U.S. Department
of Transportation

TRANSIT PLANNING AND RESEARCH REPORTS

Annotated Bibliography

AUGUST 1995

Federal Transit Administration

Office of Research, Demonstration and Innovation

U.S. Department
of Transportation

**Federal Transit
Administration**

Administrator

400 Seventh St., S.W.
Washington, D.C. 20590

SEP 7 1995

A Message from the Federal Transit Administrator:

As we move toward the next century, transit programs must change to serve the transportation and information needs of this Nation. The most successful systems are those which share information with others, and those which take people from where they are to where they want to go, when they want to go, at a price they can afford, and do so safely and securely. These principles are the basis for the Federal Transit Administration (FTA) policies and programs.

The resource material referenced in this annotated bibliography is relevant to the planning, development, operation and performance of transit systems and their components. The material reflects FTA efforts to implement its Strategic Plan which has just completed its first year of guidance. The Strategic Plan includes a mission statement that brings a new vision to public transportation in America. The mission statement along with the eight vision strategies of the Strategic Plan are described in detail on pages v-viii of this document.

This bibliography will help the transit community keep abreast of the currently available information on planning and research activities sponsored by the FTA. It describes recently published research products of the FTA National Planning and Research Program and the Transit Cooperative Research Program, as well as transit-related research materials from other agencies of the United States Department of Transportation. In addition, the bibliography provides easy-to-follow instructions on how to obtain a copy of each report cited in this reference document.

Recognizing the continuing inflow of customer requests for information published in previous editions of this bibliography, we encourage you to continue pursuing the information resources, cited in this document, as a means to address your local and regional transportation needs.

Gordon J. Linton

U.S. Department
of Transportation
Federal Transit
Administration

TRANSIT PLANNING AND RESEARCH REPORTS: ANNOTATED BIBLIOGRAPHY

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FOREWORD

This is the third edition of the *Transit Planning and Research Reports: An Annotated Bibliography*. It references the most current and available planning and research reports published as of August 1995 and sponsored by the Federal Transit Administration of the United States Department of Transportation, Washington, DC.

The bibliography is a reference tool designed to provide easy and rapid access to FTA research products. It describes recently published research products of the FTA National Planning and Research Program and the Transit Cooperative Research Program, as well as transit-related research materials from other agencies in the United States Department of Transportation. The intent is to inform the transit community and the general public of the published materials available to assist state and local agencies in improving transit services and reducing the cost of public transit.

In this bibliography, each report is listed separately as a bibliographic entry accompanied by a report availability statement and a summary description of the published material. The index includes keywords that have been extracted from the full-text reports as well as from the summary descriptions cited in this bibliography. This was done to provide more complete coverage of each report's contents.

The final section of this bibliography contains instructions on how to obtain FTA reports including ordering FTA sponsored reports from the National Technical Information Service (NTIS). It also includes a report order form, an evaluation form and a listing of the FTA Regional Offices along with their street addresses, telephone and FAX numbers.

Notice:

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The United States Government does not endorse manufacturers or products. Trade names appear in the document only because they are essential to the contents of the report.

Mission Statement and Vision Strategies of the Federal Transit Administration U.S. Department of Transportation

The Federal Transit Administration (FTA), one of the major agencies within the U.S. Department of Transportation, is guided by the mission established by the Secretary of Transportation, Federico Peña, which states that:

> *"The Department of Transportation will "Tie America Together" with a safe, technologically advanced, and efficient transportation system that promotes economic growth and international competiveness now and in the future, and contributes to a healthy and secure environment for us and our children."*

The FTA now has a Strategic Plan in place that supports the DOT mission. FTA's own mission statement brings a new vision to public transportation in America that addresses the complex challenges and boundless opportunities facing transit in America today:

> *"To ensure personal mobility and America's economic and community vitality by supporting high quality public transportation through leadership, technical assistance and financial resources."*

To carry forward this mission, the FTA has charted a bold new vision:

> *"We are leading America with high-quality public transportation that ensures personal mobility and livable communities."*

To translate this vision into action, the following eight Vision Strategies and Goals have been established by the FTA:

Vision Strategy No. 1: Maximize Security and Safety of Transit Systems for Service Users--To provide a secure and safe environment that includes operationally safe equipment and facilities, as well as personal security and property protection.

Goal Number 1 - Improve personal security.

Goal Number 2 - Improve operational safety.

Goal Number 3 - Develop and demonstrate new and innovative security and safety technologies.

Goal Number 4 - Improve emergency management planning.

Vision Strategy No. 2: Foster Customer-Oriented Public Transportation--To focus on customer based needs for current and future markets and provide responsive, affordable, convenient, and accessible public transportation services.

Goal Number 1 - Emphasize improved transit services for minorities and transit dependent persons living in economically distressed communities.

Goal Number 2 - Make transit systems easier to use and more reliable to the customer.

Goal Number 3 - Support the development of full service transit systems that have the ability to meet a variety of customer needs.

Vision Strategy No. 3: Foster Industry Adaptability to Enable the Industry to Respond to Changes in Transportation Patterns, Technologies, and Needs--
To promote a competitive transit industry that plans and responds to changes in travel patterns and needs.

Goal Number 1 - Increase and improve public transportation effectiveness through research and adoption of new technology, management practices and service innovation.

Goal Number 2 - Foster production of "Better" transit vehicles and components.

Goal Number 3 - Promote the collection, dissemination,and exchange of information on research, technology, management practices, and innovation.

Goal Number 4 - Provide assistance to domestic transit manufacturers and technical service industries to enhance the U.S. competitive position in global markets.

Vision Strategy No. 4 - Maximize a Multimodal Approach to Transportation--
To Encourage collaboration among those who use, provide, regulate, fund and/or benefit from transportation to promote choices among transportation modes.

Goal Number 1 - Lead the development of seamless transportation systems that provide options and ensure convenient linkages between modes for all persons in all communities combined with a public awareness of those transportation choices through easily accessible integrated information.

Goal Number 2 - Promote a collaborative process among Federal, State, local, and other organizations (public and private) which provides a greater variety of choices in the transportation of people and goods.

Goal Number 3 - Identify and address community and individual transportation needs through intermodalism.

Vision Strategy No. 5: Ensure a Quality Organization that Emphasizes Mutual Respect--To be responsive to employee needs and empower its employees to be productive contributors to the FTA mission.

Goal Number 1 - Foster an environment which supports mutual respect and courtesy, ensures that all employees are treated fairly, and strives to maintain and upgrade the professional/technical knowledge and competence of employees.

Goal Number 2 - Foster an environment which actively promotes the employment and retention of a diverse workforce within FTA.

Goal Number 3 - Promote career development and the establishment of a fair and equitable reward system to include awards other than monetary. These initiatives will maximize individual contributions to the agency while improving employee quality of life.

Goal Number 4 - Encourage mutual understanding of the program challenges of headquarters and regional offices.

Goal Number 5 - Operate under the principle that employees are valued, empowered to make decisions and take risks while functioning as a team to accomplish the agency's mission.

Vision Strategy No. 6 - Ensure Highest Level of Transit Service Assistance Delivery--To improve the delivery of transit service and mobility for the public through a proactive role in providing technical assistance and support to transportation providers.

Goal Number 1 - Provide improved technical assistance to FTA grantees.

Goal Number 2 - Provide stable and reliable sources of funds for improved service.

Goal Number 3 - Improve ongoing program evaluation to increase effectiveness of the FTA program in supporting and improving public transportation and mobility.

Goal Number 4 - Streamline the grant delivery process and provide improved program management to FTA grantees.

Vision Strategy No. 7: Promote Linkages Between Transit Needs and Community Needs--To promote a coordinated planning process that involves the needs of the community through Livable Communities and improved personal mobility.

> *Goal Number 1* - Promote the development of transit facilities and services that meet the needs of communities, which are linked to land use planning and design that encourage pedestrian/bicycle access.
>
> *Goal Number 2* - Link transit and environmental planning to enhance environmental preservation.
>
> *Goal Number 3* - Promote a participatory planning and design process that stresses community involvement.

Vision Strategy No. 8: Foster a Positive Image for Public Transportation--To clearly demonstrate the benefits that public transportation brings to our communities and to raise the consciousness of the public toward the role of FTA as a major partner in public transportation.

> *Goal Number 1* - Promote public transportation in America with FTA as an active partner.

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Advanced Public Transportation Systems

APTS Project Summaries.
Federal Transit Administration, Advanced Public Transportation Division, Office of Research, Demonstration & Innovation (Ronald E. Boenau, TRI-11), July 1995, 25pp.
Report Number: FTA-TRI-11-95-7

Available from:
Federal Transit Administration
Office of Research, Demonstration & Innovation
400 7th Street, SW, Room 6107
Washington, DC 20590 Telephone: 202/366-4995 FAX: 202/366-3765
Order Number: FTA-TTS-30-95-7

This report announces the status of the research projects currently underway in the Federal Transit Administration's (FTA) Advanced Public Transportation Systems (APTS) program. It is updated periodically to inform the transportation community of the most recent project activities. The subject areas covered in this summary report include the following: APTS Program Description, Smart Traveler, Smart Vehicle, Smart Intermodal, and Program Evaluations and Research.

Advanced Traveler Aid Systems for Public Transportation: The Intelligent Transit Mobility System.
University of Delaware, Kikuchi S, Anedja S, Chakroborty P, et al.; Prepared for the FTA University Research and Training Program (Dennis J. Symes, TRI-11), September 1994, 108pp.
Project Number: FTA-DE-26-0001-94-1

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-95-07

The intelligent transit mobility system (ITMS) is an innovative system that improves public transit information dissemination and facilitates decision making in urban travel. It provides the transit user with "intelligent" decision support for the choice of mode, route, arrival, and departure times as well as general information on transportation services in the region. ITMS stores the schedule and other information which is updated by the real time monitoring of the operating status, and provides traveler itineraries tailored to individual travel requirements via a hand-held computer and electronic communications. Part 1 discusses the conceptual framework of ITMS; examines traveler information needs and survey results; discusses the structure of ITMS (functions and components); reviews available technologies for ITMS components; and examines implementation issues. Part 2 of this report develops and tests ITMS prototype devices and software and examines the possibility of integrating GIS as one of the features of ITMS. The prototype ITMS model called TRANSPAL is highlighted as "your portable transit pal." TRANSPAL is a user interface device consisting of a palm-up computer which stores transit schedules and finds the routes, transfer points and expected arrival time as well as the map of the

relevant routes and locations. It demonstrates how a user communicates with the central information processor to obtain transit information via a portable device. The study concludes with discussions of the ITMS mission, limitations and difficulties of implementation and future research needs.

Artificial Intelligence for Transit Railcar Diagnostics. TCRP Report 1.
Transportation Research Board of the National Research Council, ANSTEC, Inc., Mulholland IP, and LTK Engineering Services, Oren RA; Prepared for the FTA Transit Cooperative Research Program (Gwendolyn R. Cooper, TRI-30), 1994, 63pp.
Report Number: TCRP Report 1

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Report 1 *Price:* $20

The purpose of this effort was to determine the potential for using computer technologies such as artificial intelligence (AI) techniques to improve transit railcar diagnosis, with the overall goal to increase transit railcar availability and save costs by decreasing the maintenance labor hours required to predict and diagnose failures. This report presents the results of an evaluation of seven AI techniques applicable to the diagnosis of malfunctioning transit railcar systems and subsystems. It is a valuable resource for transit railcar maintenance professionals concerned with improving railcar maintenance fault-diagnostic capabilities through the use of AI technologies. In this report, AI is defined as a computer program that uses human problem solving techniques to assist and augment the diagnostic process. Seven AI technologies (expert systems, case-based reasoning, model-based reasoning, artificial neural networks, computer vision, fuzzy logic, and knowledge based systems) were investigated to determine their potential application for the diagnosis of transit railcar systems and subsystems. Site surveys were conducted at maintenance facilities and railcar subsystem suppliers to gather information regarding current and future diagnostic and maintenance practices, barriers to implementation, and maintenance cost data. A literature review was performed to identify any AI techniques currently in use as well as those used in other industries that would have potential application for railcar maintenance. The economic analysis points out that the cost of initially implementing the AI programs can be paid back within one year. The report concludes that AI technology is sufficiently mature for cost-effective application in the transit railcar diagnostic process and provides recommendations for implementation of the technology.

Automatic Vehicle Location/Control and Traffic Signal Preemption: Lessons from Europe.
Chicago Transit Authority, Communications Implementation Task Force; September 1992, 140 pp.
Project Number: FTA-IL-06-0088-92-1

Available from:
Chicago Transit Authority

Bus Service Management Division
350 N. Wells Street, Room 760, PO Box 3555
Chicago, IL 60654
Contact David L. Phillips Telephone: 312/664-7200 FAX: 312/664-2748
Order by Title
or
NTIS Order Number: PB95-130951 *Price:* A07

The Chicago Transit Authority's (CTA) need to replace an old bus radio system with an automatic vehicle location/control (AVL) system and to update the traffic signal preemption (TSP) system, generated this tour study of European systems. Europe has led in the deployment of such systems. The purpose of this travel log report is to document the insights and to share the information provided by the European site visits so that transit managers and riders will benefit from this information. The travel log documents the lessons learned from the European site visits by staffs from the CTA and the City of Chicago. The European site visits began in October 1991. The first week focused on AVL systems in Germany and included site visits to Osnabruck, Koln, Wiesbaden, Saarbrucken and Stuttgart. The second week focused on TSP and included site visits to Zurich, Switzerland; Hanover, Germany; and Amsterdam in the Netherlands. The European tour provided invaluable insights in the development of the CTA's AVL system. The report highlights the generosity and eagerness of European suppliers to share their experience as well as the expertise and dedication of the people encountered at all levels.

IDEA/IVHS: Emerging Concepts and Products for Intelligent Transportation Systems. Progress Report 1.
Transportation Research Board, National Research Council; Prepared for the Federal Highway Administration, and the National Highway Traffic Safety Administration, September 1994, 82pp.
Report Number: IVHS-IDEA Progress Report 1

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: IVHS-IDEA Progress Report 1

This progress report presents a summary of the 21 technical projects initiated during the first year of the Innovations Deserving Exploratory Analysis (IDEA) program for intelligent vehicle highway systems (IVHS). The IVHS-IDEA program focuses on new methods, technologies, processes, and systems for application to IVHS. It is open to all individuals within the technical community including entrepreneurs, small and large businesses, and institutions from the United States and abroad. Two types of projects are presented. Type 1 projects evaluate the feasibility of new and unproven concepts for application to intelligent transportation systems (ITS). Type 2 projects focus on applied testing and evaluation of new products or results. The 21 projects presented in this report are profiled separately and grouped accordingly: Automated Lane Control and Warning Systems; Automated Safety and Collision Avoidance Systems; Advanced Traffic Management Systems; Advanced Communication Systems; Human Factors Application to IVHS; Intelligent Ridesharing and Carpooling; and Vehicle Identification and Classification

System. The program welcomes any comments, suggestions, or recommendations on emerging IDEA products, results, and implementation plans presented in this report.

Intelligent Transportation Systems Projects.
U.S. Department of Transportation, ITS Joint Program Office, HVH-1; FHWA Office of Traffic Management and ITS, HTV-1, FHWA Office of Safety and Traffic Operations R&D, HSR-1, and FHWA Office of Motor Carriers, HMT-1; FTA Office of Research, Demonstration & Innovation, TRI-11; and NHTSA Office of Crash Avoidance Research, NRD-50; January 1995, 434pp.
Report Number: FHWA-JPO-95-001

Available from:
Federal Transit Administration
Office of Research, Demonstration & Innovation
400 7th Street, SW, Room 6107
Washington, DC 20590 Telephone: 202/366-4995 FAX: 202/366-3765
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The intelligent transportation systems (ITS) program, formerly called intelligent vehicle highway systems (IVHS), applies advanced and emerging technologies in fields such as information processing, communications, control, and electronics to surface transportation needs. The program focuses on the development and deployment of a collection of user services. Twenty-nine inter-related user services have been defined to date as part of the national program planning process. This report describes those ITS projects funded by the United States Department of Transportation's(US DOT) modal administrations: the Federal Highway Administration (FHWA), FTA, and the National Highway Traffic Safety Administration (NHTSA). The report is a complement to the National ITS Program Plan and is organized to describe those US DOT sponsored activities which support the development of user services, national compatibility planning, deployment, deployment support, and program assessment. Successful deployment of ITS services and systems will achieve improvements in safety, mobility, and productivity, and reduce harmful environmental impacts, namely, those caused by traffic congestion.

National Intelligent Transportation Systems Program Plan.
First Edition.
ITS America, and US DOT Joint Program Office for ITS. Robertson HD, and Euler GW, Editors; March 1995, 4 volumes.
Report Number: DTFH61-94-R-00076

Available from:
ITS America
400 Virginia Avenue, SW, Suite 800
Washington, DC 20024 Telephone: 202/484-4847 FAX: 202/484-3483
Order by Title

Advanced Public Transportation Systems

The purpose of the *National ITS Program Plan* is to guide the development and deployment of intelligent transportation systems (ITS) in the United States. This is the first edition of the plan. The plan was developed through a consensus building process which sought the involvement of the entire ITS community. The *National ITS Program Plan* consists of four documents: an Executive Summary, A Synopsis, and Two Volumes. The Executive Summary provides a brief overview of the goals, objectives, and recommendations presented in the ITS plan. The Synopsis provides a fifty page encapsulation of the major subject areas within the document, with special emphasis on the area of deployment. Volume I focuses on the issues of goals, compatibility, deployment, and program assessment. Volume II contains detailed descriptions and plans for each of the 29 user services.

Nontechnical Constraints and Barriers to Implementation of Intelligent Vehicle-Highway Systems. Report to Congress.
U.S. Department of Transportation, Office of the Secretary (Thomas Marchessault, P-37); Prepared for the United States Congress, June 1994, 133pp.

Available from:
U.S. Department of Transportation
Office of the Secretary
Office of Economics, P-37, Room 10223
Washington, DC 20590 Telephone: 202/366-5412 FAX: 202/366-3393
Order by Title

The ISTEA requires the US DOT to prepare, in cooperation with the Departments of Commerce and Justice, two special reports on intelligent vehicle highway systems (IVHS) nontechnical and institutional issues (Appendix A). This document is the first. The report discusses whether nontechnical and institutional factors raise substantial barriers to the development and deployment of IVHS in the United States Some of the issues addressed in this study include: barriers to private sector participation in the national program; institutional impediments to metropolitan traffic management; procurement of IVHS products and services; design and performance standards; staffing and education needs; antitrust issues; liability concerns; and others. The report is based upon the results of research studies and comments from members of the IVHS community, state and local governments, academia, private parties, and public interest groups (Appendix C). The report states that none of the issues examined are so large as to seriously delay or prevent the timely development and adoption of IVHS technologies.

Primer on Intelligent Vehicle Highway Systems. TR Circular 412.
Transportation Research Board Committee on Intelligent Vehicle Highway Systems, In Cooperation with IVHS America; Prepared by SEI Technology Group, August 1993, 60pp.
Report Number: TR Circular Number 412

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TR Circular 412

Advanced Public Transportation Systems

This Primer is a source of basic information on IVHS terminology, technologies, and activities. The main objective of the Primer is to provide a useful source of basic information to those new to the IVHS field and a reference tool to those already involved in IVHS. The essays that form the first half of this Primer describe the prominent and timely topics in IVHS and provide a basic foundation of information on IVHS. Although the focus is on United States IVHS, there are sections describing the state of IVHS in Canada, Europe, and Japan. There are brief descriptions of major United States operational field tests, and information on the roles of various United States standards setting organizations and Federal agencies involved in IVHS. The second half of this Primer is an IVHS glossary. This section should prove useful to those planning to become more familiar with IVHS terms, activities, and organizations.

Responsive Multimodal Transportation Management Strategies and IVHS.
Bellomo-McGee, Inc., Bellomo SJ; Prepared for the FHWA Office of Safety & Traffic Operations (Wayne Berman, HTV-31), and the FTA Office of Research, Demonstration & Innovation (Sean Ricketson, TRI-11), February 1995, 162pp.
Report Number: FHWA-RD-94-086

Available from:
Office of Safety & Traffic-Operations R&D
Federal Highway Administration
6300 Georgetown Boulevard, Suite 700
McLean, VA 22182 Telephone: 703/285-2408 FAX: 703/285-2264
Order Number: FHWA-RD-94-086

This report presents the results of a study of potential applications of new and emerging intelligent transportation systems technologies to multimodal transportation systems. It presents 27 candidate multimodal scenarios and discusses their potential benefits, costs, and feasibility, as well as related institutional and legal issues. It reflects the view of the authors as well as those of participants in a series of national workshops held to discuss the contents. This report will be of interest to intelligent transportation systems planners and implementing agencies who may want to consider innovative ways to enhance the operations of highways, transit, paratransit, and goods movement. Note: the name, intelligent vehicle transportation systems (IVHS), has been changed to intelligent transportation systems.

Review of and Preliminary Guidelines for Integrating Transit into Transportation Management Centers.
EG&G Dynatrend, Schweiger CL; Prepared for the FTA and the Volpe National Transportation Systems Center (Volpe Center), July 1994, 102pp.
Project Number: FTA-MA-26-0007-94-3

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-94-25

Advanced Public Transportation Systems

This report describes how transit-related functions can be incorporated into transportation management centers, i.e., facilities which use advanced technologies to provide transportation information and manage or control transportation networks. The study team contacted 13 TMCs around the country to determine how they had dealt with transit in the context of their overall operations. The document describes how the TMCs contacted and coordinated their various roles and responsibilities, and the technologies currently used by the TMCs to collect and disseminate transit and traffic information. The needed capabilities of future traveler information systems are also discussed. A detailed list of contacts with the TMCs is also included in this report.

Smart Cards for Transit: Multi-Use Remotely Interrogated Stored Data Cards for Fare and Toll Payment.
Coopers & Lybrand, Federal Consulting Practice, Busnell WR; Prepared for the Volpe Center, and the FTA Office of Research, Demonstration & Innovation (Sean Ricketson, TRI-11), April 1995, 153pp.
Project Number: FTA-MA-26-0020-95-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-221222 *Price:* A07

This project developed relevant information on existing and future, stored readable/writable data card technology for fare and toll payments. The project coincides with the FTA objective of developing a plan for a common standard card-based fare payment system that can be used for various public transit modes. Information was developed through analyses of existing automated card ttechnology, examination of current and planned applications in relevant transit modes, and in-person interviews with public transit personnel. The report presents card design characteristics for person-based and vehicle-based applications as well as application characteristics that must be supported by the ultimate automated card system. The key finding was that fare and toll applications have different requirements. Moreover, the goal of integrating these two applications (person-based and vehicle-based) onto a single card is complicated by differences such as the required read range. For the person-based application, it appears that remote coupling (RF proximity) technology will best satisfy integrated requirements. A key reason for choosing RF proximity technology over magnetic stripe technology was to support the needs of mobility limited riders. For vehicle-based applications, a much longer read range is necessary, and it appears that longer range smart transponder (RFID Type III) technology is the most appropriate. Only a few of the existing technologies are applicable when matched against critical requirements and performance criteria.

SmartMaps for Advanced Traveler Information Systems Based on User Characteristics. Working Paper 623.
University of California at Berkeley, Institute of Urban and Regional Development, Southworth M, and Isaacs R, et al.; Prepared for FTA Advanced Public Transportation Systems Program (Ronald J. Fisher, TRI-11), August 1994, 137pp.
Project Number: FTA-CA-26-0007-94-1

Advanced Public Transportation Systems

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-138350 *Price:* A06

This study aims to create user information systems that are attractive, effective and intelligible to diverse transit customers. Throughout the study, attention is given to the importance of age, gender, cultural background, cognitive ability, level of education and literacy in the use of various information systems. This report provides: 1) an assessment of user requirements relevant to the design of effective traveler information systems; 2) a survey of enabling technologies and prototypes for electronic information systems; and 3) a set of conceptual designs for electronic, interactive traveler information systems for public transit. Computer aided information systems such as SmartMaps are presented as traveler information systems capable of reaching the diverse transit users. Existing computer applications relevant to the creation of SmartMaps are summarized and technological requirements for setting up such systems are outlined. Wayfinding is discussed in terms of age-related differences in wayfinding, individual differences in map reading skills, map placement and orientation, written directions versus graphic representations, and wayfinding aids for visually impaired persons. A program of future research needs is outlined including the testing of a prototype system. The highlight of this project is its assessment of selected human factors that influence who can use the technologies, how the technologies will be used, and how effective and likely their use will be, as well as the conceptual design of the information system.

Clean Air

Retrofit of Buses to Meet Clean Air Regulations. A Synthesis of Transit Practice. TCRP Synthesis 8.
Transportation Research Board, National Research Council; Prepared for the FTA Transit Cooperative Research Program/TCRP (Gwendolyn R. Cooper, TRI-30), 1994, 55pp.
Report Number: TCRP Synthesis 8

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 8 *Price:* $12

The Environmental Protection Agency (EPA) has issued a regulation affecting pre-1994 model year urban buses when their engines are rebuilt or replaced after January 1, 1995. Known as the EPA's Urban Bus Retrofit/Rebuild Program, the requirement applies only to those urban buses powered by heavy-duty diesel (HDD) engines operating in metropolitan areas with 1980 populations of 750,0000 or more. The intent of the regulation is to reduce particulate matter (PM) emissions from urban buses. This report will familiarize transit agency staff with the program. The document will be of interest to transit agency general managers, operations, maintenance, and planning personnel, as well as environmental agency officials, equipment suppliers, consultants, and others concerned with bus operations planning and design. The synthesis summarizes the options available under the EPA's program for heavy-duty diesel bus engines and clarifies the information in the regulations for transit agencies developing their own strategies for compliance. The synthesis also provides an overview of transit agency programs already in place to reduce PM emissions. This synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation.

Sourcebook on Transit-Related Environmental Regulations: Requirements Affecting the Acquisition and Maintenance of Transit Vehicles and Facilities.
EG&G Dynatrend, Friend D; Prepared for the FTA Office of Planning (Joseph Ossi, TPL-20), December 1994, 206pp.
Report Number: DOT-T-95-09

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-95-09

This sourcebook provides transit agency staff with a description of the major environmental requirements that may affect the acquisition and maintenance of transit vehicles (buses, vans, locomotives, railcars, and other vehicles and equipment) and facilities (agency buildings, other

structures and associated rights-of-way). The sourcebook is divided into eight sections and covers the following subject areas: Vehicle Emission Reduction; Bus and Support Vehicle Tires; Air Conditioning Systems; Stormwater Runoffs; Hazardous Waste Management; Underground Storage Tanks; Asbestos and Lead-Based Paint Removal; and Hazardous Wastes in Rights-of-Way. The first three sections describe the environmental requirements that may affect a transit agency's approach to vehicle acquisition and maintenance. The next two sections discuss environmental concerns associated with the maintenance of a transit agency's vehicles as well as its facilities. The final three sections of the sourcebook focus upon environmental requirements that apply to a transit agency's management of its facilities. This sourcebook should be used as a reference document only. It does not provide a comprehensive description of every environmental regulation affecting transit vehicle and facility acquisition and maintenance.

Transit Noise and Vibration Impact Assessment.
Harris Miller Miller & Hanson, Inc.; Prepared for the FTA Office of Planning (Abbe Marner, TPL-20), April 1995, 219pp.
Report Number: DOT-T-95-16

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-95-16

This *Guidance Manual for Transit Noise and Vibration Impact Assessment* provides guidance in preparing and reviewing the noise and vibration sections of environmental submittals from grant applicants. The manual has been prepared to promote quality and uniformity in assessments, as well as to serve readers with differing levels of technical background and interests. It is intended for use by the transit industry, including the FTA staff, grant applicants, consultants and the general public. The report consists of two parts (noise and vibration), a common introduction, 13 chapters, and the following subject areas for both noise and vibration: Basic Concepts, Screening Procedures, General Assessment, and Detailed Analysis. Appendix A provides background information for transit noise impact criteria; Appendix B provides additional detail in selecting receivers of interest for those users desiring such detail; Appendix C provides detail in determining existing noise; and Appendix D contains the procedures for computing source reference levels. In addition, the manual provides background information for communicating with the public on transit noise and vibration issues. The approach and reference data in the technical chapters will be useful for FTA staff to review technical details of submittals and the documentation section for judging the adequacy of a submittal. Overall, the readers can use this manual as an aid to reviewing environmental documentation from applicants, in preparing noise/vibration assessments; and to advise applicants on the need for an assessment.

Clean Air

Transportation Energy Data Book. Edition 14.
Oakridge National Laboratory, Davis SC, and Martin Marietta Energy Systems, Inc.; Prepared for the Department of Energy, May 1994, 315pp.
Report Number: ORNL-6798

Available from:
Oakridge National Laboratory
P.O. Box 2008
Bldg. 5500A, MS 6366
Oakridge, TN 378831-6366
Contact: Stacey C. Davis Telephone: 202/586-9121 FAX: 202/586-1637
Order Number: ORNL-6798

The *Transportation Energy Data Book* is a compendium of transportation statistics that draws together transportation data from national and international sources under one cover. It is meant to be used as a handy desktop reference book and to inform policymakers and analysts about transportation activities. The purpose of this document is to present statistical data in the form of tables and graphs. There are more than 200 pages of tables and figures. Each of the major transportation modes is treated in a separate chapter preceded by a synopsis of the chapter's contents. Chapter 1 compares United States data with data from countries in Asia, Europe, and North America. Aggregate energy use and energy supply data for all modes (air, water, highway, pipeline, and rail) are presented in Chapter 2, along with statistics on the price and supply of transportation fuels. Chapter 3 statistically covers automobiles, trucks and buses. It also contains information on fleets, Federal standards, fuel economies of highway vehicles, and high-occupancy vehicle lanes. Household travel behavior characteristics are displayed in Chapter 4. Chapter 5 presents data on alternative fuels and alternatively fueled vehicles. Chapter 6 contains data for major nonhighway modes (air, water, and rail). A new Chapter 7 contains information on environmental issues. The majority of statistics contained in this databook are taken from published sources.

Finance

Finance, Taxation, Pricing, Economic Analysis, Socioeconomics, Education, and Management. Transportation Research Record No. 1395.
Transportation Research Board, National Research Council; (Gwendolyn R. Cooper, TRI-30), 1993, 208pp.
Report Number: TR Record No. 1395

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TR Record No. 1395 *Price:* $41

The first three papers in this Record address transportation finance issues, including public-private partnerships, the valuation of time to be used in pricing services, and treatment of roads as a public utility, charging a fee for their use in the same way as for public utilities. The second group of papers describe economic analysis techniques, including use of toll route diversion behavior as a means of measuring driver's value of time and the derivation of value of time curves for Bangkok. Other papers evaluate road user cost comparisons between signalized intersections and interchanges under rural expressway conditions, and welfare maximization with financial constraints for bus systems. Other papers of economic interest describe a different perspective on highway investment and economic growth, social costs of peak-period road pricing, external factors that influence future transportation logistics, and the estimation of fuel costs and tail pipe emissions. An international paper addresses the economic theory of travel decisions--. The socioeconomic impact papers address the consequences of highway rehabilitation on businesses, the effects of highway bypasses, and travel patterns of poor people. Several papers discuss performance management, customer satisfaction, fare policy as part of transit strategic management, and response consistency of management questionnaire surveys. The final paper discusses enhancement of the future pool of civil engineers for transportation.

ISTEA Flexible Funding Opportunities for Transporation Investments FY 1995.
FTA Office of Planning (Sean Libberton, TPL-10), March 1995, 30pp.
Report Number: FTA-TGM-20-95-1

Available from:
Federal Transit Administration
Office of Planning, TPL-10
400 7th Street, SW, Room 6100
Washington, DC 20590 Telephone: 202/366-2360 FAX: 202/366-3765
Order by Title

ISTEA provides state and local planners and decisionmakers with unprecedented tools to develop and implement plans, improvement programs, and projects to meet locally determined goals. One such tool, flexible funding, supports multimodal planning and project development by eliminating strict modal criteria as a condition for use. This is a joint FTA/FHWA report that summarizes ISTEA's flexible funding opportunities for a wide range of surface transportation investments. The report summarizes the planning, programming, and administrative procedures which

maximize the full potential of flexible funds. Several examples of innovative projects and effective planning processes are presented to illustrate how some metropolitan areas and states are meeting the challenges presented by ISTEA. The report concludes with a series of tables which identify the flexible fund programs available to states and urbanized areas of greater than 200,000 population

Rebuilding America: Partnership for Investment.
Federal Highway Administration, Office of Policy Development, December 1994, 32pp.
Report Number: FHWA-PL-95-023

Available from:
Federal Highway Administration
Office of Policy Development, HPM-1
400 7th Street SW, Room 3317
Washington, DC 20590 Telephone: 202/366-0180 FAX: 202/366-7742
Order Number: FHWA-PL-95-023

This report summarizes the efforts and progress made to date by the US DOT and focuses specifically on the FHWA's implementation of important financing initiatives. FHWA established the *Innovative Financing--Test and Evaluation Project* in order to identify existing transportation financing barriers and to advance innovative financing mechanisms that would increase highway investment. The initiative asks state and local governments to identify projects which could be advanced through new ways of financing. Overall, this document provides an overview of the innovative financing initiative and discusses the emerging financial strategies, the increased flexibility provided by ISTEA, and the new horizons for innovative financing in the coming years. It also provides examples of the ways in which various states propose to apply new financial strategies for leveraging Federal and state funds and increasing infrastructure investment.

Human Resources

Civil Engineering Careers: A User's Guide for Awareness, Retention, and Curriculum Programs.
The Pensylvania State University, Mason JM, Jr., and Kostiva LM, Transportation Research Board, National Research Council, 1994, 112pp.
Report Number: NCHRP Report 347 - Part II

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: NCHRP Report 347/Part II *Price*: $25

This *User's Guide* serves as a single-source document that provides a permanent reference for securing information and guidance available to agencies and organizations interested in enhancing the civil engineering and transportation professions. It contains 14 sections that provide step by step descriptions of how various constituencies can implement the ARC action plans. The Guide details strategies for implementing programs that provide students with an awareness of civil and transportation engineering careers, that retain interested students, and that affect curriculums that relate the relevance of class material to such careers. These programs have been referred to as the ARC (Awareness, Retention, and Curriculum) model. The Guide complements the recruitment and retention initiatives of the American Association of State Highway Transportation Officials and others. This report covers the third phase designed to expand the ARC model.

Management Training and Development Programs. A Synthesis of Highway Practice.
B.T. Harder, Inc., Harder BT; Prepared for the FHWA National Cooperative Highway Research Program, 1994, 61pp.
Report Number: NCHRP Synthesis 188

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: NCHRP Synthesis 188

This synthesis provides an overview of the training and development activities of transportation agencies in the United States and Canada. The synthesis will be of interest to administrators, human resource managers, technical managers, and those who develop training courses for DOTs. It describes management philosophies that support management training and development programs, such as effective leadership, customer service as a primary mission, increased workforce productivity, employee involvement, teamwork for more effective results, and the need for a systems perspective by management. Major issues discussed in this report include: the increasing nonengineering functions within DOTs, aging and diversity of the workforce, recruitment of entry level professionals, employee retention, and the use of contract services. The remaining portion of the synthesis explores the options available to DOTs for management training and development as well as the programs currently in use, both nationally and by selected DOTs.

Information

Directory of Rural Public Transportation Providers Funded by FTA's Section 18 Program.
Community Transportation Association of America; Prepared for the FTA Rural Transit Assistance Program/RTAP (Roger Tate, TRI-30), Administered by the American Public Works Association, December 1994, 227pp.
Project Number: FTA-IL-26-7001-95-02

Available from:
Community Transportation Association of America
RTAP National Transit Resource Center
1440 New York Avenue, NW, Suite 440
Washington, DC 20005
RTAP Hotline: 800/527-8279 (voice/TDD) TAP-IN Bulletin Board: 202/628-2537
Internet: CTRmag@aol.com.
Order Number: FTA-IL-26-7001-95-02, *or*
or
NTIS Order Number: PB95-216719 *Price:* A14

This rural directory is a comprehensive listing of the 1,162 agencies providing general public transportation in areas with less than 50,000 population under the FTA Section 18 program. The purpose of the directory is to assist in identifying and locating individual Section 18 providers. States will find this directory helpful as they implement the public transportation management systems required by ISTEA and the ADA. The directory has two main sections. Section 1 provides a state-by state listing of Section 18 providers; a map page that includes the state contact persons, as well as a synopsis of the state's Section 18 program (number of providers, fleet size, total rural population, and most recent Section 18 funding figures). Section 2 is an index of Section 18 providers by the state and counties in which they provide public transit services. This report is a companion to the *Status Report on Public Transportation in Rural America, 1994;* and the *Directory of Specialized Transportation Providers Funded by FTA's Section 16 Program*

Florida Transportation Almanac.
University of South Florida, Center for Urban Transportation Research, College of Engineering, May 1995, 281pp.

Available from:
University of South Florida
4202 E. Fowler Avenue, ENB 118
Tampa, FL 33620-5350 Telephone: 813/974--3120 FAX: 813/974-5168
Email: ball@eng.usf.edu
Order Number: CUTR/Almanac 1995

This is the first annual edition of the *1995 Florida Transportation Almanac*. It was prepared to assist transportation planners, managers, decisionmakers, and the general public by providing a compilation of transportation statistics and other transportation-related information. The Almanac contains data from existing data sources throughout Florida and the United States. The Almanac is comprised of the following eight major sections: Demographics, Travel Behavior Charactersitics, Modal Statistics (modal statistics for highways, aviation, public transportation,

rail, seaports, transportation demand management, freight, and intelligent transportation systems), Tourism, Transportation Financing, Transportation Education and Research, Directory of Contact Information, and Miscellaneous (list of frequently used acronyms and metric conversion chart).

FY-1994 Statistical Summaries: Grant Assistance Program.
FTA Office of Program Management, Resource Management and State Programs Division, Jo Tucci, TPM-20; Prepared for the FTA Office of Program Management (Jo Tucci, TPM-20), March 1995, 165pp.
Report Number: FTA-TGM-10-95-1

Available from:
Federal Transit Administration
Office of Program Management, TPM-20
400 7th Street, SW, Room 9311
Washington, DC 20590 Telephone: 202/366-1657 FAX: 202/366-7951
Order Number: FTA-TGM-10-95-1
or
NTIS Order Number: PB95-216818 *Price:* A08

This annual report presents analyzed data on the distribution and use of various program funds administered by the FTA. The programs discussed in this report are the principal source of Federal financial aid to urban and non-urban areas for transit. Data is compiled from the capital, operating, and planning assistance grants awarded to transit agencies, states, metropolitan planning organizations, and other units of local governments. The statistical data are presented in tables, charts, and graphs. Overall, the FTA obligated $4.5 billion for various grants in FY-1994 (up $85.7 million from last year). Of the total obligated in FY-1994, 79 percent was programmed for capital purposes, 19 percent for operating expenditures, and 2 percent for planning assistance. Excluding Stark-Harris (II), the urbanized areas with populations over 1 million received 72 percent of the total grant funds obligated. The number of vehicles budgeted in FY-1994 climbed to a total of 5,545 which is 271 short of the all time high bus count of 5,816 in FY-1974. These figures do not include Sections 16 and 18.

1994 Federal Radionavigation Plan.
U.S. Department of Transportation, Office of the Secretary (P-7), and United States Department of Defense, May 1995, 250 pp.
Report Number: DOT-VNTSC-RSPA-95-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number:

The Federal Radionavigation Plan (FRP) delineates policies and plans for radionavigation services provided by the United States Government to ensure efficient use of resources and full protection of national interests. Developed jointly by the United States Departments of Defense and Transportation, the FRP sets forth the Federal interagency approach to the implementation and

operation of radionavigation systems. The FRP is updated biennially. This eighth edition of the plan describes respective areas of authority and responsibility, and provides a management structure by which the individual operating agencies can define and meet radionavigatioon requirements in a cost-effective manner. In addition, this edition contains the current policy on the radionavigation systems mix. The constantly changing radionavigation user profile and rapid advancements in systems technology, require that the FRP remain as dynamic as the issues it addresses. This edition of the FRP builds on the foundation laid by previous editions and further develps national plans towards providing an optimum mix of radionavigation systems for the foreseeable future.

Intermodal Passenger Terminal Facilities Project Summaries. A Compendium of Proposed Active, and Completed Intermodal Passenger Terminal Facilities.
US DOT Intermodal Terminal Committee, December 1994, 261 pp.

Available from:
U.S. Department of Transportation
Office of Intermodalism, S-3
400 7th Street, SW, Room 10126
Washington, DC 20590 Telephone: 202/366-5781 FAX: 202/366-7952
Order by Title

This compendium of *Intermodal Transportation Passenger Terminal Facilities* provides a descriptive overview of cooperative approaches to offer improved transportation choices and connections. It includes a representative snapshot of Federally funded, proposed Federally funded, public and privately funded, and privately financed passenger intermodal facilities. The information in the project descriptions was provided primarily by local sponsors or interested parties of the terminal facilities and enhanced with DOT data. The compendium was compiled in response to general public interest in terminal facility developmental activities. The projects and studies listed in this report are presented using the Standard Federal Regional alignment. This report also contains a glossary of transportation terminology.

Intermodal Technical Assistance for Transportation Planners and Policymakers.
US DOT Office of Intermodalism, Office of the Secretary of Transportation, December 1994, 72pp.

Available from:
U.S. Department of Transportation
Office of Intermodalism, S-3
400 7th Street, SW, Room 10126
Washington, DC 20590 Telephone: 202/366-5781 FAX: 202/366-7952
Order by Title

This report is intended to help the user find information on intermodal technical assistance provided by the US DOT. The resource document, updated and expanded since its first publication in 1993, provides information on intermodal technical assistance activities and describes available tools, such as studies, conferences, courses, reports, data, and quantitative

models, that can help planners and policymakers respond to the requirements of ISTEA and the Clean Air Act.

ISTEA and Regional Roundtable Report and Action Plan. A Progress Report From Our Customers.
US DOT Office of the Secretary; Prepared for the Transportation Community; March 1994, 59pp.

Available from:
U.S. Department of Transportation
Office of Intergovernmental and Consumer Affairs
400 7th Street, SW, Room 10405
Washington, DC 20590 Telephone: 202/366-1524 FAX: 202/366-7907
Order by Title

This report summarizes the findings of a series of regional roundtable meetings held by the US DOT leadership team in the ten Federal regions in November and December 1993. These outreach meetings were arranged across the nation to assess the progress to date in the implementation of ISTEA and to listen to the customers. The discussions were designed to give US DOT customers, namely, state and local officials from each of the ten Federal regions, the direct opportunity to advise the leadership on how well the ISTEA process was working. This report summarizes the findings of the outreach meetings. "Listening to the Customer" section of this report presents ten general areas of nationwide concern as well as recommendations from the roundtable meetings. The US DOT response to the recommendations is presented as an Action Plan. It outlines the actions US DOT intends to take, designates the agencies responsible for achieving each improvement, and sets a timeline for completion. The overall message heard at the regional meetings was that ISTEA was working and supported across the country. Full funding of ISTEA was consistently the highest priority issue for state and local officials. Other common themes that emerged were calls for education and training, simplifying the ISTEA project approval process/regulations, closer cooperation with EPA, careful monitoring of the ISTEA, improving access to health care in rural areas, encouraging supportive land use policy, and others.

National Transit Summaries and Trends From the 1992 National Transit Database.
DIGICON Corporation, Black TN ; Prepared for the FTA Office of Program Management (Linda Barnes, TPM-20), May 1994, 86pp.
Project Number: FTA-MD-26-9002-94-1

Available from:
Federal Transit Administration
Section 15 Program/TPM-20, Room 9311
Washington, DC 20590 Telephone: 202/366-6471 FAX: 202/366-7951
Order Number: FTA-MD-26-9002-94-1
or
NTIS Order Number: PB95-125191 *Price:* A05

Information

This is the third annual edition of the *National Transit Summaries and Trends (NTST)*. It was developed from the Section 15 database and provides a national overview of the mass transit industry in 1992. NTST highlights the aggregate financial and operational characteristics and trends of mass transit for the five-year period 1988-1992 and the ten-year period 1983-1992. Key statistics and performance indicators for the nation's transit industry are also presented. Along with the national transit profile, the report presents profiles for urbanized area under 200,000 population, 200,000 to one million, and over one million population. These profiles provide aggregate transit service performance and financial information for 1992. Performance indicators, used to measure transit service supplied and its cost effectiveness, are presented by mode and type of service. A new chapter provides key characteristics for individual transit systems by mode of operation. Other chapters include: Capital Funding; Operating Funding and Expenses; Service Supplied and Consumed; and Safety, Reliability and Maintenance. Based on the data received in the 1992 Section 15 report year, the following observations have been made: capital funding of transit systems increased by four percent from 1991 to 1992; capital investment increased 48 percent since 1988; and fixed guideway system investments accounted for 70 percent of capital expenditures. In addition, passenger fares accounted for 36 percent of the 15.9 billion required to operate transit services in 1992, while local assistance accounted for 30 percent; state assistance provided another 23 percent and Federal assistance five percent; other sources of funding account for the remainder. Nearly 7.7 billion riders used some mode of public transit in 1992, totaling 37.2 billion passenger miles. Two and one half billion miles of vehicle revenue service were provided with nearly 68,000 transit vehicles operating daily in maximum service. The 1992 Section 15 data reflected an excellent safety record for transit. The national rate of patron injuries is 11.6 per ten million passenger miles for all modes combined. Bus service had only one maintenance roadcall per 4,487 miles of operation (a 33 percent improvement since 1988).

National Transit Summaries and Trends for the 1993 National Transit Database Section 15 Report Year.
DIGICON Corporation, Binaut TL (DIGICON), and Futrell MF (FTA/TPM-13): Prepared for the FTA Office of Program Management (Linda Barnes, TPM-20), December 1994, 115pp.
Project Number: FTA-MD-26-9002-94-5

Available from:
Federal Transit Administration
Section 15 Program/TPM-20, Room 9311
Washington, DC 20590 Telephone: 202/366-6471 FAX: 202/366-7951
Order Number: FTA-MD-26-9002-94-5, *or*
or
NTIS Order Number: PB95-239323 *Price:* A06

This fourth annual edition of the *National Transit Summaries and Trends* (NTST) provides a national overview of the mass transit industry in 1993. It summarizes the financial and operating data submitted to the FTA by the nation's public transit operators, pursuant to 49 USC 5335 (formerly Section 15 of the Federal Transit Act, as amended). A national transit profile is presented along with profiles for urbanized areas of under 200,000 population; 200,000 to one million; and over one million population. The national transit profile provides aggregate operating statistics and financial data for the industry. NTST is developed from the National Transit

Database and thus represents a portion of the 1993 annual report. Overall, NTST is organized to offer a national transit profile followed by chapters on key modal characteristics of individual agencies; key characteristics by urbanized areas; capital funding; operating funding and expenses; service supplied and consumed; safety; and reliability and maintenance effectiveness. For the first time, an appendix displaying an aggregated national transit database report by individual reporting forms is documented. Based on the 1993 data received, capital funding of the nation's transit systems increased by approximately 8.5 percent from 1992 to 1993; capital investment increased 52 percent since 1989; fixed guideway systems investments accounted for 70 percent of capital expenditures; and Federal assistance accounted for 42 percent of capital funding in 1993. The 1993 data also showed that passenger fares accounted for 36.5 percent of the $16.8 billion required to operate transit services in 1993, while local assistance accounted for 31 percent, state assistance provided 21 percent, and Federal assistance represented about five percent. Other funding sources accounted for the remaining 6.5 percent. Over 7.4 billion unlinked trips used some mode of transit service in 1993. There were almost 2.6 billion miles of vehicle revenue service provided with over 70,000 transit vehicles operating daily in maximum service. The 1993 National Transit Database data reflected an excellent safety record for transit. The national rate of transit patron injuries is 11.5 per ten million passenger miles (all modes combined). Directly operated bus service had one maintenance roadcall per 4,337 miles of operation.

National Transportation Atlas Data Bases, 1995.
CD-ROM
US DOT Bureau of Transportation Statistics, CD-ROM, 1995.

Available from:
Bureau of Transportation Statistics
400 7th Street, SW, Room 2104
Washington, DC 20590
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Telephone: 202/366-3282 FAX: 202/366-3640
Statistical Information: (800) 853-1351

This is the first edition of the *National Transportation Atlas Data Bases: 1995* released by the Bureau of Transportation Statistics (BTS) . The CD-ROM (compact-disk read only memory) provides a geographic description of transportation modal networks and intermodal terminals along with a series of background files, primarily boundaries, that can be used in conjunction with the facility files. This information characterizes the data infrastructure to support research, analysis and decisionmaking across all modes of transportation. The Atlas Data Bases are designed primarily to meet the needs of the US DOT at the national level, but can have major applications at state and local scales throughout the transportation community. The Atlas Data Bases are designed to be used within geographic information systems software, although the profiles are provided in ASCII format and can be used in any database spreadsheet, or other software package that can accommodate the amount of information in any given file.

National Transportation Statistics 1995.
US DOT Bureau of Transportation Statistics, with assistance from Volpe National Transportation Systems Center, and onsite contractors (Gross M, and Feldman R); November 1994, 360pp.
Report Number: DOT-VNTSC-BTS-94-3

Information

Available from:
Bureau of Transportation Statistics
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Telephone: 202/366-3282 FAX: 202/366-3640
Statistical Information: (800) 853-1351

The *National Transportation Statistics* report is published by the US DOT Bureau of Transportation Statistics to compile and make accessible basic information on the Nation's transportation systems. This twenty-third edition is a compendium of national transportation, and transportation-related statistics from a variety of government and private sources. It includes information on energy, environment, and other transportation categories at the national level. The data illustrate transportation activity for the following transportation modes: air, automobile, bus, truck, transit, rail, water, and pipeline. Basic descriptors such as operating revenues/expenses, number of vehicles and employees, vehicle and passenger miles, and passenger and freight operations are included. Transportation trends in performance, safety, and motor vehicle sales, production and costs are also presented. Safety information compares data for transportation accidents, fatalities, and injuries, for all modes of transportation as well as multimodal transportation of hazardous materials. Supplementary information include data on transportation and the economy, energy consumption, energy intensiveness, energy transport, and energy supply and demand. Additionally, selected statistics on commercial space transportation and data from the FHWA report, *Journey to Work Trends in the United States and its Major Metropolitan Areas, 1960-1990,* are also illustrated. Summary statistics, in five year increments, are provided for the years 1960-1992, and 1993 when available. This year's publication has been redesigned to complement the Bureau's *Transportation Statistics Annual Report.*

North American Transportation. Statistics on Canadian, Mexican and United States Transportation. Revised.
Arthur L. Webster II, EXP Associates, Inc.; US DOT Bureau of Transportation Statistics, Revised May 1994, 79pp.

Available from:
Bureau of Transportation Statistics
400 7th Street, SW, Room 2104
Washington, DC 20590
Order by Title

Telephone: 202/366-3282 FAX: 202/366-364
Statistical Information: 800/853-1351

This document describes the transportation systems of North America with comparable statistics for Canada, Mexico, and the United States. It was published to describe and understand the continental transportation system with the intent of encouraging future trilateral research on the system. The report contains data on the size and scope, use, employment, fuel consumption, and economic role of each country's transportation system. Many of these data are for 1990. The data presented in this report cover transborder and other international transportation statistics, including transborder passengers and modal trends in freight transport. The Comparative National Statistics section covers such items as the transportation bill, domestic passenger travel, fuel consumption, employment, fatalities, and freight. Another section presents statistical profiles of each of the main modes of transportation, including highway, aviation, rail, water, and transit.

Modal trends for 1987-1991 are statistically supported for highway, aviation, rail, water, and transit.

Program of Research for HOV Systems. Transportation Research Circular.
Committee on High-Occupancy Vehicle Systems, Transportation Research Board, National Research Council; April 1995, 34pp.
Report Number: TR Circular No. 441

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TR Circular No. 441

This document establishes a national research program on high-occupancy vehicle systems (HOV). It has resulted from deliberations by members and friends of TRB's High-Occupancy Vehicle Systems Committee, open forums conducted at National HOV Systems Conferences, and from individual members of the Research Subcommittee. The report provides background information on both the committee's and subcommittee's activities and accomplishments. Two chapters cover program highlights, including key statistics and individual research problem statements titles, and a plan for implementation. The final three chapters of this report are devoted to three main areas of HOV research: planning and design, operations and enforcement, and HOV systems on arterials. One of the first studies to be undertaken in the program is the development of an HOV Systems Manual. It is proposed that the manual be updated periodically which will integrate current knowledge with the results of the completed research projects.

Status Report on Public Transportation in Rural America, 1994.
Community Transportation Association of America, Rucker G; Prepared for the FTA Rural Transit Assistance Program (RTAP) administered by the American Public Works Association, December 1994, 65pp.
Project Number: FTA-IL-26-7001-95-01

Available from:
Community Transportation Association of America
RTAP National Transit Resource Center
1440 New York Avenue, NW, Suite 440
Washington, DC 20005 RTAP Hotline: 800/527-8279 (voice/TDD)
TAP-IN Bulletin Board: 202/628-2537 Internet: CTRmag@aol.com.
Order Number: FTA-IL-26-7001-95-01, *or*
or
NTIS Order Number: PB95-217006 *Price:* A04

This status report presents the findings of a nationwide study of transit systems funded under Section 18 of the Federal Transit Act. It provides a comprehensive overview of the Section 18 transit network in terms of the current population being served by public transit in rural areas; the number and characteristics of local transit agencies providing services in rural areas; and the

unserved needs and populations in rural areas of the United States. Data were collected from the 1,147 agencies receiving Section 18 funding and providing service during 1992. The report identifies and discusses the Section 18 service area which includes nearly 3.5 million square miles and almost 91 million people, 32 percent of whom are disadvantaged by age, poverty and/or disability. Based on the data gathered for 1992, some of the Section 18 network characteristics reflected in this report are the following: 1) majority of recipients (58 percent) are public entities, 37 percent are private nonprofit agencies, 3 percent are private for-profit organizations, and 2 percent are tribal agencies; 2) most recipients are small and operate in sparsely settled areas (60 percent serve areas with less than 100 persons per square mile); 3) most vehicles are vans (53 percent), and nearly half of all Section 18 vehicles are wheelchair accessible (40 percent of all vans and two-thirds of all small buses); 4) core ridership consists of transit dependent persons (62 percent women, 36 percent elderly, and 24 percent with a disability); 5) typical agency provides 83,000 trips a year and averages 20,000 miles per vehicle per year (average trip is 2.6 vehicle miles, costs $3.81 per trip and $1.48 per vehicle mile); and 6) much of rural America remains unserved (38 percent of rural residents have no public transit service).

Surface Transportation Research and Development Plan. A Report to Congress. Second Edition.
US DOT Research and Special Programs Administration; A Report of the Secretary of Transportation to the United States Congress; March 1995, 183pp.

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order by Title

This is the second in a series of congressionally required plans submitted by the Secretary of Transportation to the Congress. ISTEA requires that an integrated national surface transportation research and development (R&D) plan be developed that focuses on surface transportation systems needed for the next decade. The objectives of the plan are: 1) develop a range of technologies needed to produce convenient, safe, and affordable modes of surface transportation to be available for public use beginning in the mid-1990s; and 2) maintain a long-term advanced R&D program that provides for the next generation of surface transportation systems. This plan focuses on surface transportation research underway or planned within the currently proposed Intermodal Transportation Administration, the Bureau of Transportation Statistics (BTS) and the Office of the Secretary. The proposed Intermodal Transportation Administration would include the functions now performed by six administrations: FHWA, NHTSA, FTA, FRA, RSPA, and MARAD. This plan is divided into 14 chapters related to surface transportation R&D. Chapter 1 provides an overview of recent US DOT research, development, and technology initiatives. Chapters 2-13 outline the Department's current and near-term surface transportation research program for fiscal years 1994-1996, and provides a long-term outlook of the individual research areas. Chapter 14 discusses contracting procedures affecting the Department and its grantees.

Information

Technology Applications Program of the Federal Highway Administration: Demonstration Projects, Application Projects, Test and Evaluation Projects and Special Projects.
FHWA Office of Technology Applications, Safety & System Applications (HTA-30); April 1994, 182pp.
Report Number: FHWA-SA-94-028

Available from:
Federal Highway Administration
Office of Technology Applications, HTA-30
Washington, DC 20590 Telephone: 202/366-8033 FAX: 202/366-7909
Order Number: FHWA-SA-94-028

This report documents the FHWA Technology Applications Program. It lists and provides descriptive profiles and status information of 22 projects currently in progress in subject areas that range from asphalt and concrete mix technologies; bridge design and inspection; corrosion, geotechnical, and hydraulic engineering; to safety systems and hardware; pedestrians and bicycles; traffic control and management; technology assessment; and marketing. This publication focuses and organizes the 22 projects in four categories: demonstration, application, test and evaluation, and special projects. Each project write-up in the four categories includes a project number, title, description and status, and the name, organization code, and telephone number for the project manager. The report also includes three indices: Project Number Index, SHRP Index, and Subject Area Index.

Transit Planning and Research Programs: Fiscal Year 1993 Project Directory.
FTA Office of Research, Demonstration & Innovation, Rodano E, TPM-30; Prepared for the FTA Office of Research, Demonstration & Innovation, April 1994, 85pp.
Project Number: FTA-TTS-5-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB94-180726 *Price:* A05

This directory provides descriptive profiles and status information for the transit planning and research projects initiated during fiscal year 1993 by the FTA. Its purpose is to inform the public, especially the transit industry, of the nature and scope of work underway to assist state and local agencies in improving services and reducing the cost of public transit. Under the Transit Planning and Research Program, assistance is provided in a broad range of disciplines, including Advanced Public Transportation Systems, Clean Air, Finance, Human Resources and Productivity, Information, Policy Analysis and Evaluation, Regional Mobility, Safety & Security , Technology Development, Transit Accessibility, Planning and Project Development, Transit Cooperative Research, and the National Transit Institute.

Information

Transit Planning and Research Programs: Fiscal Year 1994 Project Directory.
FTA Office of Research, Demonstration & Innovation, Drancsak M; Prepared for the FTA Office of Research, Demonstration & Innovation, March 1995, 92pp.
Report Number: FTA-TTS-5-95-1

Available from:
Federal Transit Administration
Office of Research, Demonstration & Innovation, TRI-30
400 7th Street, SW, Room 6427
Washington, DC 20590 Telephone: 202/366-0201 FAX: 202/366-3765
Order Number: FTA-TTS-5-95-1
or
NTIS Order Number: PB 95-216438 *Price:* A05

This annual directory provides descriptive profiles and status information for the transit planning, research and safety projects initiated during FY-1994 by the FTA. Its purpose is to inform the transit community and the general public of the nature and scope of work underway to assist state and local agencies in improving services and reducing the cost of public transit. The projects listed in the directory reflect the implementation of FTA's Strategic Plan, which includes a mission statement that brings a new vision to public transit in America. The 124 projects recorded in this directory are organized accordingly: Advanced Public Transportation Systems; Clean Air; Finance; Human Resources and Productivity; Informaion; Planning and Project Development; Policy Analysis and Evaluation; Regional Mobility; Rural and Specialized Transportation; Safety and Security; Technology Development; Transit Access; and Cooperative Research Programs. The final section contains three separate indices that list the projects by state and project number, grantee, and by the FTA project manager. The FTA regional offices are included in this report along with their street address, telephone and FAX numbers.

Transit Planning and Research Reports: An Annotated Bibliography.
FTA Office of Research, Demonstration & Innovation, Drancsak M, TRI-30; Prepared for the FTA Office of Research, Demonstration & Innovation, July 1994, 67pp.
Project Number: FTA-TTS-5-94-2

Available from:
Federal Transit Administration
Office of Research, Demonstration & Innovation, TRI-30
Washington, DC 20590 Telephone: 202/366-0201 FAX: 202/366-3765
Order Number: FTA-TTS-5-94-2
or
NTIS Order Number: PB94-214210 *Price:* A04

This annotated bibliography presents the most current and available planning and research reports, as of July 1994, sponsored by the FTA. The bibliography is a reference tool designed to provide easy and rapid access to FTA research products. The intent is to keep the transit community well-informed of the planning and research activities. The bibliography announces recently published research products of the National Planning and Research Program and includes citations

of research results of interest to the transit community from other sources, along with easy-to-follow instructions on how to obtain a copy of each report. Each report referenced in this document consists of a bibliographic entry accompanied by a report availability statement and a summary description of the report. The final section contains instructions on how to obtain FTA reports, a report order form, an evaluation form, and a request for future editions of the bibliography. The FTA plans to continue serving the information needs of its customers by announcing the availability of future research results through this type of bibliography.

Transit Profiles. The Thirty Largest Agencies for the 1993 National Transit Database Section 15 Report Year.
DIGICON Corporation, Black TN, and Futrell MF, TPM-40: Prepared for the FTA Office of Program Management (Linda Barnes, TPM-20), December 1994, 86pp.
Project Number: FTA-MD-26-9002-94-1

Available from:
Federal Transit Administration
Section 15 Program/TPM-13, Room 9311
Washington, DC 20590 Telephone: 202/366-6471 FAX: 202/366-7951
Order Number: FTA-MD-26-9002-94-1
or
NTIS Order Number: PB95-239315 *Price:* A05

This Section 15 report summarizes the financial and operating data submitted to the FTA by the nation's public transit operators, pursuant to 49 USC 5335 (formerly Section 15 of the Federal Transit Act, as amended). These data represent a portion of the 1993 Annual Report and consist of individual profiles for the 30 largest transit agencies in the United States Criteria used to determine these agencies is operating expense. Data contained in each profile consists of general and summary reports, as well as modal, performance and trend indicators for the 1993 report year. Specific financial and service characteristics, as well as capital funding and performance measures are listed for each mode. This is a user-friendly document. Rather than requiring the user to assemble data from numerous tables, the Transit Profile report provides the user with a comprehensive overview in graphic and summary format of an individual transit agency's financial and operating statistics for the 1993 Section 15 report year with summaries of key data items for prior years. All data in this report are for transit system fiscal years ending on or between January 1 and December 31, 1993.

Transit Research Abstracts, 1994.
Transportation Research Board, Urban Mass Transportation Research Information Service (UMTRIS); Prepared for the FTA Office of Research, Demonstration & Innovation (Drancsak M, TRI-30), September 1994, Volume 12, 437pp.
Project Number: FTA-DC-26-7009-94-1

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/ 334-2519

Order by Title and Volume Number *Price:* $82

Transit Research Abstracts is an annual publication that features abstracts and ongoing research project summaries on planning, designing, financing, constructing, operating, maintaining, managing, and marketing all modes of public transit. Some of these modes are advanced guideway systems, buses, carpools, commuter services, elderly and handicapped transport, heavy and light rail transit, paratransit, rapid transit, streetcars, taxicabs, trolley buses, and vanpools. Information was retrieved from the UMTRIS database, a subfile of the TRIS database. Each issue of the Abstracts is divided into five sections: abstracts of reports and journal articles; summaries of ongoing research; source index; author/investigator Index; and retrieval term Index. UMTRIS is an FTA sponsored and TRB managed online database that serves as an institutional memory for FTA project reports and as the central source of transit information for the community. UMTRIS database is available online to users of DIALOG Information Services, File 63. UMTRIS is now available through the TRB database TRIS on CD-TRANSPORT.

TRANSPORT, CD-ROM.
SilverPlatter Information, 1995; Prepared for the Transportation Research Board, Transportation Research Information Service (TRIS), 1995.

Available from:
SilverPlatter Information
100 River Ridge Drive
Norwood, MA 02062-5043 Telephone: 800/343-0064 FAX: 617/769-8763
Internet: info@silverplatter.com
Order by Title

Now available for the first time on CD-TRANSPORT, a database which provides the complete information resources of three leading transportation research organizations: The Road Transport Research Program of the Organization for Economic Cooperation and Development (OECD); the Transportation Research Board (TRB) of the National Research Council; and the European Conference of Ministers of Transport (ECMT). TRANSPORT combines the following databases into a single, easy-to-search source: TRB's TRIS Database; OECD's International Road Research Documentation (IRRD) Database; and ECMT's TRANSDOC Database. These three databases that comprise CD-ROM TRANSPORT are internationally renowned for their comprehensive transportation related research. TRANSPORT is an international information resource for anyone requiring timely, comprehensive research information in the field of transportation. The TRIS database, sponsored by US DOT and managed and operated by TRB, contains 310,000 records covering subjects such as: highway research, public transit, railroad research, maritime research, highway safety and air transportation in the United States The IRRD database contains 285,000 records covering all aspects of road research at an international level. TRANSDOC contains over 40,000 records relating to the social sciences of transportation published in the member countries of ECMT. Abstracts are tri-lingual in English, French and German. With these three databases combined, TRANSPORT on CD contains over 600,000 records with more than 20,000 records added annually. The entire TRANSPORT database is available on two compact disks. Single disk covering data from 1988 to present (with quarterly

updates) is priced at $1,295. Two disk set covering data from 1968 to the present (with quarterly updates) is priced at $1,795.

Transportation Statistics. Annual Report 1994.
US DOT Bureau of Trasnportation Statistics, January 1994, 243pp.

Available from:
Bureau of Transportation Statistics
400 7th Street, SW, Room 2104
Washington, DC 20590 Telephone: 202/366-DATA FAX: 202/366-3640
Order by Title Statistical Information: 800/853-1351

The *Transportation Statistics Annual Report* is the first or keystone publication of the Bureau of Transportation Statistics (BTS), the newest operating administration of the Department of Transpotation. This annual report is a summary of the state of the nation's transportation system and its effects and impacts. It also discusses the quality of statistics used to characterize the transportation system, and planned efforts by the BTS to improve the quality of the statistics. Discussions of transportation in this publication are organized around concepts such as industries, modes, markets, and corridors. All four transportation modes--airways, highways, railways, and waterways--are examined through available data and statistical studies. The report begins with an overview of what transportation is and its value. Separate chapters cover the network itself; use of the transportation system; assessment of how well it works; benefits and costs; safety, including accident by modes/trends and international comparisons; energy and environment; and the status of statistical programs; and potential for their improvements. BTS encourages the reader to provide comments on this first effort so that future editions can be made more useful to decisionmakers and the transportation community.

United States Waterway Data.
CD-ROM
US DOT Bureau of Transportation Statistics, CD-ROM, 1995.

Available from:
Bureau of Transportation Statistics
400 7th Street, SW, Room 2104
Washington, DC 20590 Telephone: 202/366-DATA FAX: 202/366-3640
Order by Title Statistical Information: 800/853-1351

This is the first edition of the *United States Waterway Data* CD-ROM released by the Bureau of Transportation Statistics. The CD-ROM is a collection of data related to the navigable waters in the United States including inland, off-shore, Great Lakes and Saint Lawrence Seaway. Information on commerce, facilities and performance, imports and exports, accidents, and the geographic waterway network are provided. These data were collected from several agencies and institutions including the United States Army Corps of Engineers, BTS, the United States Coast Guard, Oak Ridge National Laboratory and Vanderbilt University.

Planning and Project Development

Assessing Travel Behavior by Blacks in the United States: A New Perspective.
University of South Florida, Center for Urban Transportation Research, Eric T. Hill; Prepared for the US DOT Research and Special Programs Administration (RSPA), Office of University Research & Education, October 1994, 64pp.
Report Number: DOT-T-95-10

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-95-10

This report analyzes the 1983 and 1990 Nationwide Personal Transportation Study (NPTS) data to provide insights for use by transportation planners and policymakers on changes in travel patterns and trip-making behavior by Blacks in the United States. The analyses indicate that mobility for the Black community is growing at a faster rate than for the Non-Black communities. These data suggest that Blacks are narrowing the historical gap in mobility with Non-Blacks. Between 1983 and 1990, vehicle trips by Blacks increased 56.9 percent; vehicle miles of travel increased 75.1 percent; person trips increased 27 percent; and person miles of travel increased 37 percent. The number of Blacks becoming licensed to drive increased by 27.9 percent from 1983 to 1990.

Commuting Alternatives in the United States: Recent Trends and A Look to the Future.
University of South Florida, Center for Urban Transportation Research, Ball WL; Prepared for the RSPA Office of University Research & Education, December 1994, 112pp.
Report Number: DOT-T-95-11

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-95-11

This report was prepared to assist in developing a thorough understanding of current trends for commuter trips in the United States. Using data from the Census, American Housing Survey, and the Nationwide Personal Transportation, general trends in commuting are presented, including those related to mode choice, vehicle occupancy, departure time, travel time, and travel distance. This is followed by a discussion of commuting alternatives, including public transportation, ridesharing, and working at home. Recent trends in the use of each commuting alternative are presented, including the commute share for a series of commuter subgroups characterized by a variety of geographic, demographic, and housing characteristics. A discussion of the future outlook for each of the commuting alternatives is also included.

Criteria for Qualifying Contractors for Bidding Purposes. Synthesis of Highway Practice 190.
Transportation Research Board, National Research Council, Thomas HR, Jr. (Pennsylvania State University), and Smith GR (Pennsylvania State University); Prepared for the FHWA National Cooperative Highway Research Program, 1994, 48pp.
Report Number: NCHRP Synthesis 190

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: NCHRP Synthesis 190 *Price:* $11

This synthesis will be of interest to administrators, contracting officers, engineers, and contractors, as well as bonding firms and sureties or others involved with highway construction and the procurement process for these services. Information is provided on the current practices used by state highway agencies to qualify contractors for performing competitively bid contract work. The synthesis covers the evolution of the various practices of qualifying contractors by public agencies and private sureties for public construction, discusses the surety industry perspective, and addresses the areas of overlap between them, as well as important differences. Specific advantages and disadvantages of prequalification and postqualification practices are highlighted. The report also describes the bonding process, methods used by public agencies to determine the contractor's bonding capacity, and the extent which only bonding is required by states. Information was assembled from numerous sources, including a large number of state highway and transportation departments. This synthesis is an immediately useful document that records practices that were acceptable and available at the time of publication.

Evaluation of Intermodal Passenger Transfer Facilities.
University of Wisconsin-Milwaukee, Horowitz AJ, and Thompson NA; Prepared for the FHWA, September 1994, 226pp.
Report Number: DOT-T-95-02

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-95-02

This report presents a selection of methods for preliminary design, location, and evaluation of intermodal passenger transfer facilities. Methods were selected or adapted from previous station, terminal or airport studies, or from multimodal transportation plans. Issues considered include safety/security, effective transfers, terminal access and efficiency, passenger concerns, physical and nonphysical environments, finances, site concerns, modal enhancement, and architecture/building considerations. Specific topics discussed include establishing project objectives, principles of facility location, evaluation of institutional arrangements, evaluation of

community development, evaluation of site design and access, evaluation of internal design, and user benefits. The document includes a review of previous research on the topic, and a glossary of terms and abbreviations.

Evaluation Workbook for Community Transportation Coordinators and Providers in Florida.
Center for Urban Transportation Research, University of South Florida; Prepared for the Florida Commission for Transportation Disadvantaged, April 1994, 164pp.

Available from:
Center for Urban Transportation Research
University of South Florida
4202 E. Fowler Avenue, ENB 118
Tampa, Florida 33620 Telephone: 813/974-3120 FAX: 813/974-5168
Order by Title

This workbook presents a framework for evaluating the performance of designated community transportation coordinators (CTCs) and operators. The intent of this evaluation model is to determine how well the CTC and operators are doing their jobs and whether the costs/rates are reasonable. The workbook is instructional and may be used by local coordinating boards or community transportation coordinators. Part 1, *Introduction*, describes the Florida Coordinated Transportation System and presents a complete evaluation model along with instructions on how to use the workbook and how the accompanying 16 modules are organized. Part 2, *Getting Started*, describes the key documents needed and the steps necessary to begin an evaluation. Part 3, *Evaluation Modules*, contains all eight evaluation modules, each examining a different aspect of local coordinated transportation for the disadvantaged. Part 4, *Conclusions*, contains modules designed to help reviewers form overall conclusions. The appendices contain a resource list, list of abbreviations, and a glossary of terms. This evaluation process responds to Florida Statutes which mandate all recipients of Federal, state, or local government funds, who transport persons with disabilities, to contract with the local CTC for transportation disadvantaged services.

Guide to Land Use and Urban Transportation. Volume II: Applying the Concepts.
Snohomish County Transportation Authority Staff (SNO-TRAN); Prepared for the FTA Office of Planning (TPL-20), December 1993, 282 pp.
Report Number: DOT-T-94-24

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-94-24

This report offers specific strategies and designs for planners, developers, and others for making their communities more accessible by transit. Topics covered include developing an urban center,

transit compatible site plans, transit friendly shopping centers, mixed use developments and transit, and redesign of strip commercial areas to better utilize transit. A separate chapter highlights ideas particularly applicable to small communities. A set of model goals and policies for effective public transportation in the context of urban/suburban land use patterns are also included. The document should be valuable to public officials, planners, developers, transit operators, consultants, and citizen groups.

Guide to Metropolitan Transportation Planning Under ISTEA: How the Pieces Fit Together.
FHWA Office of Program Development, and FTA Office of Research, Demonstration & Innovation, U.S. Department of Transportation, July 1995, 42pp.
Report Number: FHWA-PD-95-031

Available from:
Federal Highway Administration
Office of Environment & Planning, HEP-41
400 7th Street, SW, Room 3240
Washington, DC 20590 Telephone: 202/366-2069 Hotline: 202/366-2069
Order Number: FHWA-PD-95-031

This *Guide to Metropolitan Planning* was prepared in an easy-to-read format to provide a framework for linking the various elements of ISTEA's transportation planning process together, and to provide information, suggestions, and examples of ways to carry out the metropolitan planning process. The Guide is designed for transportation professionals, elected officials, and policymakers, as well as community and business interests, who want to understand and participate in the transportation planning and decisionmaking process.

Identification of Transportation Planning Data Requirements in Federal Legislation. Travel Model Improvement Program.
EG&G Dynatrend, Karash KH, Schweiger C; Prepared for the Volpe Center; Sponsored by the FHWA, FTA, US DOT Office of the Secretary, Environmental Protection Agency, and Department of Energy; July 1994, 106pp.
Report Number: DOT-T-94-21

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-94-21

This report identifies the new planning and associated data collection requirements set forth in Federal legislation and regulations related to the CAAA of 1990 and the ISTEA of 1991. It identifies the shortcomings of the existing set of transportation planning models. The new planning requirements emphasize strategies which promote more efficient use of existing transportation facilities such as intermodalism, congestion management, and various

transportation control measures, namely, improved public transit, trip reduction ordinances, traffic flow improvements, encouragement of nonmotorized uses, etc. Detailed descriptions of the history of transportation planning, and the planning and data collection requirements of the CAAA and ISTEA are provided in Appendices A and B. Summary tables of current planning requirements are presented in Appendix C. Appendix D discusses the potential for GIS and IVHS to improve existing models and their associated data collection process. A list of references is presented in the final Appendix E. Overall, work needs to be done to bring current practice to the state-of-the-art as well as to advance the practice with research into new model structures and approaches. This report is a product of the Travel Model Improvement Program (TMIP), a research program designed to respond to the requirements of the CAAA and ISTEA.

MPO Capacity: Improving the Capacity of Metropolitan Planning Organizations to Help Implement National Transportation Policies.
U.S. Advisory Commission of Intergovernmental Relations; Prepared for the FHWA, May 1995, 70pp.
Report Number: Commission Report A-130

Available from:
U.S. Advisory Commission on Intergovernmental Relations
800 K Street, NW, Suite 450 South Building
Washington, DC 20575
Order Number: Commission Report A-130

New expectations for metropolitan planning organizations (MPOs) under ISTEA helped generate this study. This is a study of MPO capacity-building. The study explores the universe of MPOs to identify the type of help MPOs need to build the capacities needed to more fully implement ISTEA. The report begins with a close look at the new expectations created by ISTEA, summarizes the findings of recent conferences, surveys, and studies that have addressed MPO capacity issues, and briefly reviews capacity-building assistance. The report examines the universe of 339 MPOs and explains how the sample cases were selected for the field work. The final chapter summarizes the field observations in 18 MPOs providing Federally required transportation planning in the 12 representative metropolitan areas selected for this case study. Numerous charts and tables profile the capacity-building needs of MPOs along with the type of help requested by MPOs, the status and power of MPOs under ISTEA, and other related characteristics. Based on the findings, the Commission concluded that efforts to improve the capacity of MPOs should be built around three interrelated principles: 1) education more than regulations; 2) create a common understanding among all partners about what ISTEA requires in a practical working sense; and 3) create a closer, more trusting working relationship among all partners in the MPO process.

Multimodal Priority Setting and Application of Geographic Information Systems.
Transportation Research Board, National Research Council, 1994, 95pp.
Report Number: TR Record No. 1429

Available from:
Transportation Research Board

2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TR Record 1429 Price: $25

The 12 papers in this volume were presented at the Transportation Research Board's 73rd Annual Meeting in 1994. Five papers focus on techniques for multimodal planning and priority selection. Such strategies include scoring procedures for weighting criteria and comparing alternatives; a new approach for evaluating the cost-effectiveness of multimodal transportation alternatives; a common framework for multimodal project selection; based on a comparison of the experience of two metropolitan planning agencies; and the use of a regional travel simulation model to estimate system-level impacts of transportation actions allowing for comparison of mobility improvements and infrastructure repair projects. Seven papers address applications of geographic information systems (GIS). Applications include a data collection process for a sign inventory using global positioning systems with GIS, the use of GIS for planning transit services for people with disabilities, and the building of transportation analysis zones using GIS. Two case studies review implementation of GIS to large transportation planning: the development of a prototype transportation management GIS database for pavement systems and the application of GIS to urban roadway and infrastructure management.

Nonmotorized Transportation Research and Issues. Transportation Research Record No. 1396.
Transportation Research Board, National Research Council, 1993, 89pp.
Report Number: TR Record 1396

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TR Record 1396

This Record is compiled from the papers (14) presented at the Transportation Research Board's Annual Meeting in January 1993. The first five papers in this Record focus on nonmotorized transportation (NMT) in China, namely, the bicycle. Each paper discusses a different aspect of bicycle transportation in the country. Following these papers, a variety of NMT topics are discussed from the vantage point of many countries around the world. Pedestrian and bicycle programs in Kuwait City and Nigeria are presented, along with bicycle planning in the United states. Transportation problems in developing countries are discussed along with a new approach to planning and policy making for NMT in Third World cities. The development and application of an NMT choice model based on individual preferences is described along with the effect of lower bus fares on different income groups in Indonesia. Economic incentives as a determinant of mode choice are summarized in a separate paper. Recommendations are proposed that lead to a better understanding of these incentives and to development of economically efficient user fees encouraging use of NMT. Pedestrian speedflow relationships in developing country central business districts are measured and compared with those of the *Highway Capacity Manual*. The final paper in this Record addresses the worldwide experience in integrating bicycles as a mode of

access to public transit. The experience is relevant to the United States in making transit available through several modes.

Planning and Managing Intermodal Transportation Systems: A Guide to ISTEA Requirements.
Central Transportation Planning Staff, Capelle RB, Jr.; Prepared for FHWA Office of Environment and Planning, Intermodal Division, November 1994, 106pp.
Report Number: DOT-T-95-03

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-95-03

This guidebook is designed to be a hands-on, planner-friendly document that answers hard questions about intermodal management system planning *in practice.* It was written from the perspective of the Commonwealth of Massachusetts' statewide management system workplan. The report describes a structured process for information and data collection analysis, and evaluation of alternative strategies to support strategic and policy decisionmaking on intermodal issues by transportation officials at the state and metropolitan level. It builds upon requirements in the ISTEA. The report describes structuring a workplan to evolve such a system; evolving of needed technical teams and coordinating committees; developing advisory councils to foster private sector involvement and input; and establishing needed "issue-based data" to focus the effort. Particular emphasis is placed on intermodal freight issues, data, and implications. From a methodological standpoint, the document highlights freight forecasting and urban goods models which are needed for such an approach.

Planning for Transit-Friendly Land Use: A Handbook for New Jersey Communities.
Skidmore, Owings & Merrill, Lehr & Associates, Edwards and Kelcey, Inc., and Jane Lyle Diepeveen, P.P.; Prepared for New Jersey Transit and the FTA Office of Planning (Stallsmith E, TPL-20), June 1994, 137pp.
Project Number: FTA-NJ-08-7001-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-236758 *Price:* A07

This Handbook has been specifically designed to assist elected and appointed planning officials, members of planning and zoning boards, technical planning staff members, community representatives, and individual citizens interested in improving the relationship between land use planning and transit. It serves as a guide to New Jersey communities considering the implementation of transit-friendly land use plans around their transit stations, along their major corridors, as well as for proposed new areas of development. The Handbook presents techniques

to reinforce four basic strategies that encourage high-quality living and working environments, help create a sense of place, enhance community identity, provide attractive and efficient access to transit facilities, and offer shared amenities for transit users and the community at large. The four strategies are: Organizing land uses to support transit; Emphasizing pedestrians and other non-motorized modes of access; Taming the automobile; and Creating a sense of place and stewardship. Each of the four strategies is discussed in a separate chapter (chapters 2-5). Chapter 6 identifies tools for implementing the transit-friendly techniques presented in preceding chapters. The final Chapter 7 offers an example of a sample transit friendly Master Plan for a station area. The Appendices include additional technical materials such as model zoning, site plan, and redevelopment ordinances; sources for funding; coordination procedures; and a bibliography. A glossary of terms is also included in this report.

Public Outreach Handbook for Departments of Transportation.
Frank Wilson & Associates, Inc.; Prepared for the FHWA National Cooperative Highway Research Program, Transportation Research Board, National Research Council, 1994, 39pp.
Report Number: NCHRP Report 364

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: NCHRP Report 364 *Price:* $24

This handbook contains information on strategies, techniques, and tools needed to develop and implement successful public outreach campaigns. The information will be of interest to public information officers, as well as to all individuals concerned with the transportation development process, provision of facilities and services, and performance of the system. Public outreach techniques are designed for communicating with the public, and their use is logical and effective business practice as well as mandated by Federal and state laws or regulations.

Public Transportation 1994. Current Research in Planning and Development; Management, Marketing, and Fare Policy; and Technology.
Transportation Research Board, National Research Council, 1994, 113pp.
Report Number: TR Record No. 1451

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TR Record No. 1451 Price: $26

The 12 papers in this volume record new research in planning and management of public transportation. Each paper has been reviewed by peers in the field of public transportation. New ideas are explored and improved practices discussed. Part 1, Planning and Development, addresses six subjects: urban decentralization; bus transit coverage; transit network analysis; transit system design; city transport system; and civil and utilities design guidelines for rail transit

projects. Part 2, Management, Marketing, and Fare Policy, focuses on three explorations of transit user information. Part 3, Technology, considers three technological operational challenges: personal rapid transit in Gothenburg; empty vehicle management/redistribution; and automated people mover system in Taipei.

Symposium Papers for the Operations and Service Planning Symposium, Washington, DC, December 8-10, 1993.
FTA Office of Research, Demonstration & Innovation (Bert Arrillaga, TRI-12), July 1994, 345pp.
Project Number: FTA-TTS-10-94-1.

Available from:
Federal Transit Administration
Office of Research, Demonstration & Innovation, TRI-12
Washington, DC 20590 Telephone: 202/366-0231 FAX: 202/366-3765
Order by Title

This report contains full text copies of the 23 papers delivered at the *Operations and Service Planning Symposium* sponsored by the FTA Office of Mobility Enhancement, and held in Washington, DC, December 8-10, 1993. The purpose of the three-day symposium was to bring together transit planners from across the country to discuss and exchange information on transit operations and planning issues/needs. The topics covered include the FTA perspective on operations and planning support, changing demographics, automatic passenger counters, electronic fareboxes, geographic information systems, timed transfer networks, service routes fares and fare structures, and London buses, runcutting, and scheduling. Priority areas for undertaking new research were identified and presented for support to the FTA Transit Cooperative Research Program and the FTA National Planning and Research Program.

Policy Analysis and Evaluation

Art in Transit. Brochure
FTA Office of Policy (Fred Williams, TBP-10), Prepared for FTA Customers, 1995, 14pp.

Available from:
Federal Transit Administration
Office of Policy, TBP-10
400 7th Street, SW, Room 9300
Washington, DC 20590 Telephone: 202/366-4060 FAX: 202/366-7116
Order by Title

The FTA endorses the goal of making public transportation in every respect a first-rate experience. Circular 9400.1A, which is part of this brochure, outlines the FTA's commitment to including art in transit projects that the agency funds. This circular revises FTA Circular 9400.1, reaffirms that costs for design and art are eligible costs for FTA-funded projects, provides guidance for the incorporation of quality design and art into transit projects funded by FTA, and, within recommended limits, leaves the allocation of funds for art to the discretion of the local transit agency. This brochure also illustrates the added value that art has brought to transit systems in metropolitan areas throughout the United States

Report on Funding Levels and Allocations of Funds. Report of the Secretary of Transportation to the United States Congress Pursuant to 49 U.S.C. 5309(m)(3) (Formerly Section 3(j) of the Federal Transit Act).
FTA Office of Policy (John Day, TBP-10); Prepared for the United States Congress, May 1995, 221pp.
Report Number: FTA-TBP-10-95-1

Available from:
Federal Transit Administration
Office of Policy, TBP-10
400 7th Street, SW, Room 9300
Washington, DC 20590 Telephone: 202/366-4060 FAX: 202/366-7116
Order by Title
or
NTIS Order Number: PB95-255857 *Price: A10*

The *Report on Funding Levels and Allocation of Funds,* formerly called the Section 3(j) report, is the U.S. Department of Transportation's annual report to Congress. It provides recommendations to Congress for the allocation of FY 1996 funds to be made available for construction of new fixed guideway systems and extensions. New fixed guideway systems and extensions, such as a light rail line, a subway or a busway/HOV facility, are referred to as "New Starts" and are considered to be major capital investments. This report recommends 12 projects for funding in FY 1996 ($719.56 million available), all of which have existing Federal funding commitments in the form of Full Funding Grant Agreements or Letters of Intent. The first section of this report discusses the FY 1996 budget, the revised policy on New Starts, and principles for allocations of funds. Funding recommendations for the 12 projects are described along with the remaining commitment capacity under ISTEA. Profiles of all 78 projects in the New Starts

pipeline are described in various stages of development, i.e., under construction, final design, preliminary engineering, and projects in system planning.

Transportation, Environmental Justice, and Social Equity Conference Proceedings, Chicago, Illinois, November 1994.
Surface Transportation Policy Project, and Center for Neighborhood Technology; Prepared for the FTA Office of Policy Development (Menczer WB, TBP-10), July 1995, 94pp.
Project Number: FTA-DC-26-6025-95-1

Available from:
Federal Transit Administration
Office of Policy Development, TBP-10
400 7th Street, SW, Room 9310
Washington, DC 20590 Telephone: 202/366-4060 FAX: 202/366-7116
Order Number: FTA-DC-26-6025-95-1
or
NTIS Order Number: PB95-256145 *Price:* A05

This report documents the proceedings of the first conference on *Transportation Environmental Justice and Social Equity*, held in November 1994 in Chicago, Illinois. The conference brought together more than 150 representatives of community groups, Federal agencies, national non-profit organizations, and local officials. The intent was to recreate the planning and decisionmaking process so that future investments benefit all communities, including low income communities, communities of color,, and tribal communities. This conference was an important step toward making transit affordable, convenient, accessible, and efficient for all members of our communities and toward ensuring transit's positive role in community economic development. The report summarizes the conference discussions and outcomes. Chapter one presents the introduction, Federal opportunities and policies, panel discussions, conclusions and recommendations. Chapter two contains the five topical papers written for the conference that helped frame discussions about how the Federal government, along with local agency partners, can work to achieve an equitable transportation system. Chapter three summarizes working group activities. A summary of the Chicago field trip, conference evaluation results, environmental justice principles, legal and regulatory framework, as well as a list of attendees, glossary of terms, and suggestions for further reading are included in the appendix. A video of the proceedings is also available. For more information, contact Laura Olsen, STPP, 202/939-3470 or Jacky Grimshaw, CNT, 312/274-4000.

Unsticking Traffic: When Transit Works, and Why. An FTA Policy Paper.
Hickling-Lewis-Brod, Inc.; Prepared for the FTA Office of Policy (Williams F, TBP-10), October 1994, 109pp.
Report Number: FTA-TBP-10-94-2

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-155453 *Price:* A06

This report presents an application of the Urban Transportation Performance Monitoring System (UTPM), a customer-based analytical method for measuring the performance of transportation at an intermodal level. The system makes and reports its measurements in a way that enables decisionmakers to identify the kind of improvements that make people and the economy better. This report tests the application of the UTPM to four corridors: Midtown Manhattan-Queens in New York City, Downtown Manhattan-Newark, San Diego-El Cajon, and Chicago-Midway. UTPM recognizes and seeks to understand the role of customers in determining the success of transportation systems and technologies. It is based on the observation that, in certain "strategic" corridors where traffic congestion is high and a high-capacity transit (e.g., rail or busway) is available, the door-to-door travel times on both modes tend to equalize. This phenomenon is know as the "Mogridge-Lewis effect" after its primary investigators, Martin Mogridge and David Lewis. Under these conditions, an improvement in the higher-capacity transit mode results in a corresponding improvement in door-to-door highway travel times. Highway users may benefit more from an investment in transit than in additional highway capacity. UTPM is designed to expose what customers actually gain from roads, transit, sidewalks, bikeways, parking facilities and the interconnected aspects of the transportation system.

Working Together on Transportation Planning: An Approach to Collaborative Decision Making. An FTA Policy Paper.
The National Association of Regional Councils in Association with Program for Community Problem Solving; Prepared for FTA Office of Policy (Menczer WB, TBP-10), May 1995, 59 pp.
Project Number: FTA-DC-26-6013-95-1

Available from:
Federal Transit Administration
Office of Policy Development, TBP-10
400 7th Street, SW, Room 9310
Washington, DC 20590 Telephone: 202/366-4060 FAX: 202/366-7116
Order Number: FTA-DC-26-6013-95-1
or
NTIS Order Number: PB95-236659 *Price:* A04

This report provides information for metropolitan planning organizations (MPOs) to help them develop a consensus-based planning approach. It looks at the partnership that must be formed with transportation stakeholders including community groups, special interest groups, minorities, public agencies, private sector interests, and elected officials, to develop transportation plans and programs with maximum community involvement. It also provides detailed examples that demonstrate how MPOs can design collaborative processes that meet the intent of the Clean Air Act Amendments of 1990 and the ISTEA of 1991 and strengthen the plans produced by the MPOs. Chapter one describes the project and research methodology. Chapter two summarizes the impact of ISTEA on MPOs during the revision of their transportation decisionmaking process. Chapter three presents a four stage consensus building model which can direct MPOs in implementing a collaborative planning process. The final chapter describes how to measure the success of the collaborative process once implemented. Case studies of the public involvement processes used by six MPOs are included in the appendix.

Regional Mobility

Bus Transit System: Its Underutilized Potential.
University of Pennsylvania, Department of Systems Engineering, Vuchic V, et al., and University of Delaware, Department of Civil Engineering, Kikuchi S, et al.; Prepared for the FTA Office of Research, Demonstration & Innovation (Joseph Goodman, TRI-12), May 1994, 84pp.
Project Number: FTA-DE-08-7001-94-1

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-45.3)
Washington, DC 20590
Order Number: DOT-T-94-20

It was clear in the 1970s that to make bus services competitive with auto traffic, bus improvement measures should consist not only of better vehicle design and more shelters, but also independence from general traffic and street congestion. This meant, creating distinct bus systems competitive with auto traffic that provided higher quality service, similar to light rail, with separate rights-of-way and related infrastructure. This study is a defense for bus transit systems, i.e., systems with physical independence from other traffic. It affirms that the conversion of bus priority systems into HOV facilities and general purpose lanes has undermined buses as a viable alternative to automobiles and returned the bus back to basic operations in mixed traffic without special treatment. The objective of this study was to evaluate the present conditions and problems of bus transit services in American cities and to analyze the reasons for the failures to maintain bus priorities. The study clarifies and evaluates two types of bus transit services: bus transit system (BTS), i.e., bus services operating on separate rights-of-way; and basic bus systems (BBS), i.e., buses running on streets in mixed traffic without special treatment. The surveys conducted of bus transit agencies (14) and bus transit experts (24) showed that the present condition of bus services was far from satisfactory. The study presents an analysis of the prevailing conditions and problems and recommends specific measures to upgrade bus services in North American cities. The study states that present policies encouraging HOV facilities are counterproductive and should be revised. Findings and recommendations of this study are summarized and organized in five separate topic areas.

Curbing Gridlock: Peak Period Fees To Relieve Traffic Congestion. Volume 1: Committee Report and Recommendations. Volume 2: Commissioned Papers.
Transportation Research Board Committee for Study on Urban Transportation Congestion Pricing, and the National Research Council Commission on Behavioral and Social Sciences and Education; Prepared for the FTA and FHWA, 1994, 152pp.
Report Number: Special Report 242

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: Special Report 342

Interest in and controversy about the use of congestion pricing as a tool to reduce and manage traffic congestion generated this study. The study was conducted to assess the critical issues surrounding congestion pricing, and the potential role of congestion pricing as a tool for congestion management. *Volume 1* presents an overview of the materials contained in the 17 commissioned papers documented in the second volume of this study, and the study team's view of the potential for congestion pricing in the United States The report provides a brief overview of congestion management theory and practices, discusses the affects on motorists, discusses administrative and political barriers and ways to overcome them, describes the design of pilot projects and the importance of proposal evaluations. Conclusions and recommendations are presented regarding implementation of congestion pricing on United States roads and bridges. The two appendices contain more detailed material about some of the same issued covered in the main text. *Volume 2: Commissioned Papers* contains full text copies of the 17 commissioned papers that were presented and discussed at a symposium held in June 1993 at the National Academy of Sciences. Congestion pricing is offered as one of the most promising ways of reducing gridlock, i.e., having motorist pay for using roads and bridges during peak periods. The adoption of congestion pricing as a demand management policy is viewed as a drastic change from the current operation of the road system, and recommends using private sector initiatives similar to the ones currently underway in Southern California.

Evaluation of the Baltimore Guaranteed Ride Home Program.
Volpe Center, and KPMG Peat Marwick; Prepared for the FTA Office of Research, Demonstration & Innovation (Joseph Goodman, TRI-12), December 1994, 76pp.
Report Number: FTA-MA-26-0006-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-170510 *Price:* A04

This report evaluates the experience of the Baltimore Metropolitan Council and the Baltimore/Washington International (BWI) Business Partnership, Inc., with a demonstration of a guaranteed ride home (GRH) program (March 1992 to March 1993) in the BWI Airport employment area. The program offered employees of member organizations, who use transit or rideshare at least three times per week and who register for the program, free rides home in the case of personal or family emergencies or unscheduled overtime, via taxis or rental cars depending on the distance of their residences from places of employment. This report provides an overview of the GRP program along with four separate chapters that discuss the BWI Airport employment site, demonstration history, evaluation approach, and the demonstration results. Conclusions relate to the effectiveness of GRH procedures, impact on HOV usage, and incentive for Transportation Management Association membership. The GRH was well received by member employers and employees. Although program participation increased steadily throughout the demonstration, there was no conclusive evidence that the GRH program directly increased HOV usage in the BWI Airport employment area during the demonstration. However, the program helped to retain existing HOV users.

Regional Mobility

Guide to Land Use and Public Transportation. Volume II: Applying the Concepts.
The Snohomish County Transportation Authority (SNO-TRAN); Prepared for the FTA Office of Planning (TPL-20), December 1993, 282pp.
Report Number: DOT-T-94-24

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW, (M-45.3)
Washington, DC 20590
Order Number: DOT-T-94-24

This Guide offers specific strategies and designs for planners, developers, and others for making their communities more accessible by transit. Topics covered include developing an urban center, transit compatible site plans, transit friendly shopping centers, mixed use developments and transit, and redesign of strip-commercial areas to better utilize transit. A separate chapter highlights ideas which are particularly applicable to small communities. A set of model goals and policies for effective public transportation in the context of urban/suburban land use patterns are also included. The document should be valuable to public officials, planners, developers, transit operators, consultants, and citizen groups.

High-Occupancy Vehicle Project Case Studies: Historical Trends and Project Experiences.
The Texas A&M University System, Texas Transportation Institute, Turnbull KF; Prepared for the FTA Office of Planning (TPL-20), February 1992, 64pp.
Report Number: DOT-T-94-18

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW, (M-45.3)
Washington, DC 20590
Order Number: DOT-T-94-18

This report provides an examination of the historical trends in use and impacts of six key high occupancy vehicle (HOV) projects and other such facilities in North America. Based on available data, the projects are analyzed using nine separate evaluation measures: person movement capacity, bus operating efficiencies, travel time savings, air quality and energy impacts, per-lane freeway efficiency, impacts on the general purpose freeway lanes, safety, public support, and cost-effectiveness. The analysis indicates that the HOV projects studied provide significant benefits and are effective transportation improvements.

Implementation Experience with Deep Discount Fares.
Oram Associates, under contract to Volpe National Transportation Systems Center, Oram RL; Prepared for the FTA Office of Research, Demonstration & Innovation, September 1994, 84pp.
Project Number: FTA-MA-26-0006-94-2

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-130829 *Price:* A05

This report reviews the experiences of transit agencies across the country with deep discount fares, a new public transit strategy (1988-1993). Based on new market research findings, deep discounting has shown that it is possible to raise transit ridership and revenues simultaneously with a combination of higher cash fares and deeply discounted tickets or tokens. Deep discounting is both a fare structure and marketing program, but it remains an innovative and experimental technique that does not always yield the intended results. Nevertheless, it has gained rapid acceptance in the transit industry, having been applied in more than 20 large, medium, and small cities since 1988. This report presents an overview of the deep discount concept, reviews its market research basis, documents the experience of 17 cities in implementing the strategy, provides cross-cutting findings on the market segments that appear to have responded best to deep discounting, and makes recommendations for optimizing the benefits of implementing the program. The report states that most deep discounting experiences have been positive. Although the pitfalls of deep discounting are not yet fully understood, the transit industry has found the deep discount idea an appealing alternative to conventional fare plans. This study calls for more formal evaluation of the concept.

Livable Communities Initiative. Program Description. Brochure.
FTA Office of Planning (Edward L. Thomas, TPL-20); Septermber 1994, 9pp.

Available from:
Federal Transit Administration
Office of Planning
400 7th Street, SW, Room 6100
Washington, DC 20590 Telephone: 202/366-0264 FAX: 202/366-3765
Order by Title

This brochure presents the new FTA Livable Communities Initiative. The purpose is to help communities to understand the principles of the Livable Communities Initiative and introduce more community oriented transit facilities and services. The FTA will emphasize the livable community principles in its grants assistance programs. This brochure provides a description of the FTA Livable Communities Initiative which includes its purpose, objectives, characteristics, eligible recipients, eligible projects, and project fundings. The brochure also includes a section on project development which discusses the factors for considerations, capital program issues, and project coordination. Basically, the FTA Livable Communities Initiative is designed to improve mobility and the quality of life in communities.

Mobility Match Study in Prince George's County, Maryland.
JHK & Associates, Inc., In Association with Ecosometrics, Inc.; Prepared for Maryland National Capital Park & Planning Commission, and FTA Office of Research, Demonstration & Innovation (Joseph Goodman, TRI-12), November 1994, 335pp.
Project Number: FTA-MD-26-0005-94-1

Available from:
Federal Transit Administration
Office of Research, Demonstration & Innovation
400 7th Street, SW, Room 6107
Washington, DC 20590 Telephone: 202/366-9267 FAX: 202/366-3765
Order Number: FTA-MD-26-0005-94-1
or
NTIS Order Number: PB95-210274 *Price:* A14

The study focuses on developing non-traditional transit alternatives to better serve the residents of Prince George's County. It identifies the transportation needs of the area, evaluates the applicability of traditional and non-traditional transit options, and develops an implementation plan for selected transportation services. This report presents a summary of information collected to identify target areas for the implementation of non-traditional transit services. It describes the methodology used to select target employment clusters and residential areas; the findings of the trip generation estimation for the key employment and residential areas; and the estimation of non-traditional transit usage for these areas. The report includes the preliminary options proposed for the County, the evaluation of the options, and the selected options for the development of the implementation plan. One of the recommended options is a shuttle system operated with small buses and designed to serve the needs of the Prince George's Plaza/Hyattsville areas. A second option provides a connection of a major hospital with nearby residential communities and a major shopping center in the County. This service would be operated as fixed route during peak periods and route deviated service during off-peak hours. The third recommended service is another community-oriented bus that provides frequent connections between a newly developed residential community, metro stations, and retail establishments. The study recommends implementation of the three options to evaluate the applicability of the proposed non-traditional transit in serving the needs of suburban communities.

National Bicycling and Walking Study: Transportation Choices for a Changing America. Report to Congress.
Highway Safety Research Center, Zegeer C, et al.; and HDR Engineering Inc., Feske D, et al.; Prepared for the FHWA, March 1994, 150pp.
Report Number: FHWA-PD-94-023

Available from:
Federal Highway Administration
Office of Environment & Planning, HEP-20
Washington, DC 20590 Telephone: 202/366-4042 FAX: 202/366-7660
Order Number: FHWA-PD-94-023

This report is about enhancing the travel options of bicycling and walking. The report draws upon all of the work completed to date in outlining an action plan to promote bicycling and walking as viable transportation options. The study aims to increase the use of these two travel modes by developing a plan for making bicycling and walking safer and more appealing modes of personal transportation. The document presents a plan of action for activities at the Federal, state, and local levels for meeting the goals of doubling the current percentage of total trips made

by bicycling and walking (from 7.9% to 15.8%), and reducing by ten percent the number of bicyclists and pedestrians killed or injured in traffic crashes. The concept of 'institutionalization' is discussed along with indicators of institutionalization and the need to institutionalize bicycling and walking into the Nation's transportation system at the Federal, state, and local levels. The report envisions this program to lead to a nation of travelers with new opportunities to walk or ride a bicycle as part of their everyday life, and a transportation system that provides new levels of personal mobility at modest cost while encouraging cleaner air and a healthier populace.

Program of Research for HOV Systems. Transportation Research Circular No. 441.
Committee on High-Occupancy Vehicle Systems, Transportation Research Board, National Research Council; April 1995, 34pp.
Report Number: TR Circular No. 441

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TR Circular No. 441

This document establishes a national research program on high-occupancy vehicle systems (HOV). It has resulted from deliberations by members and friends of TRB's High-Occupancy Vehicle Systems Committee, open forums conducted at National HOV Systems Conferences, and from individual members of the Research Subcommittee. The report provides background information on both the committee's and subcommittee's activities and accomplishments. Two chapters cover program highlights, including key statistics and individual research problem statement titles, and a plan for implementation. The final three chapters of this report are devoted to three main areas of HOV research: planning and design, operations and enforcement, and HOV systems on arterials. One of the first studies to be undertaken in the program is the development of an HOV Systems Manual. It is proposed that the manual be updated periodically which will integrate current knowledge with the results of the completed research projects.

Program of Joint Development for Denver's Crossmall Transitway: Stimulating Development Along the Transitway Crossmall in Denver, Colorado.
Gregory Jones & Associates, Jones G; Prepared for the Downtown Denver Partnership, Inc., and the FTA Office of Planning (Effie S. Stallsmith, TPL-20), June 1994, 80pp.
Report Number: FTA-CO-08-7001-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-170791 *Price:* A05

The California/Stout Streets Transitway project was identified as the "centerpiece of the regional transit system because it provided the most strategic and cost effective solution to the central business district's transportation needs." This joint development study was designed to prepare and to provide property owners, businesses, developments and tenants in the Denver central

business district for a major transportation investment by identifying transit related development opportunities, the economic impacts of transit, and strategies for mitigating impacts and integrating transit improvements most effectively and aesthetically into Downtown Denver. The findings demonstrate creation of an environment that: 1) promotes the integration of light rail transit into Downtown Denver, 2) identifies joint development opportunities, and 3) provides recommendations to capitalize on joint development opportunities created by the introduction of light rail transit along the crossmall in Downtown Denver. The study introduced a new urban station which was adopted by the Regional Transportation District as a catalyst for focusing density and developing and encouraging a business-transit patron connection. Joint development solutions were identified to potential conflicts, especially in property owner resistance to land acquisition for stations and station locations. The study also introduced zoning incentives for focusing density and making direct access links between station and businesses which were adopted by the Mayor's Downtown Zoning Task Force. The findings and recommendations documented in this report became a work program which was implemented in conjunction with the development of the crossmall and the introduction of the metro area connection (MAC)--a light rail system 5.3 miles in length penetrating Downtown Denver. The implementation of the findings and recommendations of the study achieved a significant influence on transit related design, development, and zoning in Downtown Denver.

Ramp Metering Status in North America. 1995 Update.
FHWA and FTA, Piotrowicz G, and Robinson J; Prepared for the FHWA and the FTA, June 1995, 62pp.
Report Number: DOT-T-95-17

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW, (M-45.3)
Washington, DC 20590
Order Number: DOT-T-95-17

This document updates a previous report published in September 1989 titled *Ramp Metering Status in North America*. This update, like the previous report, provides an initial resource for agencies exploring the feasibility of ramp metering. It offers the same straight-forward look at the operational and institutional issues inherent in ramp metering and provides current information on the state of the practice in ramp metering. The report is divided into six sections. The first three parts present a sample of various ramp metering applications in several cities and describe the benefits reported. The fourth section addresses factors that should be considered and some of the capabilities and limitations of ramp metering. In the fifth, guidelines for the implementation of ramp metering are identified. The sixth part presents lessons learned from agencies currently operating ramp metering. The report includes an overview of the status of ramp metering in North America, a list of ramp metering contacts, and a bibliography. Based on the research results, ramp metering has proven to be one of the most cost-effective techniques for improving and maintaining the efficient operation of urban freeways during peak traffic periods. The benefits derived from ramp metering include accident rate reductions of 24 to 50 percent, increased

mainline speeds of 16 to 62 percent, and others. Results from the benefits include consistent commute times, less congestion, and reduced driver frustration.

Road Pricing for Congestion Management: A Survey of International Practice. Synthesis of Highway Practice 210.
Transportation Research Board, National Research Council, Gomez-Ibanez JA (Harvard University), and Small KA (University of California, Irvine); Prepared for the FHWA National Cooperative Highway Research Program, 1994, 83pp.
Report Number: NCHRP Synthesis 210

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: NCHRP Synthesis 210 *Price:* $19

This synthesis will be of interest to transportation agency administrators and managers, state and regional planners, metropolitan planning organizations, policymakers, economists, traffic engineers, and others concerned with reducing traffic congestion in urban areas. The report discusses the experience of several foreign countries that use road pricing as a tool for congestion management (congestion pricing); and it provides insights into the applicability of similar ideas in the United States The focus is on political and policy objectives, the institutional and technical considerations in implementing the proposals, the impacts on traffic and related factors in the urban environment, and public reactions. To introduce the foreign experience, the synthesis describes the various congestion pricing schemes and their automated or electronic tolling technologies. Case studies of congestion pricing experiences are presented for Singapore, Hong Kong, the Scandinavian toll ring cities, as well as intercity congestion pricing in France. The Netherlands and the United Kingdom have undertaken the first full-scale studies of congestion pricing for huge metropolitan areas, and thereby have greatly advanced our knowledge of what to expect from such policies and how they might be implemented. One key conclusion of this study is that properly designed congestion pricing schemes can substantially reduce traffic congestion. Study results show that congestion pricing need not be costly to implement or administer. The schemes in operation require only about 10 to 12 percent of their revenues to cover operating and enforcement costs. .

Travel Demand Management Innovation and Research Symposium: Setting a Strategic Agenda for the Future. Symposium Proceedings.
Transportation Research Board, National Research Council, Turnbul KF, and Lindquist NF, editors; Sponsored by the FTA (Gwendolyn R. Cooper, TRI-30) and FHWA, October 1994, 150 pp.
Report Number: Transportation Research Circular Number 433

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519

Order Number: TR Circular 433

These proceedings summarize the highlights from the *Travel Demand Management Innovation and Research Symposium: Setting a Strategic Agenda for the Future* that was held on November 15 and 16, 1993, in Arlington, Virginia. The symposium brought together a wide range of individuals from throughout the country to discuss the current status of travel demand management (TDM) activities and to help chart a course to advance the state of TDM practice into the next century. The symposium proceedings represent the collective experiences of the foremost TDM practitioners and researchers in 1993. The symposium results also serve as the basis for an ongoing research program focused on advancing the state of the practice related to TDM planning, implementation, and evaluation.

Transit-Based Residential Development in the United States. A Review of Recent Experiences. Working Paper 611.
University of California at Berkeley, Institute of Urban and Regional Development, Cervero R, and Bernick M, et al.; Prepared for the FTA Office of Planning (Effie S. Stallsmith, TPL-20). March 1994, 50pp.
Project Number: FTA-CA-26-0022-94-1

Available from:
Federal Transit Administration
Office of Planning, TPL-20
Washington, DC 20590 Telephone: 202/366-5653 FAX: 202/366-3765
Order Number: FTA-CA-26-0022-94-1
or
NTIS Order Number: PB95-188959 *Price:* A04

Rail transit agencies are placing new emphasis on transit-based and/or residential developments within a one-quarter mile radius of a rail transit station built to tie into the station through easy walking or shuttle access. These developments are often referred to as the 'Transit Village.' This study represents the first examination of transit-based development efforts nationwide. The study goals were to compile an inventory of the recent major residential developments on transit district land and residential developments on non-transit district land proximate to a rail transit station and built to tie into the station; to detail recent planning efforts to concentrate development at transit stations; and to analyze transit agency roles in achieving transit-based developments. Steps were taken in conjunction with 17 American rail transit systems to achieve these goals. The report discusses the achievements and prospects for these developments as well as the roles for transit agencies and for the FTA. The current state of transit-based developments in America is summarized as having a good deal of transit agencies' support. But still, very few residential projects are actually built on transit district land or land adjacent to the station. The study identifies the FTA role as one of examining ways to work with local transit agencies in an implementation mode, and not one of coordinating additional conferences on the subject or trying to generate interest.

Rural and Specialized Transit

Directory of Rural Public Transportation Providers Funded by FTA's Section 18 Program. Community Transportation Association of America; Prepared for the FTA Rural Transit Assistance Program (Roger Tate, TRI-30), Administered by the American Public Works Association, December 1994, 227pp.
Project Number: FTA-IL-26-7001-95-02

Available from:
Community Transportation Association of America
RTAP National Transit Resource Center
1440 New York Avenue, NW, Suite 440
Washington, DC 20005 RTAP Hotline: 800/527-8279 (voice/TDD)
TAP-IN Bulletin Board: 202/628-2537 Internet: CTRmag@aol.com.
Order Number: FTA-IL-26-7001-95-02
or
NTIS Order Number: PB95-216719 *Price:* A16

This rural directory is a comprehensive listing of the 1,162 agencies providing general public transportation in areas with less than 50,000 population under the FTA Section 18 program. The purpose of the directory is to assist in identifying and locating individual Section 18 providers. Many states will find this directory helpful as they implement the public transportation management systems required by ISTEA and the ADA. The directory has two main sections. Section 1 provides a state-by state listing of Section 18 providers; a map page that includes the state contact persons, as well as a synopsis of the state's Section 18 program (number of providers, fleet size, total rural population, and most recent Section 18 funding figures). Section 2 is an index of Section 18 providers by the state and counties in which they provide public transit services. This report is a companion to the *Status Report on Public Transportation in Rural America, 1994,* and the *Directory of Specialized Transportation Providers Funded by FTA's Section 16 Program.*

Directory of Specialized Transportation Providers Funded by FTA's Section 16 Program. Community Transportation Association of America; Prepared for the FTA Rural Transit Assistance Program (Roger Tate, TRI-30), December 1994, 352pp.
Project Number: FTA-IL-26-7001-95-03

Available from:
Community Transportation Association of America
RTAP National Transit Resource Center
1440 New York Avenue, NW, Suite 440
Washington, DC 20005 RTAP Hotline: 800/527-8279 (voice/TDD)
TAP-IN Bulletin Board: 202/628-2537 Internet: CTRmag@aol.com.
Order Number: FTA-IL-26-7001-95-02
or
NTIS Order Number: PB95-215695 *Price:* A16

This directory is a comprehensive listing of 3,673 private, nonprofit and public agencies providing transportation to the elderly and persons with disabilities through the FTA Section 16 capital

assistance program. The directory is designed to assist the user in identifying and locating individual Section 16 transit providers. State agencies and transit systems will find this directory helpful as they begin implementing their complementary paratransit plans under ADA and the public transportation management systems required by ISTEA. The Section 16 network discussed in this directory comprises agencies with vehicles or other capital assets such as computers or radio equipment funded by the Section 16 program. This directory consists of three sections: a statistical profile of the Section 16 network; state by state listing of Section 16 providers, and an index listing Section 16 providers by state and county in which they are headquartered.

RTAP Training Resources Catalog for Rural and Specialized Transit Systems, 1994.
Community Transportation Association of America; Prepared for the FTA Rural Transit Assistance Program (Roger Tate, TRI-30), 1994, 287pp.

Available from:
FTA/RTAP National Transit Resource Center
Community Transportation Association of America
1440 New York Avenue, NW, Suite 440
Washington, DC 20005 Telephone: 202/628-1480 FAX: 202/737-9197
Hotline: 800/527-8279
Order by Title

This is the fourth update of the *Training Resources Catalog for Rural and Specialized Transit Systems.* It is produced through the FTA National Rural Transit Asssistance Program (RTAP) administered by the American Public Works Association. The Catalog is designed to identify rural transit training programs, audio-visual materials and publications that can be used by state and local agencies. Training resources have been collected from many sources and may need tailoring to fit individual training needs. The topics covered in the Catalog are presented as separate chapters and include the following: Accessibility, Americans With Disabilities Act, Commercial Driver's License, Dispatching, Driver Training, Drug Free Transit, Emergency Procedures, Indian Lands Transit, Management, Marketing, Passenger Assistance, Planning, Safety, Vehicle Maintenance, and RTAP Training Network. This Catalog is an important and usable reference tool for persons interested in operating rural and specialized transit systems. Each RTAP State and Territory Program Manager has a copy of this Catalog. Research for this fourth edition was performed by the University of Wisconsin-Milwaukee, University Outreach Transportation Programs.

Status Report on Public Transportation in Rural America, 1994.
Community Transportation Association of America, Rucker G; Prepared for the FTA Rural Transit Assistance Program (Roger Tate, TRI-30), Administered by the American Public Works Association, December 1994, 65pp.
Project Number: FTA-IL-26-7001-95-01

Available from:
Community Transportation Association of America
RTAP National Transit Resource Center

1440 New York Avenue, NW, Suite 440
Washington, DC 20005
TAP-IN Bulletin Board: 202/628-2537
Order Number: FTA-IL-26-7001-95-01
or
NTIS Order Number: PB95-217006

RTAP Hotline: 800/527-8279 (voice/TDD)
Internet: CTRmag@aol.com.
Price: A04

This status report presents the findings of a nationwide study of transit systems funded under Section 18 of the Federal Transit Act. It provides a comprehensive overview of the Section 18 transit network in terms of the current population being served by public transit in rural areas; the number and characteristics of local transit agencies providing services in rural areas; and the unserved needs and populations in rural areas of the United States. Data were collected from the 1,147 agencies receiving Section 18 funding and providing service during 1992. The report identifies and discusses the Section 18 service area which includes nearly 3.5 million square miles and almost 91 million people, 32 percent of whom are disadvantaged by age, poverty and/or disability.

Workbook for Estimating Demand for Rural Passenger Transportation.
SG Associates, Inc., Leigh, Scott & Cleary, Inc., and C.M. Research Inc.; Prepared for the FTA Transit Cooperative Research Program, (Gwendolyn R. Cooper, TRI-30), Transportation Research Board, National Research Council, 1995, 131pp.
Report Number: TCRP Report 3

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418
Order Number: TCRP Report 3

Telephone: 202/334-3214 FAX: 202/334-2519
Price: $28

This report will be of interest to agencies engaged in planning, operating, or funding passenger transportation services in rural areas. The purpose of the research was to provide methods for forecasting rural passenger transportation demand. The newly developed methodology for estimating demand for rural passenger transportation presented in this Workbook is based on a comprehensive review of previously developed methods; discussions with agencies that would use these procedures; collection of data from a sample of 39 selected counties across the nation; and detailed analysis of relationships among county population characteristics, services provided, and actual rural passenger transportation served. This report describes the types of information required to develop estimates of passenger demand and step-by-step instructions, with examples and computation forms, for developing the demand estimates. The methodology reported is applicable to rural counties. The companion workbook, which presents the methodology in simplified form, is included in this report. The methods described apply to transportation services in low-density areas. They do not apply to, and should not be used for estimation of demand in small cities, even those with populations less than 50,000, where public transportation service is provided by small fixed-route, fixed-schedule transit systems.

Safety and Security

Bus and Passenger Accident Prevention. Final Report.
Judith A. Byman Enterprises, Under Contract to Volpe Center, Judith A. Byman, and William T. Hathaway; Prepared for the FTA Office of Safety & Security (Carole A. Ferguson, TPM-30), June 1994, 84pp.
Project Number: FTA-MA-26-0010-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB94-213691 *Price:* A05

This document provides guidance on how to develop and implement an accident prevention program for urban, rural, and specialized transit systems. Included in this document is guidance on the development and implementation of an accident prevention program, evaluation of design options for new vehicles, promotion of patron safety and awareness, and personnel and training issues. Safety system policy issues and procedures to prevent bus accidents are discussed in terms of preventive maintenance programs, pre-trip and post-trip vehicle inspections, as well as policy issues and procedures concerning lifts, restraints, and securement devices. The guidance is intended to assist managers, safety directors, operations staff, board members, and state and local officials who are responsible for planning, procuring, equipping, and operating transit systems. The appendices provide safety information that is structured for immediate use, such as: Sample Safety Policy; Bus Safety Inspection Checklist; Generic Hazard Checklist; Sample Position Description Form; Employee Selection and Status Checklists; Vehicle Defect Report; and Vehicle Safety Inspection Checklist;

Exploring How to Make System Safety Work in Transit.
Volpe Center, Research and Special Programs Administration; Prepared for the FTA Office of Safety & Security (TPM-30), December 1994, 64pp.
Project Number: FTA-NY-90-A002-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-219358 *Price:* A04

The purpose of this workshop, *Exploring How to Make System Safety Work in Transit*, was to develop a workable system safety process that meets the needs of the New York Metropolitan Transportation Authority (MTA) and the New York State Public Transportation Safety Board (PTSB). The workshop addressed the issues and concerns uncovered during the April 1989 safety investigation of the MTA and its operating elements. It was the largest and most comprehensive safety investigation ever conducted of a public transit system. This report describes the two-day workshop sponsored by the FTA, the PTSB, and the MTA that was held in New York City, September 21-22, 1993, to develop ideas for improving safety at the transit systems operating under the MTA through more effective use of system safety principles and the System Safety Program Plans (SSPP). The workshop provided a unique opportunity for the attending transit operators, overseers, regulators, and safety personnel (38 altogether) with the

common goal of improving transit safety. The workshop introduced 142 safety issues and proposed 69 solutions. It supported the system safety concept as the best means to achieve the highest level of safety that is practical, and called for an effective SSPP which meets the requirements of both the operating agency and its oversight body. Information in this report may find application in many transit activities throughout the country.

Implementation Guidelines for Drug and Alcohol Regulations in Mass Transit.
Battelle Transportation Systems, G. DeGennaro G, D. Kerr D, et al.; Prepared for the FTA Office Of Safety & Security (Judy Meade, TPM-30), April 1994, 125pp.
Report Number: FTA-OH-26-0001-94-1

Available from:
Federal Transit Administration
Office of Safety & Security, TPM-30
400 7th Street, SW, Room 9305
Washington, DC 20590 Telephone: 202/366-0244 FAX: 202/366-3765
Order Number: FTA-OH-26-0001-94-1
or
NTIS Order Number: PB94-205713 *Price:* A19

These guidelines will assist transit agencies in developing drug and alcohol testing programs that satisfy the FTA regulations published in the *Federal Register* on February 15, 1994, as *Prevention of Prohibited Drug Use in Transit Operations* (49 CFR part 653) and *Prevention of Alcohol Misuse in Transit Operations* (49CFR part 654). The guidelines will assist state agencies that receive FTA funding and contractors who perform certain services for transit agencies. In addition, these guidelines will assist transit agencies to comply with requirements of *Procedures for Transportation Workplace Drug and Alcohol Testing Programs* (49 CFR part 40) and the *Drug Free Workplace Act* (49 CFR part 29). The guidelines in this report are organized by the key steps that transit agencies must take in establishing and operating successful drug and alcohol programs, namely: Policy Development and Communication, Training, Types of Testing, Testing Procedures, and Administrative Requirements. Relevant regulations are cross-referenced throughout the text and are reprinted in their entirety in Appendix 1. Forms, checklists, and lists of additional information and services are provided throughout the document.

National Conference on Transit Security: Report and Recommendations.
Southeastern Pennsylvania Transportation Authority; Prepared for the FTA Office Of Safety & Security (Edith Rodano, TPM-30), March 1995, 1105pp.
Project Number: FTA-PA-26-0001-95-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-256202 *Price:* A06

This report provides an overview and summary of the *National Conference on Transit Security* which was held in Philadelphia, March 15-77, 1995, and hosted by SEPTA. The conference was

a response to the concerns of the FTA and transit security chiefs around the country regarding the effect of transit system security on ridership. The purpose of the conference was to identify for discussion police and security needs and issues, as well as the role of general managers in security. The conference included a representative cross section of transit agencies. Workshop participants organized in pairs consisting of transit administrators and transit police, or security chiefs and representatives of American Public Transit Association (APTA), the Secretary of Transportation Office of Intelligence and Security, the Volpe Center, and FTA. Participants explored topics on four major aspects related to security: employees, management systems, facilities and vehicles, and ridership. The final section of the report presents "Fishbone Diagrams" developed by the teams to define the problems, and the creative idea listings for solving the specific problems identified. Although each team approached security from a different perspective, common themes emerged, such as: security is everyone's business, communicate with community organizations and local police departments, enforce the rules, and plan for security.

Rail-Highway Crossing Safety: Action Plan Support Proposals.
Federal Railroad Administration (FRA), FHWA, FTA, and NHTSA, June 1994, 57pp.

Available from:
Federal Railroad Administration
400 7th Street, SW, RRS-23, Room 8301
Washington, DC 20590 Telephone: 202/ 366-0533 FAX: 202/366-7592
Order by Title

This Action Plan is the US DOT initiative to promote and enhance highway-rail grade crossing safety. It presents a multifacet, multi-modal approach for improving safety at the Nation's highway-rail crossings and for the prevention of trespassing on the rights-of-way of the Nation's railroads. It is multi-faceted in that it presents enforcement, engineering, education, research, promotional and legislative initiatives addressing crossings of both light and conventional rail rights-of-way by public and private streets and highways. It is multi-modal in that contributions to its preparation have been made by four US DOT administrations: FRA, FHWA, FTA, and NHTSA. Ideas from outside sources, individuals, railroads and states have been incorporated into the Action Plan. This report presents the 55 activities of the Action Plan along with recommendations and the following two appendices: Historical Background and Status of Current Programs.

Safety Management Information Statistics (SAMIS) 1992 Annual Report.
Unisys Corporation, Under Contract to Volpe Center, Thompson A, and Aftandilian E; Prepared for FTA Office of Safety & Security (Carole A. Ferguson, TPM-30), June 1994, 48 pp.
Project Number: FTA-MA-26-0009-94-1

Available from:
Federal Transit Administration
Office of Safety & Security, Room 9305
Washington, DC 20590 Telephone: 202/366-0219 FAX: 202/366-3765
FTA Order Number: FTA-MA-26-0009-94-1
or

Safety and Security

NTIS Order Number: PB94-213733 *Price:* A03

The Safety Management Information Statistics (SAMIS) 1992 annual report, now in its third year of publication, is a compilation and analysis of mass transit accident and casualty statistics reported by 600 United States transit systems under the FTA Section 15 reporting system. This report presents trend analyses summarizing the three years of SAMIS and a series of graphs and tables summarizing the safety performance of the transit industry in 1992. Graph narratives accompany each graph. Transit safety data are presented in four categories: collisions, derailments/left roadway, personal casualties, and fires. This SAMIS report presents safety statistics for the following transit modes: motorbus, automated guideway, commuter rail, heavy rail, light rail, demand responsive, and vanpool.

Safety Management Information Statistics (SAMIS) 1993 Annual Report.
Unisys Corporation, under contract to Volpe Center, Eric Aftandilian, and Alison Thompson; Prepared for FTA Office of Safety & Security (Carole A. Ferguson, TPM-30), May 1995, 80pp.
Project Number: FTA-MA-26-0009-95-3

Available from:
Federal Transit Administration
Office of Safety & Security, Room 9305
Washington, DC 20590 Telephone: 202/366-0219 FAX: 202/366-3765
Order Number: FTA-MA-26-0009-95-3

The 1993 Safety Management Information Statistics (SAMIS) report, now in its fourth year of publication, is a compilation and analysis of transit accident and casualty statistics uniformly-collected from approximately 400 transit agencies throughout the country. The safety data presented in this annual report are collected via Form 405 of the FTA Section 15 Reporting System. This report contains trend analysis graphs as well as new graphs/tables that include collisions, personal casualties, derailments, fires and property damage per specified period of time (day, hour, minute). There are 18 new Trend Analysis graphs and tables by individual transit modes. SAMIS reports safety statistics for the following transit modes: motor bus, automated guideway, commuter rail, heavy rail, light rail, demand response and vanpool.

Transit Security Procedures Guide.
KETRON Division of Bionetics Corporation, Under Contract to Volpe Center, Balog JN, Schwarz AN, and BCDoyle; Prepared for the FTA Office of Safety & Security (Judy Meade, TPM-30), December 1994, 210pp.
Project Number: FTA-MA-90-7001-94-2

Available from:
Federal Transit Administration
Office of Safety & Security, Room 9305
Washington, DC 20590 Telephone: 202/366-0219 FAX: 202/366-3765
Order Number: FTA-MA-90-7001-94-2
or
NTIS Order Number: PB95-170304 *Price:* A06

Safety and Security

This Guide is designed to help transit systems become aware of the procedures used nationwide by transit and other programs in their security tasks. It includes information on how to apply the systems approach to transit security planning and implementation; proactive materials on the prevention of security incidents; procedures for immediate and follow-up response to security incidents; and specific evaluations of a variety of special security problems including crimes against passengers, crimes against the transit system, crimes against the public and general security issues. The evaluations include information on the most important attributes of each security problem, namely: severity, frequency, type, affected areas, time when, locations, contributing factors, solutions/ approaches, personnel cost, facility/equipment cost, effectiveness, and application. This Guide can be used by transit system planners, security personnel, and managers in developing plans, procedures, and capital programs. The report is a companion to an earlier document titled *Transit System Security Program Planning Guide,* also available from the FTA, NTIS, and Volpe Center.

Technology Development

Assessment of Ferries as Alternatives to Land-Based Transportation: Executive Summary. Volume 1 of 3 Volumes.
Norris CR, Urban Design and Transportation Planning Consultant, In Association with the Urban Harbors Institute of the University of Massachusetts at Boston, Norris CR; Prepared for the FTA Office of Technology (Irving Chamber, TRI-20), May 1994, 38pp.
Project Number: FTA-MA-06-0197-94-2

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-104576 *Price:* A03

This assessment report presents an overview of the rise, fall, return, and future uses of ferry systems as alternatives to land-based transportation modes in the United States. The purpose of the study was to learn more about where and when ferries serve as alternatives to land based transportation systems, their role as travel mode options in the future, and the context in which it makes good transportation sense to pursue the "wet road." The research was conducted in two phases: National survey of ferry systems and types, and case studies of five representative ferry systems. The case study task was to determine the decision factors for water or land based mode choice, and to identify factors that may influence future ferry planning and trends. Overall, the case study and survey assessments illustrate how particular ferry routes serve as alternatives to land based transportation in a variety of locations. The analyses identified the basic transportation functions provided by the different routes, and interpreted those historical decision-making processes which have resulted in the continuation or expansion of ongoing systems and the start-up of new ones. The conclusions are summarized and organized accordingly: four periods of 20th century ferry service; critical decision factors for water or land based mode choice; and ferry planning and implementation techniques which may be useful to future systems. The recommendations for a National Ferry Policy are also included.

Assessment of Ferries as Alternatives to Land-Based Transportation: System Types and Surveys. Volume 2 of 3 Volumes. Phase 1.
Norris CR, Urban Design and Transportation Planning Consultant, In Association with the Urban Harbors Institute of the University of Massachusetts at Boston, Charles R. Norris; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), May 1994, 38pp.
Project Number: FTA-MA-06-0197-94-2

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB94-206612 *Price:* A06

This Phase 1 report focused on identifying and assessing those factors, past, present, and future, which have influenced decisions on the choice of water-based versus land-based transportation for passenger travel. Twenty-five ferry routes and systems were surveyed to identify locations where ferry services have been used to provide an alternative to bridges, tunnels, highways, or rail routes. Summary descriptions of each of the 25 ferry systems suveyed are documented along

with geographic maps and charts. Survey findings included identification of ferry service types, general decision factors, and categorization of the systems by type and characteristics. System choice determinates were differentiated in three time frames for: 1) older systems planned before 1970; 2) currently operating systems or those planned between 1970 and 1990; and 3) new systems recently implemented or planned after 1990. The surveys have been useful in identifying general trends and directions water based transportation systems have taken vis-a-vis land based alternatives in the past 30 years. They have suggested some of the shifts in transportation policy and planning that may influence choices between land and water based systems in the future. Overall, all services tended to be multifunctional with the majority focusing on passenger and vehicle transport, and most serving tourism and recreational needs. Public transportation services ranged from lifelines serving islands, to through traffic marine highway links, to commuter vehicle transfer, to passenger commuter transit functions. Phase 1 concluded by identifying the following five ferry networks as candidates for the Phase 2 indepth study: Seattle/Puget Sound in Washington; Portland/Casco Bay Islands in Maine; San Francisco Bay in California; Mississipi River/New Orleans in Louisiana; and New York Harbor/Hudson River between New York and New Jersey

Assessment of Ferries as Alternatives to Land-Based Transportation: Case Studies of Five Ferry Networks. Volume 3 of 3 Volumes. Phase 2.
Norris CR, Urban Design and Transportation Planning Consultant, In Association with the Urban Harbors Institute of the University of Massachusetts at Boston; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), May 1994, 165pp.
Project Number: FTA-MA-06-0197-94-4

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95- 104584 *Price:* A10

This Phase 2 report consists of an indepth case study analysis of five representative ferry systems to determine the various choice factors for providing water-based alternatives as well as user preferences for selecting ferries over land based options. It contains descriptive profiles of each case study including each system's history, evolution and relationship to national and regional trends. The report focuses mainly on ferry networks and routes serving commuter needs and providing essential transportation links between roadways or other points separated by water. The case studies selected included all regularly scheduled year round ferry routes. Information was gathered through document research, site visits, interviews, and data analyses. Case study assessments included an historical analysis of the evolution of each system, descriptions of performance characteristics, and considerations relating to current national policy objectives including those set forth in the ISTEA of 1991. Issues regarding the future of public ferry transportation are presented along with recommendations for implementation. Each system was found to have distinguishing features relating to operations, vessel technology, planning methods, environmental factors, and institutional settings. A summary fact sheet for each site visit is included in the appendix of this report. The study recommends a National ferry policy to recognize the expanding role of ferries as key links in intermodal regional transportation systems, and to provide expanded Federal assistance through emerging ISTEA programs.

Technology Development

Boston Harbor Marine Transit Accessibility Study: Improving Linkage Between Water and Landside Transportation Modes and Access for Americans With Disabilities.
University of Massachusetts, Boston, Urban Harbors Institute, Held AL; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), January 1995, 66pp.
Project Number: FTA-MA-06-0197-95-05

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-212478 *Price:* A05

This report is an attempt to usher in a new era for marine transit on the Boston Harbor. It is the first comprehensive examination of the integration of land based and marine based modes to better serve the needs of ferry patrons as well as to bring marine transit facilities into compliance with the ADA. The study seeks to build upon earlier studies related to the future of the Boston Harbor Ferry System. This report discusses transportation on the Harbor, topography and logistics of the waterfront, transportation linkage alternative analysis, proposed central marine transit terminal, and commuter patterns. The report concludes that both patrons and individuals with disabilities would be best served by the development of a central marine transit terminal that would be fully accessible during all seasons and for the complete tidal range of Boston Harbor. The report also states that the needs of ferry commuters would be best served with the institution of two express bus shuttles operating from the central terminal to the Back Bay and Beacon Hill working districts of Boston. In addition, the study recommended that the city institute a waterfront transitway which would link the waterfront of Boston between North and South Stations. The waterfront transitway would primarily serve the needs of non-commuter ferry patrons and tourists.

Complete Analysis of the Bus Revenue Collection System Reconciliation Process.
Chicago Transit Authority, Tam CC, Evans KF, and Currie D; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), March 1994, 94pp.
Project Number: FTA-IL-06-0077-94-1

Available from:
National Technical Information Service/NTIS
Springfield, BA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB94-194578 *Price*: A05

The purpose of this research was to test and verify or discredit the bus revenue collection system at the Chicago Transit Authority (CTA). This report describes and analyzes the equipment, procedures, and security measures used in collecting and reconciling bus farebox revenue in the city of Chicago. The process was followed step-by-step from the deposit of fares into the farebox, through vaulting and emptying the cash box, to the counting and depositing of the revenue in the bank. The report includes a discussion of the procedures and practices observed during the testing period, as well as the findings, comments, and recommendations. The study found that the fare registering equipment operated well under most circumstances. Nearly every test yielded reconciliation rates of over 96 percent with registrations of half dollars and Susan B. Anthony dollars being the only exceptions. The agreement between dollar bills collected and

dollar bills counted was lower than expected. After performing the farebox registration tests, the shortage of bills was explained, partially, by the fact that bills were sometimes retained in the cash box when dumped at the vault island. CTA is a 24-hour, 7-day a week public transit agency providing bus and rail service to the city of Chicago and 11 surrounding suburbs. The bus system serves 12,900 bus stops while the rail connects 142 stations. Combined, the two systems provide approximately 530 million passenger trips yearly and collect over $350 million in revenue. Bus farebox receipts account for 80 percent of the total fare revenue collected.

Development and Application of a Battery Energy Storage System Simulation Program for Rail Transit Systems. Volume 3.
Carnegie Mellon University, Rail Systems Center, Ball CE, and Uher RA; Prepared for The FTA Office of Technology (Jeffrey Mora, TRI-20), March 1995, 106pp.
Project Number: FTA-PA-26-0008-95-3

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-210845 *Price:* A06

This report documents the computer model developed to evaluate the effectiveness of operating a battery energy storage system (BESS) at rail transit systems. The report presents background information of the project, covers the BESS model methodology, and discusses the application of the BESS model to two rail transit systems: the Port Authority of Allegheny County (PAT) light rail transit system in Pittsburgh, PA, and the Washington Metropolitan Transit Authority (WMATA) heavy rail system in Washington, DC. Conclusions and recommendations are included along with appendices that provide the BESS model computer source codes and a user's manual. The research results indicated that the payback periods for investment into battery energy storage are too long: 14 years for WMATA and 10 years for PAT. The capital cost of battery storage can be reduced (40 percent) by eliminating the power conditioning equipment and allowing the battery to be connected directly to the third rail catenary or trolley system. The report also recommends modifying the model to assess the economic feasibility of other forms of alternative energy sources such as generators and other storage systems.

Four Year Report on Battery-Electric Transit Vehicle Operation at the Santa Barbara Metropolitan Transit District.
Santa Barbara Electric Transportation Institute, Griffith P; Prepared for the FTA Office of Technology (Shang Hsiung, TRI-20), May 1995, 115pp.
Project Number: FTA-CA-26-0019-95-1

Available from:
Federal Transit Administration
Office of Technology
400 7th Street, SW, Room 6423
Washington, DC 20590 Telephone: 202/366-0241 FAX: 202/366-3765
Order Number: FTA-CA-26-0019-95-1
or

NTIS Order Number: PB95-253738 *Price:* A06

The Santa Barbara Metropolitan Transit District (MTD) introduced battery-electric transit vehicles into regular transit service in January 1991. This application of electric propulsion ensured quiet, exhaust-free, odorless operation, and proved to be a success with riders (ten-fold increase in ridership during the first year of operation). During the four years, MTD logged more than 300,000 miles and 60,000 hours of service on its battery-electric fleet and has carried more than 3 million passengers during the course of 8,000 driving cycles. This report provides an overview and discussion of the MTD's experiences with electric-vehicle operation and maintenance. It provides technical information relating to MTD's ongoing "real world" evaluation of various products attendant to battery-electric transit vehicle operation. The material covered herein represents a compilation of the information most frequently requested by interested third parties. The comparative costs of operation and maintenance between MTD's electric and diesel powered transit vehicles are presented, as well as information relating to driver energy management, traction batteries, battery chargers, range extenders, powertrains, energy consumption, and emissions. This report will prove useful to agencies contemplating the implementation of battery-electric vehicle operations, and will provide a solid foundation for other transit operators that have already made the decision to proceed with battery-electric transit programs. The information presented will also be of interest to manufacturers of electric vehicles and components. This report promotes an understanding of the unique requirements of battery-electric vehicle operation and, thereby, increases the opportunities for successful integration of the technology.

Innovative Technology to Improve Transit Maintenance Efficiency.
Transit Development Corporation, Inc., American Public Transit Association (APTA), Schiavone JJ; Jointly funded and prepared for the FTA Office of Technology (Jeffrey Mora, TRI-20) and the Ministry of Transportation, Ontario, January 1994, 213pp.
Project Number: FTA-DC-06-0642-94-1.

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB94-214608 *Price:* A10

The purpose of this study was to reach out to other industries, as well as to transit, to identify and document the next generation of maintenance technology. A Task Force, known by the acronym I-TIME, and comprised of transit professionals from the United States and Canada, investigated several industries to locate innovative technology to improve transit maintenance efficiency (I-TIME). This report presents an analysis of innovative maintenance technologies not commonly used in public transit today. The technologies identified in this report are grouped into four categories: Low Level Technology, Advanced Technology, Robotics and Condition Monitoring. The search for these technologies involved several activities including surveys, classified ads, and visits to a variety of industrial facilities located in the United States, Canada, and Europe. The report is comprised of two sections. Part 1 contains an introduction to the project and summarizes the technologies identified by I-TIME as well as reference material to obtain additional information. Part 2 contains five informative appendices: European Trip Report; Trip

Report to Investigate Electric Motor Monitoring Technology; Trip Report to Investigate Remote Diagnostics of Rail Signaling and Switching Equipment; Trip Reports to Investigate Potential Maintenance Technology Transfer from Defense Related Industries; and Trip Report to Investigate Robot Applications for Facility Cleaning. A reference section includes the names, addresses, telephone numbers, and FAX numbers of transit systems, manufacturers, suppliers and other organizations applicable to each technology. Additional information may be obtained by contacting APTA's Information Center at 202/898-4089; FAX 202/898-4049.

MAGLEV Demonstration, Design and Development Plan.
Carnegie Mellon University, Rail Systems Center, under contract to Port Authority of Allegheny County; Prepared for the FTA Office of Technology (Jeffrey Mora, TRI-20), August 1994, 370pp.
Project Number: FTA-PA-08-7006-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-140406 *Price:* A17

Congestion in the air and highway systems continues to worsen. By the year 2005, the cost of congestion will rise to over $60 billion annually. In this report, high speed ground transportation (HSGT) is offered as an alternative that will lessen the effects of congestion on these congested modes. This study examines the feasibility of a regional high speed magnetic levitation (MAGLEV) system connecting the Greater Pittsburgh airport with strategic stops between the Midwest and East Coast. A suburban commuter system, which operates on the same lines, is also investigated. The first link of the regional and suburban MAGLEV system consists of a demonstration line connecting the Greater Pittsburgh International Airport with downtown Pittsburgh. This study considers the economic value of such a system in terms of transportation, manufacturing, and economic development. The report discusses some of the problems facing passenger transportation; provides an overview of high speed rail and MAGLEV technologies; evaluates the domestic market potential for establishing a North American MAGLEV manufacturing center; describes the Mid-Atlantic Regional MAGLEV system; provides an economic and financial analysis of the regional and suburban systems; describes the Pittsburgh demonstration system in detail; and discusses financing strategies. The study concludes that an investment of $41 billion over the next 30 years would be required to build a regional MAGLEV system, cover its operating cost and produce enough additional transportation revenue to pay back part of this investment in the private sector financial markets. A substantial portion of this investment must come from the public sector. The additional economic activity generated by this investment would be over $78 billion. Over 675,000 person-years of work would be created by such a venture.

Rail Transit Energy Management Program. Final Report for 1993-94 Calendar Year Effort. Volume 1.
Carnegie Mellon University, Rail Systems Center, Uher RA; Prepared for the FTA Office of Technology (Jeffrey Mora, TRI-20), March 1995, 86pp.
Project Number: FTA-PA-26-0008-95-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-198354 *Price:* A05

The Rail Transit Energy Management Program (EMP) is a private/public partnership whose objective is to reduce rail transit energy cost and improve energy efficiency. Primary funding for the program comes from the FTA and is supplemented by the private sector (electric utility and rail transit supply industries). The EMP is housed at and operated by the Rail Systems Center at Carnegie Mellon Research Institute, a division of Carnegie Mellon University. The long range goal of the program is to reduce rail transit energy costs by 10 percent or $46 million annually. This report summarizes the first two years of the program. The following four task areas are addressed: program organization, rail transit energy database, alternative energy sources, and the five year program plan.

Rail Transit Energy Management Program. Volume 2: Energy Database.
Carnegie Mellon University, Rail Systems Center, Uher RA; Prepared for the FTA Office of Technology (Jeffrey Mora, TRI-20), March 1995, 72pp.
Project Number: FTA-PA-26-0008-95-2

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-209427 *Price:* A05

This report provides a descriptive overview of the Energy Database (EDB) that was established under the program that is housed and operated by the Rail Systems Center at the Carnegie Mellon Institute. It covers the database structure, contents and expansion capabilities; transit authority energy information; energy report index; user's manual; and the present status and expansion plans. The EDB provides information to members of the program, namely, rail transit energy and energy cost data, and the results of implementation of energy cost reduction strategies. The EDB also includes a means for timely exchange of information among transit operators as well as methods for monitoring the overall cost reduction and efficiency improvement associated with energy management. The database is currently set up on a personal computer and is accessed by the user via an 800 telephone line.

Report on Specific Operational and Dimensional Design Characteristics of the Present United States Passenger Vessel Fleet.
University of Massachusetts, Boston, Urban Harbors Institute, Pilsch MC; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), February 1995, 74pp.
Project Number: FTA-MA-06-0197-95-03

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547

NTIS Order Number: PB95-212445 *Price:* A05

The waterborne passenger vessel industry is working with the US DOT and the Architectural and Transportation Barriers Compliance Board to bring the industry into compliance with the Americans With Disabilities Act (ADA). This report discusses the specific operational and dimensional design characteristics of the present United States passenger vessel fleet pertinent to the industry's ability to attain a satisfactory level of accessibility. The report summarizes information on areas such as vessel operations, general characteristics, database documentation, exterior and interior vessel dimensions and services. It offers findings, conclusions and recommendations to the US DOT on both the process and the specific areas of concern that should receive attention during the effort to promulgate ADA regulations for ferries and excursion vessels. The report offers a review of statistics regarding the impact of ADA on the vessel industry; a comparison of present rules, regulations, and guidelines on ADA to highlight the treatment of the critical areas to date; and a detailed review of the survey information provided by 57 companies on 108 vessels. A total of 67 reports are presented and analyzed--34 from the operator responses, and 33 from the design and build industry. The study survey indicates that vessel industry's eventual compliance with ADA could easily become a clash between the interests of governmental, industrial and disability advocates. To be successful, the study states that the accessibility effort must be a series of compromises that allows for the establishment of an accessible path that will suit the requirements of each party.

Report on Specific Operational and Dimensional Design Characteristics of the Present United States Passenger Vessel Fleet. Appendices 1-3
University of Massachusetts, Boston, Urban Harbors Institute, Pilsch MC; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), February 1995, 136pp.
Project Number: FTA-MA-06-0197-95-04

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-212452 *Price:* A07

This appendix report documents the vessel industry survey that was conducted to develop dimensional information on specific areas of the vessels that would be impacted by ADA rules and specifications. Survey information was provided by 57 companies on 108 vessels. Based upon the information and data developed by the survey and the resulting computer analysis of this data, the study concludes that the creation of a regulation applicable to all passenger vessels, whether present or future design, should be accomplished in two sections: one for the present fleet and the second for new design and builds. The survey also found that elements included in an accessible path in buildings and facilities are also found in the present fleet of passenger vessels.

Technology Development

Seismic Design Considerations for Mass Transit Facilities.
Parsons, Brinkerhoff, Quade & Douglas, Inc., under contract to Volpe National Transportation Systems Center; prepared for the FTA Office of Planning (Steve Asatoorian , TPL-20), May 1994, 44pp.
Project Number: FTA-TGM-10-94-1
Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-443.2)
Washington, DC 20590
Order Number: DOT-T-94-19

This report reflects FTA interest in the application of seismic design to transit structures and a more uniform treatment of earthquake considerations in new transit developments. The purpose of this study was to provide general seismic guidelines for mass transit facilities under FTA jurisdiction, namely, underground structures, elevated guideways, and maintenance facilities. This report summarizes the current state of earthquake engineering and offers general guidance on how to include seismic considerations in transit structures. The report begins with background information on earthquakes and historical development of the seismic approach. It reviews current seismic design standards including the Uniform Building Code of the International Conference of Building Officials, and the Standards Specifications for Highway Bridges of the American Association of State Highway & Transportation Officials. It also reviews practices and innovative approaches associated with transit aerial structures, underground structures, and maintenance facilities including examples and discussion of economic factors. This report offers some general guidelines to transit agencies interested in preparing for earthquakes and including seismic design in transit projects.

Seismic Awareness: Transportation Facilities. A Primer for Transportation Managers on Earthquake Hazards and Measures for Reducing Vulnerability Plus Appendices.
Parsons, Brinkerhoff Quade & Douglas, Inc., under contract to Volpe Center; Prepared for the Office of the Assistant Secretary for Transportation Policy, December 1993, 226pp. (FTA contact person is Steve Asatoorian, TPL-20).
Project Number: DOT-VNTSC-OST-93-2

Available from:
Volpe National Transportation Systems Center
Kendall Square
Cambridge, MA 02142 Telephone: 617/494-2117 FAX: 617/494-3125
Order Number: DOT-VNTSC-OST-93-2

The purpose of this report is to increase the level of understanding of transportation executives and operating managers about seismic phenomena, i.e., where to be concerned about it, and how to take advantage of the latest engineering practices to obtain the protection possible. The report serves as a primer to executives. The aspects of earthquakes examined are organized and presented in 3 categories: Seismic Hazards in the United States; Seismic Vulnerability; and Seismic Design and Retrofit Practices. Basically, this report is the first attempt to elevate the

facility manager's consciousness to the threat that earthquakes pose to their facilities. It provides steps to be taken to reduce vulnerabilities to acceptable levels through proper seismic design prior to construction, and through seismic retrofit of existing facilities. More details are provided in the three appendices in this report for the technical staff and readers interested in the topic.

Technology Development Program. Technical Assistance Brief 2.
FTA Office of Technology (Shang Hsiung, TRI-20); Spring 1995, 8pp.
Report Number: FTA-TTS-20-95-1

Available from:
Federal Transit Administration
Office of Technology
400 7th Street, SW, Room 6423
Washington, DC 20590 Telephone: 202/366-0241 FAX: 202/366-3765
Order by Title

The purpose of this technology brief is to advance transit by improving information dissemination for technologies being developed and demonstrated. The FTA Technology Development Program is vital to sustaining national policy goals of promoting innovation and technological advances to meet existing transit needs. This Brief discusses the activities and status of the following FTA technology programs: Advanced Technology Transit Bus (ATTB) Program; Demonstration of Universal Electric Transportation Subsystems (DUETS); Photogrammetry; Inertial Navigation; Rail Transportation; Energy Management Program; Technology Development Program, and Transit Planning and Research Reports Highlights.

Transit Accessibility

Detectable Warnings: Detectability by Individuals with Visual Impairments, and Safety and Negotiability on Slopes for Persons with Physical Impairments.
Boston College, Benson BL, Nolin TL, Easton RD, and Mitchell PA; and AGH Associates, Inc., Desmarais L; under contract to the Volpe Center; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), September 1994, 124pp.
Project Number: FTA-MA-06-0201-94-2

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-130837 *Price:* A06

This research was undetaken to provide human factors data that would support refinements in the *ADA Accessibility Guidelines* (ADAAG). A detectable warning is defined as *a standardized surface feature built in or applied to walking surfaces or other elements to warn visually impaired persons of hazards on a circulation path.* It is a standardized feature intended to function much like a stop sign. This report presents the results of two studies on human performance on detectable warning surfaces differing slightly in dimensions, resiliency, and nature of materials. In the first study, underfoot detectability of 13 detectable warning surfaces were evaluated, by visually impaired persons, when applied to four transit platform surfaces varying in roughness and resiliency, by 24 visually impaired persons. The detection rate was greater than 95 percent for all but one surface (a prototype which has never been manufactured for sale). The second study evaluated the safety and negotiability of nine detectable warning surfaces for persons having varied physical disabilities. Forty participants having a wide range of physical disabilities, traveled up and down 4-foot by 6-foot ramps having a slope of 1:12. All trials were videotaped and rated by three independent raters for observable incidents indicating decreased safety and negotiability. Participants also rated each detectable warning surface for safety and ease of negotiability relative to brushed concrete. Based upon the moderately increased level of difficulty and decrease in safety which detectable warnings on slopes pose for persons with physical disabilities, it was determined to limit the width of detectable warnings to no more than that required to provide effective warning for persons with visual impairments.

Detectable Warning Surfaces: Color, Contrast, and Reflectance.
Accessible Design for the Blind, under contract to Volpe Center, Benson BL, Nolin TL, and Easton RD; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), September 1994, 124pp.
Project Number: FTA-MA-06-0201-94-3

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-136446 *Price:* A03

This research was undertaken to assist the FTA in refining the contrast specification for detectable warnings. It was conducted on a laboratory platform originally constructed by the Massachusetts Bay Transportation Authority (MBTA) for studying underfoot detectability of ten different

warning surfaces in association with four different platform surfaces. In this report, the results of objective and subjective measures of visual detectability are presented. Visual contrast of ten detectable warning surface/platform pairs was tested on an interior platform illuminated at 20 foot candles, as recommended by the ADAAG A4.29.2. The ten contrasts ranging from 25 percent to 86 percent were tested for detectability by 24 persons who were legally blind and had difficulty seeing transit platform edges and junctions between curb ramps and streets. Tests included objective and subjective measures of visual detectability. Objective measures were accuracy (correct identification of the presence of a warning surface) and response time. Subjective measures were each participant's choice of the *three* most visually detectable contrasts, the *one* most visually detectable contrast, and the *least* visually detectable contrast. Both human performance and subjective data supported the notion that contrasts in which the lighter surface is of low reflectance are less detectable than similar contrasts in which the lighter surface reflects more light. However, there was insufficient data in this research to specify the lower limits of contrast and reflectance which would result in high detectability. Overall, the research has demonstrated that sufficiently accurate measurement of light reflectance values of detectable warning surfaces can be readily accomplished in the field using a digital photometer.

Detectable Warnings: Testing and Performance Evaluation at Transit Systems.
Technology & Management Systems, Inc., under contract to the Volpe Center, Ketola HN, and Chia D; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), November 1994, 118pp.
Project Number: FTA-MA-26-0031-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX 703/321-8547
NTIS Order Number: PB95-200275 *Price:* A06

Rail transit systems are required under the ADA to place detectable warnings along the edges of transit station platforms as a means of alerting individuals who are blind or who have limited vision of the drop-off hazard. This report presents the results of a comprehensive testing and performance evaluation program for detectable warning materials placed along the edges of a transit station platform. The report is intended to provide information and guidance to rail transit systems to assist them in the selection and installation of detectable warning systems. The scope of the test and evaluation program included the laboratory testing of 18 detectable warning materials and the subsequent installation of eight of those materials at indoor and outdoor transit stations in Boston, Cleveland, and Philadelphia. The program evaluated--after seven months of exposure to weather and passenger traffic--the engineering performance characteristics of the materials with regard to wear, durability, adhesion/bonding to the platform surface, and appearance. A performance assessment of all eight detectable warning materials and their installations is included in this report.

Transit Accessibility

Development of Ergonomic Guidelines for Electronic Customer Information Systems
Oregon State University, Transportation Research Institute, Hunter-Zaworski KM, and Watts D; Prepared for the FTA University Research and Training Program (Hartwick R, TPM-20), December 1994, 117pp.
Report Number: FTA-OR-26-7000-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-182044 *Price*: A06

This study examines issues concerning persons with sensory and cognitive impairments and their access to public transit. The research focuses on the development of ergonomic performance guidelines for visual electronic customer information systems. It is the first attempt to provide direction for the specification and installation of these devices. The guidelines were influenced by the particular needs of persons with sensory or cognitive disabilities. The approach kept the guidelines general to accommodate the particular needs of persons with sensory disabilities in a number of language formats and electronic media. The first part of this report provides a compendium of current state-of-the-art in electronic customer information systems, including a list of model installations and summary descriptions of exemplary and currently operating systems. The second part of the report provides draft guidelines for the ergonomic performance of the man-machine interface of the visual component of electronic customer information systems. The guidelines incorporated the comments and suggestions received from more than 50 reviewers around the world. These reviewers represent transit agencies, groups of persons with disabilities, researchers, manufacturers, and government officials. The final section of this report includes a brief discussion of a number of controversial issues that arose out of the research activities and suggestions for further investigation. It is anticipated that the guidelines will form the basis of international standards to be developed as a cooperative effort between the United States, Canada, Australia, and the European Community as well as the basis for work related to the ITS/APTS program.

Directory of Specialized Transportation Providers Funded by FTA's Section 16 Program.
Community Transportation Association of America; Prepared for the FTA Rural Transit Assistance Program (Roger Tate, TRI-30), December 1994, 352pp.
Project Number: FTA-IL-26-7001-95-03

Available from:
Community Transportation Association of America
RTAP National Transit Resource Center
1440 New York Avenue, NW, Suite 440
Washington, DC 20005 RTAP Hotline 800/527-8279 (voice/TDD)
TAP-IN Bulletin Board 202/628-2537 Internet CTRmag@aol.com.
Order Number: FTA-IL-26-7001-95-02
or
NTIS Order Number: PB95-215695 *Price:* A16

Transit Accessibility

This directory is a comprehensive listing of 3,673 private, nonprofit and public agencies providing transportation to the elderly and persons with disabilities through the FTA Section 16 capital assistance program. The directory is designed to assist the user in identifying and locating individual Section 16 transit providers. State agencies and transit systems will find this directory helpful as they begin implementing their complementary paratransit plans under ADA and the public transportation management systems required by ISTEA. The Section 16 network discussed in this directory comprises agencies with vehicles or other capital assets such as computers or radio equipment funded by the Section 16 program. This directory consists of three sections: a statistical profile of the Section 16 network; state by state listing of Section 16 providers, and an index listing Section 16 providers by state and county.

Effects of Age on the Driving Habits of the Elderly: Evidence from the 1990 National Personal Transportation Study
University of South Florida, Center for Urban Transportation Research, Chu X; Prepared for Research and Special Programs Administration, Office of University Research & Education, October 1994, 49pp.
Report Number: DOT-95-12

Available from:
Technology Sharing Program
U.S. Department of Transportation
400 7th Street, SW (M-443.3)
Washington, DC 20590
Order Number: DOT-T-95-12

The number of elderly drivers grew from 8.6 million in 1970 to 22.3 million in 1990, an increase of 148 percent, while the number of all other drivers grew 50 percent. This report examined the effects of age on the driving habits of the elderly as revealed in the 1990 Nationwide Personal Transportation Survey (NPTS). The analysis was limited to the content of the NTPS and to urban residents. Elderly was defined as persons 65 years or older. Six aspects of driving habits were considered that have safety implications for the elderly: amount of daily driving, driving by time of day, driving speed, driving by type of roadways, vehicle size, and number of passengers carried. Regression analysis was used to isolate the effects of being elderly while holding constant a set of personal, household, location and trip characteristics of the drivers. Elderly drivers showed an increased effort of self-protection in their driving habits vis-a-vis mid-aged drivers (25-64 years). Being elderly not only made elderly drivers reduce daily driving, avoid peak-period and night driving, but also made them drive at lower speeds with larger cars and carry fewer passengers. The challenge to policymaking, in this report, was to balance the consequences of any policy concerning the mobility and traffic safety of the elderly.

Impact of the ADA on Special Services Provided by Urban Transit Systems.
University of Arizona, Drachman Institute for Land and Regional Development Studies, Rosembloom S; Prepared for the FTA University Research and Training Program, (Marx P, TBP-10), October 1994, 146pp.
Report Number: FTA-AZ-26-0004-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-179719 *Price:* A07

This research addresses three questions raised by the complementary paratransit requirement of ADA: (1) Will transit operators make greater use of private operators to provide the mandated paratransit services? (2) Will transit operators and social service agencies with clients with special needs work together more cooperatively than in the past? and (3) Will transit operators cease to provide service to those who formerly received special paratransit services but who are not ADA eligible? The analyses of these three points were based on a review of more than 400 ADA implementation plans submitted to the FTA by individual transit systems in January and July of 1992. Each of the three questions was discussed and analyzed separately. This report provides preliminary assessments of the differences between paratransit services provided prior to ADA and after ADA. The Appendix contains the 46 cases studies of the communities contacted. The review of question one, role of the private sector, showed that roughly 17 percent of all plans would not use more private services; and cities under 500,000 population were substantially more likely to report a role for both private and public contract providers (40 percent indicated greater use of private providers and 10 percent indicated greater use of public services). Review of research question two, coordination between operator and social service agency, showed that approximately 12 percent of transit systems reported coordination with social agencies, and about 15 percent reported no such effort. Review of question three, displacement of non-ADA eligible people especially users of pre-ADA services, showed that approximately 12 percent of the plans stated that non-ADA eligible elderly would not be served. Conversely, a little over 18 percent stated that the non-ADA eligible elderly currently riding would continue to be served.

Impact of the Americans With Disabilities Act of 1990 on the Waterborne Passenger Vessel Industry.
Urban Harbors Institute, University of Massachusetts, Pilsch MC; Prepared for the FTA Office of Technology (Irving Chambers, TRI-20), February 1993, 61pp.
Project Number: FTA-MA-06-0197-93-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB94-204880 *Price:* A04

The purpose of this study was to investigate and determine the impact of the ADA on the United States passenger vessel industry and to present findings relevant to the formulation of regulations implementing the ADA for waterborne passenger transportation systems, namely, the ferryboat and the excursion boat industries. Research tasks included a review of the regulations and guidelines produced by Federal, state, and local sources, as well as site visits to marine passenger terminals, personal interviews, meetings, and workshops. The research findings showed that 1) ADA was written mainly for land based facilities and vessels were not considered as part of the Act nor was ADA's effect on the industry considered; 2) long-standing Coast Guard regulations conflicted with ADA; 3) access issues and solutions for the vessel industry exceeded the difficulty

experienced by the air and bus industries; and 4) exemptions from certain portions of the ADA was necessary. The study concluded that accessibility to and on waterborne passenger vessels would be accomplished only if the Departments of Justice and Transportation coordinated the regulatory efforts with the passenger vessel industry and the disability community.

Making Community Transportation Accessible: Planning and Implementation Handbook. Community Transportation Assistance Project for Human Services Agencies, Department of Health and Human Services; Prepared by Project Action under contract to the Community Transportation Association of America (Roger Tate, TRI-30), 65pp.

Available from:
National Resource Center
Community Transportation Association of America
1440 New York Avenue, NW, Suite 440
Washington, DC 20005 Telephone: 202/ 628-1480 FAX: 202/737-9197
Order by Title Hotline: (800) 527-8279

This is a Community Transportation Assistance Project (CTAP) funded by the Department of Health and Human Services. CTAP is operated by a consortium consisting of the Community Transportation Association of America, Project Action of the National Easter Seal Society, and the Region IV Transportation Consortium. This handbook presents the transportation requirements of the ADA and how they apply to community transportation providers and human service agencies involved in the delivery of transportation services. The handbook is designed as a self-teaching guide and users can work at their own pace. Chapter 2 defines ADA and provides a brief overview of Titles I, IV, and V of the Act. Titles II and III are covered in the remaining chapters. Chapters 3-12 explain ADA transportation rules and offer suggestions on how to apply them. Sample forms and charts are included to assist in the planning and implementation of the requirements. Chapters 13-16 contain resource information identifying additional implementation steps, such as how to build networks and coalitions, to locate funding sources, and to contact persons experienced with implementing innovative programs. This report will interest persons and agencies that are making community transportation accessible to persons with disabilities.

Transportation Services, Utilization and Needs of the Elderly in Non-Urban Kentucky. University of Kentucky, Leinbach TR, Stamatiadis N, and Watkins JF; Prepared for the FTA University Research and Training Program (Masselink S, TPL-20), December 1994, 104pp.
Report Number: FTA-KY-26-0001-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Order Number: PB95-171740 *Price*: A06

This research seeks to provide a deeper understanding of mobility problems among the elderly by exploring the real needs of the elderly and the actual response of communities and their inhabitants to these needs. The report begins with a literature review of transport and the elderly in non-urban areas followed by study area profiles, discussions of representative community

agencies serving the senior population, and an examination of both formal and informal providers in two Kentucky communities: Cynthiana (Harrison County) and Harrodsburg (Mercer County).contrast Data, collected by using a survey questionnaire and a trip diary, indicated that many elderly do not drive nor hold a valid driver's license. The study focused upon elderly access and barriers to the use of personal vehicles, reasons for travel and modes used, and trip chaining activities. It examines data related to the influence of the aging process upon travel behavior, the impact of household structure and size upon access and travel patterns, and the notions of elderly frailty and vulnerability. The study offered a different perspective on the vulnerability concept, namely, the notion of personal isolation. Research findings indicated that a large percentage of non-urban elderly were unaware of any public transport accessible from their residence, and 80 percent reported no use of public transport in the past year. The report clearly stated that public transportation was not a viable solution, and that an effective alternative had to be devised to extend accessibility to a larger segment of this population. The study conclusively called for a more structured informal volunteer system, one using nearby relatives and friends.

User Friendly Bus Interior Design: Reducing Falls Through Improved Visual Environment. Executive Summary and Final Report.
The Pennsylvania State University, Pennsylvania Transportation Institute, Gilmore BJ; Prepared for the FTA University Research and Training Program (Solomon E, TRI-30), August 1994, 61pp.
Project Number: FTA-PA-26-0005-94-1

Available from:
National Technical Information Service/NTIS
Springfield, VA 22161 Telephone: 703/487-4650 FAX: 703/321-8547
NTIS Final Report Order Number: PB95-111464 *Price:* A03
NTIS Executive Summary Order Number: PB95-129318 *Price*: A04

As people age, their sense of balance decreases and they become more susceptible to spatial disorientation due to visual system changes which affect posture, locomotion and falls; thus, the possibility of falling becomes significantly higher. This research takes a fundamental approach to understanding the falling injuries of people on a moving bus and to establishing design guidelines for visual conditions that maximize a passenger's sense of balance and spatial orientation in a cost-effective way. It proposes cost-effective design guidelines to increase ride comfort, safety, and transit bus utility levels by specifying the visual cue requirements that allows elderly riders to maintain a maximum sense of balance and spatial orientation. This report includes a review of present ergonomic design standards and practices for bus interiors based on literature reviews and bus manufacturer publications. It discusses experimental methods used to help determine guidelines that would reduce the incidence of falls on a moving bus. Human subjects were used in both phases to obtain objective and subjective data. Results suggests that the use of vertical geometric patterns is a workable intervention strategy for bus interior design that would improve visionary control of posture and decrease the risk of falls for the elderly on moving transit vehicles. This recommendation is more beneficial to older people with poorer vision and poorer postural stability. The compliance with the recommended vertical visual cue arrangements does not require the retrofit of buses with equipment but only with the interior color scheme. The report includes suggestions for future research.

Transit Cooperative Research Program

Annual Report of Progress 1994. Transit Cooperative Research Program.
Transportation Research Board, National Research Council: Prepared for the FTA Transit Cooperative Research Program (Gwendolyn R. Cooper, TRI-30), 1994, 112pp.

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order by Title

The Transit Cooperative Research Program (TCRP) was established to provide a continuing program of applied research on transit issues. The program is sponsored by FTA and carried out under a three-way agreement among the National Academy of Sciences acting through its Transportation Research Board/TRB; the Transit Development Corporation, an educational and research arm of APTA; and the FTA. The TCRP focuses on issues significant to the transit industry, with emphasis on developing near-term research solutions to a variety of transit problems involving facilities, service concepts, operations, policy, planning, human resources, maintenance and administrative practices. Anyone with an interest in public transportation may play a role in setting the research agenda for the program by submitting research statements to TRB at any time. In addition, problem statements are solicited annually by means of a mailing to more than 4,000 individuals representing transit agencies, MPOs, universities, and Federal agencies. This annual report provides an overview of the TCRP programs. It discusses how the programs are formulated, financed, organized, as well as how the projects are placed under contract and monitored, and how the research results are disseminated and applied. The report also provides descriptive profiles and progress/status information for the 47 research projects scheduled for completion in 1995. TCRP staff biographies, TCRP research agency list, and TCRP list of publications and prices are also included in this annual report.

Applicability of Low-Floor Light Rail Vehicles in North America. TCRP Report 2.
Booz-Allen & Hamilton, Inc.; Prepared for the FTA Transit Cooperative Research Program (Gwendolyn R. Cooper, TRI-30), 1995, 179pp.
Report Number: TCRP Report 2

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Report 2 *Price:* $31

This report will be of interest to transit managers, engineers, and policymakers considering the introduction of low-floor light rail vehicles in existing or planned light rail systems. The report investigates the state of the art of light rail vehicles, assesses the applicability of their use in North America. Low-floor light rail vehicle categories have been developed to facilitate the understanding of the different types of vehicles and their applications. Critical factors that should be examined before considering low-floor light rail vehicles are identified and discussed. The report describes the growing trend toward low-floor light rail vehicles and the reasons for this

growth. It provides an extensive compilation of data on low-floor light rail vehicles, information on North American light rail system characteristics, and an analytical perspective on key issues relevant to the applicability of this technology in North America. The report also develops two illustrative examples to show, in a realistic North American setting, the cost-effectiveness of using low-floor light rail vehicles, the source of risk, and the trade-offs regarding the use of low-floor versus high-floor light rail vehicles. The report concludes that low-floor light rail vehicles provide improved accessibility and are more easily integrated into the existing environment than conventional light rail vehicles. An extensive database record of available European low-floor light rail vehicles is provided in Appendix A. Appendix B provides light rail transit system descriptions of 14 North American cities. This report also provides a glossary of terms.

Artificial Intelligence for Transit Railcar Diagnostics. TCRP Report 1.
Transportation Research Board, National Research Council, Mulholland IP of ANSTEC, Inc., and Oren RA of LTK Engineering Services; Prepared for the FTA Transit Cooperative Research Program (Gwendolyn R. Cooper, TRI-30), 1994, 63pp.
Report Number: TCRP Report 1

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Report 1 *Price:* $20

The purpose of this effort was to determine the potential for using computer technologies, namely, artificial intelligence (AI) techniques, to improve transit railcar diagnosis with the overall goal to increase transit railcar availability and save costs by decreasing the maintenance labor hours required to predict and diagnose failures. This report presents the results of an evaluation of seven AI techniques applicable to the diagnosis of malfunctioning transit railcar systems and subsystems. It is a valuable resource for transit railcar maintenance professionals concerned with improving railcar maintenance fault-diagnostic capabilities through the use of AI technologies. In this report, AI is defined as a computer program that uses human problem solving techniques to assist and augment the diagnostic process. Seven AI technologies (expert systems, case-based reasoning, model-based reasoning, artificial neural networks, computer vision, fuzzy logic, and knowledge based systems) are investigated to determine their potential application for the diagnosis of transit railcar systems and subsystems. Site surveys were conducted at transit railcar maintenance facilities and railcar subsystem suppliers to gather information regarding current and future diagnostic and maintenance practices, barriers to implementing advanced AI technology, and maintenance cost data. In addition, a literature review was performed to identify any AI techniques currently in use for railcar diagnostics and to identify and describe AI-based maintenance support systems developed and used in other industries that would have potential application for railcar maintenance. An economic analysis was performed to provide an estimate of the cost savings expected by reducing the diagnostic effort resulting from the application of AI techniques. The economic analysis points out that the cost of initially implementing the AI programs can be paid back within one year. The report concludes that AI technology is sufficiently mature for cost-effective application in the transit railcar diagnostic process and provides recommendations for implementation of the technology.

Transit Cooperative Research Program

Bus Route Evaluation Standards. Synthesis of Transit Practice 10.
Transportation Research Board, National Research Council, Benn HP of Barton-Aschman Associates, Inc.; Prepared for the FTA Transit Cooperative Research Program (Gwendolyn R. Cooper, TRI-30), 1995, 60pp.
Report Number: TCRP Synthesis 10

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 10 *Price:* $12

Bus route evaluation standards comprise several criteria that measure the quality and quantity of service offered by a public transit system's bus routes. This synthesis compiles current activity and assesses the state of the art of evaluating individual bus routes. The synthesis examined industry practice in late 1993 to early 1994 by means of a multiple choice questionnaire. Information on bus route evaluation standards and criteria used by transit agencies in the United States and Canada is summarized. The survey of transit agencies in North America indicated that 44 different evaluation criteria are currently used in the transit industry. These criteria cover activities related to bus route design and operation, ranging from location of bus stops to the hours of service. The report provides updated information to the 1984 US DOT report entitled *Bus Service Evaluation Methods: A Review*. Copies of the 1984 and 1994 surveys are provided in Appendices A and B. This synthesis will be of interest to transit agency general managers, as well as operations, scheduling, maintenance, and planning personnel. This synthesis is an immediately useful document.

Management Information Systems. Synthesis of Transit Practice 5.
Transportation Research Board, National Research Council; Prepared for the FTA Transit Cooperative Research Program, (Gwendolyn R. Cooper, TRI-30),
Report Number: TCRP Synthesis 5

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 5 *Price:* $19

This synthesis will be of interest to general managers of transit agencies, managers of management information systems (MIS), and information systems personnel, as well as operations, scheduling, maintenance, finance, and others concerned with improving information flow and database development. Concerns that the transit industry lags behind the private sector in acquiring and deploying information systems technology helped generate this study. This report focuses on the general direction of change in transit MIS and on specific integration efforts that are applicable and transferable to the transit industry as a whole. The synthesis identifies the barriers that inhibit implementation of technology as well as the direction and key success factors of selected transit agencies that have successfully implemented MIS. The synthesis documents the range, variety,

and benefits derived from the current information and examines how effectively information from special-purpose systems is integrated into the overall information systems environment and used across departmental boundaries.

Regulatory Impacts on Design and Retrofit of Bus Maintenance Facilities. Synthesis of Transit Practice 7.
Transportation Research Board, National Research Council; Prepared for the FTA Transit Cooperative Research Program, (Gwendolyn R. Cooper, TRI-30), 1994, 55pp.
Report Number: TCRP Synthesis 7

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 7 *Price:* $12

This synthesis is intended for use by transit managers and transit facility design consultants and engineers as sell as funding agencies and officials in determining the effects of recent regulations on the size, layout, and design features for new or modified bus maintenance facilities. The report 1) identifies some of the effects that recently enacted legislation and implemented regulations have had on the design of bus maintenance facilities; and 2) identifies some of the most recent successful practices that have been incorporated into the design of bus maintenance facilities including modifications to accommodate new technology vehicles. Recent regulations that impact on bus garage design are those relating to the ADA, CAAA, Clean Water Act, and EPA regulations regarding underground storage tanks. Information for this study was obtained from 16 transit agencies on practices used in the design of recently completed bus maintenance facilities. Ways in which these regulations have affected the design of relatively new bus garages are reviewed. This synthesis report is an immediately useful document that records practices that were acceptable at the time of its preparation.

Retrofit of Buses to Meet Clean Air Regulations. Synthesis of Transit Practice 8.
Transportation Research Board, National Research Council; Prepared for the FTA Transit Cooperative Research Program, (Gwendolyn R. Cooper, TRI-30),
Report Number: TCRP Synthesis 8

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 8 *Price:* $12

The EPA has issued a regulation affecting pre-1994 model year urban buses when their engines are rebuilt or replaced after January 1, 1995. Known as the EPA's Urban Bus Retrofit/Rebuild Program, the requirement applies only to those urban buses powered by heavy-duty diesel (HDD) engines operating in metropolitan areas with 1980 populations of 750,0000 or more. The intent of the regulation is to reduce particulate matter (PM) emissions from urban buses. This synthesis

report strives to familiarize transit agency staff with the EPA's Urban Bus Retrofit/Rebuild program. The document will be of interest to transit agency general managers, operations, maintenance, and planning personnel, as well as environmental agency officials, equipment suppliers, consultants, and others concerned with bus operations planning and design. The synthesis summarizes the options available under the EPA's program for heavy-duty diesel bus engines and clarifies the information in the regulations for transit agencies developing their own strategies for compliance. The synthesis also provides an overview of transit agency programs already in place to reduce PM emissions. This synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation.

Role of Performance-Based Measures in Allocating Funding for Transit Operations. Synthesis of Transit Practice 6.
Transportation Research Board, National Research Council; Prepared for the FTA Transit Cooperative Research Program, (Gwendolyn R. Cooper, TRI-30), 1994, 52pp.
Report Number: TCRP Synthesis 6

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 6. *Price:* $11

This synthesis focuses primarily on the relationship between states and the public transit systems that they fund and is designed to provide information about performance-based funding allocation methods used by the states. The synthesis explores if and how performance assessment is being used as a way to distribute financial assistance to local transit systems by state and regional bodies. Case studies were conducted for the funding allocation systems used by three states: Pennsylvania, Indiana, and Texas. The practical application of these indicators in the case studies is discussed, and the value and effectiveness of the programs is assessed from the perspectives of funding agencies and recipients. The synthesis is largely based on a survey of selected state departments of transportation (DOTs), regional financing bodies, and local transit authorities. Information on performance measures and performance-based allocation methods was obtained through various means: literature review; survey questionnaire (sent to 56 organizations/25 responses), telephone follow-up calls; and case studies. Survey results tend to represent the views and procedures of state DOTs and local transit systems more so than regional bodies like MPOs. Comments from many of the states and transit systems indicate that regional bodies play less of a role in the distribution of operating funds in most metropolitan areas. This synthesis will be of interest to transit agency general managers, financial officers, policy and planning personnel, and others concerned with the economic and budget aspects of providing transit service, as well as funding officials and policymakers in organizations such as DOTs and MPOs.

System-Specific Spare Bus Ratios. Synthesis of Transit Practice 11.
Transportation Research Board, National Research Council, Pierce JT of Los Angeles CA, and Moser EK of Baltimore MD; Prepared for the FTA Transit Cooperative Research Program (Gwendolyn R. Cooper, TRI-30), 1995, 53pp.
Project Number: TCRP Synthesis 11

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 11 *Price:* $12

Managing fleet size in relation to service levels is smart management and is also fiscally responsible. Transit managers use the spare ratio factor as a key performance indicator to measure how they are doing. The purpose of this study was to document and examine the critical site-specific variables that affect the number of spare vehicles that bus systems need to maintain maximum service requirements. The project involved transit managers at a cross section of bus transit agencies of varying size and geographic location in the United States and Canada who responded to a survey questionnaire. The survey responses (36 out of 50) document the state of the practice in the industry concerning spare vehicles and highlight specific innovative practices that have helped transit officials reach and maintain relatively low spare bus ratios. The report examines the maintenance impact of the required fleet changes resulting from implementation of ADA and the use of alternative fuel buses to meet the requirements of the CAAA. Although transit managers generally acknowledged that right sizing the fleet actually improves operations and lowers cost, many reported difficulties in achieving and maintaining a 20 percent spare ratio as recommended by FTA. Survey respondents emphasized developing improved and innovative bus maintenance techniques which would assist them in minimizing down time and improving vehicle availability, and, ultimately leading to reduced spare vehicles and labor and material costs. Transit managers also recommended greater interagency communication and cooperation in sharing information on successful programs, with a particular emphasis on technological innovations to improve fleet management.

Transit Bus Service Line and Cleaning Function. A Synthesis of Transit Practice 12.
Transportation Research Board, National Research Council, Schiavone JJ (Guilford, Connecticut); Prepared for the FTA Transit Cooperative Research Program (Gwendolyn R. Cooper, TRI-30), 1995, 55pp.
Project Number: TCRP Synthesis 12

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 12 *Price:* $14

This synthesis provides a variety of approaches to transit bus service line and cleaning functions so transit agencies can evaluate the effectiveness of their own operations. It updates material

contained in a previous TRB synthesis series, *National Cooperative Research and Development Program (NCTRP) Synthesis 1: Cleaning Transit Buses: Equipment and Procedures (1982).* In addition, this synthesis also addresses daily servicing and mechanical inspections, areas not covered originally. As a study of practice, the synthesis examines how transit agencies in the United States and Canada collectively approach service line and cleaning functions. Included are traditional approaches, as well as innovative methods and technologies. This synthesis contains discussions on defining a clean bus, defining a properly serviced bus, and on labor and equipment costs. Exterior washing, interior cleaning, and graffiti prevention and removal are discussed in detail based on the results of a survey conducted for this study. Case study examples highlight unique service line and cleaning conditions at New Jersey Transit, Phoenix Transit, and Santa Monica Municipal Bus Lines. This synthesis will be of interest to transit agency maintenance managers and other maintenance and operations personnel, as well as to equipment suppliers, consultants, and others concerned with bus maintenance operations.

Transit Cooperative Research Program. Status of Projects as of June 1994.
Transportation Research Board of the National Research Council, and the Transit Development Corporation of the American Public Transit Association; Prepared for the FTA Transit Cooperative Research Program (Gwendolyn R. Cooper, TRI-30), June 1994, 60 pp.
Project Number: FTA-DC-26-7009-94-2

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone 202/334-3214 FAX: 202/334-2519
Order by Title

The purpose of this report is to provide an overview of the TCRP and the status of the 59 research projects and 44 special studies funded in 1992, 1993, and 1994. The report contains descriptive profiles and status information of the TCRP projects listed in this report. Each project write-up includes the scope, funding, schedule, project manager, research agency, and project status. TCRP is a new major transit research program. It was established under FTA sponsorship in July 1992 and authorized as part of the ISTEA of 1991. TCRP serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it. The selection of researchers is an open process that allows all potential research agencies to compete on the basis of technical merit.

Waste Control Practices at Bus Maintenance Facilities. Synthesis of Transit Practice 9.
Transportation Research Board, National Research Council, Lowell DD; Prepared for the FTA Transit Cooperative Research Program, (Gwendolyn R. Cooper, TRI-30), 1995, 32pp.
Report Number: TCRP Synthesis 9

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Synthesis 6 *Price:* $10

Transit agencies must comply with Federal and state environmental regulations involving management of wastes generated by bus maintenance activities. This synthesis report will be of interest to transit agency general managers, as well as to personnel in operations, maintenance, and environmental departments. It will also be of interest to environmental agency officials, equipment suppliers, consultants, and others concerned with bus maintenance and fueling operations, planning, and design. The synthesis describes the waste control practices employed by 21 transit agencies in bus maintenance and fueling operations, and it identifies some successful practices that are being employed to reduce or eliminate waste. Specifically, the project examines waste control practices for painting and paint removal, washing and cleaning, parts cleaning, fueling, and fuel storage, changing of oil and antifreeze, and replacement of Freon, batteries, tires, and filters.

Workshop on Transit Fare Policy and Management Research Needs and Priorities: Proceedings.
Transportation Research Board, National Research Council in cooperation with the FTA April 1994, 77pp.

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TR Circular 421

These proceedings summarize the highlights from the *Workshop on Transit Fare Policy and Management Research Needs*, held in the summer of 1993 in Woods Hole, Massachusetts. The workshop brought together representatives from transit agencies, consulting firms, equipment vendors, universities, and Federal and local agencies to discuss research needs and priorities related to transit fare policy and management. Summaries of four resource papers and a status report on a current Transit Cooperative Research Project study highlighted the opening session and are documented in this proceedings report. Other workshop papers included in this document are the following: Workshop Overview, Welcome and Introduction, Working Group Summaries, and a Participant List. These proceedings are intended to help facilitate the development of a multifaceted fare related research program that is responsive to the needs of transit systems, Federal agencies, transit users and industry groups.

Workbook for Estimating Demand for Rural Passenger Transportation. TCRP Report 3.
SG Associates, Inc.; Leigh, Scott & Cleary, Inc.; and C.M. Research Inc.; Prepared for the FTA Transit Cooperative Research Program, (Gwendolyn R. Cooper, TRI-30), Transportation Research Board, National Research Council, 1995, 131pp.
Report Number: TCRP Report 3

Available from:
Transportation Research Board
2101 Constitution Avenue, NW
Washington, DC 20418 Telephone: 202/334-3214 FAX: 202/334-2519
Order Number: TCRP Report 3 *Price:* $28

Transit Cooperative Research Program

This report will be of interest to agencies engaged in planning, operating, or funding passenger transportation services in rural areas. The purpose of the research was to provide methods for forecasting rural passenger transportation demand. The newly developed methodology for estimating demand for rural passenger transportation presented in this Workbook is based on a comprehensive review of previously developed methods; discussions with agencies that would use these procedures; collection of data from a sample of 39 selected counties across the nation; and detailed analysis of relationships among county population characteristics, services provided, and actual rural passenger transportation served. This report describes the types of information required to develop estimates of passenger demand and step-by-step instructions, with examples and computation forms, for developing the demand estimates. The methodology reported is applicable to rural counties. The companion workbook, which presents the methodology in simplified form, is included in this report. The methods described apply to transportation services in low-density areas. They do not apply to, and should not be used for estimation of demand in small cities, even those with populations less than 50,000, where public transportation service is provided by small fixed-route, fixed-schedule transit systems.

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