout the world. Their purpose was to determine if an existing tilt system could be adapted to Amcoach to increase its curving performance. As a result of this research, the Budd Company ultimately developed an independent design, having the potential of simplicity as well as offering improved curving performance for the Amcoach. Unlike other tilt systems investigated by the FRA, it would not reduce the seating capacity of Amcoach because of equipment volumetric requirements. The Budd design is an active type, and is unique in that it is an electrical/pneumatic system as opposed to the electrical/hydraulic type characterizing all other existing active tilt systems.

PERFORMING AGENCY: Budd Company
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Lampros, AF Tel (202) 426-9665

Contract DTFR 53-80-C00111

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1980 COMPLETION DATE: Oct. 1981 TOTAL FUNDS: \$475,000

ACKNOWLEDGMENT: FRA

02 341055

FUNDAMENTAL STUDIES OF PHENOMENA RELATED TO WHEEL-RAIL CONTACT STRESSES--PHASE 3

The objective of this research is to provide fundamental information on an important group of engineering problems relating to stresses at the wheel/rail interface. That is, it is proposed to solve problems related to the forces and deformations at the contact surface between the wheel and rail. This research is fundamental to solving problems on wear, fracture, and plastic flow of wheels and rails. Furthermore, it will aid in understanding the dynamic behavior of rail vehicles, including hunting and stability, ride quality, derailment, reliability, adhesion, etc. This research will be of prime importance to those involved in vehicle dynamic research; rail vehicle manufacturers; railroad operators; wheel, rail, and track designers; and regulatory agencies concerned with rail technology safety, reliability, and maintenance. A computer program called CONFORM has been developed, the usefulness of which will be improved by incorporating a better characterization of the creepage forces and including additional degrees of freedom for penetration of a wheel into a railhead as well as kinematic coupling effects of wheelset as influenced by various track perimeters. Because the most critical stresses lie just beneath the surface, it is important to have a means of surveying the stresses at all points just below the surface

of the contact patch. For this purpose, The Computer Subroutine Program SUBSIG was developed. This subroutine can be loaded into the previously developed program (CONFORM and CONTACT) which were designed to find the contact pressures on the surface of the loaded patch. The new subroutine then surveys a network of subsurface points, calculates all six stress components at each such point, evaluates the severity of the stress state with respect to plastic yielding, selects the most critically stressed point, and gives the effective stress at that point which determines whether or not plastic yielding occurs. Additionally, the theory for longitudinal creepage (the controlled slippage of wheels over the rails which always accompanies steady rolling) for closely conforming wheel and rail contact (e.g., flange throat contact) has been developed. This is the first known

prediction of the force/creepage relationship for situations where the contact patch is known to be non-elliptical.

PERFORMING AGENCY: Pennsylvania University, Philadelphia
INVESTIGATOR: Paul, B Tel (215) 243-7191
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Woll, TP Tel (202) 426-9564

Contract DOT-OS-60144

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Oct. 1980 COMPLETION DATE: Sept. 1983

ACKNOWLEDGMENT: FRA

03 025403

URBAN RAPID RAIL VEHICLE SYSTEMS PROGRAM

To enhance the attractiveness of rapid rail transportation to the urban traveler by providing existing and proposed transit systems with service that is comfortable, reliable, safe, and as economical as possible. Short range goals: Demonstration of the state-of-the-art in rapid rail vehicular technology. The Advanced Concept Train (ACT-1) phase calls for delivery of two next generation rail transit vehicles by 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: Teel, S Tel (202) 426-0090

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: 1971
 COMPLETION DATE: July 1981

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. The use of theory already developed is being used to improve the geometric design of wheels.

REFERENCES:

Thermal Damage and Rail Load Stresses in a 33-Inch Railroad Car Wheel, Wetenkamp, HR; Kipp, RM, ASME Paper 77WA/RT-2, Jan. 1978

The Influence of Brake Shoes on the Temperature of Wheel in Railroad Service, Wetenkamp, HR; Eck, BJ; Rhine, PE, ASME Journal of Engineering for Industry, Vol. 102 No. 1, Feb. 1980

PERFORMING AGENCY: Illinois University, Urbana, Department of Theoretical and Applied Mechanics

INVESTIGATOR: Wetenkamp, HR Tel (217) 333-2313
 SPONSORING AGENCY: Griffin Wheel Company
 RESPONSIBLE INDIVIDUAL: Wetenkamp, HR Tel (217) 333-2313

STATUS: Active NOTICE DATE: Aug. 1980 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 and 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 and 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 being developed by the Budd Company.

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 Bexton, HJ Herring, JM

In-House

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Jan. 1971 COMPLETION DATE: 1982

ACKNOWLEDGMENT: Railway Engineering Associates, Incorporated, Dresser Transportation Equipment Division, Dominion Foundries and Steel, Limited

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: Feb. 1980

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 two reports have 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 and a report has been recently published.

REFERENCES:

Phase 09 Final Report on Bottom Fittings Protection Test Program, Kunz, EL; Olson, LL, AAR Technical Center, AAR R-343, Dec. 1978

Addendum to Phase 09 Final Report on Bottom Fittings Protection Test Program, Kunz, EL; Olson, LL, AAR Technical Center, AAR R-364, Apr. 1979

Study of Bottom Discontinuity Damage on Non-pressure Stub Sill Tank Cars in Derailments during 1977 and 1978, Kunz, EL; Phillips, EA; Role, H, AAR Technical Center, AAR R-409, Feb. 1980

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: Feb. 1981
 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: Richardson, J
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Mould, J Tel (202) 426-1682

IA AR54162
 STATUS: Active NOTICE DATE: Feb. 1981 COMPLETION DATE: Feb. 1982

ACKNOWLEDGMENT: FRA

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.

Final report is being prepared.

REFERENCES:

Dual-Powered Gas Turbine/Electric Commuter Rail Cars: Test, Evaluation and Economics, UMTA-NY-06-0005 Final Rpt., Sept. 1980, PB81-211757

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: Completed NOTICE DATE: Aug. 1981 START DATE: July 1971 COMPLETION DATE: Mar. 1981 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: Teel, S Tel (202) 426-0090

Contract DOT-UT-10007
 STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: Dec. 1976 COMPLETION DATE: July 1981 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. 1980 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: Feb. 1981 START DATE: July 1976

ACKNOWLEDGMENT: FRA

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. Contractors will perform a series of tasks including one requiring the development of a minimum number of car performance and dimensional specifications which collectively describe 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

An Investigation of Rail Rapid Transit Carbody Materials Morris, R et al, Available at NTIS, UMTA-IT-06-0175-80-1 140 p., PB80-170970

Proposed Analysis Methodology for Rail Car Propulsion System Selection, Bamberg, W; Eldredge, D, Available at NTIS, UMTA-IT-06-0229-80-1 50p, 1980, PB80-201460

Roster of North American Rapid Transit Cars 1945-1980 American Public Transit Association, Available at NTIS, UMTA-DC-06-0121-80-1 299p, 1980, PB80-213564

PERFORMING AGENCY: Decision Group, Incorporated, IT-06-0175; Lea (ND) and Associates, IT-06-0229; American Public Transit Association, DC-06-0121

INVESTIGATOR: Morris, RE Tel (703) 827-0227 Elms, CD Tel (703) 471-4007 Cihak, FJ Tel (202) 828-2888

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: Feb. 1981 START DATE: May 1976 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$1,600,000

ACKNOWLEDGMENT: UMTA

03 170617

PERFORMANCE LIMITS OF RAIL PASSENGER VEHICLES: EVALUATION AND OPTIMIZATION

The objective of this research was to identify the dynamic performance capability of conventional and innovative passenger truck designs. During the first year appropriate analytical models were adopted and extended to allow the prediction of rail vehicle ride quality, stability, and curving performance. The second year's research consisted of defining, in an engineering sense, the performance boundaries (hunting, curving, derailment, ride quality, wheel-track force levels, etc) of current and proposed passenger truck configurations. That work compared the performance boundaries of conventional, optimized conventional, and radial trucks to determine the performance limits of each class of passenger truck. The third year's effort concentrated on a continued investigation of optimized passenger vehicle performance, as well as the very important area of dynamic model validation, i.e., comparing the theoretical model's predictions with actual field test results. This validation effort resulted in an improved model that rail industry users can utilize with confidence. In addition, the current research continues the cooperative effort with the German firm M.A.N., focusing on the feasibility of active control of passenger rail vehicles.

PERFORMING AGENCY: Massachusetts Institute of Technology, Department of Mechanical Engineering

INVESTIGATOR: Hedrick, JK

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Scharf, RL Tel (202) 426-9665

Contract DOT-OS-70052

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: July 1977 COMPLETION DATE: July 1981 TOTAL FUNDS: \$240,508

ACKNOWLEDGMENT: DOT

03 170639

CONDITIONS WHICH SHOULD BE COMPLIED WITH BY WAGON COMPONENTS FOR 22 T AXLE LOAD

According to the Programme of Work, the B 142 Committee has completed its investigations as follows: 1) Comparative strength tests of Y 25 C bogies with welded frame and with cast frame, with 20 t and 22 t axleload (see B 142/RP 1); 2) Braking tests (see B 142/RP 2); 3) Fatigue and durability tests on the VELIM test circuit (see B 142/RP 3); 4) Comparative tests with the reinforced Y 25 C type bogies (see B 142/RP 4). The results of the tests described in Reports B 142/RP 1 and B 142/RP 3 show that the Y 25 bogie with cast frame with integral cross member capable of taking 22 t axleloads is now available. Equipped with the modified damping system, new springs and elastic side friction blocks, a Y 25 bogie can be constructed with cast frame suitable for use with the 22 t axleload, from the point of view of strength and wear of components. The results obtained by the B 142 Committee may be used as a basis for defining a Y 25 bogie with welded frame, suitable for 22 t. Similarly, the DB 665 bogie and the two-axled wagons can be improved. Some solutions can already be envisaged. The B 142 Committee has carried out all the studies entered on its Programme of Work.

Question B142. Four reports have been published to date.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Jutard, M Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980

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 absorbing systems, other means); preparation of leaflets for side buffers, elastic systems and long-stroke shock absorbing systems. Acceptance testing of spring systems. Theoretical calculation of longitudinal forces in trains; theoretical calculation of the behaviour in buffing impacts of goods wagons. In compliance with a request of the UIC the Committee is focusing its studies on laying down the technical conditions to be fulfilled by side buffers and by drawgear. As the competent body on the part of the UIC for the acceptance of elastic systems for the automatic coupler, the Committee is at present supervising the relevant acceptance tests on elastic systems of the types Sagem 12054 and RIV-SKF. The studies concerning the adaptation of the leaflet to "Elastic systems for goods wagons" (automatic coupler) are

being continued. In order to simplify the measurements and evaluation during dynamic buffing tests, comparative tests have been carried out. The work of setting up a mathematical model for simulating the behaviour in buffing impacts of wagons under various operating conditions, taking into account the interaction of wagon, load, load protection system and shock absorbing equipment has been begun. Studies concerning the generation of longitudinal forces in trains of various lengths, masses and compositions with side buffers and screw couplers have also been carried out by means of a computer program.

Twenty two reports have been published to date. Question B36.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Buchner, J von Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980

ACKNOWLEDGMENT: UIC

03 170643

TESTS ON AUTOMATIC COUPLING

The engineering work on the automatic coupler for wagons (type AK UIC 69e) was completed. Current work mainly concerning the acceptance tests on variants of the coupler body and on interchangeable parts of the automatic coupler, are about to be completed. The revised complete set of drawings for the production of the automatic coupler is available. A rather large number of these couplers is 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 5 400 tonnes are also being equipped for ore traffic; they were placed in operation early in November 1976. Four more of these unit trains of this order are now in revenue earning services. The remaining studies to be started shortly within the scope of the question "Mass and composition of goods trains" terminate the stage proper of "Tests on goods wagons". Studies covering the design of the automatic coupler for passenger coaches have been completed. Some details of this coupler vary from that for wagons. Direct coupling with the automatic coupler for wagons is ensured. The first couplers were delivered early in 1979. The required studies on these couplers are now in progress. At present extensive riding stability tests (maximum speed = 200 km/h) are being made by the FS. The B 51 Specialists Committee is also taking part in a large number of other studies, e.g. devices on the headstocks of wagons, installation drawings and questions of automatic as far as connected with the automatic coupler.

Twenty-one reports have been published to date. Question B51.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Buchner, J von Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980

ACKNOWLEDGMENT: UIC

03 170646

STANDARDISATION OF PASSENGER CARS

The Programme of Work of the B 106 Committee at present deals with the question "Permissible stresses in components in and on passenger coaches". It involves ascertaining the load assumptions and assessment criteria, adopted by the various railways for components of passenger coaches and for their fastening systems, investigating the grounds on which they were based and establishing uniform principles for load assumptions. The work of the Committee was restricted in the first phase to studying the components inside coaches. This phase was completed with the approval of Report B 106/RP 2 in April 1980. At present the Committee is acting upon the request made by the Control Committee in April 1980, i.e. to direct its studies to components fixed to the outside of coaches.

Two reports have been published to date. Question B 106.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Schenk, M Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: 1970

ACKNOWLEDGMENT: UIC

03 170647

UNIFICATION OF ELECTRICAL EQUIPMENT FOR PASSENGER COACHES

When the B 107 and B 108 Committees were amalgamated, the B 108 Committee was made responsible for dealing with problems concerning the

optimisation of air circulation and heat distribution in passenger coach compartments. A first report on the subject (B 108/RP 4) was published in 1979. A further synthesis report will summarise all the results obtained by the Committee in this field. The B 108 Committee completed its standardisation remit by publishing a specification for electrical equipment for coaches (restricted to control equipment) (B 108/RP 5). Studies on the other items of the Programme of Work are in progress, such as relays, safety fuses, lighting, batteries.

Five reports have been published to date. Question B108.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Jutard, M Office for Research and Experiments
 STATUS: Active NOTICE DATE: Dec. 1980 START DATE: 1973
 ACKNOWLEDGMENT: UIC

03 170658

NON-POLLUTING SANITARY INSTALLATIONS

The Programme of Work involves determining the capacity requirements to be met by non-polluting toilet systems, which have already been installed or which it is intended to install in passenger coaches, studies in service conditions, studies of discharge problems, and a study of medical/ hygiene problems. Closed toilet systems of different types are currently in use or under trial on the SNCF, DB, SJ, VR and BR. The Committee is making a comparative assessment of these tests. A first draft of technical conditions for closed toilet systems has been prepared. The standardisation of connecting parts for use for discharge purposes in international traffic is being investigated. A programme is at present being prepared for comparing the various toilet systems from the point of view of practical bacteriological risks.

Two reports have been published to date. Question B140.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Buchner, J von Office for Research and Experiments
 STATUS: Active NOTICE DATE: Dec. 1980
 ACKNOWLEDGMENT: UIC

03 172456

STANDARDISATION OF WAGONS

Standardization of wagons (vehicles, containers, sub-assemblies and parts) and standardization of components, as well as development of acceptance test conditions and design of assemblies of components and improvement on standardized vehicles are studied. Currently, work on vehicles has chiefly been concentrated on the bogie wagons of UIC Leaflet series 571 and includes sets of standard drawings for nine types of freight cars. Work on two more types is being carried out now, and work on the 13th and 14th should be started. Work on containers and sub-assemblies is also being carried out. Test conditions and programs are continuously being developed.

Thirty one reports and several technical documents have been published to date. Question B12.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Schenk, M Office for Research and Experiments
 STATUS: Active NOTICE DATE: Dec. 1980
 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 performance, 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. 1980 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.

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: Aug. 1981 START DATE: July 1977

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0043920)

03 185234

TRANSIT RELIABILITY INFORMATION PROGRAM (TRIP)

The Scope in Phase I is to operate an experimental data bank with rapid rail vehicle and bus data from a few selected operating properties. The Phase II effort is to monitor all rapid rail vehicles 10 years old or younger in the U. S. plus about 5000 buses. The Phase III scope is to expand TRIP to become a National Transit Reliability Data Bank.

PERFORMING AGENCY: Transportation Systems Center, PPA/UM029
 INVESTIGATOR: Robichaud, RH Tel (617) 494-2302 Watson, L
 SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Limpert, SB Tel (617) 658-6100

Contract DOT-TSC-1559

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1978 COMPLETION DATE: Apr. 1981 TOTAL FUNDS: \$562,080

ACKNOWLEDGMENT: Dynamics Research Corporation

03 188657

RADIAL-AXLE PASSENGER CAR TRUCKS

Test & evaluation of a self-guided radial passenger truck capable of operation at speeds of 125 mph. Based on the Scheffel cross-anchor design, the non-powered version will be installed under an Amcoach for performance and life (endurance) testing at the U.S. DOT Transportation Test Center.

PERFORMING AGENCY: General Steel Industries, Incorporated; Buckeye Steel Castings
 INVESTIGATOR: Jackson, KL Tel (314) 423-6500
 SPONSORING AGENCY: Federal Railroad Administration, Office of Passenger Systems Research and Development; National Railroad Passenger Corporation
 RESPONSIBLE INDIVIDUAL: Scharr, RL Tel (202)426-9665

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: 1976 COMPLETION DATE: 1981 TOTAL FUNDS: \$1,420,000

03 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

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: Aug. 1980 START DATE: Aug. 1978 COMPLETION DATE: Aug. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0044695)

03 308323

MTC EXPERIMENTAL STREETCAR WHEELS (PHASE 2, FIELD TESTING)

A new type streetcar wheel developed by the Ontario MTC is to be field tested on a Toronto Transit Commission streetcar. The tests will determine the overall acceptance of the wheel for in-revenue service. The wheel has been particularly developed for noise and vibration control. Phase 1 (Project 31124), which included design, manufacture, and lab testing (static and vibration), is now complete field testing is scheduled to begin February 1981.

PERFORMING AGENCY: Ontario Ministry of Transportation & Communication, 31128; Toronto Transit Commission, Equipment Department

INVESTIGATOR: Strasberg, L Tel (416) 248-3771

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication, Can; Toronto Transit Commission, Equipment Department

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Mar. 1979 COMPLETION DATE: July 1981 TOTAL FUNDS: \$70,000

ACKNOWLEDGMENT: Ontario Ministry of Transportation & Communication, Can

03 308324

RING DAMPED RAILWAY WHEELS

The first phase of this project will determine the efficacy of using damping rings on subway wheels in an attempt to control squeal noise. The lab tests done to date have determined the natural frequencies and some of the mode shapes of the wheel. The damping ratios with and without various rings under varying conditions have been obtained. Phase 2 involved field testing of the damping rings on a Toronto Transit Commission subway vehicle. These tests were performed in January 1981 and evaluation of the results obtained is currently in progress.

REFERENCES:

Vibration Properties of Two Ring Damped TTC Railway Wheels Strasberg, L; Tiessinga, J, Ontario Ministry of Transportation and Communications, Oct. 1978.

Point Impedances of Railway Wheels Strasberg, L; Tiessinga, J, NOI-SEXPO 80 Paper, Apr. 1980

The Effects of Varying Ring Parameters on the Modal Damping Ratios of Ring Damped Railway Wheels, Strasberg, L; Tiessinga, J, INTERNOISE 80, Dec. 1980

PERFORMING AGENCY: Ontario Ministry of Transportation & Communication, Can, 31129

INVESTIGATOR: Strasberg, L Tel (416) 248-3771

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication, Can

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Aug. 1978 TOTAL FUNDS: \$75,000

ACKNOWLEDGMENT: Ontario Ministry of Transportation & Communication, Can

03 308325

MTC EXPERIMENTAL STREETCAR WHEELS (PHASE 1 DESIGN, MANUFACTURE, LAB TESTING)

A new type streetcar wheel has been developed by the Ontario MTC. The wheel is particularly adapted to aid in the control of noise and vibration problems. Phase 1, now complete, involved the design, manufacture, and laboratory testing of 10 prototype wheels. Phase 2 (Project 31128) will allow field testing of the wheels on a Toronto Transit Commission streetcar.

REFERENCES:

Properties of Railway Wheels Strasberg, L; Perfect, N; Elliott, GL, Acoustics and Noise Control in Canada, Apr. 1978

Some Static and Dynamic Properties of Railway Wheels Strasberg, L; Perfect, N; Elliott, GL, ASME Paper 78-WA/RT-4, Dec. 1978

Point Impedances of Railway Wheels Strasberg, L; Tiessinga, J, NOI-SEXPO 80 Paper, Apr. 1980

The Design of the MTC MG 105 Experimental Streetcar Wheel Strasberg, L, Policy Planning & Res, Ontario Ministry of Transp & Commun, Rpt. TVSTR-81-104, Jan. 1981

Static Testing of the MTC MG 105 Experimental Streetcar Wheel, Strasberg, L; Pena, L, Policy Planning & Res, Ontario Ministry of Transp & Commun, Rpt. TVSRD-80-116, Aug. 1980

Vibration Testing of the MTC MG 105 Experimental Streetcar Wheel, Strasberg, L; Tiessinga, J, Policy Planning & Res, Ontario Ministry of Transp & Commun

PERFORMING AGENCY: Ontario Ministry of Transportation & Communication, Can, 31124

INVESTIGATOR: Strasberg, L Tel (416) 248-3771

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication, Can

STATUS: Completed NOTICE DATE: Feb. 1981 START DATE: Feb. 1977 TOTAL FUNDS: \$233,000

ACKNOWLEDGMENT: Ontario Ministry of Transportation & Communication, Can

03 308331

WAYSIDE DETECTION RESEARCH FACILITY

The "Wayside Detection Research Facility" (WDRF) has been established to develop and demonstrate viable automated means for monitoring of rail car components and performance as a moving train passes in-track and trackside sensor systems. The WDRF is located at the Transportation Test Center at Pueblo, Colorado, and is being used to study the effectiveness of various types of off-the-shelf and new sensor systems in a stand-alone mode and in various system combinations. The data from this facility will be useful in developing specifications for an operational Wayside Detection Facility, and provide information to help increase the effectiveness of sensors presently installed on operating railroads.

REFERENCES:

Wayside Derailment Requirements Study for Railroad Vehicle Equipment, Fararey, JL, Shaker Research Corporation, FRA/ORD-77/18, May 1977

Feasibility of Rolling Stock Performance Via an Integrated Modular Wayside Approach, Ferguson, JD, FRA, Technical Proc 4th Annual Railroad Engineering Conf, pp 165-173, Mar. 1978

PERFORMING AGENCY: Aerospace Corporation

INVESTIGATOR: Feigenbaum, E Tel (202) 488-6052 Young, J

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Ferguson, JD Tel (202) 426-1682

Contract DOT-AR-74355

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Oct. 1977 COMPLETION DATE: Sept. 1983 TOTAL FUNDS: \$5,000,000

ACKNOWLEDGMENT: FRA

03 309939

ELASTO-PLASTIC STRESS ANALYSIS OF A RAILROAD WHEEL

Railway Wheel Failures, due to thermal cracking, is a common problem. This research work involves an investigation of the thermal stress in wheel plate area due to prolonged heating of the wheel, under drag braking conditions. The study concerns an Elasto-Plastic Stress Analysis of wheels, under repeated thermal loading inputs, to calculate the resulting residual stresses in the plate area. The effects of mechanical loads are also included. The resulting stress histories are then used to calculate the fatigue lives of the wheels.

PERFORMING AGENCY: Association of American Railroads Technical Center, Dynamics Research Division

INVESTIGATOR: Thomas, TJ

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Garg, VK Tel (312) 567-3596

In-House

STATUS: Active NOTICE DATE: Mar. 1980 START DATE: Sept. 1979 COMPLETION DATE: Dec. 1981

ACKNOWLEDGMENT: Association of American Railroads Technical Center

03 309941

A METHODOLOGY FOR THE HYBRID FORMULATION OF FINITE ELEMENTS, AND ITS APPLICATION TO ELASTO-PLASTIC ANALYSIS OF THREE-DIMENSIONAL SOLIDS

In recent years, Hybrid formulations of finite-elements have been extensively used in the field of structural analysis. In this investigation, a methodology is developed to formulate an equilibrated stress field for such element. The stress field is derived from a strain field, which is compatible with the assumed displacement field. The Hybrid elements result in a better displacement and stress approximation for the given finite element mesh, as compared to assumed-displacement models. The Hybrid elements will be used in the elasto-plastic analysis of a railroad car wheel, subjected to both cyclic mechanical and thermal loads. The investigation will concentrate on the analysis of the wheel rim areas.

PERFORMING AGENCY: Association of American Railroads Technical Center

INVESTIGATOR: Singh, SP Tel (312) 567-3594

SPONSORING AGENCY: Association of American Railroads Technical Center

RESPONSIBLE INDIVIDUAL: Garg, VK Tel (312) 567-3596

In-House

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: June 1979 COMPLETION DATE: Dec. 1981

ACKNOWLEDGMENT: Association of American Railroads Technical Center

03 319081

SINGLE AXLE TRUCK/ARTICULATED SUSPENDED CAR CHARACTERIZATION

Conduct field testing of the Budd BUDX 2000 articulated car and the single-axle autoguard car to determine their performance characteristics in the railroad environment. Will measure wheel/rail forces and motions with instrumented wheelset and other instrumentation.

PERFORMING AGENCY: ENSCO, Incorporated

INVESTIGATOR: Kenworthy, MA Tel (703) 960-8500

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Tsai, NT Tel (202) 426-0855

Contract DOT-FR-64113

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1980 COMPLETION DATE: June 1981 TOTAL FUNDS: \$290,000

ACKNOWLEDGMENT: FRA

03 323382

MODIFICATION TO TTC TRUCKS TO IMPROVE THEIR DYNAMIC BEHAVIOUR

This project includes the following: a) examination of the nature and extent of the poor dynamic behaviour of some trucks presently in use; b) cost-benefit analysis of modifying the trucks to improve their performance; c) computer analysis of trucks to determine the most promising modifications; d) design of truck modifications; and e) testing of the vehicles with and without modifications to determine the amount of improvement.

PERFORMING AGENCY: Ontario Ministry of Transportation & Communic, Can, O038GG

SPONSORING AGENCY: Ontario Ministry of Transportation & Communic, Can

RESPONSIBLE INDIVIDUAL: AppaRao, TA

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Mar. 1980 COMPLETION DATE: Dec. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

03 329555

FREIGHT CAR DESIGN AND SERVICEABILITY IMPACTS ON FREIGHT CAR UTILIZATION

The Program will complete the report of Task Force 6, Phase II on the out-of-service time caused by light bad orders on a major class 1 railroad. It will disseminate the report and publicize its conclusions, especially to railroad mechanical officers, government agencies which set design standards for railroad cars, and the car building industry.

REFERENCES:

The Impact of Freight Car Design and Serviceability on Freight Car Utilization, AAR Task Force II-6 and Input-Output Computer Systems, AAR R-438 160p, Feb. 1981

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: French, PW Tel (202) 293-4165 Muehlke, RV

SPONSORING AGENCY: Association of American Railroads, American Railroads Building, 1920 L Street, NW

RESPONSIBLE INDIVIDUAL: French, PW Tel (202) 293-4165 Muehlke, RV

Contract 035-78

STATUS: Active NOTICE DATE: Feb. 1981

ACKNOWLEDGMENT: AAR

03 335880

FRACTURE ANALYSIS OF PIPELINES

This is a research program for studying fracture initiation and propagation in pipelines which may contain a circumferential flaw such as a defect in the girth weld. During the first year, the solution of the problem of a pipe containing a circumferential through crack was obtained and that containing a part-through crack with a fully-yielded net ligament was formulated. Also, in order to clarify the question of leak vs. break in pipes certain elastic-plastic problems for a plate with a part-through crack were considered. Second and third year programs involve experimental as well as theoretical research. Basic plate experiments are being carried out in order to test the validity of fracture stability models which have been developed during the first year for cylinders and plates with a part-through crack. The particular weld and base materials of pipes will be characterized with regard to their fatigue and fracture behavior, the fixtures for the pipe bending experiments will be designed, and elastic-plastic solution of the part-through crack problem for the cylinder will be obtained. The elastic-plastic axisymmetric problem for a relatively thickwalled cylinder will be considered during the second and third years. Also during the third year the experimental program for the welded pipes will be carried out, a practical solution for a circumferential surface crack in elastic pipes will be developed, and final evaluation of various failure theories will be made in light of the experimental and theoretical results obtained in the program. This project is the result of a continuing effort by DOT to improve its regulations. The effort is fully coordinated with the pipeline welding research being conducted by the Materials Transportation Bureau at the National Bureau of Standards. The results of this research may also be applied in establishing design and inspection codes for other relatively thin-walled pressurized containers such as tank cars.

PERFORMING AGENCY: Lehigh University

INVESTIGATOR: Erdogan, F

SPONSORING AGENCY: Transportation Systems Center
RESPONSIBLE INDIVIDUAL: Orringer, O Tel (617) 494-2419

STATUS: Active NOTICE DATE: July 1981 START DATE: Sept. 1978 COMPLETION DATE: 1981

ACKNOWLEDGMENT: DOT

03 335905

SAFETY RELIEF VALVE LITERATURE SEARCH AND SYNTHESIS

Safety relief valves and other emergency control devices aid in preventing catastrophic failure of tank car shells under conditions of fire exposure. By altering relief valve design or introducing other emergency pressure relief systems it may be possible to speed up discharge of lading, thereby reducing time of exposure and reducing internal pressures in the tank car shell. This literature review is aimed at examining the potential for such an improvement.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-030

INVESTIGATOR: King, AW Tel (514) 581-3080

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Eggleton, P Tel (514) 283-7512

Contract 4433

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1981 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$5,000

ACKNOWLEDGMENT: CIGGT

03 341046

SAFETY LIFE CYCLE METHODOLOGY DEVELOPMENT/AEM-7 ASSESSMENT

The research under this contract was designed to study the applicability of safe-life methods to railroad vehicle systems and components in order to develop a methodology for determining the safe-life of rail vehicle systems. This work is being conducted in three phases: development of the methodology, development of safety-life guidelines, and application of the methods of a prototype locomotive. In the first phase, the activities included a study of rail vehicle component integrity, an assessment of the applicability of the Facility for Accelerated Service Testing (FAST) for safety life cycle testing, and general methodology development. The second phase activities included a failure analysis of the SD series of locomotives using actual accident data, preparation of safety life cycle prediction models based on fracture mechanics and locomotive dynamic performance considerations, and preparation of guidelines for safety life monitoring and testing of rail vehicles. The third phase activity, now underway, is to obtain performance data on the "break-in" period of the new Amtrak AEM-7 locomotive, and to use the data to initiate validation of the prediction models developed in the project.

PERFORMING AGENCY: Aerospace Corporation

INVESTIGATOR: Bose, RK Tel (202) 488-6066

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: McCown, RJ Tel (202) 426-1227

Contract DOT-AR-74316

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Apr. 1977 COMPLETION DATE: Oct. 1982 TOTAL FUNDS: \$1,591,000

ACKNOWLEDGMENT: FRA

03 341049

WHEEL FAILURE STUDIES

The wheel is one of the most critical components of a car or locomotive in that a failure often results in a major derailment causing significant damage and operational losses. Moreover, the railroads are operating today with trains that are longer, heavier and running at higher speeds on deteriorating track and structures. The dynamic loads imposed on the locomotive and car wheels have increased tremendously, thereby increasing the potential for wheel failures. Since a wheel failure can cause a serious derailment that may result in injury and huge nonproductive financial costs, a need exists for determining the extent to which the wheels can be expected to perform without failure. This contract satisfies this need by the development of a test facility to evaluate new and existing wheel designs under simulated operating conditions. A test device, capable of subjecting wheels to high thermal inputs until failure occurs is currently being constructed. It will be fully instrumented to determine temperature-strains and metallurgical changes. The results of these tests will be useful in providing guidelines to industry, the FRA Office of Safety, and the National Transportation Safety Board (NTSB) for preventing wheel failure.

PERFORMING AGENCY: National Aeronautics and Space Administration

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Vaughn, DA Tel (202) 426-1227

Contract DOT-FR-5380

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Apr. 1980 COMPLETION DATE: Dec. 1982 TOTAL FUNDS: \$447,500

ACKNOWLEDGMENT: FRA

03 341050

STUDY TECHNIQUES TO DISTINGUISH DEGRADED PERFORMANCE IN VARIOUS RAIL VEHICLE COMPONENTS

For the past 10 years, approximately 23 percent of the accidents sustained by the nation's railroads have been attributable to failures of various component parts of rail vehicles. Chief among these are failures of wheels, followed by truck components, coupler and draft system components, axles and bearings, and brakes. One approach taken to address this problem has been to investigate measures for preventing the failures before they occur. For example, wheel designs and alloying content have recently come under investigation in an effort to increase rail car wheels' ability to withstand high brake-induced thermal loads. This approach has resulted in the development of some successful countermeasures. However in order to implement a complete system engineering approach to the problem, investigations need to be made of concepts that will warn of impending degradation of the performance of various components. The objective of this contract is to investigate a wide range of conceptual techniques for distinguishing abnormal or degraded safety performance in various rail car parts. The range of concepts includes on-board vehicle and track-based systems. The purpose of these systems will be to signify, in the appropriate manner, that the operational performance of a given component is degraded to the point where replacement or repair is warranted. The present tasks include analysis and ranking of component parts which have failed and resulted in accidents; evaluation of the usefulness of various methods for detecting degraded performance in rail car component parts; and laboratory and field testing of those methods.

PERFORMING AGENCY: Ballistic Research Laboratory

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

Contract DOT-AR-8187

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1978 COMPLETION DATE: Sept. 1982 TOTAL FUNDS: \$175,000

ACKNOWLEDGMENT: FRA

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. 1981

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 have been 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. Experimental work on this question has been temporarily interrupted pending classification of matters concerning future research into the possible international application of the expected results.

Four reports have been published to date. Question A103.

PERFORMING AGENCY: International Union of Railways
 RESPONSIBLE INDIVIDUAL: Korpanec, I Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: 1967

ACKNOWLEDGMENT: UIC

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 and reduce costs. The projects selected: Car equipment, including technology application investigation; controls/communications/power, including technology application investigations; and maintenance technology application investigations. Three car equipment development programs have been defined: Alternating-current induction motor propulsion system; static-inverter auxiliary power supply; and improved air comfort system. In controls/power, electrical power distribution modeling and validation for rail transit systems has been initiated. Electromagnetic interference of chopper controlled propulsion systems with the existing train control track signaling systems is being investigated. A technology investigation has been partially completed for Fare Collection systems. An investigation and assessment of the use and maintenance of escalators has been completed, with a report in preparation. In response to the recent severe winters in the Northeast with consequential disruption of rail transit service, an assessment is currently underway appraising the available technologies for combating winter weather.

Contract to a performing agency not yet awarded.

SPONSORING AGENCY: Urban Mass Transportation Administration
 RESPONSIBLE INDIVIDUAL: Oren, R Tel (202) 426-0090

STATUS: Programmed NOTICE DATE: Aug. 1980 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 323374

PROPULSION TECHNOLOGY

The application of AC traction motors, flywheel hybrid drive systems, homopolar LSM motors and other advanced propulsion concepts to improve the energy efficiency and competitiveness of Canadian transport. Support research, development and demonstration of new types of propulsion for transportation. This project has concentrated on the rail and road transportation modes, but is not limited to these modes.

Prepared in cooperation with SPAR Aerospace.

PERFORMING AGENCY: Transport Canada Research and Development Centre, 061GH; Toronto University, Canada

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Audette, M

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Jan. 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

04 325456

STIRLING ENGINE

DOE awarded a contract to Mechanical Technology Incorporated (MTI) in March 1978 to develop Stirling engines. The MTI team includes United Stirling of Sweden and AM General, a subsidiary of the American Motors Corporation. The goal of the Automotive Stirling engine program is to advance the technologies as demonstrated in a series of engine prototypes so that the potential for high fuel efficiency, low noise and air pollution, and low costs can be proven. The program then will: transfer technology to the United States; encourage active private sector interest and involvement; stimulate earliest possible commercialization of Stirling engine-powered highway vehicles; provide positive transportation energy conservation without sacrificing personal mobility; and provide true transportation fleet multifuel capability as nonpetroleum fuels become available. Program activities are currently concentrated on design and fabrication of a new, more advanced automotive Stirling engine and development of improved components and materials. Detailed design of this new Stirling engine, called ASE MOD I, will be completed in June. This engine is scheduled to be tested on an engine dynamometer in February 1981. The component and materials development is directed at an improved engine called SE MOD II. This engine is intended to meet or exceed the final program objectives and will be tested in a vehicle by EPA in 1984.

PERFORMING AGENCY: Mechanical Technology Incorporated

INVESTIGATOR: Nightingale, N

SPONSORING AGENCY: Department of Energy, Office of Conservation and Solar Energy, NASA DEN3-32

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Mar. 1978 COMPLETION DATE: Sept. 1984

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FJ 2901)

04 329556

FEASIBILITY STUDY OF ADAPTIVE CONTROL OF THROTTLE AND BRAKING FORCES FOR LONG FREIGHT TRAINS

Self-tuning regulators are being investigated to develop decentralized control of multi locomotive powered trains. An off-line open loop control schedule

of the throttling and braking inputs is chosen to maintain a given velocity and acceleration pattern. The self-tuning regulators require little a priori information about the parameters of the train. The proposed decentralized on-line adaptive control scheme is simple and powerful. It can minimize the effect of noise due to grade changes. The control algorithm is illustrated by simulation examples.

REFERENCES:

Train Braking Performance Studies Using Suboptimal Controllers-Part I, Gruber, P; Bayoumi, MM, Canadian Institute of Guided Ground Transport, CIGGT Rpt 79-11, 1979

Train Braking Performance Studies Using Suboptimal Controllers-Part II, Gruber, P; Bayoumi, MM, Canadian Institute of Guided Ground Transport, CIGGT Rpt 79-12, 1979

State Estimation in Long Freight Trains Gruber, P; Bayoumi, MM, Canadian Institute of Guided Ground Transport, CIGGT Rpt 79-21, 1979

Reduced Order Model Observer for State Estimation in Long Freight Trains, Gruber, P; Bayoumi, MM, 2nd IFAC Workshop on Control App of Nonlinear Programming, 1980

Throttle and Brake Control of Multi-Locomotive Powered Long Freight Trains, Wong, KY; Bayoumi, MM; Gruber, P, Third Int'l Symposium on Large Engineering Systems, 1980

Partially Decentralized Control of Multi-powered Trains Gruber, P; Bayoumi, MM, Third Int'l Symposium on Large Engineering Systems, 1980

Suboptimal Control Strategies of Multi-Locomotive Powered Trains, Gruber, P; Bayoumi, MM, IEEE Conf on Decision & Control Dec. 10-12, Albuquerque, NM, 1980

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-003

INVESTIGATOR: Bayoumi, MM Tel (613) 547-2878 Wong, KY

SPONSORING AGENCY: Canadian Institute of Guided Ground Transport

RESPONSIBLE INDIVIDUAL: English, GW Tel (613) 547-5777

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1980 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$9,710

ACKNOWLEDGMENT: CIGGT

04 329570

LOCOMOTIVE TRACTION MOTOR BEARING FAILURE STUDY

To ascertain the cause of sporadic failures of traction motor bearings (particularly during winter operation). The study has involved two investigations. One utilizing a traction motor set up in an environmental chamber in the Ottawa laboratory (T.R. Ringer, J.F. Lane) to ascertain how water enters the bearing reservoirs and another at the Vancouver laboratory (C. Dayson) to assess the effectiveness of the wick lubrication system.

PERFORMING AGENCY: National Research Council of Canada, DME-78-G-25

INVESTIGATOR: Dayson, C Tel (604) 542-4477 Ringer, TR Tel (613) 993-2439 Lane, JF

SPONSORING AGENCY: Government of Canada

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: 1977

ACKNOWLEDGMENT: National Research Council of Canada

04 329571

SNOW INGESTION BY LOCOMOTIVE TRACTION MOTORS

Snow ingestion by traction motors is a major cause of locomotive failure and costs the Canadian railway millions of dollars in maintenance each winter. Considerable savings in maintenance costs and inventory could be realized if this problem were substantially reduced. Initially, an understanding of the precise mechanism of ingestion is being sought so that effective solutions may be devised. In addition, tests on various types of locomotive air filters are being made to determine their effectiveness under snow conditions.

PERFORMING AGENCY: National Research Council of Canada, DME-79-L-41

INVESTIGATOR: Stallabrass, JR Tel (613) 993-2371 Hearty, PF

SPONSORING AGENCY: Government of Canada

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: 1979

ACKNOWLEDGMENT: National Research Council of Canada

04 335876

IMPROVEMENT IN RAIL VEHICLE DYNAMIC PERFORMANCE THROUGH CONTROL OF LINEAR MOTOR LATERAL AND NORMAL FORCES

The objective of this research program is the exploration of the use of linear motors to improve the dynamic performance of railroad vehicles. Improved vehicle stability, ride quality, traction capability, curving performance, track loading, and derailment safety may result from use of controllable lateral and normal forces, magnetic forces present in the motor, in addition to those used for propulsion. Use of linear induction and synchronous motors in various configurations is being evaluated in locomotive and powered passenger rail vehicle applications. Experiments on the Princeton Dynamic Model Track will verify linearized analyses of the motor forces used in the system evaluation. Critical interactions between motor, vehicle and rails are being studied experimentally for a selected configuration to demonstrate the potential for improved vehicle performance. The results of this research should provide the basis for future development of high speed conventional rail technology. Communication has been made with several potential users, including U.S. DOT, researchers at Massachusetts Institute of Technology, and four industries: MITRE Corp., General Electric, Urban Transportation Development Corporation (Canada), and Japanese National Railways.

PERFORMING AGENCY: Princeton University, Department of Mechanical and Aerospace Engineering

INVESTIGATOR: Sweet, LM

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Guarino, M, Jr Tel (202) 426-9665

Contract DOT-RC-92033

STATUS: Active NOTICE DATE: July 1981 START DATE: Sept. 1979 COMPLETION DATE: Aug. 1981

ACKNOWLEDGMENT: DOT

04 335898

AEM-7 LOCOMOTIVE TEST AT TTC

The testing of the AEM-7 locomotive, begun in April 1980 at the Transportation Test Center in Pueblo, Colorado, was conducted using the Railroad Test Track (RTT) catenary system. The RTT traction substation was modified to provide two voltage levels, 12.5 kV and 25 kV, in order to test the locomotive's dual-voltage capability. Basic locomotive operating characteristics were investigated as part of the testing. Temperatures of locomotive equipment and components were measured, and catenary current harmonics were analyzed for different operational conditions. These characteristics tests indicated the ability of the locomotive to meet performance specifications. A 160,000-mile endurance test is being completed to determine whether the locomotive and Amfleet cars can operate at high speeds over the Northeast Corridor for an extended period of time. A number of equipment failures occurred during the endurance testing that required solutions.

PERFORMING AGENCY: Transportation Test Center

INVESTIGATOR: McCutcheon, W

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Gannett, MC Tel (202) 426-9665

STATUS: Active NOTICE DATE: July 1981 START DATE: May 1980 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$1,133,110

ACKNOWLEDGMENT: FRA

04 341269

TLRV POWER-CONDITIONING HARDWARE UTILIZATION STUDY

The most advanced and most powerful electrical traction system ever built is the one developed for the Tracked Levitated Research Vehicle (TLRV). This system was developed by the Federal Railroad Administration (FRA) under the levitated-systems program and was partially tested in 1976, before it was dismantled and stored at the Transportation Test Center (TTC). Low-speed tests were conducted successfully up to 44 mph. These low-speed tests, originally planned to be followed by tests up to 150 mph, were conducted after the levitated systems program was terminated because of the potential application of the system to conventional locomotives. The contract primarily focuses on the possible application of the partially tested power conditioning system to conventional locomotives. It involves system definition for locomotive application, system definition for static power source application, novel control methods for ac traction, and advanced semiconductor cooling techniques. The principal accomplishment in 1980 is

the preparation of a report on the first phase of the work. This contract will establish the R&D groundwork for AC traction for locomotives and multiple unit (MU) cars. This type of electrical traction maximizes usable power per driven axle. It can, for example, lead to a reduction in the size of locomotive fleets.

PERFORMING AGENCY: AiResearch Manufacturing Company

INVESTIGATOR: Kalman, G Tel (213) 512-4087

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Guarino, M, Jr Tel (202) 426-9665

Contract DOT-FR-9132

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1979 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$218,000

ACKNOWLEDGMENT: FRA

04 341270

DEVELOPMENT OF IMPROVED ANALYTICAL TECHNIQUES FOR THE DESIGN OF THREE-PHASE TRACTION MOTORS

The principal objectives of the research are (a) to identify the limitations of existing three-phase motors and of the analytical techniques used in the prediction of their performance, and (b) to develop a new and improved general approach to their design. This improved approach will allow the application of modern analytical and computational methods to a broad spectrum of three-phase traction motors, with special emphasis on new materials, optimum geometry for their intended use, and amenability to the analysis of new machines with unusual air-gaps and cross sections. Typical examples of unusual three-phase motors are the "tubular motor" being

developed by British Rail for lightweight vehicles and the inductor rotary motor for lightweight vehicles, including electric buses and automobiles. The methodology is based on making the air-gap field of all machines (which is, generally, a complex two-dimensional region, due to slots and/or poles) the common foundation and starting point for all machine analyses. Modern techniques (including recent results from DOT's linear motor research) will be "synthesized." Sample designs will be carried out; the new method will be checked against laboratory tests on a "typical" motor. Classification of motor types and pairing with applications have been completed. The research has involved survey and preliminary assessment of existing analytical methods used to predict the performance of the three-phase motors. In addition, the researcher has developed a number of computer programs and derived fundamental formulas. Currently, the research is focusing on obtaining all the necessary explicit formulas, then upon interpreting and integration of all the partial results into a comprehensive direct approach to the design, and finally, laboratory verification of this new direct approach.

A Final Report is being published.

PERFORMING AGENCY: Polytechnic Institute of New York

INVESTIGATOR: Levi, E Tel (212) 643-4486

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Guarino, M, Jr Tel (202) 426-9665

Contract DOT-RC-92022

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: June 1979 COMPLETION DATE: May 1981

ACKNOWLEDGMENT: FRA

05 170652

BRAKE PADS FOR DISC BRAKES AND COMPOSITION BRAKE BLOCKS

The studies of this Committee mainly concern: 1) Comparative tests on test rigs to verify the conditions imposed on these rigs; 2) Tests under wet and wintry conditions; 3) Study of test methods to check the quality of the linings; 4) Study of the problem of the brake power limits of the disc brake. Report RP 4 describes the first part of the studies made on several full-size test rigs. The object of the studies in progress in this connection is to check all the conditions, requirements and recommendations concerning the test rigs and the implementation of tests within the scope of the acceptance programme for brake linings for disc brakes and brake blocks. With effect from 1.1.1980 these conditions have been incorporated in UIC Leaflet 541-3 and 541-4. The present state of knowledge concerning the functioning of disc brakes in a damp environment will be described in Report RP 6 (planned for the end of 1980). The studies under winter conditions (started in September 1977 after the termination of Question B 132) were delayed. The programme planned could not be carried out, because of difficulties with the test rig in the climatic chamber at the MBVA, Vienna Arsenal. The results of the studies concerning quality control methods were published in April 1979 in Report RP 5. The other studies, using small-scale test rigs, are in progress. In compliance with the request of the Control Committee, the problem of the brake power limits has been studied in co-operation with the Sub-Committee for braking and a schedule has been prepared for the studies required. These studies cannot be terminated within the originally planned time schedule for Question B 126; consequently the study period has been extended to 1982. The Specialists Committee has finally tried to adapt the title of Question B 126, so as to account for the extended activities and has decided to adopt the following title: "Railway braking with various friction materials".

Five 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: Dec. 1980 START DATE: 1973
ACKNOWLEDGMENT: UIC

05 170656

STANDARDISATION OF THE MATERIAL FOR CAST-IRON BRAKE BLOCKS

So far the following points of the Programme of Work have been dealt with: 1) Choice of grades of cast iron intended for the tests (preparation of technical and manufacturing specifications for brake blocks); 2) Laboratory tests concerning their chemical composition, mechanical strength and metallurgical structure; 3) Dynamic tests on small test rig; 4) Choice of grades of material for the tests on full-scale rigs; 5) Tests on full-scale rigs; 6) Track tests with individual wagons. On the basis of the first 4 points, 5 different materials were selected. The results were presented in Report B 146/RP 1 (October 1979). The full-scale brake rig tests (DB rig at Minden and SNCF rig at Vitry) made it possible to reduce the number of materials for track tests to three. The full results of the braking roller rig tests will be published in Report B 146/RP 2. The track test programme is in progress. The work has been divided, according to the braking system used (S, SS, P,

R), among four railways, viz. CFF, MAV, PKP and SJ. It seems that it will be the resistance to wear and to cracking which will be the chief criteria in selecting the standard material.

One report has been published to date. Question B146.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Osuch, K Office for Research and Experiments
STATUS: Active NOTICE DATE: Dec. 1980
ACKNOWLEDGMENT: UIC

05 341052

FREIGHT TRAIN BRAKE SYSTEMS SAFETY/STUDY A

The objectives of this contract are to develop concepts for improved stopping distances for freight trains, to study effect of irregular car brake forces on in-train forces, and to evaluate brake shoe characteristics and the effect of shoes on wheel life. An assessment of the safety benefits that would accrue by achieving shorter stopping distances will be done. Brake rigging efficiencies will be measured. Data developed under other contracts will be used to assess the inherent characteristics and associated problems of each type of brake shoe. The results and recommendations of the study will be used for subsequent work to develop braking systems performance guidelines in support of Freight Car Power Brake Regulations.

PERFORMING AGENCY: IIT Research Institute
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Vaughn, DA Tel (202) 426-1227

Contract DTFR 53-80-C-00088

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: June 1980 COMPLETION DATE: June 1983 TOTAL FUNDS: \$181,512

ACKNOWLEDGMENT: FRA

05 341053

FREIGHT TRAIN BRAKE SYSTEMS SAFETY/STUDY B

The objectives of this contract are to formulate characterization of brake pipe air flow, to develop comprehensive computer models of the air brake system to be used as a tool to address outstanding NTSB brake questions, and to develop brake shoe data to be used in brake shoe evaluations. The air flow through the brake pipe will be analyzed mathematically to determine pressure/flow characteristics. Tests of a simulated freight train brake pipe will be conducted. Brake shoes will be tested on a dynamometer to determine the coefficient of friction under environmental conditions. The outputs of this contract will include train brake testing techniques to assure adequate brake force, and recommendations concerning brake shoe operation in various environments.

PERFORMING AGENCY: Bolt, Beranek and Newman, Incorporated
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Vaughn, DA Tel (202) 426-1227

Contract DTFR 53-80-C-00103

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: July 1980 COMPLETION DATE: July 1983 TOTAL FUNDS: \$238,205

ACKNOWLEDGMENT: FRA

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, SH 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: Completed NOTICE DATE: Aug. 1981 START DATE: July 1978 COMPLETION DATE: Dec. 1980 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: Completed NOTICE DATE: Aug. 1981 START DATE: Sept. 1978 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$210,000

ACKNOWLEDGMENT: FRA

06 160400

ASSESSMENT AND EVALUATION OF SIGNAL/CONTROL SYSTEM EQUIPMENT AND TECHNOLOGY

The objective of the FRA Signal/Control Program was to assess the state-of-the-art of newly available and presently installed Signal/Control Systems, develop a set of specifications for a state-of-the-art improved system, demonstrate the equipment, and certify requirements for cost-effective upgrading of Signal/Control Systems as used on intercity passenger rail routes. This new system would have high speed capability, be compatible with electrification, be capable of bidirectional operation, and reflect the most modern technology that is economically justified. It is recognized that in developing any improved system, economic restraints may require the retention and incorporation of a substantial amount of existing signal and control equipment. The status of present-day signal/control equipment and technology both in the United States and abroad was evaluated. The results have been publicized and recommendations made for further developments and fabrications of a prototype system using the most advanced techniques. One goal of the program was 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., Dec. 1978, PB-296494/AS

Task 2: Status of Present Signal/Control Equipment Taylor, SF; Marshall, JF; Schultz, CM; Whalen, RB, STV, Inc., Kentron, Inc., Dyer (TK), Inc.--Available NTIS, FRA/ORD-78/39.2 122 p., PB-299891/AS

Task 3: Standardization, Signal Types, Titles Taylor, SF; Marshall, JF; Schultz, CM; Whalen, RB, STV, Inc., Kentron, Inc., Dyer (TK), Inc.--Available NTIS, FRA/ORD-78/39.3 356 p., PB80-142441

Task 4: Electrical Noise Disturbance Taylor, SF; Marshall, JF; Schultz, CM; Whalen, RB, STV, Inc., Kentron, Inc., Dyer (TK), Inc.--Available NTIS, FRA/ORD-78/39.4, July 1980, PB81-111130

Task 5: Economic Studies Taylor, SF; Marshall, JF; Schultz, CM; Whalen, RB, STV, Inc., Kentron, Inc., Dyer (TK), Inc.--Available NTIS, FRA/ORD-78/39.5, Jan. 1981, PB81-190209

Task 6: Specification Development Taylor, SF; Marshall, JF; Schultz, CM; Whalen, RB, STV, Inc., Kentron, Inc., Dyer (TK), Inc.--Available NTIS, FRA/ORD-78/39.6, Mar. 1981, PB81-194318

Task 7: Summary Report Taylor, SF, STV, Incorporated, In process of publication

PERFORMING AGENCY: STV, Incorporated

INVESTIGATOR: Taylor, SF Tel (215) 326-4600

SPONSORING AGENCY: Federal Railroad Administration, Office of Passenger Systems, RRD-22

RESPONSIBLE INDIVIDUAL: Woll, TP Tel (202) 426-9564

CONTRACT DOT-FR-773-4236 (CPFF)

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1977 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$752,025

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 measurement and analysis of intensive measurements has led to a simple practical method for the prediction of signal strength for VHF and UHF propagation in the railway terrain (lines, stations and tunnels).

The sixth and final report has been published. Question A133.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Gelbstein, E Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980

ACKNOWLEDGMENT: UIC

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

06 308308

INDUCTIVELY-COUPLED POWER TRANSMISSION SYSTEMS FOR LONG TRAINS

Inductive couplers which were manufactured under previous contract will be mounted on a 32 car unit train for field testing. The reliability and durability of the couplers will be monitored over an 18 month period, while they are being used as a train line communications link.

REFERENCES:

A Communications System for Long Trains Aitken, GJM, CIGGT Rpt. 75-4, Feb. 1975

Inductive Coupling for Transmission of Braking Signals in Long Freight Trains, Aitken, GJM, CIGGT Rpt. 77-4, Jan. 1977

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-927

INVESTIGATOR: Aitken, GJM Tel (613) 547-5777

SPONSORING AGENCY: Canadian National Railways; Canadian Pacific Railways

RESPONSIBLE INDIVIDUAL: Pak, W Tel (514) 395-6660 Cass, B

Contract 376/927

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Nov. 1979 COMPLETION DATE: Mar. 1982 TOTAL FUNDS: \$53,099

ACKNOWLEDGMENT: CIGGT

06 329578

LIGHTWEIGHT VEHICLE TRACK SHUNTING

The objective of this contract is to determine the extent of the shunting problem on the railbus and other light-weight rail vehicles and to identify solutions to it. Railroads in the United States currently use a shunting technique in which the vehicle completes an electric circuit between the tracks, to activate signaling and control systems such as highway crossing warning signals. This study disclosed that special precautions must be taken before single-unit lightweight railroad cars can be operated on common carrier railroads. Such operation without special precautions introduces the likelihood of signal malfunctions in train protection systems and rail-highway grade crossing warning systems. Malfunctions of the signal system result from failure of the vehicle to make known its presence on a track by failing to pass sufficient current in a given time through its wheels and axles from one rail to the other. This is known as a shunt failure. Approximately one-half of the contract has been completed in an effort to define the extent of the problem and possible avenues for its solution. Tasks that have been completed in 1981 were: 1) Development of a clear statement of the problem; 2) Identification of applicable (government and industry) regulations and gathering of related data; 3) Assessment and documentation of industry developments and operational requirements; and 4) Formulation of R&D recommendations.

REFERENCES:

Lightweight Vehicle Track Shunting Horvath, R; Foley, P; Whalen, RB, Dyer (TK), Incorporated, FRA/ORD-81/56, Apr. 1981

PERFORMING AGENCY: Dyer (Thomas K), Incorporated

INVESTIGATOR: Horvath, R Tel (202) 466-7755

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Woll, TP Tel (202) 426-9564

Contract DOT-FR-53-80-P-00141

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1980 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$7,291

ACKNOWLEDGMENT: FRA

06 341062

RAILROAD ELECTROMAGNETIC COMPATIBILITY

Electromagnetic compatibility (EMC) is the capability of electronic (or electrical) equipments or systems to be operated in their intended operational electromagnetic environment at designed levels of efficiency. All operating electrical equipment produce electric and magnetic fields which may influence other electrical equipment. This influence can produce a safety hazard, degradation of equipment performance, or just be a nuisance. EMC

Signals, Control and Communications

06A

is becoming increasingly important in view of the relatively hostile railroad environment and the introduction of more sophisticated electrical systems. This contract will provide an EMC assessment of railroad systems and identify problems and concerns. Systems will include both mainline and classification yard environments. Locomotives, signaling communication, and control equipment will be examined. Recommendations for EMC improvements and mitigation techniques will be developed.

PERFORMING AGENCY: Electromagnetic Compatibility Analysis Center
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Cracker, WF, Jr Tel (202) 426-0855
Contract DOT-AR74311
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Feb. 1977
TOTAL FUNDS: \$552,000
ACKNOWLEDGMENT: FRA

07 049659

HUMAN FACTORS IN RAILROAD OPERATIONS

This continues a program of research and consultation on human factors in railroad safety in support of FRA regulatory responsibilities involving human performance. Current work includes design and fabrication of a locomotive and train handling evaluator, measurement of the noise environment of the train crews, 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

SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

STATUS: Active NOTICE DATE: Feb. 1981

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 Public Support for Railroad Training Stewart (DA) and Associates, Jan. 1978
- Local Level Labor-Management Workshop (Buffalo Terminal Project), Conrail, Aug. 1979
- Local Level Labor-Management Workshop (Houston Terminal Project), Oct. 1979
- Project REAP: A Report to the Industry (Alcohol Conference), Jan. 1980
- Local Level Labor-Management Workshop (Buffalo)

SPONSORING AGENCY: Federal Railroad Administration, Office of Federal Assistance

RESPONSIBLE INDIVIDUAL: Kozak, DJ Tel (202) 426-6277

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Apr. 1975

ACKNOWLEDGMENT: FRA

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.

REFERENCES:

- Summary Report: 321 (b) Rail Retrofit Evaluation-Light and Commuter Rail Systems, Volume I (Dec. 1980 Revised), UMTA-CA-06-0125-80-1, PB81-187148

PERFORMING AGENCY: Crain and Associates, CA-06-0125

INVESTIGATOR: Crain, JL Tel (415) 327-8101

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: Completed NOTICE DATE: Aug. 1981 START DATE: Mar. 1979 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$575,000

ACKNOWLEDGMENT: UMTA

07 324945

APPLICATION OF THE ISO 2631 STANDARD TO RAILWAY VEHICLES

The chief objective of the B 153 Committee is to develop a standard testing method within the UIC which is compatible with the ISO texts currently being revised and which will make it possible to assess the exposure to vibrations of passengers and staff in railway trains. The main objects of the preliminary studies are to catalogue the recordings made and the different analysis methods used, and to apply the Standard 2631 to a few typical practical cases. Parallel with this, the standard is being examined in detail and the various problems arising in connection with its application by the railways are clearly formulated. Line tests and laboratory tests will be carried out to serve as a basis for UIC/ORE proposals to ISO. Permanent liaison is being established between the ORE B 153 Committee and the ISO TC 108 (Sub-Committees 2 and 4). The ultimate objective of the Committee is to draft recommendations to be incorporated into the future Standard ISO 2731 in so far as it affects railway transport.

Question B153.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Jutard, M Office for Research and Experiments

STATUS: Active NOTICE DATE: Jan. 1981 START DATE: 1979

ACKNOWLEDGMENT: UIC

07 335475

HIGH LEVEL PLATFORM-RAIL VEHICLE THRESHOLD GAP STUDY AND TESTS

PURPOSE: The purpose of this investigation is to gather data in four areas for use by DOT in its initiatives aimed at making transit systems accessible to persons in wheelchairs: a. The acceptable range of maximum gaps (various horizontal and vertical spacings in combination) which can be safely crossed by individuals in manually propelled or powered wheelchairs. b. Suitable techniques for safely and independently crossing such gaps in a wheelchair. c. The abilities of persons in wheelchairs with different disabilities safely and independently to cross the gaps. d. The effects crossing these gaps repeatedly may have on the structural integrity (durability and life expectancy) of wheelchairs. PLAN: A portable gap-simulator apparatus at the Veterans Administration Prosthetics Center (VAPC), New York will be used to gather the data mentioned above. METHOD: Persons using their own or Government-owned manual or powered wheelchairs cooperating in the study will be asked to proceed from starting reference lines and independently to cross a series of gaps of increasing difficulty. Their achievements using different wheelchair strategies and techniques will be recorded. A separate specially designed testing machine will be used in the durability tests.

PERFORMING AGENCY: Veterans Administration, Medical Center, Test and Development Laboratory

INVESTIGATOR: Reichenberger, AJ

SPONSORING AGENCY: Veterans Administration, Department of Medicine and Surgery, 129-26-6369 790-001-I

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1980

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZO 45969)

08 049658

RAIL SAFETY/GRADE CROSSINGS PROTECTION

The program consists of three major tasks: (1) Development of new concepts for train detection with capabilities to provide constant warning time to motorists, (2) Development of new and more effective means of providing warning to the motorists, and (3) Development of guidelines to improve the conspicuity of locomotives and to reduce the possibility of death and injuries due to grade crossing accidents.

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: Feb. 1981

ACKNOWLEDGMENT: FRA

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 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

08 308313

DEVELOPING GUIDELINES FOR ELIMINATING UNNECESSARY RAIL-HIGHWAY GRADE CROSSINGS ON LOW-VOLUME RURAL ROADS AND STREETS IN SMALL COMMUNITIES

Library and field research to determine and document the pros and cons of

considering the closing of a rail-highway grade crossing as an alternative when assessing crossing and community needs. It is the thesis of this project that the availability of a procedure for deriving, reviewing and assessing possible alternative routing options and all their safety, traffic and community impacts, actual and potential, would promote understanding and acceptance of crossing closure as an option. This can best be accomplished if uniformly approached in a systematic fashion.

PERFORMING AGENCY: Kansas State University, Department of Civil Engineering, EES 2709, 2713, 2714

INVESTIGATOR: Russell, ER Tel (913) 532-5862

SPONSORING AGENCY: Federal Railroad Administration; National Railroad Passenger Corporation; Atchison, Topeka and Santa Fe Railway

RESPONSIBLE INDIVIDUAL: George, B Tel (202) 426-2920 Bellino, JO Tel (202) 383-2543 Holman, L Tel (913) 862-9360

Contract DOT-FR-9026

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Oct. 1978 TOTAL FUNDS: \$38,063

ACKNOWLEDGMENT: Kansas State University

08 309947

RAILROAD-HIGHWAY CROSSING ACCIDENT CAUSATION STUDY

Study will involve an analysis of crossing accident data, interviews with individuals involved in accidents and a review of accident reports to determine crossing accident causes.

PERFORMING AGENCY: IOCS Incorporated

INVESTIGATOR: Knoblauch, K

SPONSORING AGENCY: Federal Highway Administration, Traffic Systems Division

RESPONSIBLE INDIVIDUAL: Coleman, J

Contract DOT-FH-119682

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Oct. 1979 TOTAL FUNDS: \$121,000

ACKNOWLEDGMENT: Federal Highway Administration (273289354)

08 333451

ALTERNATIVE WAYS TO IMPROVE THE VISIBILITY OF RAILROAD-HIGHWAY CROSSING SIGNALS

This study will analyze ways to improve the crossing light dispersion and intensity, determine hardware changes needed to improve signal visibility, and build and test a prototype of the proposed change.

PERFORMING AGENCY: Allard, Incorporated

INVESTIGATOR: Urbanek

SPONSORING AGENCY: Federal Highway Administration, Traffic Systems

RESPONSIBLE INDIVIDUAL: Coleman

Contract 81-R-00017

STATUS: Active NOTICE DATE: July 1981 START DATE: Mar. 1981 COMPLETION DATE: Sept. 1982 TOTAL FUNDS: \$240,000

ACKNOWLEDGMENT: Federal Highway Administration (035391354)

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: Feb. 1981 START DATE: Sept. 1973

ACKNOWLEDGMENT: FRA

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 RRS Nos. 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: Feb. 1980 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: Feb. 1980 START DATE: Oct. 1977

ACKNOWLEDGMENT: FRA

09 170659

NON-DESTRUCTIVE EXAMINATION PROCEDURES

The E 139 Committee presented its first two reports in April 1979, one on magnetoscopic and ultrasonic testing of axle-shafts, and the second on the terminology concerning these two methods of inspection. At present work is in progress on tests in the works both on solid wheels and wheel tyres and on rails. Studies relating to the latter are in the hands of a working party on "Rails" and are sufficiently well advanced for a report (RP 3) to be presented at the beginning of next year on ultrasonic acceptance testing of rails in the works. The results of the tests carried out with solid wheels and tyres, as well as all the recommendations based on these tests, will be published in Report RP 5. Furthermore, two members of the E 139 Committee have in the course of this year published a technical document on methods of detecting faults in rails by eddy currents; this document will shortly be distributed. Finally, the Committee has also compiled extensive documentation on general non-destructive testing of rails in situ. The Committee is now able to publish a report on ultrasonic testing of rails in

situ. This report (RP 4) outlines current methods and gives the main guidelines for the next few years. To summarise, by the end of 1981 or the beginning of 1982, the E 139 Committee could publish the following reports: RP 3: Ultrasonic testing of rails at the works (report almost completed), RP 4: Ultrasonic testing of rails in situ, RP 5: Ultrasonic testing of solid wheels and tyres.

Two reports published to date. Question E139.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Osuch, K Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980

ACKNOWLEDGMENT: UIC

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.

REFERENCES:

A New Proposal for the Performance Testing of Shipping Containers; Godshall, WD, Package Development and Systems, 9(5): 21-23, Sept. 1979

PERFORMING AGENCY: Forest Products Laboratory

INVESTIGATOR: Koning, JW, Jr

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1980 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 Canadian rail users and manufacturers.

PERFORMING AGENCY: PMRL/CANMET, 430831; Department of Energy, Mines and Resources, Canada

INVESTIGATOR: Fegredo, DM Tel (613) 593-7104

SPONSORING AGENCY: Department of Energy, Mines and Resources, Canada

RESPONSIBLE INDIVIDUAL: White, DWG Tel (613) 593-7074

In-House

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Apr. 1975 TOTAL FUNDS: \$300,000

ACKNOWLEDGMENT: PMRL/CANMET

09 319913

FIRE RESISTANT MATERIALS

Nonmetallic materials research will be performed to provide polymeric compounds with improved service properties and fire safety for both domestic and military aircraft. Polymer types with potential cost benefit to the development of lightweight aircraft structures will be investigated. Synthesis, chemical modifications, and molecular characterization of high char yield polymers will be done to provide candidate systems from which selections can be made for resin matrix binders, film formers, adhesives, foams, transparencies and modified carbon fibers. Criteria for selection will include reduced flammability, smoke and toxic gas emissions, fire impact stability and controlled electrical properties. The polymer microstructure, solid state physics and chemistry, environmental performance, and combustion characteristics with the attending toxicological effects as well as thermomechanical properties will be determined on new and advanced state-of-the-art polymers and related to projected applications. The data derived from these studies will serve as a base for analytical studies to predict fire endurance, toxic threat levels, carbon fiber release, and mechanical and environmental performance. Candidate polymers and processes will be

provided for evaluation as prototype, subsystem components for testing, with particular and immediate attention being given to resin matrices for carbon fiber composite structures. In addition, quantum chemistry calculations will be applied to large polymers and graphitic structures to determine such properties as photodissociative stability and conductivity.

PERFORMING AGENCY: Ames Research Center, National Aeronautics and Space Administration
 SPONSORING AGENCY: National Aeronautics and Space Administration, Office of Aeronautics and Space Technology, 505-33-31
 RESPONSIBLE INDIVIDUAL: Heimbuch, AH

STATUS: Active NOTICE DATE: Nov. 1980 START DATE: Oct. 1977

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZH 870004 2)

09 331135

THE ECONOMIC ASPECTS OF FRACTURE IN THE U.S. ECONOMY

This award to the National Bureau of Standards (NBS) will provide partial funds to help support a study on the economic aspects of fracture on the U.S. economy. The study will be undertaken by NBS with the assistance of additional consultants and subcontractors from the private sector. The purpose will be to examine and report on: (1) the total cost of fracture to the nation, including all costs of unintended fracture (e.g. bridge and pipeline failure, airplane crashes, etc.), costs related to social-personal factors, and costs of fracture prevention; (2) the portion of the total national cost of fracture that could be reduced by the universal application of current best practice fracture technology; and (3) the portions of the presently irreducible national cost of fracture that represent the lack of knowledge on fracture behavior and control.

PERFORMING AGENCY: National Bureau of Standards
 INVESTIGATOR: Reed, RP Smith, JH
 SPONSORING AGENCY: National Science Foundation, Directorate for Mathematical and Physical Sciences, DMR80-21179

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: Sept. 1980 COMPLETION DATE: Aug. 1981 TOTAL FUNDS: \$25,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSY 1911)

09 335897

PCB SUBSTITUTES

The objective of this contract is to identify a suitable substitute for railroad transformer coolants containing PCB. During FY80, the contractor installed instrumentation on and monitored the performance of transformers containing Iralec and RTemp in service on SEPTA lines. Transformers are presently being prepared for in-service tests of Midel and RTemp II.

PERFORMING AGENCY: ENSCO, Incorporated
 INVESTIGATOR: Marine, R
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Gannett, MC Tel (202) 426-9665

Contract DT-FR 53-80-C00002

STATUS: Active NOTICE DATE: July 1981 START DATE: Oct. 1979 COMPLETION DATE: Mar. 1982 TOTAL FUNDS: \$41,000

ACKNOWLEDGMENT: FRA

09 335899

AN IMPROVED AUSTENITIC-MANGANESE STEEL FOR RAILROAD APPLICATIONS

The objectives are: (1) To establish a suitable alloy composition and heat treatment to provide improved wear resistance in railroad components such as frogs, cross-overs, bridge-wedges; (2) To determine the weldability of all alloys developed in (1) to ensure that, the railroad components can be repaired by welded overlays and that the cast component may be joined by welding to a standard rail; (3) To determine the suitability of all alloys developed in (1) to be explosively hardened, modifying compositions accordingly.

REFERENCES:

An Improved Hadfield Steel for Use in Railway Costing Richardson, DC; MacKay, WBF; Smith, RW, Proc Conf on Solidification Tech in Foundry & Casthouse, 1980

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-089

INVESTIGATOR: MacKay, WBF Tel (613) 547-2634 Smith, RW
 SPONSORING AGENCY: Canadian Pacific Limited; Transport Canada Research and Development Centre; Queen's University, Canada
 RESPONSIBLE INDIVIDUAL: Taylor, EH Tel (514) 395-7263 Dillon, R

STATUS: Active NOTICE DATE: July 1981 START DATE: May 1980 COMPLETION DATE: July 1982 TOTAL FUNDS: \$135,990

ACKNOWLEDGMENT: CIGGT

09 341051

FIRE-FLAMMABILITY OF MATERIALS USED IN RAIL PASSENGER CARS

Despite the enviable safety record possessed by intercity rail passenger travel the occurrence of an onboard fire within the rail vehicle interior presents the potential threat of injury or death to passengers. DOT is considering the development of fire safety standards for materials used within the interior of the vehicles. Information describing rail interior fires will be collected as well as pertinent Federal, state, and local fire prevention regulations and codes. Existing flammability test methods will be reviewed to select methods which are applicable to vehicle interior materials. Flammability of current interior materials in various categories of use will be measured using suitable fire testing methods. A full-scale test of a typical rail passenger vehicle interior will be conducted. This test will allow the evaluation of the complete interaction between burning materials within the entire vehicle. The output of the research effort will be used in developing fire performance requirements for materials used within rail passenger vehicle interiors.

PERFORMING AGENCY: Ballistic Research Laboratory
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

Contract DOT-AR-8179

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Aug. 1978 COMPLETION DATE: Aug. 1982 TOTAL FUNDS: \$675,000

ACKNOWLEDGMENT: FRA

10 170655

RAILWAY NOISE

The object of the Committee is to study the causes of railway noise, to develop remedies and to fix limiting values for the radiation of noise by vehicles and for the extent to which people are exposed to noise. Proposals have been made for the abatement of raking noise and curve squealing, the propagation of noise in the vicinity of railway installations has been studied and a computation model for the prediction of noise propagation has been developed. The efficacy of noise insulating walls along railway lines as well as vehicle screens has been studied. An acoustic comparison between various types of bridges has been made. Furthermore, technical noise insulation measures, to improve the acoustic performance of less recent railway stock, have been suggested. Studies have been carried out with a view to reducing the noise developed by permanent way machines. Regarding the problem of rolling noise in the contact area between wheel and rail, the corrugation wear on the running surfaces of the wheel is being studied. To measure the irregularities in the running surface of the wheel, a laser profilograph will be used jointly with a mechanical measurement device. Following a request of the UIC Bridge Sub-Committee on acoustic comparison between several types has been made. A relevant report is being prepared. A report concerning the relationship between the disturbing effect of the noise caused by railway traffic and the noise produced by other means of transport is being prepared.

Fifteen reports have been published to date. Question C137.

PERFORMING AGENCY: International Union of Railways
RESPONSIBLE INDIVIDUAL: Lamla, H Office for Research and Experiments

STATUS: Active NOTICE DATE: Dec. 1980

ACKNOWLEDGMENT: UIC

10 196753

SUBWAY ENVIRONMENTAL SIMULATION PROGRAM

To validate specific portions of the Subway Environmental 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: Completed NOTICE DATE: Aug. 1981 START DATE: July 1979 COMPLETION DATE: May 1981 TOTAL FUNDS: \$451,000

ACKNOWLEDGMENT: UMTA

10 303272

PHYSICAL AND CHEMICAL PHENOMENA RESPONSIBLE FOR ODOR FORMATION IN DIESEL ENGINES

Diesel engines are well known for their fuel economy but they do emit combustion products which have unpleasant odors. This research is aimed at determining the engine conditions which produce the odors and thereafter decreasing the amount of odor. The present award builds on a previous Grant AER 76-19752. The main objectives of this award are: 1) to refine the methodology of measuring the amounts of odoriferous materials in a combustion gas stream, 2) to test specific hypothesis of the formation and destruction of odoriferous materials, 3) and to define the effects of important factors controlling the dynamics of combustion on odor emission.

PERFORMING AGENCY: Drexel University, School of Engineering, Dept of Mechanical Eng & Mechanics

INVESTIGATOR: Cernansky, NP

SPONSORING AGENCY: National Science Foundation, Directorate for Engineering and Applied Science, DAR76-19752 A03

STATUS: Active NOTICE DATE: July 1980 START DATE: June 1976 COMPLETION DATE: Mar. 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CD 285 3)

10 324949

VIBRATIONS TRANSMITTED THROUGH THE GROUND

The research programme is split-up into three main groups of investigations: The first group deals with the study of the generation and propagation of

vibrations. In each instance, the propagation of vibrations from the track to adjacent buildings should be investigated at 3 measuring locations (track in deep tunnel, track in tunnel near the surface, track in the open), taking into account the characteristics of the track, the vehicles and the tunnel and also the ground characteristics. A transfer function should be sought and a mathematical model developed; the second group deals with the study of the effects of vibrations. The effects of vibrations on adjacent buildings (damage to buildings) and on people living in these buildings (annoyance) should be studied, having extensive recourse to results already existing, to be adapted to railway conditions by means of verifying measurements; and the third group deals with the study of measures to reduce vibrations. In this connection, the remedial measures already known should be assembled first of all and classified according to a uniform measuring program for their effectiveness. It is intended to continue the development of the available remedial measures or, if necessary, to develop new ones, which should each time be optimised for theoretical and practical applications.

Question D151.

PERFORMING AGENCY: International Union of Railways

RESPONSIBLE INDIVIDUAL: Lamla, H Office of Research and Experiments

STATUS: Active NOTICE DATE: Jan. 1981 START DATE: June 1979

ACKNOWLEDGMENT: UIC

10 325451

EVALUATE CONTROL TECHNOLOGY FOR DIESEL POWERED EQUIPMENT IN UNDERGROUND MINES

A survey of several coal and noncoal mines will be made to obtain data on typical duty cycles for vehicles powered by diesel engines. The objective is to provide baseline numbers for calculation of integrated levels of significant contaminants at various mine locations. In addition, the data will be useful for assessing fuel and manpower requirements for productivity studies. The mining vehicles will include LHD's locomotives, personnel transports, supply tractors, and shuttle cars. Representative mining operations will include room and pillar, bench, and blast and cave mining. A survey of about 25 mines will be conducted in which time studies of the operating equipment will be made. The horsepower output of each vehicle will be estimated and, if possible, measured during each cycle. The calculated average power use will be correlated with emission levels for several contaminants.

PERFORMING AGENCY: Bureau of Mines

INVESTIGATOR: Freedman, R

SPONSORING AGENCY: National Institute for Occupational Safety & Health, O-9277407-VOC-E31 IAA 79-17

Contract

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: May 1979

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FE 80)

10 325453

UPGRADING AND UPDATING WASH-1238

The purpose is to upgrade and update WASH-1238, Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants, 1972. The work shall include current shipment data, changes caused by no reprocessing, higher burnup and enrichments, special routing considerations, and intermediate storage requirements. The transport of material associated with decommissioning is also to be considered as well as problems associated with waste. Analysis of accident data is to include health effects and risk analysis as given in NUREG-0170. Final document is to provide the technical basis for an EIS on the subject.

PERFORMING AGENCY: Sandia Laboratories

INVESTIGATOR: Luna, RE Finley, NC

SPONSORING AGENCY: Nuclear Regulatory Commission

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Dec. 1978 COMPLETION DATE: July 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FE 2020)

10 341064

HANDBOOK FOR MEASUREMENT, ANALYSIS AND ABATEMENT OF RR NOISE

The Environmental Protection Agency (EPA) has promulgated Railroad Noise Emission Standards for locomotives and rail cars, and the FRA has issued complementary compliance regulations covering these standards. The EPA is presently under court order to expand these standards to include railroad facility noise emissions. These new standards will then be

incorporated into the present FRA compliance regulations. In order to facilitate the work of FRA safety inspection personnel charged with enforcing these regulations, railroad personnel who must demonstrate compliance, and railroad facilities design engineers, a handbook combining existing information and experience in the field of railroad noise abatement was determined to be needed. The contractor has been charged with the responsibility of producing a handbook which will be understandable for technicians and designers untrained in acoustics, to include noise measurement procedures under ideal and non-ideal conditions applicable to railroad operations; existing data on railroad noise sources; and proven abatement procedures applicable to railroad noise sources. The handbook will be

arranged in a format to facilitate modifications, improvements and the introduction of new information as it is developed.

PERFORMING AGENCY: Wyle Laboratories

INVESTIGATOR: Stusnick, E

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Koper, JM Tel (202) 426-0808 Mason,

RL Tel (617) 494-2443

Contract DOT-TSC-1786

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept.

1979 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$145,980

ACKNOWLEDGMENT: FRA

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.

REFERENCES:

Noncontacting Suspension and Propulsion for Ground Transportation, Wormley, DN; Richardson, HH; Hedrick, JK; Limbert, DA, DOT/R-SPA/DPB-50/79-34, Sept. 1979, PB80-176274

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, TM Tel (617) 494-2286

Contract DOT-OS-60135

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: June 1976 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$226,000

ACKNOWLEDGMENT: DOT

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, GM 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. 1980 START DATE: July 1976 COMPLETION DATE: 1981 TOTAL FUNDS: \$4,055,091

ACKNOWLEDGMENT: UMTA

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 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: Feb. 1981 START DATE: Feb. 1977 COMPLETION DATE: June 1981 TOTAL FUNDS: \$166,000

ACKNOWLEDGMENT: American Public Transit Association

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, HH Tel (617) 253-2246 Wormley, DN
SPONSORING AGENCY: Federal Railroad Administration

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Mar. 1979 COMPLETION DATE: Sept. 1981

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 329558

MAGNETIC SUSPENSIONS FOR URBAN AND INTER-CITY TRANSPORTATION

Tractive electromagnets with automatic control as a means of levitating and controlling ground transportation vehicles in both low-speed (urban) and high-speed (intercity) applications are studied. Particular emphasis is placed on the effects of lateral and heave motion, as well as forward speed, lift, draft, and controllability.

PERFORMING AGENCY: Massachusetts Institute of Technology
INVESTIGATOR: Wormley, DN Tel (617) 253-2246 Richardson, HH
SPONSORING AGENCY: Department of Transportation

STATUS: Active NOTICE DATE: Aug. 1981

ACKNOWLEDGMENT: Massachusetts Institute of Technology

11 330671

COLD WEATHER TRANSIT TECHNOLOGY PROGRAM

A research and development program for applications of advanced technologies to active and passive countermeasures for ice control and snow removal on automated guideway transit systems.

PERFORMING AGENCY: Notre Dame University, 26030

INVESTIGATOR: Berry, WB Tel (219) 283-4241

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Morgan, PH Tel (202) 426-2896

Contract IN-06-0009

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: Jan. 1981 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$20,000,000

ACKNOWLEDGMENT: Notre Dame University

11 330673

TESTING OF AN AGT VEHICLE TO CONTROL CENTER COMMUNICATION SYSTEM

The purpose of this research is to fully test and demonstrate a modified communication system for the Morgantown People Mover Transit System. The modified system has the capability of automatically identifying any calling vehicle by displaying its ID number anytime the vehicle radio is activated. Another feature to be tested is the vehicle audio monitoring capability. That capability allows the operator to monitor the vehicle for any indication of a passenger related emergency condition. Such capabilities are considered critical on driverless vehicles.

PERFORMING AGENCY: West Virginia University

INVESTIGATOR: Elias, SEG Tel (304) 293-4550 Mitry, S

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Mitry, S Tel (304) 293-6371

Contract WV-06-0014

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: Mar. 1980 COMPLETION DATE: June 1981 TOTAL FUNDS: \$21,872

ACKNOWLEDGMENT: West Virginia University

11 330675

ELECTRIC POWER, ENERGY REQUIREMENT AND REAL TIME POWER MEASUREMENTS FOR AGT SYSTEMS

The objective of this study is to measure the instantaneous power and energy demands of AGT vehicles and systems. This information is necessary in order to assist and design fund innovations, and evaluate various aspects of energy requirements of AGT's. The research will develop a data logging device which will measure the real time power consumption and record this information for later retrieval and analysis. In addition a model of a single AGT vehicle including on or off board rectification and regenerative braking and developing a statistical model for the simulation of a total AGT system.

PERFORMING AGENCY: West Virginia University

INVESTIGATOR: McConnell, RL Tel (304) 293-6371

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: McConnell, RL Tel (304) 293-6371

Contract WV 11-0003

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: July 1981 TOTAL FUNDS: \$49,910

ACKNOWLEDGMENT: West Virginia University

11 330676

INTEGRATION OF AGT SYSTEMS WITH OTHER TRANSPORTATION MODES

This research studies the integration of the "Morgantown Downtown People Mover (M-DPM)" system in a comprehensive transit system that includes all the existing transportation modes. It studies the effect of parameters such as bus routes, stops, schedules, number of cars and buses, and all other pertinent parameters on the comprehensive system. A simulation model is developed to simulate the existing traffic conditions and to evaluate both the existing transportation modes and the proposed integrated system.

PERFORMING AGENCY: West Virginia University, Staggers (Harley O) National Transportation Center, WV-11-0003

INVESTIGATOR: Iskander, WH Tel (304) 598-0038

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Iskander, WH Tel (304) 598-0038

Contract WV-11-0003

STATUS: Active NOTICE DATE: Apr. 1981 COMPLETION DATE: Aug. 1981 TOTAL FUNDS: \$35,417

ACKNOWLEDGMENT: West Virginia University

11 330677

VISUAL AESTHETIC IMPACTS OF AGT GUIDEWAYS

Principles of urban design are applied to AGT guideways and aesthetic impact issues are examined. A series of impact matrices are developed which relate design objectives to design elements of guideways and key aesthetic issues. The matrices are used to identify impact areas and trade offs, and involve citizen and specialist input. Preference structures are measured for different interest groups and design guidelines are presented.

PERFORMING AGENCY: West Virginia University, WV-11-0003

INVESTIGATOR: Neumann, ES Tel (304) 293-5580 Trent, RW Kvashny, A

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Asatoorian, S Tel (202) 426-2898

Contract WV-11-0003

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: July 1980 COMPLETION DATE: July 1982 TOTAL FUNDS: \$110,000

ACKNOWLEDGMENT: West Virginia University

11 331133

LABORATORY DEMONSTRATION OF HYDRAULIC CAPSULE PIPELINE

A preliminary study conducted at the University of Missouri-Columbia showed that a hydraulic capsule pipeline system is a superior method of transporting many items now carried by trucks and trains. The objective of this study is to design, build, test, and operate a small-scale freight pipeline transport system. This system will be the most complete and advanced ever built and tested. The completion of this project will go a long way toward enhancing the state-of-the-art and demonstrating the technical feasibility of hydraulic capsule pipeline systems.

PERFORMING AGENCY: Missouri University, Columbia, Department of Civil Engineering

INVESTIGATOR: Liu, K

SPONSORING AGENCY: Department of Energy, Office of Basic Energy Sciences, C-5-34048 AC02-80ER10650

Contract

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: June 1980 COMPLETION DATE: May 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FQ 336)

11 335877

LATERAL STABILITY AND DYNAMIC RESPONSE OF RAM AIR CUSHION VEHICLES

The objective is to expand the understanding of the air suspension characteristics of tracked ram air cushion vehicles (TRACV) with emphasis on lateral/directional behavior and vehicle response to guideway irregularities. The knowledge gained from this research is essential to evaluate the viability of this high speed ground transportation concept. The analytical component of the study develops methods to predict aerodynamic forces and moments due to roll, yaw, and sideslip displacements for the purpose of determining the stability derivatives. Unsteady force due to irregularity of the guideway surfaces will be predicted. The experimental work involves the determination of static lateral/directional characteristics in a wind tunnel and the determination of the vehicle response to guideway nonuniformities using the Princeton Dynamic Model Track. Both of the experimental facilities have been used successfully in previous TRACV studies at Princeton. The theoretical and experimental results will be applied to the evaluation of vehicle stability and ride quality over typical guideway surfaces. This research is directed towards developing experimentally verified prediction methods for the aerodynamics, dynamics and ride quality of Tracked Ram Air Cushion Vehicles, such that vehicle system trade-off studies for this advanced concept can be conducted on a sound basis.

PERFORMING AGENCY: Princeton University, Department of Mechanical and Aerospace Engineering

INVESTIGATOR: Curtiss, HC, Jr

SPONSORING AGENCY: Transportation Systems Center

RESPONSIBLE INDIVIDUAL: Barrows, TM Tel (617) 494-2758

Contract DOT-RC-92032

STATUS: Active NOTICE DATE: July 1981 START DATE: June 1979 COMPLETION DATE: 1981
ACKNOWLEDGMENT: DOT

11 341061
POWERING MAGNETICALLY LEVITATED VEHICLES
In optimizing design of magnetically levitated vehicles, the functioning of different magnetic structures has been investigated. This study seeks to

determine the power requirements of the various structures and how that power is best supplied. Once determined, that information will be included in future studies on design optimization.

PERFORMING AGENCY: Massachusetts Institute of Technology
INVESTIGATOR: Kassakian, JG
SPONSORING AGENCY: Transportation Systems Center
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: 1981
ACKNOWLEDGMENT: Massachusetts Institute of Technology

12 059864

EVALUATION OF SAFETY OF LOADING AND SECUREMENT HARDWARE FOR TRANSPORTING WHEELCHAIR PASSENGERS ON TRANSIT VEHICLES

The objectives include: (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: Rae, JW

SPONSORING AGENCY: Urban Mass Transportation Administration, CA-06-0098-00-01

Contract CA-06-0098-00-01 (FFP)

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: Jan. 1977 COMPLETION DATE: Mar. 1981 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; Phase 17-105A Car Study.

PERFORMING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute

INVESTIGATOR: Phillips, EA Tel (312) 567-3607

SPONSORING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute

RESPONSIBLE INDIVIDUAL: Phillips, EA Tel (312) 567-3607

STATUS: Active NOTICE DATE: Feb. 1981 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: Feb. 1981

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: Feb. 1980 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: Feb. 1981 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 liquefied 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 was conducted on a cooperative basis with the FRA. Results are not yet available.

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: Feb. 1981 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 nine year period 1971-1979 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: Feb. 1981 START DATE: 1970
 ACKNOWLEDGMENT: AAR

12 130946

QUANTITATIVE DESCRIPTIONS OF TRANSPORTATION ACCIDENTS INVOLVING HAZARDOUS MATERIALS

Objectives: 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: Feb. 1981 START DATE: July 1975
 ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GPW 511)

12 135594

STUDY OF PHYSICAL PARAMETERS OF TRANSPORTATION ACCIDENTS

The objective of this task is to extend the work reported in Severities of Transportation Accidents (SLA-74-0001), to describe the accident environment to which large shipping casks may be exposed and, in addition, to describe the marine transport accident environment. These basic environmental descriptions are required to determine the risk of shipping radioactive material and the preparation of environmental impact statements. The basic approach used in this type of study has been to search historical records for the details of railroad, highway, and marine transport accidents. From this data base, description or profile of various accident types can be formed. Monte Carlo methods are sometimes used to describe the multi-variable data base which describes these accidents. From this type of analysis, the probability of occurrence of selected environmental parameters can be determined.

PERFORMING AGENCY: Sandia Laboratories, Transportation Technology Center
 INVESTIGATOR: Pope, RB
 SPONSORING AGENCY: Department of Energy, Transportation Branch Div of Transportation & Fuel Storage
 STATUS: Active NOTICE DATE: Feb. 1981 START DATE: 1975 TOTAL FUNDS: \$80,000

12 135596

TRANSPORTATION ACCIDENT ENVIRONMENTAL DATA BANK

Under this program, a centralized source of environmental information is provided for use by organizations engaged in risk assessment, testing, and evaluation of standards for programs involving the transportation of energy materials. Information generated is analyzed, summarized, and disseminated to potential users. Emphasis is placed on obtaining the latest information, ensuring comprehensive coverage of transportation application and publicizing the existence of the information. Such information is provided on a cooperative basis to other government agencies, industries, and when appropriate, to foreign nations. Information collected under this program has been and is being used as the prime source for studies of normal and accident transportation environments, in truck, train, aircraft, and ship modes of transport. The index to this work is updated annually and information is added to the program as it becomes available.

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: Davidson, CA Tel (505) 264-2765
 SPONSORING AGENCY: Department of Energy, Division of Environmental Control Technology

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1975 TOTAL FUNDS: \$100,000

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: Feb. 1981 START DATE: June 1976 COMPLETION DATE: May 1981

ACKNOWLEDGMENT: FRA

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 permitted the best acoustic signals for the warning of gangs working on the track to be defined. A detailed analysis of the problem of automatic warning of track maintenance gangs taking into consideration the requirements of the various disciplines involved (track maintenance, personnel safety, telecommunications and signalling safety) has led to a full specification of system requirements which is considered to be practical.

Ten 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: Dec. 1980 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. Assist UMTA in safety training courses at the Transportation Safety Institute, and reviews of safety programs at pre-operational and operational transit systems.

PERFORMING AGENCY: American Public Transit Association
SPONSORING AGENCY: Urban Mass Transportation Administration

Contract DOT-UT-60061

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Dec. 1976 COMPLETION DATE: Mar. 1981 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. 1980

ACKNOWLEDGMENT: FRA

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

INFORMATION AND GUIDANCE ON RADIOACTIVE MATERIALS TRANSPORTATION AND ACCIDENTS

This Guidebook is to provide first responders to transportation incidents involving radioactive materials with practical information for dealing with the situation pending arrival or 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. Three thousand copies of interim edition were delivered May 1980 with revised 1980 Edition expected October 1981.

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) 426-2311

Contract DOE-40-744-79

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Mar. 1979 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$38,000

ACKNOWLEDGMENT: DOT

12 308320

RAILROAD TANK CAR SAFETY RESEARCH AND TEST PROJECT, PHASE 17-105A CAR STUDY

The objective of this study is to assess the safety of 105A insulated pressure cars in relation to the DOT 112J and 112T cars which as a result of DOT hazardous materials regulation HM-144 are required to have thermal shields, head shields and top and bottom shelf couplers. For proper perspective the study also will relate 105A car safety to the unshielded car types 112A and 114A. The comparisons will be made on the basis of accident data analysis as well as fire tests and mechanical impact tests. In addition to carrying the same products as are carried in the 112 type cars (propane, anhydrous ammonia, etc.) the 105A cars also carry other hazardous products such as chlorine, hydrogen chloride, hydrocyanic acid and carbon dioxide. The 105A Car Study will include six tasks. Task A will develop population data on the fleet of 105A tank cars over the period 1965-1978 and also develop recent tank car shipment data. Under Task B accident data will be assembled over the period 1965-1978. The objective of Task C is to compare on the basis of accident data, the vulnerabilities of the 105A and 112A (114A) cars to head puncture and thermal ruptures. Task D will involve a document review relating to expressed opinions and stated conclusions regarding 105A car safety and its relationship to the safety of the 112A (114A) and 112J (112T) cars. Task E will involve fire tests on 4 ft. x 4 ft. standard insulated test plates such as are specified in the HM-144 thermal shield tests. The test program may also involve fire tests on full size empty tank cars. The tests will be conducted by the FRA through the Ballistics Research Laboratory at their new test facility at Socorro, New Mexico. Task F, mechanical impact tests, include puncture and gouge type drop tests on insulated plate samples. The 105A car Study will be conducted in close cooperation with the FRA with the physical testing Tasks E and F primarily funded by them.

See also RRIS 12A 081788.

REFERENCES:

Study of Class 105A Tank Cars (Population and Accidents) Phillips, EA; Role, H., AAR Technical Center, Aug. 1980, R-433

PERFORMING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute

SPONSORING AGENCY: Association of American Railroads Technical Center; Railway Progress Institute; Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Phillips, EA Tel (312) 567-3607

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: 1979

ACKNOWLEDGMENT: Association of American Railroads Technical Center

12 316078

SCALE MODEL EXPERIMENTS FOR ENVIRONMENTAL AND SAFETY CONTROL ASSESSMENTS OF ENERGY MATERIAL SHIPPING CONTAINERS SYSTEMS

The scope of work covered in this program is the development of experimental data and analysis of the structural response of spent fuel and high-level waste transportation systems to assess the effects of accident environments on safety and potential environmental consequences. The approach used in this program is to conduct a few carefully selected experiments for specified container accident conditions, and simulated environments. The containers used in the current experiments are replica scale models of typical spent fuel and high-level waste shipping casks. These experiments are being closely coordinated with LASL to provide the most relevant baseline data for subsequent correlation of the computer codes being developed there.

PERFORMING AGENCY: Battelle Memorial Institute
 INVESTIGATOR: Robins, RA
 SPONSORING AGENCY: Department of Energy, Office of Health and Environmental Research, 800045

STATUS: Active NOTICE DATE: June 1980 START DATE: 1979

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ER 539)

12 319915

CONSTITUTIVE DESCRIPTION FOR ENVIRONMENT AND SAFETY CONTROL ASSESSMENTS OF ENERGY MATERIALS SHIPPING CONTAINERS (ABBREV)

This program encompasses a number of objectives that, while interrelated in their ultimate application to energy system shipping container design and evaluation, are best pursued as separate technical tasks. The overall objective is the development of constitutive descriptions for the materials used in shipping container systems with particular emphasis on the modeling of rapid transient loading. These descriptions and the related containment failure analyses and experiments will provide the basis for developing a rational margin of confidence in such container systems. To achieve this overall objective, the scope of effort has been divided as follows: Task A--Assessment and Application of Endochronic Plasticity Theory for the Dynamic Analysis of Energy Materials Shipping Containers; Task B--Failure Analysis of Energy Materials Shipping Containers, Analytic Representation of Dynamic Failure Modes and Effects; Task C--Constitutive Representation of Thermal/Structural Interactions; Task D--Analytical Methods Development for Estimating and Bounding Structural Damage to Energy Materials Shipping Containers; Task E--Development of Analysis Support Experiments; and Task F--Design Optimization of Energy Materials Shipping Containers Subjected to Extreme Loading Conditions. Lin, H.C.; B.J. Hsieh and R.A. Valentin, The Use of Endochronic Plasticity Theory in Modeling the Dynamic Inelastic Response of Shipping Containers: A Preliminary Assessment, Proceedings of 5th International Symposium on Packaging and Transportation of Radioactive Materials, Las Vegas, May 1978.

PERFORMING AGENCY: Argonne National Laboratories; Department of Energy, Division of Environmental Control Technology
 INVESTIGATOR: Valentin, RA Lin, HC
 SPONSORING AGENCY: Department of Energy, Division of Environmental Control Technology, 800193 W-31-109-ENG-38

STATUS: Active NOTICE DATE: Nov. 1980 START DATE: Sept. 1977

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ER 34)

12 319918

RISK ASSESSMENT AND TESTING

The objective of the Transportation Safety Studies project is to assess the risks to man and the environment from the transport of energy materials. The study encompasses essentially all transportable energy materials and transportation modes with emphasis on nuclear fuel cycle materials. State-of-the-art risk assessment methods such as fault tree analysis are used in the study. The program output will be a series of reports on the risks in transporting particular energy materials by particular transport modes. The reports will provide: (1) a quantitative evaluation of the risk, (2) information to assist society in determining the acceptability of the risk, and (3) an indication of the principal contributors to the risk. This will provide direction on methods to change the transport system should the risk be judged unacceptable by society.

PERFORMING AGENCY: Battelle Memorial Institute/Pacific Northwest Labs; Department of Energy
 INVESTIGATOR: Rhoads, RE
 SPONSORING AGENCY: Department of Energy, 800041 EY-76-C-06-1830

STATUS: Active NOTICE DATE: Nov. 1980 START DATE: Oct. 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CY 608 3)

12 325452

STANDARDIZED ANALYSIS OF FUEL SHIPPING CONTAINERS

The goal of this project is a system of unified computer programs for the standardized safety analyses of nuclear fuel shipping containers and other equipment associated with the nuclear fuel cycle. The initial version of the SCALE system (Standardized Computer Analysis for Licensing Evaluation) performs multidimensional criticality safety and shielding analyses. An advanced version of SCALE will include heat transfer analyses. It will also

include an interactive capability for specifying input and a deliberate capability for establishing inter-modular execution paths.

PERFORMING AGENCY: Oak Ridge National Laboratory
 INVESTIGATOR: Whitesides, GE
 SPONSORING AGENCY: Nuclear Regulatory Commission

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Feb. 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (CU 811 4)

12 331132

STRUCTURAL & THERMAL ANALYSIS METHODS FOR ENVIRONMENTAL & SAFETY CONTROL ASSESSMENTS OF ENERGY MATERIAL SHIPPING CONTAINER SYSTEMS (ABBREV)

In assessing the adequacy of the environmental and safety controls provided by energy material shipping containers, their response to a wide range of accident conditions must be determined. The prohibitive expense of prototype and exact scale-model tests makes analytical tools, substantiated by a few carefully designed experiments, the logical procedure for evaluating the environmental and safety control provided by a given container system. The purpose of the project is to develop analytical computer codes that will predict shipping container response to a wide range of accident conditions including fire, impact, and puncture. We have developed computer codes that predict container response to end-on and oblique impact. Another code predicts railcar-container system response for cases where the railcar strikes a train during coupling operations. Current and future efforts will improve and generalize these codes and develop additional codes that will predict container response to other accident conditions. We intend to substantiate experimentally all of the computer programs using data obtained from simplified test specimens and from tests of more complex specimens performed at other laboratories.

PERFORMING AGENCY: Los Alamos Scientific Laboratory
 INVESTIGATOR: Butler, TA
 SPONSORING AGENCY: Department of Energy, Division of Environmental Control Technology, 800044 W-7405-ENG-36

Contract

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: 1979 TOTAL FUNDS: \$260,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ER 220)

12 331136

THE MISSISSAUGA EVACUATION RESEARCH PROJECT

The project included an immediate post-evacuation survey of 1,000 households evacuated after the chlorine gas derailment in Mississauga, on November 10, 1979. Phase I of the survey registered (1) individual behavior during and after the evacuation, (2) individual decisions and information/-communication used, (3) assessment of the risk, (4) experience and learning from the event, (5) problems encountered during the evacuation. Phase II repeats elements (1) through (4) as in Phase I, as well as the (5) economic aspect of evacuation and (6) study of individuals in evacuation centres, and on the periphery of the evacuation.

REFERENCES:

The Mississauga Train Derailment and Evacuation: November 10-17, 1979 Event Reconstruction & Organizational Response, Timmerman, P, Avail Toronto University, Publications and Information Dept, Report ERR-6 40p, May 1980

Preliminary Report on Survey of Households Evacuated During the Chlorine Gas Emergency, Whyte, A; Liverman, D; Wilson, J, Avail Toronto University, Publications and Information Dept, Report ERR-7 44p, May 1980

PERFORMING AGENCY: Toronto University, Canada, Institute for Environmental Studies
 INVESTIGATOR: Burton, I Whyte, A
 SPONSORING AGENCY: Toronto University, Canada, Institute for Environmental Studies

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: Nov. 1979

12 341047

HAZARDOUS TRANSPORTATION OF RADIOACTIVE MATERIALS

Spent nuclear fuels must be transported from power plants, where they are used, to secure disposal areas. These fuels are still radioactive, although

spent, and must be handled with extreme care. The Ballistics Research Laboratory is conducting a study to determine the behavior of casks used to hold spent fuels in the event the casks are exposed to fire resulting from a rail accident. The study will be conducted using full-scale pool and torch fires of spent fuel casks. The investigation will describe the relationship of temperature and burning time to the critical locations of the casks. Guidelines for responding to rail and cask fires can then be developed from this research.

PERFORMING AGENCY: Ballistic Research Laboratory
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

Contract DOT-AR-8178
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Aug. 1978 COMPLETION DATE: Aug. 1982 TOTAL FUNDS: \$650,000

ACKNOWLEDGMENT: FRA

12 341048 GUIDELINES FOR RAILROAD ACCIDENT EMERGENCY RESPONSE AND WRECK CLEARANCE

The response to the release of hazardous materials by local, state, Federal or railroad personnel may endanger those people or may create a situation more dangerous than the original problem. Emergency response personnel must be informed of the characteristics of the materials(s) and combination of materials with which they are faced and the response that is most appropriate for the situation. This study is designed to prevent uninformed action by developing guidelines recommended for use by emergency personnel in situations involving hazardous materials. The study will include the investigation of current hazardous material wreck clearance procedures and will assess the risks inherent in each of those procedures. Recommendations and guidelines will outline the responses that are most appropriate in specific emergency situations. A handbook for emergency response personnel will be prepared which will contain recommendations and guidelines outlining responses that are most appropriate in specific situations.

PERFORMING AGENCY: Air Force Rocket Propulsion Laboratory
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

Contract DOT-AR-9157
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1979 COMPLETION DATE: July 1982 TOTAL FUNDS: \$450,000

ACKNOWLEDGMENT: FRA

12 341066 THERMAL SHIELD TESTING

Performance specifications are needed to ensure that tank cars, commonly used to carry hazardous materials, are able to withstand a degree of fire and heat before their contents are forced into the atmosphere. This contract supports, in part, the development of performance specifications by upgrading the torch fire test facility at the Transportation Test Center so that simulated pool and torch fires of thermal shield systems on tank cars can be carried out. Upgrading of the torch fire test facility center and studying fire protection afforded by existing insulation on Class 105 tank cars will assist the rail industry in improving fire protection and thermal shields of one of the most commonly used containers for the shipment of hazardous materials. Results of this contract are directed toward the development of recommendations for improving the fire safety of munition-carrying box cars.

PERFORMING AGENCY: Ballistic Research Laboratory
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

Contract DOT-AR-9134
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1979 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$500,000

ACKNOWLEDGMENT: FRA

12 341067 SUPPORT OF FIRE TESTS OF SPENT NUCLEAR FUEL SHIPPING CASKS

The transportation of casks containing spent nuclear fuel by rail is often a long and time-consuming journey. In the event of an accident, the trip may also pose a threat to the residents of communities through which the train must pass. In an effort to mitigate the possibility of such a mishap, the U.S.

Department of Energy is conducting a study for FRA to evaluate the capability of spent fuel casks to withstand accidents and fires without releasing dangerous levels of radiation. The study will involve the design and fabrication of two small-scale casks and an examination of their behavior in fires. The study will also involve reconditioning two full-size casks and an examination of their behavior in fires. Results of these fire tests, and results from other research contracts, will help the FRA in the formulation of performance specifications required for spent fuel casks.

PERFORMING AGENCY: Department of Energy
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Dancer, D Tel (202) 426-1227

Contract DOT-AR-8189
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1978 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$1,025,000

ACKNOWLEDGMENT: FRA

12 341068 RAILROAD VANDALISM

The Ballistics Research Laboratory is conducting a research study for the FRA to assess the extent of vandalism to urban area railroads. This study will determine the degree to which an improved communications network improves the effectiveness of the various railroad police forces in reducing vandalism, as well as the desirability of expanding this approach to other large urban areas in the U.S. This effort has been divided into five tasks: Task 1--Assessment of current vandalism status; Task 2--Improved communications network; Task 3--Implementation and utilization of an improved communications system unifying all surveillance efforts; Task 4--Collection of data; and Task 5--A final report on the results of this study.

PERFORMING AGENCY: Ballistic Research Laboratory
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

Contract DOT-AR-8038
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Mar. 1978 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$225,000

ACKNOWLEDGMENT: FRA

12 341069 A STUDY OF METHODS TO DETERMINE DANGEROUS STATES OF HAZARDOUS CARGOES DURING TRANSPORT

The U.S. Army's Ballistics Research Laboratory is conducting a research study for the FRA to develop a means of detecting the release and/or changed physical state of hazardous materials while cargo is in transport and before the release becomes a serious problem. Early detection of the release of hazardous materials will enable train crews to take appropriate action to prevent additional releases or to avoid dangerous situations. The study includes the identification of those hazardous materials that require early detection and the development of laboratory tests of techniques that might be used to carry out that detection. A work plan will be developed for field testing prototypes of detection techniques.

PERFORMING AGENCY: Ballistic Research Laboratory
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Levine, D Tel (202) 426-1227

Contract DOT-AR-8196
STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1978 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$125,000

ACKNOWLEDGMENT: FRA

12 341070 U.S. DOT HAZARDOUS MATERIALS PROGRAM

The number, variety and possible combinations of hazardous materials carried on single trains is ever growing. This growing and changing situation makes the establishment of safety regulations, performance specifications, and emergency response measures difficult, at best. In facing the ever-chang-

ing problems of transporting hazardous materials, research undertaken in this contract is designed to determine what research is needed to support the efforts of the Materials Transportation Bureau and other U.S. DOT administrations. The results of the research will allow regulations, specifications and requirements to be established with the confidence that they will solve the problems for which they are intended in the most efficient and beneficial way possible. The study will (1) review past R&D in hazardous materials, (2) develop a multi-year advanced R&D plan, and (3) conduct preliminary research in some of the areas recommended for examination.

PERFORMING AGENCY: Department of Transportation
SPONSORING AGENCY: Federal Railroad Administration
RESPONSIBLE INDIVIDUAL: Dancer, DM Tel (202) 426-1227

Contract DTFR 53-80-X-00104

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Aug.
1980 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: FRA

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 undertaken. 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-84290
 STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Jan. 1979 COMPLETION DATE: Apr. 1981

ACKNOWLEDGMENT: FRA

13 329573

LOW COST CATENARY CONCEPT ANALYSIS

The objective of this activity is to determine if the electrification system described in U.S. Patent No 3,829,631 is technically feasible and more economical to be built than conventional railroad electrification systems.

PERFORMING AGENCY: American Electric Power Service Corporation
 INVESTIGATOR: Retallack, R Tel (212) 440-8514
 SPONSORING AGENCY: Federal Railroad Administration; Department of Energy
 RESPONSIBLE INDIVIDUAL: Kamalian N Tel (202) 426-9564

CONTRACT DOT-DTSR53-80-C00045
 STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1980 COMPLETION DATE: June 1982 TOTAL FUNDS: \$110,000

ACKNOWLEDGMENT: American Electric Power

13 335896

RAILROAD ELECTRIFICATION ANNUAL STATUS REPORT

The Federal Railroad Administration has a need to develop and maintain a data base on railroad electrification activities. Part of the data base is a periodic status report of activities in railroad electrification. The report identifies and briefly describes activities being conducted by the government, railroads, suppliers, architect/engineering firms and the utility industry. A

report covering the time period January 1976 through December 1978 has been released; a report covering the time period 1979 through June 1980 has been drafted and is scheduled for release in September 1981. This project will produce a report on railroad electrification activities covering the time period from June 1980 through June 1981.

PERFORMING AGENCY: Ebon Research Systems
 INVESTIGATOR: Hudgins, G Tel (202) 483-3306
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Novotny, RA Tel (202) 426-9564

Contract DT-FR 53-81-C-00226
 STATUS: Active NOTICE DATE: July 1981 START DATE: Apr. 1981 COMPLETION DATE: Apr. 1982

ACKNOWLEDGMENT: FRA

13 335903

POWER SUPPLY FACTORS IN RAILWAY ELECTRIFICATION

An evaluation of the various power supply alternatives for railway electrification will be made. The relevant capital and operating costs will be evaluated for Canadian conditions and constraints to determine the desirable voltage and frequency on a system-wide basis.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-068
 INVESTIGATOR: English, GW Tel (613) 547-5777 Corneil, ER
 SPONSORING AGENCY: Transport Canada Research and Development Centre
 RESPONSIBLE INDIVIDUAL: Versailles, A Tel (514) 283-4064

STATUS: Active NOTICE DATE: July 1981 START DATE: May 1981 COMPLETION DATE: Nov. 1981 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: CIGGT

13 335906

MANITOBA ELECTRIFICATION

The implications of railway electrification to the province of Manitoba will be analyzed. The scope of the study covers: labour adjustments, manufacturing opportunities, transportation service changes, and the physical and economic implications for Manitoba Hydro.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-079
 INVESTIGATOR: English, GW Tel (613) 547-5777 Schwier, C
 SPONSORING AGENCY: Department of Highways and Transportation
 RESPONSIBLE INDIVIDUAL: Wallace, J Tel (204) 944-2000

STATUS: Active NOTICE DATE: July 1981 START DATE: Mar. 1981 COMPLETION DATE: Oct. 1981 TOTAL FUNDS: \$39,000

ACKNOWLEDGMENT: CIGGT

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) 472-5140

Contract DC-09-7001

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Mar. 1976 COMPLETION DATE: Dec. 1983 TOTAL FUNDS: \$1,500,000

ACKNOWLEDGMENT: UMTA

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 opening in 1979 concentrated on obtaining "before" and base-case data on the impacts of construction. Operational impact measurement began 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) 472-5140

Contract GA-09-7002

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Mar. 1976 COMPLETION DATE: Dec. 1983

ACKNOWLEDGMENT: UMTA

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 319083

THE CHALLENGE OF POTENTIAL LOSS OF RURAL RAIL FACILITIES OR TRANSPORTATION SYSTEMS

Develop an "early warning" community decision strategy for leaders to identify problems, opportunities and pre-crisis planning. Design model criteria for evaluation of transportation alternatives to serve agriculture, agri-business and citizens. Develop components of a community decision model to provide economic tools, impact data, preventative action, key indicators, alternative solutions, and generate community support. Identify critical transportation service needs for agriculture, agri-business, communities and people. Staff will identify critical location for study and relevant data for research model on the Milwaukee Road corridor from Madison to Prairie du Chien. Staff will contact shippers, receivers, agricultural leaders,

community, government agencies. Collected data from primary sources and secondary sources including regional planning commission and rail planners at the Department of Transportation. Staff will develop an economic impact model for early warning of communities threatened with a loss of transportation facilities. Prepare guidelines to assist community leaders in developing programs for transportation.

PERFORMING AGENCY: Wisconsin University, Madison, Department of Agricultural Economics, WISM040

INVESTIGATOR: Vilstrup, RH Cottingham, J Eldridge, C

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, SAES WIS

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: July 1979 COMPLETION DATE: June 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0080875)

15 319092

IMPACTS OF COAL DEVELOPMENT ALTERNATIVES

Identify alternative method of utilizing western North Dakota lignite resources to meet energy needs. Identify and evaluate effects of alternative development patterns on local economic activity. Identify the factors that affect the level and pattern of development of North Dakota lignite. Identification of technically feasible coal development alternatives and estimation of resource requirements and costs for each will be accomplished through the analysis of secondary data on natural energy needs, supplies of energy resources in other regions, and transportation costs for various energy forms. Engineering estimates available from secondary sources will be valuable in determining costs and resource requirements. Economic impact analyses will be made for each development alternative. Income, employment, and population projections will be used to estimate and identify economic and social impacts.

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics, ND03332

INVESTIGATOR: Leistriz, FL Hertsgaard, TA

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, SAES ND

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: July 1973 COMPLETION DATE: Sept. 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0064440)

15 329551

SOCIAL IMPACTS OF TRANSPORTATION IN CANADA

The work is to develop a consistent clarification of social impacts, reflecting the linkages that exist among the processes of urbanization, economic growth, transportation development and social change, as well as the historical relationships in Canada between transport investment and population redistribution.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-071

INVESTIGATOR: Moore, E Tel (613) 547-6116 Yeates, M Holmes, J Osborne, B Spector, A

SPONSORING AGENCY: Canadian Transport Commission, Research Branch

RESPONSIBLE INDIVIDUAL: Mozersky, KA Tel (613) 997-2691

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Nov. 1980 COMPLETION DATE: Oct. 1981 TOTAL FUNDS: \$14,994

ACKNOWLEDGMENT: CIGGT

15 335319

WESTERN COAL PLANNING ASSISTANCE PROJECT

STATES TO WHICH PROJECT PERTAINS: Montana, North Dakota, and Wyoming. The USGS, in cooperation with the Missouri River Basin

Commission (MRBC), initiated a project to assist State and local governments in resolving problems associated with coal/energy development. The project focuses on the major coal areas of Montana, North Dakota, and Wyoming, and consists of two phases. Phase one was completed with the publication of a four-volume reference system on planning problems and data needs associated with coal mining and related activities. The objectives of Phase Two are to update and revise Phase One products, expand information on transportation of coal and coal products and possible impacts on energy and transportation-centered communities, and to develop and conduct experimental workshops utilizing Phase One products.

PERFORMING AGENCY: Department of the Interior, Geological Survey,
Land Information & Analysis Office
INVESTIGATOR: Ulman, WJ
SPONSORING AGENCY: Department of the Interior, Geological Survey,
Land Information & Analysis Office

STATUS: Active NOTICE DATE: June 1981 START DATE: Sept.
1978 TOTAL FUNDS: \$19,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZUA
5150)

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/

A report is currently being drafted.

PERFORMING AGENCY: Ontario Ministry of Transportation & Communication, 3607

INVESTIGATOR: Soots, V

SPONSORING AGENCY: Ontario Ministry of Transportation & Communication, Can

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: 1975

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

16 193782

EMERGENCY CONSERVATION PLANS TO REDUCE DEMAND FOR FUEL

This is a follow-on project to develop Standby Federal Conservation Plans for Transportation in the event of a severe energy supply interruption. Guidelines are also being developed to assist states in the development of local and statewide transportation contingency strategies. This effort is part of the response by the Department of Energy to the Emergency Energy Conservation Act of 1979. The MIT effort does not include the development of a rationing program, which is also mandated by the 1979 legislation. The MIT effort involves the generation and evaluation of alternative contingency measures.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Humphrey, TF

SPONSORING AGENCY: Department of Energy

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Oct. 1980 COMPLETION DATE: Dec. 1981

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 196749

ALTERNATIVE FUELS IN MEDIUM SPEED DIESEL ENGINES

The joint program (DOE, FRA, AAR) is exploring the use of alternative fuels for locomotive diesel engines with a two cylinder experimental engine

of SWRI. As currently planned, the small engine tests will be followed by tests of candidate fuels in both a two-cycle and four-cycle full size diesel engine. Current fuels under evaluation include off-specification diesel fuels and non-diesel fuels such as alcohols and synthetic liquid fuels derived from coal, shale or tar sands. The fuels will be tested for engine performance, combustion characteristics, emission levels and piston ring wear.

REFERENCES:

Alternative Fuels for Medium Speed Diesel Engines. Phase I Stormont, JO; Baker, Q; Wood, C, Southwest Research Institute, Draft Final Rpt., May 1980, FRA/ORD-80/40.1

PERFORMING AGENCY: Southwest Research Institute, AR-8163

INVESTIGATOR: Stormont, JO Tel (512) 684-5111 Baker, QA Wood, CD

SPONSORING AGENCY: Department of Energy, Office of Transportation Programs; Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Alpaugh, RT Tel (202) 252-8012 Koper, JM Tel (202) 426-0808 Furber, CP Tel (202) 293-6256

CONTRACT DOE-EM-78-C-01-4266

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1978 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$880,000

ACKNOWLEDGMENT: FRA

16 315155

STUDY OF ALTERNATE FUELS/ENERGY SOURCES TO NON-HIGHWAY TRANSPORTATION

The objective is to assess the potential for implementation of alternative fuels in non-highway transportation systems in the near, mid and far time frames. The methods employed are to: (1) survey existing information of prime movers and fuels; (2) rank R and D needs through assessing energy source and fuel availability, performance and systems compatibility, capital requirement and economics, environment and safety impacts, and military and foreign fuels compatibility; and (3) recommend a research and development program. DOE-TEC opportunities to aid implementation of alternate fuels with high technological compatibility with prime movers, favorable cost per unit energy saved, and high potential for utilization will be identified.

PERFORMING AGENCY: Exxon Research and Engineering Company, Government Research Laboratory

INVESTIGATOR: Cart, EN, Jr

SPONSORING AGENCY: Department of Energy, Division of Transportation Energy Conservation, EC-77-C-05-5438

Contract

STATUS: Active NOTICE DATE: July 1980 START DATE: Sept. 1977

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ER 1123)

16 323370

RAIL TECHNOLOGY/LOCOMOTIVES

Review of design and operating factors which influence energy consumption by railway locomotives. Emphasis will be placed on developing improved fuel measuring facilities for locomotives and conducting fuel measuring experiments relating fuel consumption to operational factors. Develop locomotive fuel consumption and work output data acquisition system and collect over-the-road fuel performance data. Identify and assess new fuel efficient locomotive engine designs.

PERFORMING AGENCY: Transport Canada Research and Development Centre, 050GE

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Johnson, WF

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Apr. 1979 COMPLETION DATE: Mar. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

16 323375

RAIL TECHNOLOGY/FREIGHT CARS ENERGY CONSERVATION

Identify, develop, test and evaluate appropriate technical measures related to rail freight car technology which indicate a potential to conserve energy in intercity rail transport. Support prototype testing of steerable railcar trucks for use on heavy freight cars.

PERFORMING AGENCY: Transport Canada Research and Development Centre, 052GE

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Johnson, WF

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Apr. 1979 COMPLETION DATE: Mar. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

16 323376

LOCOMOTIVE FUEL CONSUMPTION MEASURING DEVICE

Design and manufacture a fuel consumption measuring device for locomotives. Use device to test fuel savings possible from various add on devices, handling techniques, fuel additives, and velocity and h.p./ton ratio changes.

PERFORMING AGENCY: Canadian Pacific Limited, Q0121E

SPONSORING AGENCY: Canadian Pacific Limited

RESPONSIBLE INDIVIDUAL: Preston, C

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Jan. 1980 COMPLETION DATE: Dec. 1982

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

16 323377

INTERCITY RAIL

Explore system/operational options to improve energy efficiency of passenger rail. Investigate energy characteristics of future high performance rail services; estimate energy contribution resulting from introduction of these services.

PERFORMING AGENCY: Transport Canada Research and Development Centre, 051GE

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Johnson, WF

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Apr. 1979 COMPLETION DATE: Mar. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

16 325455

WASTE OIL RECYCLING

This project is directed toward the commercial demonstration and implementation of a new process for the recovery of used automotive lubricating oil. The conventional acid/clay re-refining process has become environmentally unacceptable, sharply curtailing the amount of used oil which can be re-refined. Laboratory tests have indicated the technical feasibility of the new two-stage distillation, solvent precipitation process. In this process, all distillate and precipitate fractions of the waste oil are potentially recovered as useful products. Each year, about 650 million gallons of used automotive lube oil are disposed. If the planned commercial-scale demonstration succeeds in fully implementing the used oil recovery process, approximately 14 million barrels of oil equivalent per year could be saved. This project was initiated in FY 78 and is being conducted by the Bartlesville Energy Research Center. Major milestones in FY 80 are design completion and selection of a re-refining plant site. Facility construction is expected to begin in the late summer of FY 81 with plant startup approximately one year later. Commercial operation is scheduled to commence in the second quarter of FY 83.

PERFORMING AGENCY: Department of Energy, Bartlesville Energy Technology Center

INVESTIGATOR: Thompson, CJ

SPONSORING AGENCY: Department of Energy

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Oct. 1977 COMPLETION DATE: Sept. 1983

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FE 1533)

16 329550

FEASIBILITY STUDY OF DEVELOPING AN ENERGY CONSUMPTION TRAIN PERFORMANCE CALCULATOR

The feasibility of developing a computer program capable of accurately estimating railway linehaul energy use on a route and service-specific basis for both diesel-electric and electrified railways is investigated. A theoretical examination of the components of train resistance is made and the predictions compared with existing empirical formulae. Locomotive effi-

ciency is investigated and the influences of driver behaviour analyzed. A simulation software package suitable for energy conservation studies and incorporating the above analysis is presented, as well as an analytic formulation for costing purposes. A validation and development program is outlined.

REFERENCES:

Railway Linehaul Energy Intensity: An Analysis Leading to Design of a Train Simulation Software Package, English, GW; et al. CIGGT Rpt. 80-15, Feb. 1981

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-090

INVESTIGATOR: English, GW Tel (613) 547-5777 Young, J Schwier, C

SPONSORING AGENCY: Ministry of Transport, Canada, Railway Transportation Directorate

RESPONSIBLE INDIVIDUAL: Ganton, T Tel (613) 992-9197

Contract OST80-00012

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: Sept. 1980 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$36,000

ACKNOWLEDGMENT: CIGGT

16 329561

ENERGY AUDIT AND EVALUATION

This study will develop approaches to minimizing energy consumption without reducing safety or quality of service. With the cooperation of a New England railroad, an audit of energy in transportation and non-transportation usage has been conducted. Conservation options will be developed in parallel with the audit. Tests will be conducted to verify the options and followed by the dissemination of results through project reports, an energy conservation manual, and an Energy Management Workshop to be held in September 1981.

REFERENCES:

Baseline Fuel Consumption Tests on the Boston & Maine Railroad, Interim Rpt.

Evaluation of Freight Train Energy Conservation Options on the Boston & Maine Railroad, Hitz, J; McGrath, T; Dorer, R, Transportation Systems Center, Interim Rpt., Dec. 1980

Technical Proceedings of the Energy Management Workshop Kearney, (AT) Incorporated, FRA/ORD-80/18 12p, Nov. 1979, PB80-144975

PERFORMING AGENCY: Transportation Systems Center

INVESTIGATOR: Coulombre, RE Tel (617) 494-2540 Hitz, J Dorer, R

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Koper, JM Tel (202) 426-0808

CONTRACT DOT-PPA-RR-152

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Oct. 1979 COMPLETION DATE: Oct. 1981 TOTAL FUNDS: \$200,000

ACKNOWLEDGMENT: FRA

16 329563

ASSESSMENT OF THE IMPACT OF GRAVITY-ASSISTED GUIDEWAYS ON URBAN RAIL TRANSIT SYSTEMS

This project involves the investigation and assessment of the impact of gravity-assisted guideways on urban rail transit systems. It will establish design criteria to assure acceptable system performance, reliability and safety. Within the limits of the acceptable design criteria, key variables such as geology, dip grade and distance between stations will be examined, and their effect on the costs of system construction, operation and maintenance estimated. Finally, the gravity-assisted guideway designs will be compared to recently built transit systems in cost, performance, reliability and safety.

PERFORMING AGENCY: Jet Propulsion Laboratory, CA-06-0144

INVESTIGATOR: Dayman, BJ Tel (213) 354-9456

SPONSORING AGENCY: Urban Mass Transportation Administration

RESPONSIBLE INDIVIDUAL: Butler, G Tel (202) 426-0090

CONTRACT UMTA-CA-06-0144

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: July 1980 COMPLETION DATE: July 1981 TOTAL FUNDS: \$150,000

ACKNOWLEDGMENT: Jet Propulsion Laboratory

16 329577

TRAIN ENERGY USE AND FUEL CONSUMPTION TEST PROJECT

Analyze the energy use characteristics of various Amtrak train consists and use the data to assess where energy use may be improved. The information will be useful to Amtrak in day-to-day train operations and to both Amtrak and the FRA/NECIP in responding to public and Congressional inquiries. Selected trainsets in the Amtrak route consumption structure will be carefully instrumented to obtain energy consumption during a revenue run. The operational procedures and route characteristics will be analyzed. When conditions warrant a Train Performance Calculator run to assist in data analysis will be conducted.

REFERENCES:

Amtrak Fuel Consumption Study Hitz, JS, Transportation Systems Center, FRA/ORD-81/42, Feb. 1981

PERFORMING AGENCY: Transportation Systems Center; ENSCO, Incorporated; Klauder (Louis T) and Associates

INVESTIGATOR: Coulombre, RE Tel (617) 494-2540, Michaels, W Tel (703) 960-8500 Watson, R Tel (215) 563-2570

SPONSORING AGENCY: Federal Railroad Administration; National Railroad Passenger Corporation

RESPONSIBLE INDIVIDUAL: Woll, TP Tel (202) 426-9564

Contract DOT-TSC-PPA-032

STATUS: Active **NOTICE DATE:** Aug. 1981 **START DATE:** June 1980 **COMPLETION DATE:** Dec. 1981 **TOTAL FUNDS:** \$27,000

ACKNOWLEDGMENT: FRA

16 335323

DEVELOPMENT OF HYBRID FUELS FOR TRANSPORTATION

Hybrids are fuels derived from combinations of different energy sources and which are generally formulated as solutions, emulsions, or slurries. The underlying objective of this program is to reduce the use of petroleum-derived fuels and/or to minimize the processing requirements of the finished hybrid fuels. Several hybrid fuel formulations have been developed and tested in a direct injection single-cylinder diesel engine. The formulations included solutions of ethanol and vegetable oils in diesel fuel, emulsions of methanol and of ethanol in diesel fuel, and slurries of starch, cellulose, and carbon in diesel fuel. Based on the progress to date, the solutions and emulsions appear to be viable diesel engine fuels if the economic factors are favorable and the storage and handling problems are not too severe. The slurries, on the other hand, are not to the same point of development as the solutions and emulsions. Although other solids do represent energy sources, the carbons appear to have the most potential for development into finished fuel slurries for current diesel engine designs. The relative stages of development of the various hybrid fuel types are such that the solutions and emulsions are more advanced than the slurries. As a result of this, additional effort is currently being devoted to the advancement of slurry fuel technology.

PERFORMING AGENCY: Southwest Research Institute, Mobile Energy Division

INVESTIGATOR: Ryan, TW

SPONSORING AGENCY: Department of Energy, Office of Conservation and Renewable, 10-5315-001 AC04-79CS54240

Contract

STATUS: Active **NOTICE DATE:** June 1981 **START DATE:** June 1978 **COMPLETION DATE:** June 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FS 257)

16 341056

AMTRAK LOCOMOTIVE JOINT FUEL CONSUMPTION TEST

The purpose of this joint project is to design and conduct tests on revenue locomotives over Amtrak routes using primarily existing FRA instrumentation for obtaining actual fuel-consumption data in gallons per 1,000 gross ton miles for selected routes of normally scheduled Amtrak trains. The trains are to be in revenue operation when the measurements are made which will necessitate an experienced test crew to minimize any adverse effect on Amtrak operations. The energy efficiency of intercity rail passenger service is a function of such factors as locomotive type, state of maintenance of locomotive, train make-up, train performance requirements, route terrain, passenger loadings, and the weight of the cars. The wide variations in these factors lead to wide fluctuations in Amtrak fuel efficiency on a route-by-route basis. There is a critical need for accurate fuel consumption data on Amtrak trains for several reports that are being prepared by the FRA, Amtrak, and at least one state agency. Amtrak has manually collected fuel consumption data on the San Diegan service. In addition Amtrak and FRA worked together to collect fuel consumption data between Boston and New Haven. Amtrak and F.R.A./TSC collected data on twenty six trips over this territory for the dual purpose of (1) measuring energy consumed and (2) to make a comparison with TSC's Train Performance Calculator. These tests are complete and the results reported. Next, FRA and Amtrak plan to conduct a more sophisticated effort using Ensco, Inc. to collect (for the first time) a full complement of data (measurement parameters) and record them on digital tape for accurate data processing. This will provide FRA and Amtrak with needed information on (1) accurate actual fuel consumption data, (2) the measurement and data collection techniques to use, and (3) a specification for a data collection/recording/processing system. A separate company, Uptime Inc. is developing a commercial device for such measurements. The results of the proposed Ensco test will assist in defining the requirements for the performance of the yet-to-be-developed commercial piece of equipment.

Contract to Uptime Data Technology, Incorporated, to be awarded August 1981.

REFERENCES:

Amtrak Fuel Consumption Study (Boston-New Haven Test Results), Hitz, JS, Transportation Systems Center, FRA/ORD-81/42, Feb. 1981

PERFORMING AGENCY: ENSCO, Incorporated; Klauder (Louis T) and Associates

INVESTIGATOR: Zaiko, JP Tel (703) 321-4717 Watson, R Tel (215) 563-2570

SPONSORING AGENCY: Federal Railroad Administration; National Railroad Passenger Corporation

RESPONSIBLE INDIVIDUAL: Woll, TP Tel (202) 426-9564 Gall, HJ Tel (202) 383-2580

Contract DTPR-80-C-40002

STATUS: Active **NOTICE DATE:** Aug. 1981 **START DATE:** Oct. 1980 **COMPLETION DATE:** Mar. 1982 **TOTAL FUNDS:** \$71,725

ACKNOWLEDGMENT: FRA

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:

- Project Work Plan Mar. 1976
- State-of-the-Art Survey FRA-OPPD-76-5, Apr. 1976
- System Functional Requirements FRA-OPPD-77-10, July 1977
- System Performance Measurements FRA-OPPD-78-9, Feb. 1978
- Orientation Module FRA-OPPD-80-2, Mar. 1980
- Advanced Systems Study FRA-OPPD-80-4, June 1980

PERFORMING AGENCY: Missouri Pacific Railroad Company

INVESTIGATOR: Sines, GS

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 472-7280

Contract DOT-FR-65139

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Nov. 1975 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$5,500,000

ACKNOWLEDGMENT: FRA

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 arrangements such as the Clearinghouse for pooling general service cars. Part of the promotion will entail specifying 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.

REFERENCES:

- Alternatives for Improving Freight Car Management AAR R-426 37 p., Apr. 1980
- A Technique for Conducting an Internal Review of Freight Car Management, Reebie Associates, July 1980
- Management Alternatives to the Challenge of Railcar Utilization, Reebie Associates, 58 p., Oct. 1979
- A Technique for Assessing the State of Railcar Management 42 p., Dec. 1979
- Proposal for Change in the Railroad Industry-Wide Car Management System, AAR R-379 59 p., June 1979

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: French, PW Tel (202) 293-4165 Muehke, RV

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 472-7280 Taylor, CE Tel (202) 293-4084

CONTRACT DOT-FR-53-80-C-50005

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1977 COMPLETION DATE: Aug. 1981 TOTAL FUNDS: \$100,000

ACKNOWLEDGMENT: AAR

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. 1980 START DATE: Jan. 1979

17 188651

LOCOMOTIVE DATA ACQUISITION PACKAGE (LDAP)

The objective is to develop a preprototype 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. The preprototype system is being tested in revenue service operations on several railroads in a series of experiments designed to improve energy consumption.

A workshop was held December 1980 for the railroad industry and other interested parties.

REFERENCES:

- Locomotive Data Acquisition Package, Phase I Abbott, RK; Kirsten, FA; Mullen, DR; Turner, DB, Lawrence Berkeley Laboratory, Available from NTIS, FRA/ORD-78/68; LBL-45 119p, Sept. 1978
- Locomotive Data Acquisition Package, Phase II System Development. Final Report. Volume I-System Overview, Abbott, RK; et al, Lawrence Berkeley Laboratory, FRA/ORD-80/39.I 136p, May 1980
- Locomotive Data Acquisition Package, Phase II System Dev. Final Rpt. Vol. II - LDR Operations & Maintenance, Abbott, RK; et al, Lawrence Berkeley Laboratory, FRA/ORD-80/39.II 107p

PERFORMING AGENCY: California University, Berkeley

INVESTIGATOR: Scalise, DT Tel (415) 843-2740 X5055

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Koper, JM Tel (202) 426-0808

IA AR-DOT-FR5380X0073

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Mar. 1980 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$533,000

ACKNOWLEDGMENT: FRA

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: Aug. 1981 START DATE: Apr. 1977

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

17 315154

RESEARCH INITIATION-CALIBRATION OF A MULTI-PATH FLOW MODEL FOR RAIL FREIGHT TRAFFIC

This research project is directed toward testing a multiple parameter, multi-path assignment algorithm, developed previously by the principal investigator, with actual flow data for the U.S. railroad system. Seven tasks are included: (1) creation of an abstract rail network representing several corridors with multiple routes, using the Federal Railroad Administrations network model (2) development of a traffic flow data base from the Waybill-Junction Sample data file of the Interstate Commerce Commission (3) assignment of cost functions to links and nodes of the network model (4) calibration of the model, including estimation of parameters (5) examination and interpretation of the parameter values as they relate to network conditions, market conditions, and routing decisions (6) application of the calibrated model to modified networks and (7) report preparation.

PERFORMING AGENCY: Princeton University, School of Architecture and Urban Planning

INVESTIGATOR: Lutin, JM

SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG78-05442

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Apr. 1978

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 6865 1)

17 316059

QUEUEING SYSTEMS-NETWORKS OF QUEUES AND QUEUES WITH PERIODIC POISSON INPUT

Queueing network systems abound in applications. They appear in such areas as communications networks, computer time-sharing systems, maintenance and repair facilities, air-traffic control, medical-care delivery systems, and many production, assembly and inspection operations. Despite their immense importance, queueing network systems are still not completely understood. For example, the equilibrium behavior of these systems when subjected to nonstationary random inputs is not totally understood. This research considers random periodic Poisson inputs, and develops some approximate diffusion models for predicting steady-state behavior. Heavy connections between heavy traffic approximations and the analytical theory of Markov processes and diffusions are explored in order to obtain computationally tractable results.

PERFORMING AGENCY: Systems Control, Incorporated
 INVESTIGATOR: Lemoine, AJ Harrison, JM
 SPONSORING AGENCY: National Science Foundation, Division of Engineering, ENG78-24568

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: June 1979 TOTAL FUNDS: \$84,344

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSE 7449)

17 324510

AUGMENTATION OF FREIGHT TRANSPORTATION DATA SETS

The benefits and costs of augmenting current freight transportation flow data will be investigated. Current incompatibilities and deficiencies with respect to time, space and commodity types will be identified so they may be rectified. Potential means for accomplishing this objective entail centralized data collection, communication and coordination of various data collection efforts, marginal collection of data by existing collectors and merging of existing data sets. The above means will also be appraised under differing circumstances. Another objective is investigation of existing sources of data collected for any purpose as potential generators of information on transportation commodity flows.

PERFORMING AGENCY: Pennsylvania University, Philadelphia
 INVESTIGATOR: Allen, WB
 SPONSORING AGENCY: Department of Transportation

43000

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: 1980

17 325449

NETWORK ANALYSIS AND OPTIMIZATION

This research is concerned with the systems analysis of structural characteristics and solution methods for large-scale combinatorial network optimization problems. Network optimization problems have applications to computer networking, communication planning, economic and energy equilibrium analysis, logistics, and transportation. The research involves three separate, but overlapping, areas: (1) model formulation and decomposition methods for combinatorial network optimization problems; (2) probabilistic analysis of large combinatorial network optimization problems; and (3) equilibrium analysis on congested networks that arise in settings such as communication, economics (spatially separated markets), transportation, and water resources planning. These topics are related by the facts that (1) each focuses on network applications, (2) each involves problem decomposition, and (3) each has combinatorial characteristics that result in easily identifiable and easily solvable components, such as shortest route or assignment subproblems. The analysis of these problems relies on combinatorial methodology such as Lagrangian relaxation, resource directive decomposition, and fixed point theory, as well as on ergodic methods from probabilistic theory. This is the first year of a 3-year continuing grant.

PERFORMING AGENCY: Massachusetts Institute of Technology
 INVESTIGATOR: Magnenti, TL
 SPONSORING AGENCY: National Science Foundation, Directorate for Engineering and Applied Science, ECS79-26225

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: May 1980 COMPLETION DATE: Oct. 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (EZ 354)

17 325450

DECOMPOSITION TECHNIQUES FOR NONLINEAR COST MULTICOMMODITY FLOW PROBLEMS

Nonlinear cost multicommodity flow problems arise in many applications such as traffic scheduling and packet switching. In such applications, networks with thousands of arcs and nodes are not uncommon. This project develops nonlinear decomposition methodologies for solving large-scale flow scheduling problems. The scope of work includes theoretical development, computational testing, and the development of heuristic variations. The research investigates both transfer decomposition and subset decomposition techniques, and the analytical and computational aspects of the solution algorithms are studied. The sensitivity of the method to the choice of the subnetworks in the decomposition is explored. Computational testing and demonstration of the resulting algorithms are performed using Department of Transportation data. This is the first year of a 2-year continuing grant.

PERFORMING AGENCY: Florida University, Gainesville
 INVESTIGATOR: Hearn, DE
 SPONSORING AGENCY: National Science Foundation, Directorate for Engineering and Applied Science, ECS79-25065

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: May 1980 COMPLETION DATE: Oct. 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (EZ 368)

17 329575

LOCOMOTIVE FAILURE REPORTING AND ANALYSIS SYSTEM

The objectives are to develop a failure reporting and analysis system (FRAS) to be used to record the experience obtained with the Amtrak AEM-7 electric locomotive being tested at the Transportation Test Center (TTC) in Pueblo, Colorado. The FRAS is designed to document the operational record of the AEM-7 locomotive as it is being endurance tested at the TTC. The documentation will provide a quantitative history of the reliability and availability of the locomotive and will provide a data trail which can be used as an aid to correct chronic problems.

REFERENCES:

A Failure Reporting and Analysis System for the AEM-7 Locomotive Test Program, Available from Transportation Systems Center, Draft Report

PERFORMING AGENCY: Transportation Systems Center
 INVESTIGATOR: Wlodyka, R Tel (617) 494-2143
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Woll, TP Tel (202) 426-9564

CONTRACT DOT-TSC/PPA-032

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Feb. 1979 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$55,000

ACKNOWLEDGMENT: FRA

17 335883

FAST DATA MANAGEMENT AND SUPPORT

This contract will provide a data management base for the FAST test data, and fulfill all approved requests for such data by users. This effort will be accomplished by the use of the DEC-20/50 computer system located at the Association of American Railroad's (AAR) computer center in Chicago with AAR personnel in Chicago and at the Transportation Test Center (TTC) in Colorado. A data storage support system will be maintained to respond to data requests and raw test data processing in preparation for storage in the FAST management system.

PERFORMING AGENCY: Association of American Railroads Technical Center
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Larkin, TP Tel (303) 545-5660 x291

Contract DOT-FR-9159

STATUS: Active NOTICE DATE: July 1981 START DATE: Sept. 1979 TOTAL FUNDS: \$2,115,430

ACKNOWLEDGMENT: FRA

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: Aug. 1981 START DATE: Aug. 1977

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.

REFERENCES:

The Structure of Cost and Technology of Regulated Common Carriers of Other Special Commodities; Chiang, JSW, Sept. 1979

Market Structure and Industry Behavior of the General Commodity Carrier, Michael, G, Jan. 1980

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Friedlaender, AF

SPONSORING AGENCY: Transportation Systems Center

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Feb. 1979 COMPLETION DATE: Oct. 1980 TOTAL FUNDS: \$64,390

ACKNOWLEDGMENT: Massachusetts Institute of Technology

18 319075

RAIL WEAR ECONOMIC ANALYSIS

As part of the TDC/FRA Joint Research Project Agreement in Freight Car Technology the objectives of this project are as follows: To achieve maximum practical cooperation and exchange of data on freight car truck technology; and To evaluate the rail renewal cost savings in typical U.S. and Canadian railway environments by adopting Type II trucks. Comparison is to be made using Truck Design Optimization Project (TDOP) dynamic performance measurements on Type II and conventional trucks as data input into the CIGGT Road Maintenance Cost Model computer program.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport,

PRO-930

INVESTIGATOR: McIlveen, ER Tel (613) 547-5777 Birk, AM Lake, RW

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Dibble, DW Tel (514) 283-4189

Contract 09SD.T8200-9-9526

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Jan. 1980 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$37,263

ACKNOWLEDGMENT: CIGGT

18 323379

ECONOMICS OF TRANSPORT MANAGEMENT

Development of a reference text on the applied economics of transport management, with 85 to 90 percent relation to freight and balance to passenger. It is intended to be a blend of academia and industry and thus will be of benefit to both areas. Both macro and micro examples will be used. Very few recent sources give application of economics for all modes. This will assist to alleviate this void.

PERFORMING AGENCY: British Columbia Institute of Technology, B002UD

SPONSORING AGENCY: British Columbia Institute of Technology

RESPONSIBLE INDIVIDUAL: Maitland, EY

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Aug. 1978 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

18 324512

IMPACTS OF VARYING BUDGETARY CONDITIONS ON LOCAL TRANSIT SYSTEM DECISIONS

Based on data available at the University of Pennsylvania, the impacts of varying budgetary conditions on local transit systems and the effect of these decisions over time on the quality of transit service will be investigated. Carriers will include those with inadequate subsidies to cover normal operation, maintenance and replacement costs, as well as carriers with surpluses or profits. Carriers include buses, streetcars, rapid rail and commuter rail. Many transit systems have reached the state of being unable to maintain normal service levels, much less expand capacity to accommodate expected increases in passenger traffic. New federal initiatives will be recommended.

PERFORMING AGENCY: Pennsylvania University, Philadelphia

INVESTIGATOR: Morlok, EK Viton, PA

SPONSORING AGENCY: Urban Mass Transportation Administration

70935

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: 1980

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: Feb. 1981 START DATE: Jan. 1977 TOTAL FUNDS: \$292,584

ACKNOWLEDGMENT: Massachusetts Institute of Technology

20 083533

ECONOMIC ANALYSES 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.

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

The Canadian Grain Marketing System Peltier, KA; Anderson, DE, Dept of Agricultural Economics; Agricultural Experiment Stat, AER Rpt 130, 1978

Analysis of Selected Basis Relationships for Sunflower and Spring Wheat, Colvin, DP, North Dakota State University, Fargo, MS Thesis 174p, 1979

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics, ND01354

INVESTIGATOR: Wilson, WW

SPONSORING AGENCY: Department of Agriculture

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: July 1977 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: North Dakota State University (CRIS 0060238)

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, 2nd and 3rd 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. 1981 START DATE: Aug. 1978 COMPLETION DATE: June 1981 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. The demand for commercial grain transportation services has been estimated for the State of Michigan. Specifically, the quantities of grain requiring commercial transportation services were estimated for 1985, 1990 and 2000 by counties. These projections were estimated under alternative domestic and foreign supply-demand scenarios. Since rail service quality is an important determinant of current and future rail use, the major service quality dimensions were identified as well as the extent to which rail use responds to improvements in the quality of rail service. The results indicate that the potential rail use increase due to improvements in rail service quality is substantial. Continued efforts are being directed toward the rationalization of the rural freight transportation system within a selected study region of Michigan. Additional work is being directed toward assessing the sensitivity of the location of economic activity to changes in the availability of transportation service. An analytical procedure has been developed to address this issue. An application of this procedure to Michigan is in progress.

REFERENCES:

The Potential Responsiveness of Selected Michigan Rail User to Improvements in Rail Service, Patrick, JM; Thompson, SR, North Central Journal of Agricultural Economics, Vol. 1 No. 2 pp 115-121, July 1979

Quantities of Grain Requiring Commercial Transportation Services in Michigan with Projections to 1985, 1990 and 2000, Thompson, SR; Fishbein, RE; Vollmers, AC, Michigan Agricultural Experiment Station, Research Rpt. 375, Mar. 1979

Rail Service Quality and User Response Patrick, JM; Thompson, SR, Michigan State University Dept of Agricultural Economics, Staff Paper 79-8, Feb. 1979

Integrating a Regional Economic Model with Commodity Flow Data for Transportation Policy Analysis, Pratt, JE; Thompson, SR, Michigan State University Dept of Agricultural Economics, Staff Paper 79-90, Dec. 1979

PERFORMING AGENCY: Michigan State University, East Lansing, Department of Agricultural Economics, CSRS M1CL

INVESTIGATOR: Thompson, SR

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, M1CL01254

STATUS: Active NOTICE DATE: Aug. 1981 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. The analysis of the social costs of regulating railroad grain rates in the Upper Midwest was completed and a Minnesota Agricultural Experiment Station Technical Bulletin was published. Social costs from the current system of rail rates are estimated at between \$42 million and \$62 million on wheat and barley in the Upper Midwest. These social costs could be eliminated or greatly reduced if rail rates are shifted to a cost-of-service basis. The study concludes that railroads should be given more flexibility in rate-making to enable them to adjust their rates in accordance with costs to meet the competition of unregulated trucks and barges. Data obtained on 1977 grain flow study by origin, destination, and mode of transportation were summarized and placed on computer tape for analysis. The sample data were expanded to obtain estimates for the entire state. The estimates were also checked for accuracy with secondary data. Maps showing the areas of origin and destination for grain flows by each mode of transportation are being constructed. Summary tables were submitted to the University of Illinois which is coordinating the study nationally.

REFERENCES:

Railroads, Grain Transportation and the Interstate Commerce Commission, Martin, M; Dahl, R
 A Transportation Issue-Lock and Dam 26 Martin, M; Dahl, R
 An Economic Analysis of the Social Cost of Regulated Value-of-Serv Wheat & Barley Rail Rates in the Upper Midwest, Martin, M
 Social Costs of Regulating Grain Rail Rates in the Upper Midwest, Martin, M; Dahl, R, UMN-Agricultural Experiment Station, Bulletin 319 21p, 1979

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: Aug. 1981 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.

REFERENCES:

Estimating Barge Transportation Costs for Grain and Fertilizer, Moser, DE; Woolverton, ME, Agricultural Experiment Station, Research Bulletin 1029, 1978
 Estimating Truck Transport Costs for Grain and Fertilizer Payne, WF; Baumel, CP; Moser, DE, Agricultural Experiment Station, Research Bulletin 1027, 1978

PERFORMING AGENCY: Missouri University, Columbia, Department of Agricultural Economics, CSRS MO

INVESTIGATOR: Moser, DE Rudcl, R

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, M000040-1

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070255)

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. processors, feed mills, feedlots and wet corn millers.

REFERENCES:

Importance of Wheat Exports to Kansas-Oklahoma-Texas Region and Utilized Transportation Modes, 1976-77, Fuller, S; Dezik, J, Texas Transportation Institute, Tech Note, 1978
 Ports on Texas Gulf Coast: Economic Role for Texas and U.S. Crops, Johnson, M; Fuller, S, Texas Agricultural Experiment Station, B-1268, 1980

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. 1981 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.

REFERENCES:

Projections of Production, Livestock Consumption and Transport Surplus of Five Grains in Okla, 1985, 1990, 2000, Johnson, MA, Oklahoma State Univ, Department of Agricultural Economics, AE 7809 16 p., 1978

PERFORMING AGENCY: Oklahoma State University, Department of Agricultural Economics, OKL01648

INVESTIGATOR: Oehrtman, RL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS OKL

STATUS: Active NOTICE DATE: Aug. 1981 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. Interviews were completed with a stratified random sample of 126 grain elevators, processors, flour millers and feed manufacturers throughout Ohio. Information was collected on marketing and transportation characteristics and on corn, wheat, soybean and oats receipts and shipments by month and transportation mode for 1977. Preliminary results indicate a substantial increase in grain shipments by barge on the Ohio River, the number of unit train shippers and the amount of grain which they ship. A micro-economic analysis of 17 rail lines located in a 31 county area of Central and Southwestern Ohio was conducted during the last year. The grain elevators on these lines have been revisited to examine in more detail the impact of loss of rail service on individual shippers. Shippers losing rail service may elect to retain that service through a subsidy agreement between the shipper and the rail carrier. In Ohio, the shippers must pay the non-Federal portion of the subsidy. Results indicate that less than half of the grain elevators elected to enter the subsidy program and that rail service on the subsidized lines will probably cease when the subsidy program terminates. Other transportation alternatives such as trucking become economically preferable to rail as soon as the shipper has to pay 30% or more of the subsidy cost.

REFERENCES:

Railroad Abandonments: Optimal Solutions and Policy Outcomes District and County 1984, 1989 and 1999, Larson, DW; Vogel, RC, Economic Regulation, 1980

Transportation Issues. Ohio Outlook Guide for 1980 Systems in Western Ohio, Larson, DW; Woolverton, MW, Ohio State University, Columbus, MM, 398, 1979

Effects of Rail Abandonment on Grain Marketing and Transportation Costs in Central and Southwestern Ohio, Larson, DW; Kane, MP, North Central Journal of Agricultural Economics, Vol. 1 No. 2 pp 105-114, 1979

The Economics of Alternate Distribution Methods of Anhydrous Ammonia in the Ohio Landmark Cooperative System, Larson, DW; Lewis, EG, Ohio State U-Dept of Agricultural Economics & Rural Soc, ESO 681, 1979

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:** Aug. 1981 **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.

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

Projected Quantities of Grain Production and Grain Requiring Transp Service in Montana 1984-1985, 1989-1990 & 1999-2000, Koo, WW; Cox, L, Montana Agricultural Experiment Station, Res Rpt. 132

Rail Based Grain Distribution System in Montana Koo, WW; Cox, L, Montana Agricultural Experiment Station, Bulletin 707

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:** Aug. 1980 **START DATE:** Oct. 1976 **COMPLETION DATE:** Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service

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. A manuscript was completed analyzing the operations of the Canadian grain marketing system. The study describes Canadian marketing institutions and trade policies. The study also makes a comparative analysis of the Manitoba and the North Dakota grain handling systems. Work was initiated on an evaluation of forward pricing strategies for wheat and sunflowers. This analysis evaluates historic basis relationships and evaluates various hedging scenarios over time. A follow-up study of Canadian trade policies and bilateral trade flows between Canada and the U.S. was initiated. The study will develop historic trade flow data and relate the flows to specific economic policies in each country.

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:** Feb. 1980 **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.

REFERENCES:

Influence of Coal Transportation Costs on the Optimal Distrib of Coal & Optimal Location of Electric Power Plants, West Virginia University, DOT/RSPA/DPB-50/79/36, Oct. 1979

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: Aug. 1981 START DATE: Sept. 1978 COMPLETION DATE: 1981 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.

A series of 6 reports will be published by TSC between March and July 1981.

PERFORMING AGENCY: Transportation Systems Center, OP-040

INVESTIGATOR: Maio, DJ Tel (617) 494-2258

SPONSORING AGENCY: Office of Policy and International Affairs, Intermodal Studies Division

RESPONSIBLE INDIVIDUAL: Swerdloff, CN

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: June 1978 COMPLETION DATE: Oct. 1981

ACKNOWLEDGMENT: DOT

20 315153

WATER TRANSPORTATION ECONOMICS, NAVIGATION PLANNING EVALUATION, COMMODITY FLOWS (ABBREV)

OBJECTIVE: To develop techniques and data input for an Analytical System for the nation and regions to aid in the planning and evaluating of alternatives in water transportation. The techniques and input data would be used by Corps offices in preparing survey reports, reconnaissance reports, design memoranda or other investigations related to U. S. waterways and harbors including the Inland Navigation Analysis (INSA) Program in OCE. This work unit will undertake a study to develop a methodology and projections of U. S. domestic and foreign waterborne grain traffic for the inland waterways, Great Lakes and coastal ports of the U. S. Grain included are corn, wheat, soybeans, grain sorghum, barley, rye, and rice. The level of geographic detail for the projections will be sufficient for adaptation for use in survey reports. The required site specific information for the survey report will be applied by Corps field offices to the results of this work unit to obtain the required grain projection. APPROACH: The research to develop grain projections will build upon the interagency and land grant college commodity flow survey for calendar year 1977 as part of a previous IWR work unit. The grain projection study will coordinate the scope of work and research effort with OCE, BERH and Corps field offices. Several other federal agencies such as the Department of Agriculture and the St. Lawrence Seaway Development Corporation will be consulted for input. The study will be undertaken by contract with selected state universities and/or appropriate private contractors. The output will be a grain projection methodology, projected grain waterborne commerce in a technical report, computer tapes and a draft ER.

PERFORMING AGENCY: Army Corps of Engineers, Engineer Institute for Water Resources

INVESTIGATOR: Olson, HE Antle, G

SPONSORING AGENCY: Army Corps of Engineers, Engineer Institute for Water Resources, 31068

STATUS: Active NOTICE DATE: July 1980 START DATE: 1979

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZTK 963)

20 319910

GREAT LAKES INTERNATIONAL TRADE-HINTERLAND SERVED AND SHIPPERS' ROUTE OPTIONS

OBJECTIVES: To provide information that will promote knowledgeable decision-making on both the planning and operational levels among those responsible for the future of Great Lakes ports. Specifically: 1. To compile origin/destination (O/D) information for the international movement of goods through Great Lakes ports and for international movements to and from the Great Lakes' 19-state hinterland (using tapes from the Bureau of Census Survey of Domestic and International Transportation of U.S. Foreign Trade). 2. To develop and calibrate a model of shipper choice for cargo routing of overseas trade. 3. To use information obtained to identify any significant strengths and weaknesses of Great Lakes ports in terms of shipment characteristics and their impacts. ANTICIPATED BENEFITS: This information will be of immediate benefit to Great Lakes port managers and to port, local, state and regional planners. Recent technological changes have had dramatic consequences for many Great Lakes ports. Managers are faced with major decisions regarding the ports' futures and have little information upon which to base those decisions. Commodity flow data, O/D analyses and hinterland definitions developed under this project should help them. This information will also be of use and interest to the shipping industry. IDENTIFIED BENEFITS TO DATE: A rudimentary model of shipper choice for routing of overseas cargo has been developed and calibrated using 1970 public use tapes. Investigators are awaiting the Bureau of Census' release of 1976 public use tapes to begin their O/D commodity flow analyses. The investigator has also reviewed the Census Bureau's "Domestic and International Transportation of U.S. Foreign Trade: 1976-Preliminary Report."

PERFORMING AGENCY: Wisconsin University, Milwaukee, School of Business Administration

INVESTIGATOR: Schenker, E Heilmann, R

SPONSORING AGENCY: National Oceanic and Atmospheric Administration, Sea Grant Program Office, R/PS-25

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Sept. 1978 TOTAL FUNDS: \$26,671

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GBP 3879 1)

20 319912

IMPROVING TRANSPORTATION OF MARITIME COMMERCE ON THE COLUMBIA-SNAKE SYSTEM

OBJECTIVES: Transportation on the Columbia-Snake rivers system affects the economic development and stability of a major portion of a three state area. Use of the rivers system will increase as new transportation systems are developed, and as fuel costs and availability force business and industry to shift to more economical transportation systems. The potential bottleneck to this expected growth is the undersized lock at Bonneville Dam. In this study we will: 1) review the history of shipping on the Columbia; 2) develop a time-cost-delay-model for barge traffic on the river; 3) identify cost savings of enlarging the locks; and 4) identify the level of traffic that would generate economic feasibility (B/C ratio greater than one) for enlarging the lock; 5) review cargo projections in conjunction with the University of Idaho programming model; and combine the University of Idaho's projection model with the feasibility levels obtained by this investigation to specify the feasibility and accompanying distributional impacts of modification of the locks. ANTICIPATED BENEFITS: The potential for economic growth in the Columbia-Snake region depends, in large part, upon the locks at Bonneville. Growth in transportation on the river may be constrained by these undersized locks. Yet modifications would be expensive. This study will help policy makers decide if and when (what volume of traffic) such modifications will be economically feasible. The project will encourage a regional research effort by two universities in the area. The expertise and training accomplished in the study will bring greater aid to the firms and agencies engaged in regional maritime transportation. IDENTIFIED

BENEFITS TO DATE: (1) Cost estimates for enlarging the locks at Bonneville were obtained from the Corps of Engineers, and are being adapted and refined. (2) Traffic projections for the Columbia River are being statistically estimated. (3) Rail and other transportation rates are being obtained.

PERFORMING AGENCY: Washington State University, Department of Agricultural Economics

INVESTIGATOR: Casavant, KL

SPONSORING AGENCY: National Oceanic and Atmospheric Administration, Sea Grant Program Office, R/WSU-2

STATUS: Active **NOTICE DATE:** Nov. 1980 **START DATE:** 1978 **COMPLETION DATE:** Mar. 1981 **TOTAL FUNDS:** \$12,900

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GBP 3900 1)

20 325448

DEVELOPMENT OF A MODEL FORECASTING COAL TRANSPORTATION CAPABILITY

DESCRIPTION: The demand for coal is expected to rise substantially as more and more coal burning plants are constructed and existing oil-and gas-fired plants are converted to burn coal. A large portion of the coal needed to meet this demand will have to come from the western states, such as Montana, Wyoming, the Dakotas, and Utah. Planners and policy makers do not generally see any obstacles in the extraction and utilization of this western coal except that, at the stage of transportation, capability may not be adequate and additional capability-both rail and slurry pipe line-may be required to meet the increased transportation demand. This continuing research project involves the development of a coal transportation model that will determine capacity requirements and shipments, undersupply, regulatory, and environmental constraints of coal utilization. Mathematical programming techniques will be used to conduct the analysis.

PERFORMING AGENCY: Texas University, Austin, Department of Electrical Engineering

INVESTIGATOR: Baughman, ML Vadie, H

SPONSORING AGENCY: Texas University, Austin

STATUS: Active **NOTICE DATE:** Feb. 1981 **START DATE:** 1978

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (NTX 982 1)

20 329574

APPLICATION OF STATEWIDE FREIGHT DEMAND FORECASTING TECHNIQUES

The objective of Phase II is to demonstrate the applicability of a freight demand forecasting technique for direct use by state agencies. The technique must, at a minimum, develop freight flows by highway, rail, and water for the current year; forecast the likely annual freight volumes and shifts among the modes over the short term (5 years or less); and provide origins and destinations by commodity within a corridor or region at the sub-state, state, or multi-state level. The technique must use generally available data and methods, with modification if necessary, to facilitate application to specific problems (e.g., deregulation and rate changes). Extensive development work is not envisioned. The required end-product is a usable freight forecasting

technique documented in a self-contained user's manual for general application at the state level.

PERFORMING AGENCY: Creighton (Roger) Associates, Incorporated

INVESTIGATOR: Memmott, FW Tel (518) 439-4991

SPONSORING AGENCY: American Assn of State Hwy and Transp Officials; Federal Highway Administration

RESPONSIBLE INDIVIDUAL: Spicher, R Tel (202) 389-6741

NCHRP HR 20-17

STATUS: Active **NOTICE DATE:** Aug. 1981 **START DATE:** June 1981 **COMPLETION DATE:** Nov. 1982 **TOTAL FUNDS:** \$175,000

ACKNOWLEDGMENT: National Cooperative Highway Research Program

20 335890

INTERREGIONAL COMPETITION AND THE DEMAND FOR TRANSPORTATION BY THE FOOD INDUSTRY

Create a spatial equilibrium model for an agricultural commodity which includes markets for transportation and fresh and processed forms of the commodity. This model will be used to examine certain policy issues. Econometric methods will be used to estimate the appropriate supply and demand equations. Quadratic programming will be used to solve this system and to estimate the impact of different types of changes in the operating environment of the optimal solution. Ground work for the project includes: (a) theoretical work for the demand specification and estimation, (b) theoretical work for supply specification and estimation, (c) partial completion of the empirical work on a preliminary transportation model, (d) planning stages for estimation of the complete supply and demand system, (e) planning for the estimation of the transportation supply system, and (f) preliminary work into the supply of processing and marketing services.

PERFORMING AGENCY: Pennsylvania State University, University Park, Department of Agricultural Economics and Rural Sociology, PEN02400

INVESTIGATOR: Dunn, JW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS PEN

STATUS: Active **NOTICE DATE:** July 1981 **START DATE:** Apr. 1979 **COMPLETION DATE:** June 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0076815)

20 341058

ANALYSIS OF TRAILER-ON-FLATCAR MODE SHARE

This study addresses the sensitivity of various factors to mode-split for TOFC services. TOFC has been examined as a candidate for increased mode share in an environment of increased energy costs. Cost of providing TOFC service has been studied as a function of distance, type of commodity and volume of traffic. The cost performance is then compared with the revenues which can be achieved to determine profitability and the sensitivity of this profit is used to understand the impact of rising fuel costs for a range of situations and against a range of competition.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Roberts, PO

SPONSORING AGENCY: Transportation Systems Center

STATUS: Active **NOTICE DATE:** Aug. 1981 **START DATE:** 1981 **COMPLETION DATE:** 1982

ACKNOWLEDGMENT: Massachusetts Institute of Technology

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) 426-6277

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1976 COMPLETION DATE: Mar. 1981 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. Beginning in January of 1981, the Houston project will be administered through the auspices of the Houston Belt and Terminal Railroad.

PERFORMING AGENCY: Federal Railroad Administration, Task Force on Rail Trans of Labor/Management Committee

INVESTIGATOR: Joiner, D Tel (713)224-3662 Anderson, 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) 426-6277

Contract DOT-FR-75244 (CC)

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Aug. 1977 TOTAL FUNDS: \$195,000

ACKNOWLEDGMENT: FRA

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 mechanical bad order time.

REFERENCES:

Catalog of Freight Car Utilization Projects and Publications, 26p, July 1980

FCUP Publications Listing 8p, Nov. 1980, available from FCUP

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) 472-7280 Taylor, CE Tel (202) 293-4084

CONTRACT DOT-FR-53-80-C-50005

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1977 COMPLETION DATE: Aug. 1981 TOTAL FUNDS: \$647,765

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 service planning model, and to assist any large railroad to apply this model on its 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 install the terminal control and budgeting system on B&M. It will test the dynamic class track assignment system on SP.

Fourteen reports issued by November 1980.

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) 472-7280 Taylor, CE Tel (202) 293-4084

Contract DOT-FR-53-80-C-50005

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1977 COMPLETION DATE: Sept. 1982

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.

REFERENCES:

The Car Cycle Analysis System Car Cycle Analysis Subcommittee, AAR R-442 61p, Sept. 1980

PERFORMING AGENCY: Association of American Railroads

INVESTIGATOR: French, PW Tel (202) 293-4165 Warfield, TP

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads

RESPONSIBLE INDIVIDUAL: Shamberger, RC Tel (202) 472-7280 Taylor, CE Tel (202) 293-4084

Contract DOT-FR-771-5279

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1977 COMPLETION DATE: Aug. 1981 TOTAL FUNDS: \$60,000

ACKNOWLEDGMENT: AAR

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: Completed NOTICE DATE: Aug. 1981 START DATE: Apr. 1977 COMPLETION DATE: Mar. 1981 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) 426-6277

Contract 75232

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: May 1976 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$300,000

ACKNOWLEDGMENT: FRA

21 188662

BUFFALO TERMINAL PROJECT

The purpose is to test the labor management concept on Conrail. The objective is being achieved through a series of experiments involving changes in operating practices, labor agreements, rates, and regulations.

PERFORMING AGENCY: Conrail, Labor-Management Task Force

INVESTIGATOR: Bethge, C Tel (716) 847-4272 Morey, J

SPONSORING AGENCY: Federal Railroad Administration; New York State Department of Transportation; Conrail, Labor-Management Task Force

RESPONSIBLE INDIVIDUAL: Kozak, DJ Tel (202) 426-6277

CONTRACT DOT-FR-8186

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: July 1978 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$400,000

ACKNOWLEDGMENT: FRA

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: Feb. 1981 START DATE: June 1978 COMPLETION DATE: Dec. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

21 319078

PORTLAND TERMINAL PROJECT

The purpose is to establish a cooperative labor-management experimental project in the Portland railroad terminal. The objective of the program is 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: Federal Railroad Administration, Task Force on Rail Trans of Labor/Management Committee

INVESTIGATOR: Carrier, W Hudson, J

SPONSORING AGENCY: Federal Railroad Administration; Association of American Railroads; Railroad Labor Organizations

RESPONSIBLE INDIVIDUAL: Collins, DM Tel (202) 426-6277

Contract DOT-FR-9045

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Feb. 1979 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$900,000

ACKNOWLEDGMENT: FRA

21 319909

IMPACT OF CHANGES IN WAGE RATES AND BENEFITS ON GRAIN FREIGHT RATES

OBJECTIVE: Identify marginal relationships between changes in various components of operating costs of railroads and changes in freight rates of transporting grain by railroads. Emphasis of the study will center around specifying the relationship between marginal labor costs and marginal review (freight rates) of railroads, with respect to grain transported. APPROACH: Operating Revenues and Expenses, Operating Statistics of Large Railroads, Commodity Statistics and Wage Statistics in Class I Railroads in the U.S. are sources of data to which a multiple regression study will be fit to achieve the objective.

PERFORMING AGENCY: Kansas State University, College of Business Administration

INVESTIGATOR: Winkler, AL

SPONSORING AGENCY: Kansas State Government, 0078253 KAN00008

STATUS: Active NOTICE DATE: Nov. 1980 START DATE: July 1978 COMPLETION DATE: May 1989

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 78253)

21 323371

RAIL FREIGHT TRANSPORT PLANNING IN CANADA

In this research project routing and scheduling operations of freight trains are studied. This study is conducted for a major railway company with the objective of upgrading service quality—that is, reliability and travel time at the lowest possible cost. An optimization model is proposed to simulate various operating strategies. This model will supplement Canadian National's collection of simulation tools.

PERFORMING AGENCY: Montreal University, Canada, Center for Research on Transports, Q010UE

SPONSORING AGENCY: Montreal University, Canada, Center for Research on Transports

RESPONSIBLE INDIVIDUAL: Ferland, JA

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: June 1979 COMPLETION DATE: Dec. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

21 323380

STRATEGIES FOR IMPROVING RAIL CAR DISTRIBUTION: A STUDY IN OVERCOMING ORGANIZATIONAL AND INSTITUTIONAL BARRIERS TO INNOVATION

The project assessed the readiness of the railroad industry to accept change in the car distribution process, and its capability for implementing that change. Innovations were examined in terms of the organizational and institutional aspects their implementation might affect, and the payoffs that might be realized by their implementation. Those innovations which were found to be most feasible and beneficial were examined in more detail, and strategies for their implementation were developed.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Martland, CD Meyer, M

SPONSORING AGENCY: Department of Transportation

RESPONSIBLE INDIVIDUAL: Pecor, D

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: 1980 COMPLETION DATE: Aug. 1981

ACKNOWLEDGMENT: Massachusetts Institute of Technology

21 335878

MANAGEMENT OF RAILROAD CAR DISTRIBUTION

The problem of low freight car utilization has plagued railroads for many years. As the costs of equipment continue to rise, this problem becomes more pressing. A key element in any systematic approach to the problem of low car utilization is improving the distribution of empty freight cars. The objective of this research is to synthesize the knowledge gained in previous studies of empty car distribution, and build upon that knowledge to suggest implementable strategies by which railroad management can improve performance in this critical area. The principal focus in this approach is to incorporate appropriate price and opportunity cost information into relatively simple decision-making aids for railroad management. It is not the intent of this research to develop new network optimization procedures to specify routing of empty cars automatically, but rather to incorporate

important fundamental ideas from economics and operations research into a synthesis of existing models to produce simpler, more usable, analytic tools which can aid management decision-making.

PERFORMING AGENCY: Cornell University, Department of Civil and Environmental Engineering

INVESTIGATOR: Turnquist, MA

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Terry, DH Tel (202) 426-2608

Contract DT-RS-56-80C-00013

STATUS: Active NOTICE DATE: July 1981 START DATE: Sept. 1980 COMPLETION DATE: Oct. 1981

ACKNOWLEDGMENT: DOT

21 335895

TERMINAL CONTROL AND BUDGETING

Efforts to improve terminal performance require more effective terminal control systems. This project is demonstrating several new control techniques in a case study involving Boston & Maine, with initial efforts directed at improving the control system at East Deerfield Yard. Three types of improvements will be made: the inclusion of car costs in the terminal's operating budget, the use of variable budgets, and the use of probabilistic train connection standards.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Martland, CD Tel (617) 253-5326 Marcus, HS

SPONSORING AGENCY: Association of American Railroads; Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: French, PW Tel (202) 293-4165

STATUS: Active NOTICE DATE: July 1981 START DATE: Oct. 1980 COMPLETION DATE: Oct. 1982 TOTAL FUNDS: \$210,000

ACKNOWLEDGMENT: Massachusetts Institute of Technology

21 341045

INTERMODAL FREIGHT SYSTEMS ENGINEERING

The results of an extensive study of the intermodal freight system are being evaluated and supplemented with additional work in key subject areas. These are based on the needs of intermodal carriers and shippers as well as departmental planning and policy activities. The purpose of this contract is to develop a group of concise reports, each addressing a specific subject area. Definitive information will be developed on line-haul operations with assessment of the impact of new rolling stock configurations and train handling techniques on energy consumption and travel time. Operations between major city pairs will be studied utilizing newly refined simulation

models for both the rail and highway modes. Operational recommendations concerning terminal areas will be formulated with attention to shipper-oriented aspects important to market share growth. Differences between motor carrier and railroad intermodal pick-up and delivery activities are to be evaluated in the process of formulating the recommendations. The outputs of this work will be a number of brief reports, each addressing a specific topic:

PERFORMING AGENCY: Transportation Systems Center

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Blanchfield, JR Tel (202) 426-0855

Contract DOT-TSC-PPA RR 157

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: June 1980 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$118,000

ACKNOWLEDGMENT: FRA

21 341073

RAILROAD SERVICE PLANNING MODEL

The original MIT Railroad Service Planning Model is being reprogrammed into more than a dozen smaller sequential programs which may be run on a low-cost desk-top computer. While the program may then require substantial operating time, the need for large-capacity storage and a main-frame computer will be eliminated.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Martland, CD

SPONSORING AGENCY: Association of American Railroads

RESPONSIBLE INDIVIDUAL: French, PW

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: 1980 COMPLETION DATE: 1981

ACKNOWLEDGMENT: Massachusetts Institute of Technology

21 341074

MOTIVE POWER COSTING

Planning for peak-period locomotive requirements involves a balancing of motive power costs against the costs of delays resulting from lack of power. Illinois Central Gulf Railroad costs are being examined in determining how to improve the availability of locomotives in peak times.

PERFORMING AGENCY: Massachusetts Institute of Technology

INVESTIGATOR: Manheim, ML

SPONSORING AGENCY: Association of American Railroads

RESPONSIBLE INDIVIDUAL: French, PW

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: 1980 COMPLETION DATE: 1981

ACKNOWLEDGMENT: Massachusetts Institute of Technology

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. A survey of grain elevators, feed processors, corn millers, soybean processing plants and wheat millers was made in Indiana in 1978 as part of the regional project. Data were collected by personal interview and are currently being processed. Usable survey forms were obtained from over 140 firms representing more than 25% of storage or processing capacity in the state. Data were collected on receiving, shipping, storage and grain handling capacity for each firm. Data were obtained on receipts and shipments of grain by month, by type of grain, by origin and destination and by mode of transport. The data on grain flows will be combined with similar data collected by other states and will represent data not available from any other source. The data will be used in models designed to evaluate the efficiency of the grain marketing and transportation system which serves both domestic and foreign buyers. Summaries of the data will be published to meet frequent requests for data on grain shipments from Indiana. These data should be useful to firms which are considering location of new grain handling firms, and to persons responsible for making decisions about the transportation system for marketing Indiana grain.

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: Feb. 1980 START DATE: July 1971 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Purdue University (CRIS 0060205)

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.

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., 1977

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: Aug. 1981 START DATE: Aug. 1971 COMPLETION DATE: July 1999

ACKNOWLEDGMENT: Michigan State University, East Lansing (CRIS 0060632)

22 138375

REDUCING LOSSES FROM PHYSICAL INJURY TO FRUITS & VEGETABLES DURING PACKAGING, HANDLING, & TRANSPORT

Determine the extent and cause of physical injuries to fresh fruits and vegetables packaging, handling, and transport; to reduce such losses by improved methods of packaging, handling, and transport of these commodities. Measure losses from physical damage to fruits and vegetables at various stages of harvesting, packing, loading, transport and distribution of these products to consumers. Develop improved handling techniques, new packages, and improved methods of transportation to reduce such losses and improve the quality of food available to consumers. Standardized sizes of packages will be studied for effects on loss reduction and for increased efficiency and consequent savings in food costs.

REFERENCES:

Lettuce Temperatures in a Van Container with a Reverse Mechanical Damage and Losses to Crisphead Lettuce During, Hinsch, RT; Hinds, RH; Goddard, WR, Proceedings (27th) pp 130-33, 1975

Performance of 35-pound Fiberboard Boxes Jumble-Packed with Peaches and Nectarines, Rij, RE, 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

Transit Temperatures of Iceberg Lettuce Shipped in Pallet Bins, Hinsch, RT; Harris, CM, Department of Agriculture Marketing Research Report, Report 1098 7p, 1979

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: Aug. 1981 START DATE: Oct. 1969 COMPLETION DATE: Oct. 1984

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.

Two additional reports are in the process of being published.

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: Aug. 1981 START DATE: July 1974 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0065175)

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. The use of unit train rates provides economic advantages to those firms who have the rate. A study of the extent to which prices to farmers are affected by transportation rates is nearing completion. Those elevators shipping by unit trains appear to offer higher prices to farmers but also have higher costs of operation, absorbing much of the potential gain from reduced rates. Projections for production and consumption of grain and oilseed crops were revised upward for Illinois to conform with new national estimates. Data from other states were also revised and were tabulated and summarized for use in writing the regional publication.

PERFORMING AGENCY: Illinois University, Urbana, Department of Agricultural Economics, CSRS ILLU

INVESTIGATOR: Hill, LD Tel (217) 333-2455 Hoffman, LA

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, ILLU-05-0344

STATUS: Active NOTICE DATE: Aug. 1981 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 completed and published of the quantities of grain expected to move out of Iowa counties by 1985 and 1990 and the tons of fertilizer that will be transported into each Iowa county by type of fertilizer by 1985 and 1990.

REFERENCES:

Volume of Grain and Fertilizer Requiring Transportation: Projections to 1984-1985 and 1989-1990 by Counties in Iowa, Miller, JJ; Baumel, CP; Wisner, RN; Fenton, TE, Iowa State Univ, Department of Economics

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: Aug. 1981 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. A survey and analysis of market flows of grain by origin, destination, and mode of transport for 1977 has been completed. Data will be used to describe the pattern of grain movement in the North Central region for regional transportation project NC-137. Regional analysis will be by USDA personnel stationed at the University of Illinois Urbana. Kansas data have been distributed to firms supplying data and to Kansas and Federal government agencies. Also, data have been used in hearings concerning public policy for transportation at State and Federal governmental levels. A manuscript reporting study results is in progress. Estimated production of wheat, oats, barley, rye, corn, grain sorghums, and soybeans by county in Kansas based on National Interregional Agricultural Projections for 1985, 1990, and 2000 have been completed. Estimated livestock production by counties of various classes of livestock have been estimated for the same years. Local consumption of grain and associated transportable surpluses of food grains, feed grains, and soybean have been estimated for 1985, 1990, and 2000. A manuscript reporting these results also is in progress.

REFERENCES:

Rail Line Abandonment in the North Central Region Sorenson, LO; Anderson, DG; Johnson, MA, Kansas Experiment Station, Bulletin 627 Pub No. 249, Feb. 1979

Statement of L. Orlo Sorenson Professor of Agricultural Economics, KSU Manhattan, KS, Concerning Senate Bill S. 1946, Sorenson, LO, National Agricultural Outlook Conference, November 6, 1979, 1979

Agricultural Transportation Adjustments to Fuel Scarcity Sorenson, LO, Proc of Agricultural/Energy Conf, Ozark Reg Comm, June 1979, 1979

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: Aug. 1981 START DATE: Oct. 1961

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070301)

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.

PERFORMING AGENCY: Wisconsin University, Madison, Department of Meat and Animal Science, CSRS WIS

INVESTIGATOR: Vilstrup, RH

SPONSORING AGENCY: Department of Agriculture, WIS02268

STATUS: Inactive NOTICE DATE: Aug. 1981 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.

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. 1980 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.

Additional Report: An Economic Analysis of Optimal Grain Market Structures and Grainflow Patterns with Selected Policy and Technological Changes in the Northeast, South, and Delta areas within Mississippi, Ph. D. dissertation, 1978 by A. J. Allen.

REFERENCES:

A Spatial Analysis of River Grain Elevators on the Tennessee-Tombigbee Waterway: A Projection for the 1980's, Allen, AJ; et al, Mississippi Agriculture and Forestry Experiment Station, AEC MR No. 82, 1979

Changing Structure of Mississippi's Grain Marketing Industry Learned, RD, Jr; et al, Mississippi Agriculture and Forestry Experiment Station, AEC MR No. 85, 1979

Optimum Grain and Soybean Market Structure and Flows for South Mississippi, Allen, AJ; Phillips, TD, Mississippi Agriculture and Forestry Experiment Station, AEC MR No. 88, 1979

Economic Feasibility and Potential for a Bulk Fertilizer Handling Fac & River Grain Elevator for Rosedale, Miss, Allen, AJ; et al, Spec. Rpt. 8, 1978

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: Aug. 1981 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.

REFERENCES:

Feed Grain Production and Utilization Balances for Alabama, Past, Present, and Future, Bedri, OAK, Auburn University, MS Thesis 107p, 1979

The Public Grain Elevator of the Alabama State Docks System Its Impact on the Alabama Economy, Stallings, JL; Hurt, JR; Strawn, HB, Agricultural Economics Series; Alabama Agric Exper Station, No. 32, 1979

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: Aug. 1981 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. A manuscript reporting grain shipments to and from Kentucky by type of grain, by mode of transportation, by month and based on the 1977 survey of grain handling firms in the three areas of Kentucky was completed. The 1973 Directory of Grain Handling firms in Kentucky was updated to 1978. An M.S. Thesis in progress will report analyses of grain use and grain balances in Kentucky.

REFERENCES:

Directory of Grain Handling Firms in Kentucky: 1978 Reed, MR; Shuffett, DM; Hall, HH, Kentucky Univ-Dept of Agricultural Economics, Extension Info Series

Grain Flows in Kentucky: 1977 Reed, MR; Shuffett, DM; Hall, HH, Kentucky Univ-Dept of Agricultural Economics, Res Rpt.

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: Aug. 1981 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. Grain flow data including volume, method of transportation and destination were collected. These data are to be analyzed on a regional basis and were submitted to the regional coordinating committee.

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: Aug. 1981 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. The approximately 135 questionnaires were tabulated, coded and punched on cards for summary inter-state and inter-regional analysis of grain flows from Ohio to other destinations. Seasonal flows were made by mode of transport and by month for each grain for the 1977 crop year. The flow data are now being incorporated with other participating states and are being tabulated at the University of Illinois. Grain production-consumption balances were developed for Ohio by S-115 regional subcommittee for checks against flow data. Grain production projections were made to the years 1985, 1990 and the year 2000 to be used in the national grain flow projection model. Final adjustments are being made on the national linear programming model and the model is now operational. Data from a few remaining states are being prepared and model analysis will be completed in sufficient detail for publication as per schedule. An analysis of the soft red winter wheat milling industry of Ohio is in process and historical production data are being gathered to be incorporated in the descriptive analysis.

REFERENCES:

Transportation Rates for Corn, Wheat and Soybeans Free, WJ; Stone, LE; Baldwin, D, Tennessee Valley Authority; Southern Coop Regional Series, Ser 227, Bulletin Y-124 127 p., 1978

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: Aug. 1981 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 A study of farmers' responses to storage incentives identified three basic conclusions: (1) the main impetus for placement of corn in loan and resale programs has been the acquisition of capital; (2) if the present price of corn increases, price expectations of producers increase relatively more, so that more corn is stored, except in the quarter preceding harvest; (3) in contrast to farmers, commercial storers of corn store relatively less corn as the price increases. Illinois has assembled data on origin, destination, and mode of transport for grain from interviews conducted in 41 states. Revisions in the data and checking for consistency are nearly complete. A matrix has been constructed using all 41 states as origins and destinations showing the volume of each grain by each mode. These have been correlated with published national data on exports, waterway movement, railroad 1% waybill sample, and farm sales and production. Illinois data is being analyzed to provide comparisons with 1970 data and to relate sub-state movements to price relationships.

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: Aug. 1981 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. 1980 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0073070)

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. 1980 START DATE: Jan. 1978 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0074775)

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 disinfestation and storage maintenance of cereal grains in storage and transit. Determine effects of the treatment on quality factors and establish cost data.

REFERENCES:

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: Aug. 1981 START DATE: June 1976 COMPLETION DATE: Nov. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0043120)

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. The grain model has been expanded by including foreign import demand. Corn, wheat and soybean import demand for 1985 by regions have been estimated. Ocean ship rate data have been collected. Data have been collected by crop reporting district for past demand or urea, ammonium nitrate, nitrogen solutions, ammoniated phosphate and triple superphosphate. Demand projections have been made to 1985 for each product. Demand projections have also been made for fertilizer exports and agricultural uses of fertilizer. U.S. and Canadian fertilizer production facilities and their 1985 operating capacities have been identified. Also, major fertilizer ports have been identified along with the historical quantities of each type of fertilizer imported. Ex Parte rail rates are being collected. Barge and truck rates have been estimated.

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: Aug. 1981 START DATE: Apr. 1976

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070487)

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. The world wheat model identified 54 shipping origins, 39 domestic wheat consuming regions, 11 export ports and 9 importing regions. The study contains a base model and nine alternative models. The base 1985 model includes total domestic consumption of 26.5 million metric tons and foreign consumption of 30.5 million tons with total domestic supply at 84.6 million tons. The base model shows the optimal flow of grain to domestic and export markets. The results show that most wheat will be exported through the Gulf and West Coast ports. The base model also indicates the domestic flow of wheat. Storage of wheat in the base model is concentrated in Nebraska and Kansas. If the Soviet Union increases imports of wheat from the U.S., that wheat would be exported primarily through the Duluth port. Much of that grain would come from North Dakota. All other alternative models show the interaction between changing import demand and domestic flows to all ports. Under all alternative formulation of the model, Montana always markets wheat to the West Coast and to nearby domestic millers. Montana's grain movements to the West Coast increases with increased demand in Asian countries. The models also suggest there will be very little grain storage in Montana. An Agricultural Experiment Station bulletin is almost completed.

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

An Economic Analysis of Marketing Montana TCK Smut Free Wheat in the People's Republic of China, Cramer, GL; Murphy, ME; Mathre, DE, Montana Agricultural Experiment Station, Bulletin 699, Feb. 1978

Competition Between Truck-Barge and Rail Transportation in Rate Sensitive Areas, Koo, WW; Cramer, GL, Transportation Perspectives, Fall, 1977

Optimal Stochastic Control of U.S. Wheat Stocks and Exports, Burt, OR; Koo, W; Dudley, N, Montana State University, Bozeman, Staff Paper 79-2, 1978

Optimal Stochastic Control of U.S. Wheat Stocks and Exports, Burt, OR; Koo, W; Dudley, N, American Journal of Agricultural Economics

PERFORMING AGENCY: Montana State University, Bozeman, Department of Agricultural Economics, MONB0078

INVESTIGATOR: Cramer, GL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service

STATUS: Active NOTICE DATE: Aug. 1981 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. improve forecasts of U.S. grain production, supply equations

REFERENCES:

Feed Grain Imports and Their Effect on Feed Grain Prices in the Importing Country, Reed, M, Iowa State University, Ames, Ph. D. Thesis, 1978

Use of Subjective Data in Estimating Farm Supply Response Kingtong, Y, Iowa State University, Ames, Ph. D. Thesis, 1978

The Effect of Corn Quality on Ration Costs Miller, DR, Iowa State University, Ames, MS Thesis, 1978

Use of Planting Intentions to Predict Actual Plantings Ladd, GW; Kingtong, Y, Iowa State University, Ames, Dept of Economics, Staff Paper 86, 1978

Relation of Corn Grades to Feed Quality Ladd, GW; Miller, D, Iowa State University, Ames, Dept of Economics, Staff Paper 87

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

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

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.

REFERENCES:

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: Aug. 1981 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 at the producer level. Use existing spatial equilibrium models to identify least cost routings from origin to port.

REFERENCES:

The Japanese Food and Feed Grain Economy Kalmbach, PM; Sharp, JW; Walker, FE, Department of Agricultural Economics & Rural Sociology, Sept. 1979

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

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071808)

22 179697

ECONOMIC ANALYSES OF THE UNITED STATES 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. All research has been completed on the network transportation model using the Out-Of-Kilter algorithm. A PhD Dissertation has been completed in which there was developed a multi-mode and a multi-region network transportation analysis by Crop reporting districts of the hard red winter wheat region.

REFERENCES:

Hard Red Winter Wheat Stegelin, FE, Oklahoma State University, Stillwater, Unpublished PhD Dissertation

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. 1981 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. Government officials in the Ministries of foreign trade, foreign trade organizations, ministries of agriculture, and other agencies involved in grain and oilseed import decision processes in Poland, the German Democratic Republic, Czechoslovakia, and Hungary were interviewed to obtain information regarding the potential and desired strategies that exist for cooperative export organizations to increase sales to Eastern Europe. It was apparent that U.S. farmer owned export organizations must be flexible in their pricing terms and be willing to both discount prices and offer delivery from optional origins. Also, cooperative export organizations must overcome a lack of close working relations relative to that of the private multinational grain export houses. Countertrade, technical assistance, and other cooperative arrangements were investigated to determine their potential use in improving the competitive position of U.S. cooperative export organizations. While these offer potential in certain cases, pitfalls were found to be associated with most of the marketing strategies explored. In the case of countertrade arrangements it was discerned that these arrangements are unwieldy and difficult to implement. Locating available and desirable goods to be imported by the U.S. appears particularly difficult but if this can be circumvented this type of arrangement might be usefully employed by U.S. cooperative export organizations.

REFERENCES:

The Nonmarket Economies Balance of Payments: Implications for U.S. Agricultural Exports, Jones, JR, Research Paper No. 7659

Idaho Inland Elevator Wheat and Barley Marketing Patterns Abbott, RV; Jones, JR, Idaho University, Agricultural Experiment Station, Prog Rpt. 209, 1979

The Nonmarket Economies' Balance of Payments, Implications for U.S. Agriculture, Jones, JR, Idaho University, Agricultural Experiment Station, Res Rpt. 7659, 1978

International Trade: Economic Outlook for 1980 Martin, MV; Jones, JR, Pacific Northwest Extension Publication, No. 161, 1980

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: Aug. 1981 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0071187)

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.

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: Aug. 1980 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. An in-transit shipboard fumigation of corn with phosphine resulted in a high level of biological efficacy even when a minimal dosage was used. Distribution and efficacy of the gas were affected by high temperatures of the grain caused by heating of the ship's fuel supply. Gas forced into the keel duct by the heat resulted in a low-level leak into the engine room. The problem was recognized immediately, and the leak was closed and the gas vented. Therefore, there was no danger to the ship's crew. Measurement for gas in working areas and living quarters during fumigant application, in transit, and during unloading of the grain showed no danger to the fumigators, ship's crew, or the grain handlers. Tests on the in-transit fumigation of export-type containers were completed. By covering the floor with a plastic film and sealing the doors with duct tape, a 20-ft. size loaded container was fumigated effectively with three different formulations of phosphine even when subjected to road travel 24, 48, and 72 hours after treatment. Even though as much as 79% of the gas was lost during road transit, concentrations retained were adequate to kill *Attageus megatom* larvae and *Tribolium castaneum* adults in the container during each trial.

REFERENCES:

An In-Transit Shipboard Fumigation of Corn Leesch, JG et al, Journal of Economic Entomology, 71:928-35, 1978

A Review of the U.S. Research on In-Transit Shipboard Fumigation of Grain, Davis, R; Gillenwater, HB, Proc 2nd Int Working Group Stored-Prod Entomol. Sept 1978, 1979

An In-Transit Shipboard Fumigation of Wheat Redlinger, LM; et al, Journal of Economic Entomology, Vol. 72 No. 4 pp 642-647, 1979

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: Aug. 1981 START DATE: Apr. 1978 COMPLETION DATE: Apr. 1983

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0044430)

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.

The objectives of this project are to determine the time and cost performance of U.S. grain ports and determine those grain port locations which maximize the export grain marketing/transportation system's efficiency. The systems analysis is to include grain transportation from production origins to port areas, movement through port areas and delivery to foreign consumers. The analysis is to be accomplished with two models, an interregional competition model and a simulation model of port areas. The Maritime Administration's Bulk Commodity Simulation Model has been placed on the Texas A and M computer system and simulates the four port regions--Gulf, Atlantic, Pacific and Great Lakes. This model has been updated to represent current conditions, and will be used to determine time and cost performances of existing ports under various conditions. Much of the data for the U.S. interregional competition model has been gathered or estimated. Its data requirements include exportable surplus of grain by subregions of U.S., transportation costs from subregions to various port areas, handling and storage costs at port areas and shipping costs to foreign destinations.

REFERENCES:

U.S. Grain Ports: Location and Capacity Dezik, J; Fuller, S, Texas Agricultural Experiment Station, PR-3593, 1979

PERFORMING AGENCY: Texas A&M University, Department of Agricultural Economics, TEX06365

INVESTIGATOR: Fuller, SW Harston, C Cook, ML

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS TEX

Contract 801-15-40

STATUS: Active NOTICE DATE: Aug. 1981 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: Aug. 1980 START DATE: May 1978 COMPLETION DATE: May 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0076330)

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. Efforts have been concentrated on the equipment shortage research objective. A preliminary report on this phase will be completed soon. Objective 2 with respect to rail ownership will include potential future alternatives such as the State Rail Authority and Regional Rail Authorities.

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: Aug. 1981 START DATE: Nov. 1978 COMPLETION DATE: Dec. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0077403)

22 308428

LIVESTOCK TRANSPORTATION BY RAIL

Modification of an existing 85-foot double-deck stock car with on-board drinking and feed stations and subsequent test trips of varying lengths will determine if there could be increased shipping of cattle by rail. A major goal is prevention of "shipping fever" in cattle which is caused by the stress of long-distance trips.

REFERENCES:

Experimental Railcar for Transport of Cattle Ashby, BH; et al, Presented 1979 Winter Meeting American Soc of Agric Engrs, No. 79-6510, 1979

Rail Transportation of Cattle in a Modified Car Sharp, AJ, Presented Animal Air Transp Annual Meeting, Washington, D.C., 1979

PERFORMING AGENCY: Texas Department of Agriculture; Texas A&M University

SPONSORING AGENCY: Department of Agriculture, Office of Transportation

RESPONSIBLE INDIVIDUAL: Bailey, WA

STATUS: Terminated NOTICE DATE: Aug. 1981 START DATE: Mar. 1979 COMPLETION DATE: Feb. 1980 TOTAL FUNDS: \$65,000

22 315156

DEVELOPMENT OF COATINGS FOR PROTECTION OF COAL DURING TRANSPORT AND STORAGE

Coal in stockpiles or in rail cars is subject to adverse effects from exposure to wind and rain. The purpose of this program is to evaluate the technical feasibility and economics of coating coal stores to prevent moisture penetration and air circulation. Small stock piles of coal will be coated to test the durability and water permeability of a novel polymeric coal coating. Analysis of the relative degradation in fuel value of coated and uncoated piles will be performed.

PERFORMING AGENCY: Atlantic Research Corporation

INVESTIGATOR: Culp, C Tel (703) 642-4193 Hyde, R

SPONSORING AGENCY: Atlantic Research Corporation

Contract

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Dec. 1980 COMPLETION DATE: Dec. 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ER 817)

22 319084

OPTIMUM NUMBER, SIZE, AND LOCATION OF COMMERCIAL GRAIN STORAGE FACILITIES IN SOUTH CAROLINA

Determine the optimum number, size, and location of commercial grain storage facilities in South Carolina. The optimum number, size, and location of commercial grain storage facilities will be considered to be that configuration which minimizes the costs of assembling, storing, and distributing grain in South Carolina. Grains to be included in the analysis include corn, soybeans, barley, oats, wheat, and grain sorghum. Storage costs will be determined by the economic engineering approach. Transportation rates will be gathered from railroads and grain trucking firms. A transshipment-plant location model, using a combinational algorithm, will be employed to determine the minimum cost solution. This project is in the data collection stage.

PERFORMING AGENCY: Clemson University, Department of Agricultural Economics and Rural Sociology, SC00395

INVESTIGATOR: Miller, SE

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS SC

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: July 1979 COMPLETION DATE: June 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0079493)

22 319085

TRANSPORTATION AND LOGISTICAL PROBLEMS ASSOCIATED WITH PULPWOOD MARKETING SYSTEM IN THE SOUTHEAST

Develop and apply mathematical models to a study of the effects of transportation costs on shipping and storage facilities needed for an economically efficient logistical system to serve Southeastern pulpwood markets. This will be pursued through the following: Estimate transportation costs involved in the pulpwood marketing process, with emphasis on regional pulpwood production and transportation networks. Determine optimum shipping patterns of the Southeastern pulpwood industry. Determine the effects of changes in costs and prices on optimum shipping patterns; the emphasis will be on the impact of expected energy costs and future pulpwood prices. The transportation system will be analyzed by collecting cost data on various transportation methods (truck, rail, etc.) and on final markets. These data will be used in a minimum cost model to determine optimum shipping patterns from woodlot to mill yard. In addition, the spread between market prices and transportation costs would be interpreted in terms of pricing efficiency. This project is in the data collection stage.

PERFORMING AGENCY: Georgia University, Athens, Department of Agricultural Economics, GEO-03-0595

INVESTIGATOR: Ames, GCW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS GEO

Contract 901-15-109

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: May 1979 COMPLETION DATE: May 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0079378)

22 319086

ECONOMIC EFFECTS OF TRANSPORTATION POLICY AND REGULATORY CHANGES IN U.S. GRAIN MARKETING SYSTEM

Determine the effect of general rate changes and alternative rate structures such as seasonal rail rates, unit train rates and barge user charges on the spatial and temporal flows of the grain in the U.S.; analyze the impact of these rate changes on the storage system in producing regions, and evaluate the interaction of the grain storage system with the grain-rail car shortage under alternative rate structures; and evaluate the sensitivity of the grain distribution system to alternative grain export policies and interaction of these export policies with transportation and regulatory changes. This research will be conducted for the continental United States with detailed information in grain transportation activities between producing and consuming regions. The basic approach to be used in this study is spatial equilibrium analysis based on a linear programming model. Most data necessary to complete this study will be given by NC-137 regional transportation and S-115 regional marketing committees. A base model based on a mathematical programming algorithm has been developed for the study. The model contains 88 grain producing regions, 24 consuming regions, 13 export locations and 9 commercial storage regions. That of the commercial storage capacity is located in major grain producing areas and along major grain transportation corridors. Thus, the storage regions identified in the study cluster in the Midwestern States. The model is primarily designed to evaluate the interaction between

PERFORMING AGENCY: Montana State University, Bozeman, Department of Agricultural Economics, MONB00089

INVESTIGATOR: Koo, WW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS MONB

Contract 901-15-108

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: May 1979 COMPLETION DATE: June 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0079377)

22 319087

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. Describe the marketing techniques and strategies used by exporters in several exporting countries. Evaluate alternative marketing procedures, such as identifying preserved shipments, special contracts, certificate final shipments, FOB, and CIF. Compare grading procedures and other terms of contracts used in world trade. Develop a model to analyze the effects of the alternative techniques on economic incentives and price level for grain at producer level. Develop cost data for different combinations of transportation modes including storage costs, port facilities, and ocean freight. Use existing spatial equilibrium and transportation models to identify least cost routings for grain from origin to port. Adapt mathematical programming models and queing theory to reduce congestion and cost in rail yards serving grain ports. Establish priorities for improving the present grain export marketing system and quantify the benefits of adoption of cost-reducing techniques and market organization.

PERFORMING AGENCY: Oregon State University, Department of Agricultural and Resource Economics, ORE00595

INVESTIGATOR: Martin, MV

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS ORE

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: May 1979 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0079428)

22 319088

IMPACT OF THE TENNESSEE-TOMBIGBEE WATERWAY ON THE TRANSPORTATION-MARKETING SYSTEM

Examine the existing transportation and marketing system for selected products in the Tennessee-Tombigbee area, determine the transportation and marketing facilities needed to move selected agricultural products into and from the region at minimum cost, analyze the adjustments needed to achieve the least cost structure, and determine those changes caused by the Waterway, and develop policy alternatives which stimulate economically efficient development on the Waterway. Information relating to transportation availability, modes and marketing facilities will be obtained by surveys. A spatial equilibrium model will be used to estimate the kind of transportation and marketing system that would efficiently move products from and into the region. The model developed for objective 2 will be used to examine potential shifts in product flows and marketing activities due to opening the Waterway. The model and results obtained in objectives 2 and 3 will be used to estimate the impact that certain policy alternatives might have. Data from the survey of grain handling firms in the state are being used as the basis of analysis of the likely impacts of the Tennessee-Tombigbee Waterway on the structure of the grain industry in Mississippi. A model of the study area was developed from existing regional models to consider the likely effects of the waterway. An analysis of the results obtained from the model is near completion in a M.S. Thesis.

REFERENCES:

Optimum Grain and Soybean Market Structure and Flows for South Mississippi, Allen, AJ; Phillips, TD, Mississippi Agricultural and Forestry Experiment Station, AEC MR No. 88, 1979

A Spatial Analysis of River Grain Elevators on the Tennessee-Tombigbee Waterway: A Projection for the 1980's, Allen, AJ; et al, Mississippi Agricultural and Forestry Experiment Station, AEC MR No. 82, 1979

PERFORMING AGENCY: Mississippi State University, Department of Agricultural Economics, MIS-4407

INVESTIGATOR: Allen, AJ

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS MIS

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: July 1978 COMPLETION DATE: Sept. 1983

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0076263)

22 319089

RATE STRUCTURE AND REGULATORY BARRIERS AFFECTING TRANSPORTATION OF WISCONSIN LIVESTOCK AND MEAT

Analyze Wisconsin's transportation systems and techniques which may provide cost reduction and improved efficiency for the livestock and meat industry. Evaluate the current interstate rate structure, transportation barriers and regulations, and economic regulation of the intrastate system. Formulate recommendations on restructuring rates, improved efficiency and technology, energy conservation and reducing transportation costs. Re-

search will be designed to identify critical interstate and intrastate rate structure problems and regulatory barriers. Transportation systems used by the Wisconsin livestock and meat industry will be studied statewide. Primary data will be obtained from field and mail surveys from transportation firms, processor and shippers. The current rate structures and Commerce Commission, the State Department of Transportation and major transportation firms operating in the State. Institutional and regulatory barriers will be reviewed, including a comprehensive study of current laws and back haul regulations. Special cost situations will be developed on alternative systems and cost case study models will be used to determine operational costs and margins. Recommendations will be developed for proposed administrative and policy changes to improve the State transportation system.

PERFORMING AGENCY: Wisconsin University, Madison, Department of Meat and Animal Science, WIS02382

INVESTIGATOR: Vilstrup, RH, Ward, RJ

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS WIS

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Oct. 1978 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0075556)

22 319090

ECONOMIC ANALYSES 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; competitive advantage; relative efficiency of time, form and place utilities under different systems; rate of technological change and progress including capital losses and replacement; their relationship with commodity futures markets. 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 cost of marketing and transportation; price responsiveness and uncertainty. Inventory of Texas export facilities. Industrial organization and efficiency models.

PERFORMING AGENCY: Texas A&M University, Department of Agricultural Economics, TEX03396

INVESTIGATOR: Cook, ML

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS TEX

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Dec. 1979 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0080569)

22 319091

TRANSPORTATION OF FLORIDA PERISHABLE AGRICULTURAL COMMODITIES

Determine demand and supply of transportation services for perishable agricultural commodities in Florida. Determine effects of Federal and State regulations on transportation efficiency. Investigate alternative systems to improve modal distribution. Identify present trends in production and distribution of Florida perishables. Use of different modes of transportation. Survey carriers in order to determine main characteristics of present truck and rail services. Interview shippers, receivers and carriers in order to assess impact of regulations on transportation. Develop transportation models that would improve present systems and help Florida's competitive position. Work during the reported period consisted of literature review, field visits to perishable product shippers and carriers, and state-wide discussions with members of the Transportation Task Force and other interested parties. Some problems believed to be worthy of research efforts have been identified. An important problem is the finding of alternatives to the present trend in the modal composition of perishable traffic in which the railroads share has been reduced to around 1%, towards a more balanced system. The energy and environmental implications of the present situation have been recognized and discussed. Also identified has been the need to look at the different regulations affecting the transportation of perishables, and to assess the impact of those regulations on efficiency, particularly as it relates to energy use. It is hypothesized that too much regulation fosters inefficiency in the use of transportation resources. A research project that will serve as a M.S. Thesis has been initiated. This study will try to measure the waste of energy due to regulation that prevents the trucks that transport Florida fresh fruits and vegetables from backhauling non-exempt goods. Ninety-five percent of

fresh fruits and vegetables transported from Florida by trucks, 4% by boat (exports) and 1% by rail. Eastern markets receive 54%, midwest 24% and southern markets 19%. Florida needs to develop back up rail transport service to handle emergencies from energy shortages in order to avoid heavy economic losses to agriculture and short falls in national fresh food supplies.

REFERENCES:

Transportation of Florida Perishables—Problems and Research Needs, Dow, JK, Florida Agric Experiment Station, Economics Information Rpt, Report No. 106 47p, Feb. 1979

PERFORMING AGENCY: Florida University, Gainesville, Department of Food and Resource Economics, FLA-AS-01904

INVESTIGATOR: Dow, JK

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS FLA

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: July 1978 COMPLETION DATE: Sept. 1983

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0075889)

22 319093

COSTS, MARGINS, AND ECONOMICS OF PROCESSING HANDLING, AND MERCHANDISING FIBERS AND OIL CROPS

Determine and maintain current cost and charges for processing, handling, storing, and merchandising fiber and oil crops. Analyze the influence on costs of variations in volume, capacity, utilization, location, types of facility, new technology, and related factors. Determine the optimum size, number, location, and configurations of processing and storage facilities needed to satisfy specific domestic and foreign demand under alternative conditions and policies. Use both economic engineering and survey approaches to provide the basic cost data in this project. From this base of information, conduct additional research through budget analyses. Obtain data through secondary sources, equipment manufacturers, university researchers in food and fiber technology, and industry surveys. Use this data in other fiber and oil crop projects. Address questions of optimum size and location of firms within the production, processing and transportation sectors of the fiber and oil crops subsectors, and changing energy and labor costs. Develop simulation models of representative industry firms.

PERFORMING AGENCY: Mississippi Agricultural & Forestry Exper Station, Fibers Program Area CE Division, ERS, CE-02-014-28-04

INVESTIGATOR: Ghetii, J

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, ERS CED

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Sept. 1977 COMPLETION DATE: Sept. 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0041613)

22 319094

COSTS, MARGINS, AND ECONOMICS OF PROCESSING, HANDLING, AND MERCHANDISING FIBERS AND OIL CROPS

Determine and maintain current cost and charges for processing, handling, storing, and merchandising fiber and oil crops. Analyze the influence on costs of variations in volume, capacity, utilization, location, types of facility, new technology, and related factors. Determine the optimum size, number, location, and configurations of processing and storage facilities needed to satisfy specific domestic and foreign demand under alternative conditions and policies. Use both economic engineering and survey approaches to provide the basic cost data in this project. From this base of information, conduct additional research through budget analyses. Obtain data through secondary sources, equipment manufacturers, university researchers in food and fiber technology, and industry surveys. Use this data in other fiber and oil crop projects. Address questions of optimum size and location of firms within the production, processing and transportation sectors of the fiber and oil crops subsectors, and changing energy and labor costs. Develop simulation models of representative industry firms.

PERFORMING AGENCY: Department of Agriculture, Fibers Program Area, CE Division-ERS, CE-02-014-11-00

INVESTIGATOR: Doty, HO

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, ERS CED

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Sept. 1977 COMPLETION DATE: Sept. 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0043465)

22 319095

COSTS, MARGINS, AND ECONOMICS OF PROCESSING, HANDLING, AND MERCHANDISING FIBERS AND OIL CROPS

Determine and maintain current cost and charges for processing, handling, storing, and merchandising fiber and oil crops. Analyze the influence on costs of variations in volume, capacity, utilization, location, types of facility, new technology, and related factors. Determine the optimum size, number, location, and configurations of processing and storage facilities needed to satisfy specific domestic and foreign demand under alternative conditions and policies. Use both economic engineering and survey approaches to provide the basic cost data in this project. Form this base of information, conduct additional research through budget analyses. Obtain data through secondary sources, equipment manufacturers, university researchers in food and fiber technology, and industry surveys. Use this data in other fiber and oil crop projects. Address questions of optimum size and location of firms within the production, processing and transportation sectors of the fiber and oil crops subsectors, and changing energy and labor costs. Develop simulation models of representative industry firms.

PERFORMING AGENCY: Texas Technological College, Fibers Program Area CE Division-ERS, CE-02-014-48-06

INVESTIGATOR: Shaw, DL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, ERS CED

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: Sept. 1977 COMPLETION DATE: Sept. 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0043466)

22 319914

NET ENERGY ANALYSIS OF SURFACE MINED COAL FROM THE NORTHERN GREAT PLAINS

The objective of this study is to provide a net energy analysis of surface mined coal from the Northern Great Plains. Four schemes of coal development are evaluated to determine the energy required to deliver coal-derived energy in a bulk form to a load center 1000 miles from the mine. The coal development schemes analyzed are: (1) transport of raw coal by unit train to load center; (2) rail transport of coal followed by load center electrical power generation; (3) mine-mouth electrical power generation with high voltage transmission to load center; and (4) gasification of coal at the mine with pipeline transmission of gas to load center. Several system models are also presented to enhance understanding and overview of the interdependence of the coal resources, the environment, and the economy of the Northern Great Plains. The potential impact of surface mining is addressed as well as the benefits to be obtained from an affirmative reclamation program.

PERFORMING AGENCY: State University System of Florida, Department of Environmental Engineering Science

INVESTIGATOR: Ballentine, T

SPONSORING AGENCY: Department of Energy, EY-76-S-05-4398

Contract

STATUS: Active NOTICE DATE: Nov. 1980 START DATE: Sept. 1972

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FA 140)

22 323372

PRODUCTIVITY IN PHYSICAL DISTRIBUTION

In many organizations physical distribution costs are considered as fixed, while the planning of a certain level of service is considered as a constraint dictated by competition. In the last few years, it has been necessary to minimize distribution costs by maintaining a steady level of service. It is proposed to systematically study the following problems: 1) Which elements enter in the calculation of distribution costs? 2) Which are the elements included in the definition and calculation of the level of service? 3) How can the relationship between these two concepts be modeled to obtain equilibrium solutions? A global decision making model will be written in the overall context of distribution: interaction between models of inventory levels, choice of transport mode, location and handling, impact on market penetration, and contribution to marketing strategies.

PERFORMING AGENCY: Montreal University, Canada, Center for Research on Transports, Q005UD

SPONSORING AGENCY: Montreal University, Canada, Center for Research on Transports

RESPONSIBLE INDIVIDUAL: Chriqui, C

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Feb. 1979 COMPLETION DATE: June 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

22 323373

COAL TRANSPORTATION

With prospects of substantial long term Western Canadian coking and thermal coal markets developing in Ontario, continual growth of export sales via the West Coast to Japan and possible westward movement of coal from Nova Scotia; plausible scenarios of coal traffic can be postulated requiring substantial investment in mainline infrastructure. This program is aimed at gaining an understanding of the system that could be used to transport coal from mines to consumers. This program has been subdivided in two sections: Section I will consider the long distance transportation of coal from Western Canada to Central Canada by unit train, coal slurry, coal gasification and possibly electric transmission. Section II: It is expected that large quantities of coal will be required in Alberta as lower quality fuel for tar sands and for steam generation in oil wells. This section will assess the short distance transportation needs for coal in Western Canada and also the possible movement of Atlantic coal to Quebec.

PERFORMING AGENCY: Transport Canada Research and Development Centre, 065HG

SPONSORING AGENCY: Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Johnson, WF

STATUS: Active NOTICE DATE: Dec. 1980 START DATE: Apr. 1976 COMPLETION DATE: Mar. 1981

ACKNOWLEDGMENT: Roads and Transportation Association of Canada

22 325447

YEAR 2000 STUDY

The objectives of this project are to: (1) characterize the present transportation systems for energy materials; (2) project system characteristics through the year 2000; (3) identify possible problems that could occur in energy material transportation; and (4) suggest actions that could be taken to prevent their occurrence. Such identification of potential problems well in advance of their occurrence will serve to reduce the number and severity of potential crises. The project will include literature searches, workshops, discussions with key personnel in energy and transportation, and analysis of the information obtained.

PERFORMING AGENCY: Battelle Memorial Institute/Pacific Northwest Labs

INVESTIGATOR: Desteese, JG

SPONSORING AGENCY: Department of Energy

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: Oct. 1977

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ER 404 1)

22 330965

A STUDY OF THE FEASIBILITY OF MOVING WESTERN COAL THROUGH A TRANSSHIPMENT POINT LOCATED ON LAKE MICHIGAN

The objectives of the study will be three-fold: 1) Determine the costs associated with establishing a major bulk ore transshipment facility on the Western side of Lake Michigan, capable of handling forecast volumes of Western coal and other commodities moving through the Great Lakes. 2) Estimate the benefits that would accrue from the use of such a facility. The benefits would be determined for optimally-sized vessels capable of making passage to a selection of upper Great Lakes ports without investing capital into seaway improvement (except for the harbors and docks). 3) Expand the calculations described in (1) and (2), above, to include comparison with possible alternative investments in expanding the Soo Locks and Saint Marys River to accommodate larger vessels. The results of the study will be beneficial to current and future coal consuming operations in the Eastern Great Lakes region in that it would assure delivery of the low-sulphur Western Coal at the cheapest price. Those with large energy requirements such as utilities, steel mills, etc., would be particularly benefited. Further the study will provide guidance to decision makers in the allocation of capital resources. In addition to industrial and utility planners, the users will include both state and federal agencies with responsibilities for efficient utilization of the Great Lakes. This will include every state government bordering the Lakes, plus the U.S. Department of Transportation including the U.S. Coast

Guard), the U.S. Army Corps of Engineers, and U.S. Environmental Protection Agency, the U.S. Department of Energy, and possibly others.

PERFORMING AGENCY: Michigan University, Ann Arbor

INVESTIGATOR: Bunch, HM

SPONSORING AGENCY: National Oceanic and Atmospheric Administration, R/T-11

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: 1980 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$29,880

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GBP 4594)

22 330966

ASSESSMENT AND PLANNING FOR ENERGY MATERIALS TRANSPORT

The overall purpose of this multi-year effort between the Department of Energy/Office of Assistant Secretary Resource Applications (DOE/ASRA) and Argonne National Laboratory (ANL) is to develop plans and implement strategies to expedite the transport of energy materials. It will accomplish this through an assessment of current and future requirements for and methods of shipping these materials. Near term efforts will include assisting ASRA in developing a comprehensive national energy transportation plan. ANL will perform a detailed assessment of the economic, energy, environmental and societal implications of the plan and other associated technological, policy and intervention activities which arise. ANL will also review and analyze relevant existing plans and forecasting methodologies, and develop an appropriate coal transportation model. As part of this effort, ANL will coordinate with the Office of Assistant Secretary Conservation and Solar Applications (DOE/ASCS) and the Office of Assistant Secretary Environment (DOE/ASEV) in developing energy use and environmental impact analyses. In addition, ANL will provide ASRA with quick response technical analysis support for activities such as ASRA assistance to the (proposed) National Energy Mobilization Board's decision-making processes.

PERFORMING AGENCY: Argonne National Laboratories

INVESTIGATOR: Bernard, MJ Bertram, KM

SPONSORING AGENCY: Department of Energy, Office of Resource Applications, 49703 W-31-109-ENG-38

Contract

STATUS: Active NOTICE DATE: Apr. 1981 START DATE: Mar. 1980 TOTAL FUNDS: \$400,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FO 1074)

22 335313

NUCLEAR MATERIALS TRANSPORTATION TECHNOLOGY STUDIES

The purpose of the Nuclear Materials Transportation Studies Project is to perform research to meet the objectives of specific elements of the Nuclear Materials Transportation Program being conducted at the Transportation Technology Center at Sandia Labs. Work will be performed in nine major tasks. These tasks will perform systems studies of DOE waste transportation; develop information for the effects of transport and handling conditions on spent fuel; develop methods for improving cask turnaround; develop improved analytical methods for thermal and structural analysis of shipping casks; evaluate the impacts of ALARA on waste transportation; develop and apply value/impact and risk assessment methodologies; develop intermodal shipment systems; and develop shipping systems for processed DOE transuranic wastes.

PERFORMING AGENCY: Battelle Memorial Institute/Pacific Northwest Labs, Department of Energy

INVESTIGATOR: Rhoads, RE Andrews, WB Desteese, JG Mccann, RA Greenberg, J Bailey, WJ Friley, JR

SPONSORING AGENCY: Department of Energy, Office of Policy & Evaluation, Office of Nuclear Energy, 006235 TICNO 80274

Contract

STATUS: Active NOTICE DATE: June 1981 START DATE: Oct. 1979 TOTAL FUNDS: \$750,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FQ 1293)

22 335320

CONTAINERS AND MATERIALS HANDLING EQUIPMENT

To conduct exploratory development on an integrated supply distribution system consisting of the functional elements of unitization, material

handling, transportation and control and identification to ensure the operation of an effective distribution system. Consists of study, innovation and exploration of novel mechanisms, techniques, materials, design approaches and fabrication techniques to develop practical concepts that will enhance all the elements of the integrated supply distribution system.

PERFORMING AGENCY: Department of Defense, Mobility Equipment Research and Development Command

INVESTIGATOR: Rodrick, E

SPONSORING AGENCY: Department of Defense, Mobility Equipment Research and Development Command, DA0N3716

STATUS: Active NOTICE DATE: June 1981 START DATE: July 1973

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (ZQA143716 3)

22 335373

CONTROL OF DAMAGE AND LOSS IN DISTRIBUTION

OBJECTIVE: 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. APPROACH: 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. PROGRESS: Dynamic performance standards were developed for 50-lb. bags of bulgur, soy-fortified bulgur, corn-soya-milk, instant corn-soya-milk, flour, soy-fortified flour, wheat-soy-blend, soy-fortified rolled oats, sorghum grits, and soy-fortified cornmeal. Excess bag length was determined not to be critical in butt impacts, although liner lamination technique is critical. Distribution environment and production methods were investigated; shipments were monitored; and productivity was found to be related to good manufacturing practices.

PERFORMING AGENCY: Michigan State University, East Lansing, School of Agriculture and Natural Resources

INVESTIGATOR: Goff, JW

SPONSORING AGENCY: Michigan State Government, 0060632 MICL03108

STATUS: Active NOTICE DATE: June 1981 START DATE: Aug. 1971 COMPLETION DATE: July 1999

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 60632 7)

22 335473

PROPOSED RAILROAD PURCHASE AND REHABILITATION PROJECT, CORTLAND COUNTY INDUSTRIAL DEVELOPMENT AGENCY

The State of New York has requested a grant to assist the Cortland County Industrial Development Agency in the purchase of 2.8 miles of railroad trackage and right-of-way (known also as USRA Line No. 1002A) from the trustees of the Lehigh Valley Railroad. The Commission would contract directly with the Cortland County IDA for the purchase of the line whose value has been appraised at 175,000 dollars. Preliminary negotiations have indicated that the trustees are willing to sell at this price. The IDA also plans to spend 30,000 dollars in the rehabilitation of the line which is adjudged to be in serviceable condition for spur line use with about 30 percent of the ties requiring replacement. USRA Line No. 1002A currently serves two industries employing 300 workers. Overhead Door company has expressed a need to expand their operation in Cortland once the question of rail service is settled. The rail line also borders and serves the Wickwire site, a 21 acre in-town industrial site currently being redeveloped with another ARC grant. The continuing operation of the railroad is considered essential to each of these industries and potential industrial site. The line also services other small industries from a public off-loading ramp. Since the formation of CONRAIL in 1976 the line has been operating under a continuation subsidy given by the State of New York. The State has desired for some time to effect a more permanent solution for continuing service. By the IDA assuming ownership of the rail line the state will have to make no further lease payments to the trustees. The IDA has further negotiated a service agreement with CONRAIL on a year-to-year basis connecting this line with

the old Erie-Lackawanna main line to Syracuse. CONRAIL has committed itself to providing service on the main line. These two actions will hopefully necessitate no further subsidy by New York State.

PERFORMING AGENCY: Cortland County Industrial Development Agency
SPONSORING AGENCY: Appalachian Regional Commission, NY-7348-80-I-302-042

STATUS: Active NOTICE DATE: July 1981 START DATE: 1981 TOTAL FUNDS: \$210,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FK 823)

22 335476

RAIL WHEAT TRANSPORTATION EFFICIENCY STUDY

OBJECTIVE: Describe and analyze the existing system of grain marketing and distribution in a 27-county region in Kansas, Oklahoma, and Texas focusing upon bottlenecks and inefficiencies in the system. Determine and analyze alternative marketing practices and adjustments in transportation infrastructure, equipment and operating practices necessary to minimize storage and logistic costs while maintaining a progressive, flexible marketing and distribution system for grain and grain products within the region. Identify the conditions and circumstances required to successfully implement prescribed system changes, including appropriate changes in firm and public policy. APPROACH: Formulate models to simulate alternative storage and transportation systems for wheat, milo, corn, and soybeans for a 27-county origin area in Kansas, Oklahoma, and Texas to all destination regions. Simulation will begin with farm to first market. Kansas State will develop farm to first market simulation and analysis to be coordinated with other marketing and transportation phases to be developed by Oklahoma State University, Texas A&M University, and the University of Houston. PROGRESS: The following tasks relating to contract work assignment have been completed: Production estimates for grains by 3 x 3 mile segments in a 27 county study area. Mileage matrix from each 3 x 3 mile square origin to each elevator destination in study area completed. Trucking cost functions for farm to first market and similar cost functions for commercial trucks determined. Truck cost functions applied to all relevant origin/destination combination in the study area and truck transport cost determined. Farm storage load-in, load-out and store costs determined for use overall computerized model. Country elevator cost data relevant for the computer model has been determined. Questionnaire surveys of country elevator and farm storage and shipping operation completed and results in process of being summarized.

PERFORMING AGENCY: Kansas State University, Agricultural Experiment Station

INVESTIGATOR: Sorenson, LO Schruben, LW

SPONSORING AGENCY: Kansas State Government, 0070725 KAN-05-493

STATUS: Active NOTICE DATE: Feb. 1981 START DATE: May 1976

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GY 70725 3)

22 335869

LADING PACKAGE MATERIALS EVALUATION

Boxes of cans resonating in boxcars often result in damage to both the cans and the car. Work is currently underway to identify the causes of lading damage in railcars, and as part of this program tests will be made to compare the currently used corrugated fibreboard boxes and on alternative material.

PERFORMING AGENCY: Michigan State University, East Lansing

INVESTIGATOR: Goff, JW Twede, D

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Orth, CL Tel (202) 755-1877

Contract DTFR53-80-C-00113

STATUS: Active NOTICE DATE: July 1981 START DATE: Aug. 1980 COMPLETION DATE: Dec. 1981 TOTAL FUNDS: \$25,000

ACKNOWLEDGMENT: FRA

22 335884

BREAK-BULK RAIL RECEIVING FACILITIES STUDY

The overall objective of the proposed study would be to provide the necessary data required for an analysis of the feasibility of constructing large break-bulk rail receiving facilities in New York State. The study is part of a larger research effort to determine a bulk commodity distribution system that would minimize transportation, storage and distribution costs to New York agricultural producers and intermediaries. Within this general objec-

tive there are several specific objectives: Describe the New York bulk commodity distribution system. Develop cost estimates for existing services. Develop projections for feed and fertilizer production and consumption by county to 1985 and 1990. All firms in NYS handling bulk feed ingredients or fertilizer will be surveyed with a questionnaire. The information will be summarized and aggregated on a county, region and state basis and analyzed in the context of the current rail transport system. Using secondary data, econometric methods will be used to project consumption and production.

PERFORMING AGENCY: Consultec Incorporated, NYC-121334

INVESTIGATOR: Anderson, BL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, SAES NYC

STATUS: Active NOTICE DATE: July 1981 START DATE: Oct. 1980 COMPLETION DATE: Sept. 1983

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0083538)

22 335885

NORTH DAKOTA GRAIN HANDLING, TRANSPORTATION, AND MERCHANDISING STUDY

To identify cost characteristics of the existing country elevator system and potential subterminals. To review and evaluate the transportation and merchandising system for North Dakota grain as to cost service relationships and future technological and institutional changes. To describe and analyze the institutional marketing characteristics of the country elevator system in North Dakota. To ascertain the impact of size and location on efficiencies of the North Dakota country elevator system including subterminals. Statistical cost analysis will be conducted for country elevator industry, on farm storage, farm trucks, and exempt agricultural motor carriers. Economic-engineering cost analysis will be made for subterminals, farm trucks, and exempt carriers to be integrated with the statistical analysis. A descriptive analysis will be made of existing country elevator system and North Dakota grain and oilseed movements. Analysis of seasonal grain marketing patterns and projected merchandising options will be conducted as part of the study. A transshipment model in a general Stollsteimer plant location framework will be used to mathematically optimize the grain handling, transportation, and marketing system. Policy alternative and implications will be analyzed relative to the results of the subparts of the study.

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics, ND03347

INVESTIGATOR: Helgeson, DL Griffin, GC Scott, DF

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, SAES ND

STATUS: Active NOTICE DATE: July 1981 START DATE: Nov. 1980 COMPLETION DATE: Sept. 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0083386)

22 335886

ECONOMIC EVALUATION OF TRANSPORTATION ALTERNATIVES FOR OKLAHOMA WHEAT AND FEED GRAINS

Determine grain marketing by counties in Oklahoma. Determine a statewide transportation model for grain. Determine optimal grain flow patterns. Determine beneficial changes in transportation for the state. Determine trends in grain production and marketings by county. Develop reactive programming model of Oklahoma's transportation network. Survey firms to obtain grain transport rates. Alter model solution by imposing alternative transportation supplies and/or costs.

PERFORMING AGENCY: Oklahoma State University, Department of Agricultural Economics, OKL01782

INVESTIGATOR: Updaw, NJ

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS OKL

STATUS: Active NOTICE DATE: July 1981 START DATE: July 1980 COMPLETION DATE: June 1985

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0082955)

22 335887

COSTS AND LOGISTICAL PROBLEMS IN TRANSPORTING AGRICULTURAL COMMODITIES TO SOUTHEASTERN SEAPORTS

Determine methods and costs of transporting soybeans and cotton from major interior assembly points to ports at Savannah, Ga., Jacksonville, Fla.,

Mobile, Ala. Compare transport rates and costs for moving soybeans and cotton from assembly points to these ports by alternative routes and transportation modes. Assess comparative advantage of the three ports to minimize transport costs and with respect to auxiliary port facilities. Survey shippers and transporters of soybeans and cotton to obtain data on transportation methods and costs. Using a cost minimizing transportation model and budgeting, compare current costs with alternative proposed transportation routes and modes.

PERFORMING AGENCY: Georgia University, Athens, Department of Agricultural Economics, GE000729

INVESTIGATOR: Williams, FW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS GEO

STATUS: Active NOTICE DATE: July 1981 START DATE: Oct. 1980 COMPLETION DATE: June 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0082921)

22 335888

ALTERNATIVE CHANGES IN THE STRUCTURE OF THE RAILROAD SYSTEM IN IOWA

To identify alternative methods of restructuring railroad lines and companies in Iowa. To measure the effect of these alternative restructured systems on railroad costs, total fuel consumption in moving grain to market and on carrier competition. Identify alternative methods of restructuring the railroad system in Iowa. Based on existing railroad cost models, estimate the impact of the restructuring alternatives on railroad costs. Based on measured fuel consumption data, estimate the effect of the restructuring alternatives on total grain producer, elevator and railroad fuel consumption. Based on trucking cost models and railroad grain rates, estimate the effect of the restructuring alternatives on potential railroad pricing competition.

PERFORMING AGENCY: Iowa State University, Ames, Agricultural Experiment Station, Agricultural Economics, IOW02439

INVESTIGATOR: Baumel, CP

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, SAES IOW

STATUS: Active NOTICE DATE: July 1981 START DATE: July 1980 COMPLETION DATE: June 1985

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0081997)

22 335889

MARKETING AND DELIVERY OF QUALITY CEREALS AND OILSEEDS IN DOMESTIC AND FOREIGN MARKETS

Identify quality factors and determine their economic significance to producers, marketers and end users of grains. Measure and evaluate changes in quality of grain between points in the marketing channels from producer through the final user, domestic and foreign. Propose and evaluate alternative marketing systems that provide incentive for maintaining original quality throughout the grain marketing channels, domestic and foreign. Analyse chemical and physical properties of grains including the presence of contaminants. Relate this information to grain quality as it affects the economics of marketing for producers and end users. Determine changes in quality and value of grains exported by alternative transportation modes by sampling at successive points in the market channel. Analyse grains harvested and conditioned with alternative technologies for their ability to maintain quality during storage and transport. Evaluate the economic effects

of alternative grade standards, quality factors and related matters in domestic and foreign markets. At present, an efficient transportation system by which the grain can be moved to port is not in place. A transportation study is being completed to determine the best method of moving the grain to tidewater. Preliminary indications are that the grain will be trucked 161 km to a transfer facility at the railhead, then transported 563 km to Anchorage, the closest tidewater port. The cost should not exceed \$27 to \$31 per metric ton, competitive with Eastern Montana and North Dakota.

PERFORMING AGENCY: Alaska University, Agricultural Experiment Station, ALK-79-01

INVESTIGATOR: Thomas, WC Lewis, CE

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS ALK

STATUS: Active NOTICE DATE: July 1981 START DATE: Oct. 1978 COMPLETION DATE: Sept. 1983

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0078062)

22 335891

DEVELOP IMPROVED PACKAGING, HANDLING AND PREPARATION FOR DOMESTIC MARKETING OF FRUITS AND VEGETABLES

Find more efficient and effective ways of preparing, handling, packaging, unitizing, and transporting fresh fruits and vegetables for producing areas to domestic markets, and determine their effects on marketing cost, losses, energy and market quality requirements. Develop, design, and test improved packages, packaging, unitizing, handling, and transport methods, and effective postharvest product treatments, evaluate by simulating transport environment conditions and by testing in commercial highway trailer, railroad, and air shipments to ascertain the effects of these improved methods and/or materials or treatments and subsequent quality throughout the marketing period.

PERFORMING AGENCY: Horticultural Research Laboratory, 7606-20580-010

INVESTIGATOR: Risse, LA Hale, PW

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, ARS 7606

STATUS: Active NOTICE DATE: July 1981 START DATE: Apr. 1979 COMPLETION DATE: Apr. 1983

ACKNOWLEDGMENT: Current Research Information Service (CRIS 0045265)

22 341057

METHODS TO ELIMINATE FROZEN COAL PROBLEMS

To prevent coal from freezing in railroad cars, chemicals, explosives and ultrasonics are being investigated. A model car holding one ton of coal is tested in a large freezer and a shakeout facility is available to assist in the subsequent unloading. In the initial phases, a series of chemicals from eight different suppliers were shown to be effective at temperatures above 0 deg F. Below minus 10 deg F none of the Freeze Conditioning Agents could inhibit the shear strength of frozen coal. Combinations of chemicals and other approaches are also being studied.

PERFORMING AGENCY: United Coal Company

INVESTIGATOR: Wolfe, R

SPONSORING AGENCY: Department of Energy

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: 1980 COMPLETION DATE: 1982 TOTAL FUNDS: \$125,000

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: Mitchell, MB Tel 202-426-0966

STATUS: Active NOTICE DATE: Aug. 1980 START DATE: 1966

ACKNOWLEDGMENT: FRA

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. 1980 START DATE: Aug. 1978 COMPLETION DATE: Sept. 1981 TOTAL FUNDS: \$298,613

ACKNOWLEDGMENT: American Public Transit Association

23 330674

TRAIN CREW REDUCTIONS FOR INCREASED PRODUCTIVITY OF RAIL TRANSIT

Train crews on most rail transit systems (regional rail and rapid transit) in U.S. cities tend to be larger than they might be if modern technologies and operating practices were fully utilized. Study will analyze potential crew reductions on different groups of systems. All duties which train crews presently perform will be defined. Possible alternatives for performing each duty will be explored, based on experiences from cities in the U.S. and abroad which operate with smaller crews. Finally, the obstacles to crew reductions, such as obsolete labor practices and lack of managerial initiative, will be analyzed and possible solutions proposed.

PERFORMING AGENCY: Pennsylvania University, Philadelphia

INVESTIGATOR: Vuchic, V

SPONSORING AGENCY: Urban Mass Transportation Administration

Grant

STATUS: Active NOTICE DATE: Apr. 1981 TOTAL FUNDS: \$69,985

ACKNOWLEDGMENT: Pennsylvania University, Philadelphia

23 335312

MODELLING THE GEOGRAPHIC COMPONENT OF MASS TRANSIT SUBSIDIES

A model is proposed for evaluating mass transit operating and net subsidies.

The model, which differs significantly from previous efforts through its explicit consideration of the spatial interdependencies of the transit system, will provide new knowledge about the nature of subsidies in mass transit systems and knowledge at a much smaller geographic scale than ever before possible. The model may be oriented to determine subsidies for individual network segments or reoriented to determine subsidies for selected social groups and for geographic subareas or jurisdictions. The key element of the model is the apportioning of fares over the entire trip path of the transit user. Total fares generated for each network segment are determined by summing the partial fares contributed by all users of that segment. The operating subsidy for the use is calculated by reaggregating the per person subsidy over the user's trip path. These results may in turn be aggregated by the social class of the use and by his/her origin or destination to provide a data base suitable for evaluating distributional equity. Finally, the distribution of net subsidies is determined by adding non fare-box revenues to operating subsidies.

PERFORMING AGENCY: Washington University, Seattle, School of Arts and Sciences

INVESTIGATOR: Hodge, DC

SPONSORING AGENCY: National Science Foundation, Directorate for Biological Behavioral & Social Sciences Div, SES80-16416

STATUS: Active NOTICE DATE: June 1981 START DATE: Sept. 1980 COMPLETION DATE: Feb. 1982 TOTAL FUNDS: \$38,500

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (FB 506)

23 335904

HIGH SPEED PASSENGER SERVICE IMPLEMENTATION--THE SNCF EXPERIENCE

To analyse the way in which the French National Railways (SNCF) is implementing high speed passenger services, notably from Paris to Lyon, in the context of intermodal competition in an age of uncertainty about the energy situation. The new service, using mostly existing track, will provide a shorter link between the two cities for electric trains operating at commercial speeds of over 200 km/hour.

PERFORMING AGENCY: Canadian Institute of Guided Ground Transport, PRO-074

INVESTIGATOR: Jones, J Tel (613) 547-5777

SPONSORING AGENCY: Via Rail Canada Incorporated; Transport Canada Research and Development Centre

RESPONSIBLE INDIVIDUAL: Bryce, S Tel (613) 547-5777 Marshall, MB Fitzpatrick, C

Contract 376-074

STATUS: Active NOTICE DATE: July 1981 START DATE: Nov. 1980 COMPLETION DATE: 1981 TOTAL FUNDS: \$16,600

ACKNOWLEDGMENT: CIGGT

23 341060

FARE COLLECTION PROJECT

This project, part of the UMTA Subsystem Technology Applications to Rail Systems (STARS) Program, is to improve the cost effectiveness of fare collection systems by examining reliability and maintainability of existing equipment; developing uniform methods for such assessment; developing reliable collection systems for local needs; and producing specifications and standards for such systems. CTA will develop a reliable pass reader which may be added to existing turnstiles, PATCO will develop a high-reliability ticket vendor.

PERFORMING AGENCY: Port Authority Transit Corporation; Chicago Transit Authority

SPONSORING AGENCY: Urban Mass Transportation Administration

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: 1981 COMPLETION DATE: 1982

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, GP
 SPONSORING AGENCY: Office of the Secretary of Transportation
 RESPONSIBLE INDIVIDUAL: Nupp, B. Tel (202) 426-4447

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Aug. 1976 COMPLETION DATE: 1981

ACKNOWLEDGMENT: OST

24 179528

ECONOMIC ANALYSIS PROGRAM

This program is the ongoing effort of the Office of Economics 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 intermodal (TOFC/COFC) traffic, and (4) Economic analysis involving statistics and forecasting. Funding levels are uncertain.

PERFORMING AGENCY: Federal Railroad Administration
 SPONSORING AGENCY: Federal Railroad Administration
 RESPONSIBLE INDIVIDUAL: Stearns, RN. Tel (202) 426-7391

STATUS: Active NOTICE DATE: Aug. 1981

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.

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

Economics and Emerging Issues of Wheat Transportation in the Pacific Northwest; Casavant, KL; Thayer, Washington State University, Circular 612, 1978.

An Economic Evaluation of the Regional Differences in Operating Prob & Struc of Agricultural Exempt Motor Carriers, Casavant, KL; Stump, Transportation Research Forum Proceedings, New York, 1978

PERFORMING AGENCY: Washington State University, Department of Agricultural Economics, WNP00379

INVESTIGATOR: Casavant, KL

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, CSRS WNP

Contract 701-15-39

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: Apr. 1977 COMPLETION DATE: Apr. 1982

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0072790)

24 315157

PROPOSED RAIL LINE ACQUISITION, RURAL TRANSPORTATION DEMONSTRATION PROJECT, CATTARAUGUS COUNTY INDUSTRIAL DEVELOPMENT AGENCY

The State of New York is requesting a grant from their Area Development Allocation to assist the Cattaraugus County Industrial Development Agency in the purchase of approximately 14.1 miles of rail line running from the City of Salamanca to the village of Cattaraugus and 1.0 mile within the township of Gowanda, all in Cattaraugus County, New York. Service on the first line (also known as USRA line 1250) is currently being provided through a lease agreement between the Erie-Lackawanna Railroad and the State of New York. Approximately 250 carloads of freight are moved on this line yearly. The purchase of this portion of the Erie-Lackawanna's lines in Cattaraugus County would complete county acquisition of all such lines in the county proposed to be abandoned by the bankrupt railroad. In doing so the County hopes to preserve rail service to three major industries in the County and save approximately 300 direct and 150-200 indirect jobs. In addition, the County has entered into discussion with Erie and Chautauqua counties relative to the linking up of a low density rail line in each of these counties with the Cattaraugus trackage in order to form a region-serving short line with service between Buffalo, Gowanda, South Dayton, Waterboro Junction, Dayton, Cattaraugus, Little Valley and Salamanca. These three lines currently generate approximately 1900-2300 carloads of freight on an 80 mile system. In Salamanca line 1250 interchanges directly with the CONRAIL and Chessie Systems. The County IDA has identified some fourteen prime industrial sites in the county; four are located adjacent to the rail line proposed for purchase. The retention of rail service will enhance the marketability of these sites and make it possible for the county to continue to have a well developed industrial promotion program.

PERFORMING AGENCY: New York State Government

SPONSORING AGENCY: Appalachian Regional Commission, NY-6891-79-I-300-060

STATUS: Active NOTICE DATE: July 1980 START DATE: Sept. 1979 TOTAL FUNDS: \$320,000

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (EF 520)

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. A survey of grain flows through all major marketing channels in Nebraska has been completed. Results are being reconciled and combined with survey results from other cooperating states. Grain balances, accounting for local feed and processing demands as well as inventory adjustments, have been calculated. Projected grain marketings from Nebraska from 1984, 1989 and 1999 are nearly completed. Results will go into a regional model capable of analyzing effects of alternative transportation and other policy adjustments. A study of implications of using the operating ratio as a regulatory test for rate adjustments has been completed. The results suggest, among other things, that regulated motor carriers tend to overemploy variable resources, especially through leasing activities, and underemploy fixed capital--the precise opposite of the Averch-Johnson hypothesis. Work was completed on a study of the implications of motor carrier regulations for ability of truckers to meet seasonal peak demands. Regulatory constraints aggravate the problem of seasonal and other temporary shortages of equipment. An analysis was completed of the implications for rural shippers of flexible rail car rental rates. Cost savings from flexible rates result in potential peak rates lower than present flat rates.

REFERENCES:

Procedures for Estimating Rail Freight Costs Berglund, M, Nebraska University, Lincoln, Dept of Agricultural Economics

The Operating Ratio and Alternative Earning Control Standards for Regulated Highway Freight Carriers, Cowen, J, Nebraska University, Lincoln

The Cost of Excess Rail-line Capacity: Implications for the Great Plains, Felton, JR, UN-L News: Business in Nebraska.

Grain Marketing Issues and Information Linsenmeyer, D; Turner, M; Felton, JR, Nebraska University, Lincoln, Dept of Agricultural Economics

The Economics of Freight Car Supply Felton, JR

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: Aug. 1981 START DATE: Oct. 1976 COMPLETION DATE: Sept. 1981

ACKNOWLEDGMENT: Current Research Information Service (CRIS-0070254)

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 regulatory 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. The estimated demand for transportation to the year 2000 from selected North Dakota crops was revised. Production of the major

crops was estimated to increase 88% by volume from 1975 to 1999. Consumption of grain by livestock was estimated to decline by 18%. This will result in a doubling of grains and oilseeds exported from the state by volume by only 60% by weight. Two publications from this effort are in process. The impact of past seasonal rail rates on trends and seasonality of grain flows, inventories and storage capacity was analyzed. Seasonal rail rates were ineffective in modifying the patterns of these variables. Grain marketing personnel were opposed to seasonal rates because it was felt that seasonal rates would not work, would complicate marketing and were overshadowed by other relatively more important factors. Findings of the above two studies and other work previously reported were summarized in testimony before the Rural Transportation Advisory Task Force. Three research reports are ready for publication. A model to examine the economic impact of rail branch line abandonment was conceptualized. Two branch lines were selected for initial tests of the model. Shippers on one line were interviewed regarding shipments and likely impacts resulting from loss of rail service.

PERFORMING AGENCY: North Dakota State University, Department of Agricultural Economics, CSRS ND

INVESTIGATOR: Cobia, DW Mittleider, JF

SPONSORING AGENCY: Department of Agriculture, Cooperative State Research Service, ND01360

STATUS: Active NOTICE DATE: Aug. 1981 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

Development of a Policy Sensitive Model for Forecasting Freight Demand, Final Report, Mar. 1981

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: Swerdlow, CN Office of the Secretary of Transportation Tel (202)426-4163

Contract DOT-OS-70006

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: Jan. 1977 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$290,000

ACKNOWLEDGMENT: OST

25 188665

STATE RAIL PROGRAM EVALUATION

Evaluation of light density line rehabilitation project funded under the Local Rail Service Assistance Act of 1978. The contractor will perform case studies of five projects and develop a continuing evaluation process for rehabilitation projects.

PERFORMING AGENCY: Ernst and Whinney

INVESTIGATOR: Tyndall, GR Tel (202) 862-6000 Taggart, RE Liff, M

SPONSORING AGENCY: Federal Railroad Administration

RESPONSIBLE INDIVIDUAL: Tusaie, W Tel (202) 426-1677

Contract DOT-FR-53-80-C-00100

STATUS: Completed NOTICE DATE: Aug. 1981 START DATE: May 1980 COMPLETION DATE: Mar. 1981 TOTAL FUNDS: \$50,000

ACKNOWLEDGMENT: Ernst and Ernst

25 308312

TRUCK SIZE AND WEIGHT STUDY

Provide analytic support to the U.S. Department of Transportation for a Congressional study on the benefits and costs of alternative national truck size and weight limits. Continuation of the "grandfather" clause will be examined as well as national uniform limits. Impacts will be studied on pavements, bridges, energy consumption, competition with railroads, safety, regional economic impacts, and environmental factors.

PERFORMING AGENCY: System Design Concepts, Incorporated

INVESTIGATOR: Stowers, J Tel (202) 393-5911

SPONSORING AGENCY: Department of Transportation, Office of Intermodal Transportation

RESPONSIBLE INDIVIDUAL: Swerdloff, CN Tel (202) 426-4163

CONTRACT DOT-OS-90073

STATUS: Active NOTICE DATE: Aug. 1981 START DATE: May 1979 COMPLETION DATE: July 1981 TOTAL FUNDS: \$320,000

ACKNOWLEDGMENT: DOT

25 316081

THE ASSESSMENT OF TECHNOLOGICAL CHANGE IN REGULATED INDUSTRIES

This is a renewal of a project started in September 1976 (APR76-23556). The objective of this research project is to develop analytic methods for assessing the impact of regulation on technological change. The approach is to estimate the impact of regulation on productivity through its impact on technological change by controlling for all major factors other than regulation that influence productivity. The research compares the performances of selected U.S. and Canadian railroads, barges and trucking firms, to estimate the efficiency losses due to regulation in the U.S. By controlling for those factors other than regulation that affect productivity levels and rate of change, the differences in the Canadian and U.S. records can be attributed to differences in regulation. This research will employ several different methods for examining the impact of regulation on productivity in regulated industry. First, an index number approach will be used looking at aggregate time series data. Second, several econometric modeling techniques will be used, employing time-series analysis and time series-cross-section analysis to estimate the technological progress of the rail, truck and barge industries in the U.S. and Canada.

PERFORMING AGENCY: Data Resources Incorporated

INVESTIGATOR: Christensen, LR

SPONSORING AGENCY: National Science Foundation, Directorate for Engineering and Applied Science, DAR78-11061

STATUS: Active NOTICE DATE: June 1980 START DATE: Sept. 1976 COMPLETION DATE: Feb. 1981

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (GSQ 1697 3)

25 319908

POLITICAL AND ECONOMIC DETERMINANTS OF REGULATORY DECISIONS

This grant supports research examining how government regulations bring about outcomes that differ from those that would occur if left to the forces of the market. It examines the operation of the Interstate Commerce Commission on the particular question of abandonment of railroad lines. It seeks to develop and implement an empirically based methodology for systematically assessing the relative effects of considerations of economic efficiency, the political interests of the agencies and local groups, and the particular interests of shippers and the railroads on ICC abandonment decisions. The study collects detailed economic and political data on a large sample of ICC decisions during the period 1968-1979. With these data the analysis of the relative importance of political activities and economic factors in abandonment cases will contribute to an understanding of market exit regulation and the role of public participation and adversarial proceedings in regulatory policy-making.

PERFORMING AGENCY: Rochester University, Department of Political Science

INVESTIGATOR: Riker, WH

SPONSORING AGENCY: National Science Foundation, Directorate for Biological Behavioral and Social Sciences, SES79-25631

STATUS: Active NOTICE DATE: Nov. 1980 START DATE: Feb. 1980 COMPLETION DATE: July 1982 TOTAL FUNDS: \$24,099

ACKNOWLEDGMENT: Smithsonian Science Information Exchange (EH 895)

25 329562

GREAT LAKES BASIN COMMISSION, TRANSPORTATION STUDY

The study was initially proposed to be a two year effort designed to provide a range of policy options to deal with anticipated commodity and goods transportation problems affecting the various freight transportation modes in the Great Lakes region, based on the results of existing state and federal transportation plans and studies. The first year effort will integrate the results-assumptions, projections, alternatives and effects of these studies. The focus will be on regional concerns and effects raised in these studies which can be related to transportation concerns at the national level.

PERFORMING AGENCY: Great Lakes Basin Commission

INVESTIGATOR: Job, C Tel (313) 668-2325 Gurioli, L Waldrup, P

SPONSORING AGENCY: Great Lakes Basin Commission

RESPONSIBLE INDIVIDUAL: Job, C Tel (313) 668-2340

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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.

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many organizations, and all the document numbers should be checked. Some organizations have more than one office, and again there will be more than one listing of document numbers of possible interest. Each summary of ongoing research is indicated not only by the *A* in the document number but also by the use of italics for the entire number.

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