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U.S. Department  
of Transportation  
**Federal Transit  
Administration**

# TRANSIT PLANNING AND RESEARCH REPORTS

## An Annotated Bibliography

July 1994



Office of Technical Assistance and Safety





U.S. Department  
of Transportation  
**Federal Transit  
Administration**

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

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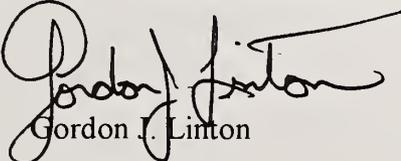
A Message from the Federal Transit Administrator:

As we move toward the next century, transit programs must change to serve the critical transportation needs of this nation. The most successful transit systems are 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 Federal Transit Administration (FTA) policies and programs.

At this time, Americans are concerned with a variety of transit issues. These include providing greater mobility, especially for those with disabilities, the elderly, those in need, and those living in rural areas; improving air quality by such means as use of alternative fuels, fuel cells, and batteries to power transit buses; taking advantage of advanced transit technologies in areas such as navigation, information, and communication; and making all transit systems safer and more secure by such means as training, development of regulatory guidelines, and an intensive drug and alcohol information and testing program. This annotated bibliography of Transit Planning and Research Reports alerts the public and the transit industry to the recent research results.

This bibliography will help the transit community keep abreast of the currently available planning and research reports sponsored by the FTA. It announces recently published research products of the FTA National Planning and Research Program. It also includes citations of research results of interest to the transit community from other sources. It gives easy-to-follow instructions on how to obtain a copy of each report.

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. The extent to which it will become a useful customer reference tool will depend, ultimately, upon your comments and suggestions. Please take the time to fill out and return the evaluation form at the end of this document to help us improve the value of this reference document.

  
Gordon J. Linton



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July 1994

Prepared by  
Marina Drancsak  
///

Prepared for  
Federal Transit Administration  
U.S. Department of Transportation  
Washington, DC 20590



Available from  
Federal Transit Administration  
Office of Technical Assistance & Safety  
400 7th Street, SW, Room 6100  
Washington, DC 20590

Report Number  
FTA-TTS-5-94-2

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# FOREWORD

## Federal Transit Administration National Planning & Research Program Annotated Bibliography

July 1994

This annotated bibliography presents the most current and available planning and research reports, as of July 1994, sponsored by the Federal Transit Administration (FTA), U.S. Department of Transportation, Washington, DC. 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 FTA planning and research activities.

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. The extent to which it will become a useful customer reference tool, ultimately, will depend upon your comments and suggestions. Please take the time to fill out and return the evaluation form at the end of this document to help us improve the value of this reference document.

This bibliography will help the transit community keep abreast of the FTA research activities. It announces recently published research products of the FTA National Planning and Research Program. It 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 project report. 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 the bibliography contains instructions on how to obtain FTA reports, a report order form, an evaluation form, and a request for future editions of the FTA transit planning and research annotated bibliography.

The reports cited in this document are mainly products of the FTA National Program of Planning & Research. The National Program of Planning & Research is one of the six elements of the Transit Planning & Research Program which was established under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The National Program of Planning & Research supports activities that have a national focus for:

Federal mission support for directed research, pilot projects, and special initiatives to advance federal transit policies and issues of National concern;

Innovative methods and techniques to improve the efficiency and effectiveness of transit operations through demonstrations, training, and technical assistance; and

Information and evaluation to improve communication among transit operators, suppliers, consultants, and the FTA.

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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.*

# ADVANCED PUBLIC TRANSPORTATION SYSTEMS

## **Advanced Public Transportation Systems: Evaluation Guidelines.**

J.A. Volpe National Transportation Systems Center; prepared for the Federal Transit Administration, Advanced Public Transportation Systems Division (Boenau R, TTS-30), January 1994, 170 pp. Report No. FTA-MA-26-0007-94-2

Available from:

Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-10

or

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-168473

The goal of the Federal Transit Administration (FTA) Advanced Public Transportation Systems (APTS) program is to enhance the ability of public transit systems to satisfy customer needs and contribute to community goals by providing information on innovative applications of available technologies from a coordinated operational test and evaluation program. This document presents guidelines for planning, implementing, and reporting the findings of the evaluation of the APTS operational tests. The research objective is to foster the consistency of evaluation philosophy and techniques, and the comparability and transferability of results to improve the quality and utility of information obtained from the APTS program. The guidelines emphasize the assessment of the APTS program national objectives and the objectives of the local

implementing agency. These guidelines are intended for use by contractors and organizations to evaluate the APTS operational tests and for state and local organizations involved in the design and evaluation of APTS.

## **Advanced Public Transportation Systems: State Of The Art Update '94.**

Volpe National Transportation Systems Center; prepared for the FTA Advanced Public Transportation Systems Division (Boenau R, TTS-30), January 1994, 154pp. Report No. FTA-MA-26-0007-94-1

Available from:

Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-09

or

NTIS Order No. PB94-169620

The objective of this research is to increase the industry's knowledge of successful applications of advanced technologies with the expectation of widespread adoption. This report, which updates two earlier reports, focuses on some of the most innovative opportunities for enhanced information, communications, and control strategies for transit and ridesharing modes. It contains the results of a limited investigation of the extent of adoption of advanced technology in public transportation service primarily in the United States (U.S.) and Canada. Technologies and applications are discussed under the following three categories: *Smart Traveler Technology*, i.e., the concepts focus on demand-side issues and encompass transit linked applications of smart cards, audiotex

and videotex, telephones, cable television, personal computers, and geographic information systems; *Smart Vehicle Technology*, i.e., concepts focus on supply-side issues, attempting to improve vehicle operations and control, fleet planning, scheduling, systems operations, and passenger safety; and *Smart Intermodal Systems*, i.e. concepts encourage coordinated use of two or more modes to make a single trip. These three categories are preceded by an Executive Summary and followed by a list of current FTA sponsored projects and an appendix containing a comprehensive list of persons contacted during the study.

**Advance Vehicle Monitoring and Communication Systems for Bus Transit: Benefits and Economic Feasibility. Revised March 1993.**

University of Pennsylvania, Department of Systems, Morlok EK, Bruun EC, and Battle Blackmon KJ; prepared for the FTA University Research and Training Program, Revised March 1993, 84pp.  
Report No. FTA-PA-11-0035-93-2

Available from:  
Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-03  
or  
NTIS Order No. PB94-164068

This report analyzes the feasibility of advanced vehicle monitoring and communication systems (AVM/C) for bus transit in the U.S. Such systems are widely used in Europe and Canada but have seen little deployment in the U.S. Many systems are now available from both American and foreign vendors; thus, the question of whether or not to deploy such a technology is a critical issue in many transit

agencies. The purpose of this report is to provide a knowledge base for transit managers that will enable them to evaluate the potential of AVM/C systems for local application. Potential benefits of such a system are discussed including benefits to current and new riders in the form of better service, and to the agency in the form of increased revenues and reduced costs. The report also discusses the actual experience of foreign and domestic agencies including costs and benefits. A method for evaluating the feasibility of leasing and purchasing AVM/C systems is presented. The study suggests that transit agencies consider AVM/C systems; these systems should be cost-effective, improving both agency finances and customer services.

**APTS Project Summaries.**

FTA Advanced Public Transportation Division, Office of Technical Assistance and Safety (Boenau R, TTS-30), May 1994, 25pp.  
Report No. FTA-TTS-30-94-5

Available from:  
Federal Transit Administration  
Office of Technical Assistance and Safety  
400 7th Street, SW, Room 6100  
Washington, DC 20590  
Phone 202/366-4995; FAX 202/366-3765  
Order No. FTA-TTS-30-94-5

This report announces the status of the research projects currently underway in the FTA Advanced Public Transportation Systems (APTS) program. It is updated periodically to keep the transportation community informed 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.

**Intelligent Vehicle Highway Systems  
Projects of the Department of  
Transportation.**

Federal Highway Administration/HTV-1,  
Federal Transit Administration/TTS-30, and  
National Highway Traffic Safety  
Administration/NRD-50; March 1994, 341 pp.  
Report No. HTV-10/4-94(7M)QE

Available from:

Federal Highway Administration  
Office of Traffic Management and IVHS  
400 7th Street, SW, Room 3401  
Washington, DC 20590  
Phone 202/366-2196  
Order No. HTV-10/4-94(7M)QE

The Department of Transportation (DOT) National Intelligent Vehicle Highway System (IVHS) program is designed to apply advance and emerging technologies in the fields of information, communications, control and electronics to surface transportation to improve efficiency and reduce negative impacts. These applications are known as IVHS. This report describes the IVHS projects (approximately 250) funded by the following DOT modal administrations: Federal Highway Administration (FHWA), FTA, and the National Highway Traffic Safety Administration (NHTSA). Each project is profiled on a separate page and contains a description of the project, start and end dates, estimated project cost, federal share, contractor name, and DOT contact person. The report is a complement to the National IVHS Program Plan and is organized to support the development of user services, national compatibility planning, deployment, deployment support, and program assessment. This report serves as a basic reference document.

**IVHS Architecture Development Program.  
Interim Status Report.**

Intelligent Vehicle Highway Society of  
America; prepared for the Department of  
Transportation, April 1994, 83pp.

Available from:

IVHS America  
400 Virginia Avenue, SW, Suite 900  
Washington, DC 20024-2730  
Phone 202/484-4847; FAX 202/484-3483.  
Order by Title

A major national initiative is underway to apply IVHS technologies to surface transportation to improve its efficiency and reduce its negative impacts. This status report presents the latest information on the National IVHS Architecture Development Program that was initiated by the DOT to achieve the goal of a nationally compatible intelligent transportation system. It is the first Program milestone report to be released to the public for review and comment. The report offers stakeholders and other interested persons 1) a first look at each of the four architecture development teams distinct approach to the development of a national IVHS system architecture, and 2) a mechanism for those interested to provide feedback on the progress to date. This report documents the proposed architecture alternatives of each of the following teams: Hughes Aircraft, Loral-IBM, Rockwell International, and Westinghouse Electric. Summaries of the four architecture alternatives provide an overview of each approach with emphasis on user services. The summaries appear exactly as the teams provided them. Teams with the most promising architectures will continue into Phase II. It is anticipated that at the end of Phase II, in mid-1996, a National IVHS architecture system will emerge.

# CLEAN AIR

## **Clean Buses and Clean Air: Major Transit Demonstration Programs in the United States.**

FTA Office of Engineering Evaluations, Sill S, TTS-20; prepared for the Federal Transit Administration (FTA), December 1993, 5pp. Report No. FTA-TTS-20-93-1

Available from:

Federal Transit Administration  
Office of Engineering Evaluations  
400 7th Street, SW, Room 6423  
Washington, DC 20590  
Phone 202/366-0220; FAX 202/366-3765  
Order No. FTA-TTS-20-93-1

This brief paper titled *Clean Buses and Clean Air* lists the active major transit demonstration programs in the 10 Federal Regions of the U.S. The demonstrations are listed on 5 charts and provide the following information: city and state, transit agency name, fuel type, number of buses in service/on order/planned, vehicle make model, engine make model, new retrofit, and type of federal assistance.

## **Guide to the Congestion Mitigation and Air Quality Improvement Program. Intermodal Surface Transportation Efficiency Act (ISTEA).**

Federal Highway Administration, Office of Environment and Planning/HEP-41; 1994, 43pp.

Report No. FHWA-PD-94-008

Available from:

Federal Transit Administration  
Office of Planning, Room 9301  
Washington, DC 20590  
Contact Abbe Marner, TGM-22

Phone 202/366-1612; FAX 202/366-7951  
Order No. FHWA-PD-94-008

or

Federal Highway Administration  
Office of Environment and Planning, HEP-41  
400 7th Street, SW, Room 3240  
Washington, DC 20590  
Contact Mike Savonis, HEP-41  
Phone 202/366-2080

This brochure presents the Congestion Mitigation and Air Quality Improvement (CMAQ) Program established by ISTEA. CMAQ funds (\$6 billion program) are allocated to the states which may use them for transportation control measures (TCMs) and programs designed to help states implement their transportation air quality plans and attain the national standards for carbon monoxide, ozone, and, in some cases, small particulate matter. ISTEA created flexible guidelines that allow the CMAQ Program to cut across traditional boundaries and encompass projects and programs dealing with highways, transit, and non-traditional areas, such as vehicle emission inspection and maintenance. This brochure provides answers to the following important questions about CMAQ: What are typical CMAQ projects? How much funding is available? How do I get started? How can I make the most of my CMAQ funds? What should be included in funding proposals? and Whom do I contact?

## **Safe Operating Procedures for Alternative Fuel Buses. A Synthesis of Transit Practice. TCRP Synthesis 1.**

Transportation Research Board, Hemsley GV; prepared for the FTA Transit Cooperative

Research Program (Arrillaga B, TTS-10),  
1993, 48pp.  
Report No. TCRP Synthesis 1

Available from:  
Federal Transit Administration  
Office of Technical Assistance and Safety  
400 7th Street, SW, Room 6107  
Phone 202/366-4991; FAX 202/366-3765  
Order No. TCRP Synthesis 1

The Transit Cooperative Research Program (TCRP) synthesis reports can serve as handbooks or design manuals because each one is a compendium of the best practices available. This report will be of interest to transit agency managers, maintenance managers, and others concerned with the operation of bus fleets using alternative fuels to meet national and local requirements related to air quality and energy diversification. Information on the use of methanol, ethanol, compressed natural gas (CNG), liquified petroleum gas (LPG), liquefied natural gas (LNG), and other alternatives is included. The purpose of the report is to provide information to transit operators on how transit agencies in the U.S., experienced in alternative fuel use, have addressed the advantages and disadvantages of alternative fuels. The document also provides information on the practices used to store, transport, and handle alternative fuels and discusses the benefits and effectiveness of these practices. The following specific aspects of alternative fuels and handling practices are addressed: training procedures; fuel storage and handling; maintenance operations; facility requirements; vehicle related issues; cost (facility and operating); and environmental considerations. The report concludes that the five alternative fuels studied are all potentially viable options that would allow transit agencies

to meet the provisions of the Clean Air Act.

**The American Association for Fuel Cells  
Newsletter: Project of the Clean Air  
Revival, Inc.**

The American Association for Fuel Cells,  
Issue Number 5, Spring 1994.

Available from:  
The American Association for Fuel Cells  
50 San Miguel Avenue  
Daly City, CA 94015  
Order by Subscription

This issue presents an international view of fuel cell activities and developments. Some of the articles reference the conference talks delivered at the Fuel Cell Conference in Long Beach, California, sponsored by the South Coast Air Quality Management District on February 23-25, 1994. The newsletter articles in this issue range from the German work on alkaline (KOH), solid oxide, molten carbonate and solid polymer (proton exchange membranes/PEM) fuel cells and systems; the United Kingdom's "Perfect World" fuel cell vehicle; Japan's progress on phosphoric acid fuel cells; and the Ballard Power Systems, Inc. of Vancouver, British Columbia, development of PEM systems for military transportation and stationary applications; to California's planned construction of the first utility-scale carbonate fuel cell power plant; Los Alamos Labs progress with PEM for hydrogen-air fuel cells; New York City's efforts to do away with diesel powered buses and gasoline powered cabs by the year 2000; and to M-C Power 1 megawatt molten carbonate fuel cell system; as well as to the Clinton Administration's message encouraging alternative fuel vehicle research and development.

## FINANCE

### **How to Evaluate Opportunities for Cross-Border Leasing and Certificates of Participation in Public Transportation.**

Jefferey A. Parker and Associates, Parker J; prepared for the FTA Office of Mobility Enhancement (Thomas E, TTS-10 and Stallsmith E), November 1993, 157pp. Report No. FTA-MA-90-7005-93-1

Available from:

Federal Transit Administration  
Office of Mobility Enhancement, TTS-10  
400 7th Street, SW, Room 6107  
Washington, DC 20590  
Phone 202/366-0264; FAX 202/366-3765  
Order No. FTA-MA-90-7005-93-1  
or  
NTIS Order No. PB94-178266

Creative financing? Is this approach right for your agency or your project? Reducing project costs and better matching revenues and outlays are two good reasons for considering cross-border leasing and Certificates of Participation (COPS). Maximizing their use will reduce the costs of capital projects as well as permit better management of cash flows. This guidebook is part of the FTA innovative financing evaluation effort and is designed to help transit agencies, state governments, and federal policymakers assess when and how to apply cross-border leasing and COPS. The report begins with an overview of recent transit industry experiences with cross-border leases and FTA-approved COPS financing. It explains how these financing mechanisms work and discusses some general issues in evaluating them. Factors to consider in measuring benefits and costs are discussed in terms of policy issues, federal guidelines, accounting

practices, risks, and comparisons of completed financings. Tables of transit industry COPS and cross-border lease transactions to date are presented and analyzed. Cross-border leasing procurement, risk and defeasance issues are reviewed in-depth and suggestions are offered for accurately measuring net benefits and costs. Potential benefits of COPS from increased flexibility in programming capital investments are reviewed through case studies involving both large and small transit systems. Ideas for expanding the use of Section 9 supported COPS through transfers of Federal highway grants are presented, and an example demonstrating the fiscal benefits of tapping Federal highway grants for transit investments is provided. Appendix A of this report discusses *True Funded Japanese Leverage Lease Description*; Appendix B discusses the *Innovative Financing Policy Context at FTA*; and Appendix C lists the *Research Materials* used in this study. Detailed definitions and explanations of how COPS and cross-border leases operate can be found in the FTA report titled *Introduction to Public Finance and Public Transit*, January 1993, by Public Financial Management, Inc., Report No. FTA-VA-26-0002-93-2; Also available from FTA.

**Intermodal Surface Transportation Efficiency Act (ISTEA): Flexible Funding Opportunities for Transit '94.**  
FTA Office of Planning (Libberton S, TGM-20); 1994, 53pp.

Available from:

Federal Transit Administration  
Office of Planning, TGM-20  
400 7th Street, SW, Room 9301

Washington, DC 20590  
Phone 202/366-2360; FAX 202/366-7951  
Order by Title

This brochure is intended to inform the state, regional, and local officials of the flexible funding opportunities that the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) offers for transit use in 1994. Part I of this brochure reaffirms the need for collaborative multimodal planning and summarizes some of the major provisions of the joint FTA/FHWA Metropolitan and Statewide Transportation Planning Regulations. Part II explains the flexible fund transfer and administration process, as well as FHWA obligation authority mechanism. Part III presents a broad overview of the Surface Transportation Program, including an explanation of the distribution rules and eligibility criteria which extend to most of the flexible funding sources presented here. These flexible funds--the STP Apportionment Adjustments, Minimum Allocation, Donor State Bonus, Interstate Maintenance, Bridge Replacement and Rehabilitation, National Highway System, Substitute Highway, and Congestion Mitigation and Air Quality Improvement programs--are profiled and their transit opportunities are defined in Part IV of this brochure. Part V provides, through a series of tables, a state by state breakdown of FY 1994 flexible funding opportunities. Part VI presents a series of brief case studies which highlight some of FY 1993 flexibly funded transit projects and the factors that played a part in the successful programming of these activities. A number of appendices are included to help further explain ISTEA flexibility provisions.

**Risk Assessment in Fixed Guideway Construction. Final Report.**

Northeastern University, Touran Dr. A, Bolster PJ, and Thayer SW; prepared for

FTA University Research and Training Program (Thomas E, TTS-10), January 1994, 146pp.

Report No. FTA-MA-26-0022-94-1

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-151099

The message in this report is directed to owners and sponsors of today's complex capital transit projects; it urges them to engage in a rigorous and systematic analysis of major sources of risk. Risk is defined as the potential for monetary loss resulting from uncertainty about the project. The objective of this research is to help the owner or sponsor in developing a framework for managing risk in the design and construction of fixed guideway transit projects. The report focuses on the design/construction and financial risks (uncertainties) affecting the project budget and schedule. A risk management framework for the design and construction of capital transit projects is presented in 3 phases--Risk Identification, Risk Measurement, and Risk Allocation and Mitigation. Each phase is addressed in a separate chapter. Various types of risks are identified and risk classification methods are discussed. A risk checklist that breaks down construction and financial risks into 15 broad categories is developed to facilitate risk identification. An overview of the surety industry and the procedures used by the surety for evaluating contractor risk is discussed. Deterministic and probabilistic methods of risk measurement and modeling are described and case studies are used to clarify the modeling process and to highlight the interaction of financial and construction risks. Research in risk allocation and mitigation is also reviewed. A system is developed for allocating the risks identified in the risk

checklist to various parties in the contract in a fair and equitable way. The study concludes that a well thought out and fair contract is an excellent vehicle for allocating risk to various parties.

**Transit Access and Land Value: Modeling the Relationship in the New York Metropolitan Area. An Implementation Handbook.**

Regional Plan Association (RPA) of New York, Anas A, and Armstrong R; prepared for the FTA Office of Mobility Enhancement (Stallsmith E, TTS-10), September 1993, 164 pp.

Report No. FTA-NY-06-0152-93-1

Available from:

Federal Transit Administration  
Office of Mobility Enhancement, TTS-10  
400 7th Street, SW, Room 6107  
Washington, DC 20590  
Phone 202/366-0264; FAX 202/366-3765  
Order No. FTA-NY-06-0152-93-1  
or  
NTIS Order No. PB94-152063

This handbook presents the findings of a multi-year study on the relationship between land values and transit access in the New York metropolitan area. It serves as a precursor to policy recommendations on value capture financing for public transit, as well as a research prototype for transit systems serving the region and the Nation. The handbook makes possible the application of research models establishing the relationship between transit access and land value benefits. It describes the processes by which statistically reliable relationships were established and can be applied to a range of policy options, service characteristics, and density settings. Two research models that establish the relationship between transit access and land value benefits are discussed and applied: the regional model

(NYREG) and the station area model (NYSTA). This approach to regional and station area modeling can be replicated elsewhere by calibration with locally available data. Implementation is also discussed in terms of hardware and software requirements, training and support service needs. This research effort contributes to a technical basis for value capture financing by advancing our knowledge in various areas. It makes possible: linking transit financing more closely to the benefits transit produces; measuring not simply how the market for land responds to transit access, but also how it responds to different qualities of access, including service frequency, speed, reliability, and the like; and enhancing transit supporting locations for new real estate development.

**Turnkey Demonstration Program Implementation Strategy. Design/Build: A New Approach. Technical Brochure.**

FTA Office of Mobility Enhancement (Thomas E, TTS-10 and Stallsmith E, TTS-10) 1994, 5pp.

Available from:

Federal Transit Administration  
Office of Technical Assistance and Safety  
400 7th Street, SW, Room 6107  
Washington, DC 20590  
Phone 202/366-0264; FAX 202/366-3765  
Order by Title

This technical information brochure introduces the implementation strategy of the FTA Turnkey (Design-Build) Demonstration Program, authorized by Section 3019 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) to demonstrate turnkey procurement practices that advance new technologies and lower the cost of constructing new transit systems. The brochure presents background information and discusses the FTA outreach activities that helped initiate and

implement the Turnkey Demonstration Program. The four demonstration projects selected to participate in the demonstration program are highlighted and graphically displayed in terms of scheduling of events. The four projects are: Bay Area Rapid Transit Airport Extension; Baltimore Light Rail Extension; San Juan, Puerto Rico, Tren Urbano; and Los Angeles El Segundo Station. These demonstrations are intended to verify the benefits of design-build-operate turnkey

procurements and to determine existing federal barriers, if any, to financing these projects. Some of the services that the FTA demonstration program will offer the program participants include expert technical assistance, contractor monitoring and evaluation of the turnkey demonstration projects for the duration of the projects. This brochure also provides a listing of the turnkey demonstration program products and program contacts.

## HUMAN RESOURCES

### **Brokering Careers in Transportation Between Community Colleges and Transit Agencies.**

City University of New York (CUNY), Institute for Transportation Systems, Parker NA, Spierer G, and Alssid J; prepared for the FTA Office of Technical Assistance and Safety, (Morison C, TTS-30), June 1993, 75 pp. Report No. FTA-NY-06-0154-93-1

Available from:

National Technical Information Service /NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-125689

The objectives of this research effort were to test the cost effectiveness of three different community college based models that would serve as a gateway to careers in transportation, and to assess the feasibility of using the community colleges of New York to attract undergraduates to the field of transportation, as well as to broker entry level positions between community colleges and transit agencies. This report presents brokering careers in transportation between community colleges and transit agencies as a model to:

- 1) raise and sustain the awareness of faculty and students about job and career opportunities in the field of transportation;
- 2) retain students in transportation related studies; and
- 3) provide early and meaningful exposure to the field of transportation as a career.

A comprehensive view of the brokering concept is developed and presented in the Executive Summary and detailed in Chapter 5 of this report, namely, the community college ARC model (Awareness-Retention-Curriculum model). The ARC model is portable, flexible,

and adaptable to various environments and would be best deployed in a coordinated system of high schools and colleges. The report recognizes the ARC model as the basic tool for reaching community college faculty and students and for developing new linkages, including career guidance, internships, and job opportunities.

### **Driver Performance Data Book Update. Older Drivers and IVHS. Transportation Research Circular 419.**

Transportation Research Board Committee A3B02, Vehicle User Characteristics, in cooperation with National Highway Traffic Safety Administration and Federal Highway Administration; March 1994, 141pp. Report No. T R Circular 419

Available from:

Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Order No. TR Circular 419

This Circular is an update of the 1987 NHTSA publication titled *Driver Performance Databook*. The Circular is a compilation of summary pages of driver performance data related to older drivers and intelligent vehicle highway systems (IVHS). The objective is to provide summaries of research data relevant to understanding driver performance capabilities and limitations that can influence crash prevention. This document is intended to provide users with a quick overview of available data on a particular topic and a reference tool for finding more detailed information. The criteria for selecting the

material included research that contained quantitative data on the performance of older drivers, or focused on the performance of drivers of any age who used vehicle or roadway based advanced technology devices. The study researched three types of IVHS related data: 1) basic information on driver performance useful in evaluating possible IVHS technologies; 2) driver performance measures using specific IVHS technologies; and 3) driver performance measures using IVHS devices. The data are presented as they appear in the literature from which they have been extracted. Both sections of this report, Older Drivers and IVHS, provide information on the following: Driver Characteristics, Response Time, Visual Performance, Information Processing, and Pre-Crash Behavior. Readers are encouraged to send copies of relevant research materials not found in this publication for inclusion in future updates of this driver performance database. Information should be addressed to: Office of Crash Avoidance Research, NRD-50, National Highway Traffic Safety Administration, Washington, DC 20590.

**Incentive Programs to Improve Transit Employee Performance. A Synthesis of Transit Practice 3.**

Transportation Research Board, Hartman RJ, Kurtz EM, and Mosher EK ; prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1994, 44pp.  
Report No. TCRP Synthesis 3

Available from:  
Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418

Phone 202/334-3213; FAX 202/334-2519  
Order No. TCRP Synthesis 3

This synthesis is a snapshot of the transit industry today. It is meant to provide information about employee incentive programs and their use in transit organizations.

*Please see page 43 for complete citation.*

**University Research and Training Program. Announcement for Fiscal Year 1994.**

FTA University Research and Training Program, Solomon E, TTS-30; June 1994, 67pp. Application due date is *September 2, 1994.*

Report No. FTA-TTS-31-94-1

Available from:  
Federal Transit Administration  
University Research and Training Program  
Washington, DC 20590  
Phone 202/366-0242; FAX 202/366-3765  
Order by Title

The FTA is inviting the academic community to participate in the FY 1994 University Research and Training Program. A number of grants will be awarded through this competitive program to institutions of higher learning for research on advanced transit topics. The 1994 program announcement contains a description of the research areas of interest to the FTA, the program requirements, application forms and procedures. To obtain a copy of the FY 1994 program announcement, contact Ms. Elizabeth Solomon, TTS-31, telephone 202/366-0242; FAX 202/366-3765.

## INFORMATION

### **Adaptation of Geographic Information Systems for Transportation. NCHRP Report 359.**

Transportation Research Board, National Research Council; prepared for the National Cooperative Highway Research Program; 1993, 76pp.

Report No. NCHRP Report 359.

Available from:

Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418

Phone 202/334-3213; FAX 202/334-2519

Order No. NCHRP Report 359

This research responds to the need to define the basic structure of Geographic Information Systems for transportation (GIS-T) based on the current needs and characteristics of transportation agencies. The study provides an overview of adaptation of the GIS concept for transportation. It is designed to help the transportation community meet the new demands, mandates, and opportunities for improved and integrated information management systems. The research objective is to develop a design and implementation plan for GIS-T that is responsive to current and projected technological capabilities and constraints, and to economic, social, and institutional needs. The research tasks included survey and data collection, development of a GIS-T framework, forecasts of potential GIS-T applications, and development of a final top-level design and implementation plan. Conclusions and suggestions for further research are provided. Details of the research effort are presented in the appendices. The study recommends that:

the state DOTs institute a strategic planning process for information systems that are *needs driven* rather than *technology driven*; the state DOTs adopt a server net architecture for GIS-T; and the state DOTs view data as a corporate resource, rather than as something "owned" by a particular entity. This report is recommended to state DOT administrators and managers of transportation agencies as well as others responsible for gathering, processing, and maintaining the information used by the agency. GIS represents a powerful new means to efficiently manage and integrate the various types of information necessary for planning, design, construction, analysis, operation, maintenance, and administration of transportation systems and facilities.

### **Data Tables for the 1992 Section 15 Report Year.**

DIGICON Corporation, Black TN; prepared for the FTA Office of Grants Management (Barnes L, TGM-10), December 1993, 319pp. Report No. FTA-MD-26-9002-93-4

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161

Phone 703/487-4650; FAX 703/321-8547

NTIS Order No. PB94-177417

*The Data Tables for the 1992 Section 15 Report Year* is one of three publications comprising the 1992 Annual Report from the Section 15 reporting system administered by the Federal Transit Administration (FTA). The report provides detailed summaries of the financial and operating data submitted to the FTA by the nation's public transportation

systems, pursuant to Section 15 of the Federal Transit Act, as amended. Extensive data are provided for 503 of the nation's transit systems, including systems operated or administered by transit authorities, states, city departments and private operators under contract to public agencies. Of the 503 systems included in this report, 53 percent of these reporting systems contract for some or all of their transportation service from private or public agencies. The Data Tables are organized in four major groups: transit revenues, transit expenses, non-financial operation data, and performance indicators. The other two volumes comprising the 1992 Section 15 Annual Report are: *National Transit Summaries and Trends*, and *Transit Profiles*.

**Effects of Added Transportation Capacity: Conference Proceedings of December 16 and 17, 1991, Bethesda, Maryland.** Texas Transportation Institute, Shunk GA; prepared for the Department of Transportation and the Environmental Protection Agency, 1994, 133pp.  
Report No. DOT-T-94-12

Available from:  
Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-12

This report, *Effects of Added Transportation Capacity*, documents the proceedings of a multi-agency conference held in Bethesda, Maryland, December 16-17, 1991. It summarizes the discussions and papers presented at a two day conference exploring the impacts of expanding highway capacity in urban areas. Much of the discussion focused on the links between transportation capacity and long-term reductions in traffic congestion and air pollution. Also explored were the links

between transportation investment and metropolitan economic development, and the effects of added transportation capacity on system performance, travel, and development. Forecasting models and experimental designs for further research were covered. The report should be of particular interest to researchers investigating topics associated with transportation planning.

**Estimates of Urban Roadway Congestion, 1990.**

Texas A&M University System, Texas Transportation Institute, Schrank DL, Turner SM, Lomax TJ; prepared for the Texas Department of Transportation and the FHWA, March 1993, 90pp.  
Report No. DOT-T-94-01

Available from:  
Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-01

This report, the fifth year of a six year research effort, focuses on quantifying urban mobility. The study contains facility information for 50 urbanized areas throughout the U.S. The research estimates the level of congestion in the seven largest Texas urban areas and 43 other areas representing a cross-section of urban areas throughout the country. The database used for this research contains vehicle miles of travel, urban area information, and facility mileage data from 1982 to 1990. Various federal, state, and local agencies provided the information used to update and verify the primary databases--the FHWA Performance Monitoring System. Vehicle miles of travel and lane mile data were combined to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. These

RCI values provide an indicator of the relative mobility level within an urban area. An analysis of the impacts and cost of congestion was also performed using travel delay, increased fuel consumption, and additional facility lane miles as measures of urban mobility. Congestion costs were estimated on an areawide, per registered vehicle, and per capita basis. For example, Washington, DC is reported as having the highest cost per registered vehicle at \$1,420, while San Bernardino-Riverside has the highest cost per capita at \$880. Some of the findings state that the cost of congestion in the 50 urban areas studied exceeded \$43.2 billion in 1990. Thirteen areas had costs greater than or equal to \$1 billion (74 percent of the congestion costs of the 50 areas studied).

**FTA Leadership 1993. ISTEA and Beyond.** FTA Office of Policy, Menczer W, TBP-10; prepared for the FTA, 1993, 17pp. Report No. FTA-TBP-10-93

Available from:  
Federal Transit Administration  
Office of Policy, TBP-10  
400 7th Street, SW, Room 9100  
Phone 202/366-4060; FAX 202/366-7116  
Order No. FTA-TBP-10-93-1

This brochure highlights key actions and achievements affecting transit during 1992 and 1993 in implementing the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). Its purpose is to encourage state and local officials in their continued efforts to implement the ISTEA goals of providing transportation that is economically efficient and environmentally sound, providing the foundation for the Nation to compete in the global economy, and moving people and goods in an energy efficient manner. Eight major themes of ISTEA are highlighted in this brochure: Flexibility, Planning, Intermodalism,

Innovation, Environment, Investment Strategies, New Partnerships, and Transit Safety and Security. In each area, the brochure outlines the steps FTA has taken to implement ISTEA goals. The brochure highlights the flexible funding transferred to transit, over \$400 million in FY 1993.

**FY 1993 Statistical Summaries. Grant Assistance Program.**

FTA Office of Grants Management, (Tucci J, TGM-10); February 1994, 149pp. Report No. FTA-TGM-10-04-1

Available from:  
Federal Transit Administration  
Office of Grants Management, TGM-10  
400 7th Street, SW, Room 9301  
Washington, DC 20590  
Phone 202/366-2053; FAX 202/366-7951  
Order No. FTA-TGM-10-94-1  
or  
NTIS Order No. PB 165016

This annual report presents selected analyzed data on the distribution and use of various program funds administered by the FTA, Department of Transportation. 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 is presented in tables, charts, and graphs and applies only to FTA programs. Overall the FTA obligated in FY 1993 \$4.4 billion for various grants. Of the total obligated in FY 1993, 78 percent was programmed for capital purposes; 20 percent for operating expenditures; and the remaining 2 percent for planning assistance. The number of vehicles budgeted in FY 1993 totaled 5,239. Excluding Stark-Harris (II) grants, urbanized areas with

populations over 1 million received 74 percent of the total grants obligated.

**Journey-To-Work Trends in the United States and Its Major Metropolitan Areas, 1960-1990.**

Volpe National Transportation Systems Center, Rossetti MA, and Eversole BS; prepared for the FHWA Office of Highway Information Management (Jarema F, HPM-40), November 1993, 245pp. Report No. FHWA-PL-94-012

Available from:

Federal Highway Administration  
Office of Highway Information Management  
400 7th Street, SW, HPM-40, Room 3306  
Washington, DC 20590  
Phone 202/366-0160  
Order No. FHWA-PL-94-012

This Trends report explores commuting behavior on both a national and metropolitan area basis from data drawn from the U.S. Decennial Census. The report updates and expands the 1986 Trends report and documents the changes that have occurred from 1960 to 1990 in population and demographics, worker characteristics, means of travel to work, household vehicle availability, and geographic revisions in the U.S. and its 39 metropolitan areas with over one million inhabitants in 1990. The thirty-year trend from 1960-1990 was examined along with recent trends, from 1980-1990. The report structures information on three levels: metropolitan, central county, and suburban county data. The Profiles section presents individual journey-to-work profiles of 39 metropolitan areas that include a *map* showing the geography, county boundaries, and central cities for each area, and a *1990 statistical profile* data sheet. National Summary Statistics (1990) profiles for the U.S., as a whole, is also included, and readers

can obtain local commuting and demographic statistics from these profiles. The appendices provide details on additions and deletions of counties resulting from geographic revisions. The ten year trends, 1980-1990, show that: the U.S. population increased by 9.8 %, from 227 million to 248 million people; solo drivers (commuters) increased from 64 % to 73%; transit use fell from 6.22% in 1980 to 5.12% in 1990; walking to work people decreased from 5.4 million to 4.5 million; the percentage of persons using carpools declined 32%; number of vehicles per household grew only 5%, from 1.61 to 1.66; vehicles per worker declined from 1.34 to 1.32; and the number of metropolitan areas increased from 34 to 39 areas (six additions, one deletion, Dayton/Springfield).

**McTrans: Center for Microcomputers in Transportation Catalog 1994 and Newsletter.**

University of Florida, Center for Microcomputers in Transportation, Transportation Research Center; 1994 Catalog, 95pp.; and McTrans Newsletter, Volume 8, Number 3, March 1994.

Available from:

Transportation Research Center  
University of Florida  
512 Weil Hall  
Gainesville, Florida 32611-2083  
Phone 904/392-0378; MCFAX 904/392-3224  
Order by Title

McTrans (Center for MicroComputers in Transportation) is a software distributor and user support center originally established by the FHWA and supported by the FTA. The McTrans Center provides support to microcomputer users through technical assistance of the software it distributes. McTrans aims to serve as the Nation's primary center for technical support and distribution of

highway transportation and transit software. McTrans answers questions on a variety of subjects, such as the program available for your needs; the kind of computer to purchase to run your software; and help with specific programs. This annual catalog lists their products and services accordingly: Highway Engineering; Traffic Engineering; Transit; Transportation Planning; General Interest; New Products; and Updates since June 1993. McTrans also publishes a quarterly newsletter which updates and provides a listing of new and improved research products. Upcoming improvements will include improvements in the 24-hour electronic bulletin board called McLink, 904/392-3225. The McTrans catalog can be obtained free of charge, upon request, as a paperback or as a catalog-on-disk (McFinder).

**National Transit Geographic Information System: A Component of the National Transportation System.**

FTA Office of Mobility Enhancement (Kulyk W, TTS-10), 1994, 6 pp.

Available from:

Federal Transit Administration  
Office of Mobility Enhancement, TTS-10  
400 7th Street, SW, Room 6431  
Washington, DC 20590  
Phone 202/366-9267; FAX: 202/366-3765  
Order No. FTA-TTS-10-94-1

This brochure is intended to inform the transportation community and the general public that the FTA is developing a National Transit Geographic Information System (GIS) incorporating user-friendly, personal computer software technology. The GIS will have the capability to display inventory and other selected data of fixed public transit facilities in the U.S., as well as to display information of other transportation facilities including highways, airports, marine ports, freight and

passenger rail systems. The Transit GIS will facilitate the exchange of information among the modal administrations and the transit industry. It will also enable managers at all levels in the Department of Transportation and the transit industry to analyze and retrieve existing transit inventory data, and project and program information. The Transit GIS will be a component of the National Transportation System and will enhance the National Spatial Data Infrastructure.

**Technical Assistance Briefs and Brochures of the FTA Office of Technical Assistance and Safety: National Planning and Research Program.**

The FTA Office of Technical Assistance & Safety, TTS, 1994.

Available from:

Federal Transit Administration  
Office of Technical Assistance and Safety  
400 7th Street, SW, Room 6100  
Washington, DC 20590  
Phone 202/366-0207; FAX 202/366-3765  
Order by Title

The Technical Assistance Briefs and Brochures are published periodically and are a good reference tool for transit professionals and others interested in transit research and planning programs. The purpose of the briefs is to provide the transit community and the general public with information on the current activities of the program areas of the FTA National Planning and Research Program.

***Advanced Public Transportation Systems (APTS)***

Brochure, APTS Program, 1994.

Brief 2, Evaluation Guidelines, Summer 1993.

Brief 3, Minnesota Guidestar Travlink Operational Test, January 1994.

Brief 4, California Advanced Public Transportation Systems, February 1994.  
Brief 5, Bellevue Smart Traveler, March 1994.

### ***Clean Air***

Brief 8, Clean Air Program, Summer 1994.  
Guide to the Congestion Mitigation and Air Quality Improvement Program (CMAQ).

### ***Finance***

Brochure, Intermodal Surface Transportation Efficiency Act (ISTEA): Flexible Funding Opportunities for Transit '94, 1994.  
Brochure, Turnkey Demonstration Program and Implementation Strategy. Design/Build: A New Approach, 1994.  
Brochure, FTA Leadership 1993. ISTEA and Beyond, 1993

### ***FTA Strategic Plan***

Brochure, July 1994.

### ***Geographic Information Systems (GIS)***

Brochure, Spring 1994.

### ***Livable Communities***

Brochure, Spring 1994.

### ***Safety and Security***

Brochure, Alcohol Drug Rules: Overview, February 1994.  
Brief 1, Drug and Alcohol Testing, Spring 1993.  
Brief 3, Emergency Preparedness Guidelines for Transit Systems, Spring 1994.  
Brochure, Identification of Drug Abuse in the Workplace: Interactive Program, 1994.  
Brochure, Transit Safety and Security Bulletin Board, 1994.

### **Transit Planning and Research Programs: Fiscal Year 1993 Project Directory.**

FTA Office of Technical Assistance and Safety, Rodano E, TTS-5; April 1994, 85pp.  
Report Number FTA-TTS-5-94-1

Available from:

Federal Transit Administration  
Office of Technical Assistance and Safety  
400 7th Street, SW, Room 6100  
Washington, DC 20590  
Phone 202/366-0201; FAX 202/366-3765  
Order No. FTA-TTS-5-94-1

or

NTIS Order No. PB94-180726

This Directory contains brief descriptions of Transit Planning and Research Projects initiated during Fiscal Year 1993 by the Federal Transit Administration. Its purpose is to inform the public and 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 and Security, Technology Development, Transit Accessibility, Planning and Project Development, Transit Cooperative Research Program, and the National Transit Institute.

### **Transit Planning and Research Reports: Annotated Bibliography.**

FTA Office of Technical Assistance and Safety, Drancsak M, TTS-5, November 1993, 53pp.  
Report No. FTA-TTS-5-93-2

Available from:

Federal Transit Administration  
Office of Technical Assistance and Safety  
400 7th Street, SW, Room 6100  
Washington, DC 20590

Phone 202/366-0201; FAX 202/366-3765  
Order No. FTA-TTS-5-93-2

This annotated bibliography presents the most current and available project reports, as of November 1993, sponsored by the FTA. The bibliography is a reference tool designed to provide easy and rapid access to FTA sponsored project reports. The intent is to keep the transit industry and the general public well-informed of the FTA planning and research activities. Each report referenced in this document consists of a bibliographic entry accompanied by a report availability statement and a summary description of the project report. The index includes keywords that have been extracted from the full-text reports as well as from the summary descriptions cited in this bibliography. The final section contains a report order form and an evaluation form as well as a request for future editions of the FTA Annotated Bibliography.

**Transit Profiles of Agencies in Urbanized Areas Exceeding 200,000 Population: For the 1992 Section 15 Report Year.**

DIGICON Corporation, Black TN; prepared for the FTA Office of Grants Management (Barnes L, TGM-10), December 1993, 315pp. Report No. FTA-MD-26-9002-93-2

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-178332

This statistical report summarizes the financial and operating data submitted to the FTA by the Nation's public transit operators, pursuant to Section 15 of the Federal Transit Act, as amended. The publication consists of individual profiles for each reporting transit agency located in an urbanized area with a population exceeding 200,000. Each profile

consists of general and summary data, as well as modal, performance, and trend indicators about a particular transit system for the 1992 report year. Basically, the Transit Profile report provides a comprehensive overview in graphic and summary format of an individual transit agency's financial and operating statistics for the 1992 Section 15 report year and summaries of key data trend line items for prior years. This Profile report eliminates the user task of assembling data from numerous tables. All data in this report are for transit system fiscal years ending on or between January 1 and December 31, 1992.

**Transit Profiles of Agencies in Urbanized Areas With a Population of Less Than 200,000 For the 1992 Section 15 Report Year.**

DIGICON Corporation, Black TN; prepared for the FTA Office of Grants Management (Barnes L, TGM-10), December 1993, 237pp. Report No. FTA-MD-26-9002-93-3

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-175205

This statistical report summarizes the financial and operating data submitted to the FTA by the Nation's public transit operators, pursuant to Section 15 of the Federal Transit Act, as amended. The publication consists of individual profiles for each reporting transit agency located in an urbanized area with a population less than 200,000. Each profile consists of general and summary information, as well as modal, performance, and trend indicators about a particular transit system. Sources of operating funds and sources of capital funds expended are portrayed on pie charts for each agency. Basically, the report provides a comprehensive overview in graphic

and summary format of an individual transit agency's financial and operating statistics for the 1992 Section 15 report year and summaries of key data trend line items for prior years.

**Transit Profiles Of The Thirty Largest Agencies: The 1992 Section 15 Report Year.** DIGICON Corporation, Black TN; prepared for the FTA Office of Grants Management (Barnes L, TGM-10), December 1993, 84pp. Report No. FTA-MD-26-9002-93-1.

Available from:  
National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-152022

This Section 15 report summarizes the financial and operating data submitted to the FTA by the Nation's public transit operators, pursuant to Section 15 of the Federal Transit Act, as amended. These data represent a portion of the 1992 Annual Report and consist of 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. Each agency profile provides general information (size of urbanized area, service area, service supplied, service consumed, and the number of vehicles operated in maximum service); and financial information (sources of operating funds, summary of operating expenses, sources of capital funds expended, and uses of capital funds; and transit system characteristics by mode). Specific financial and service characteristics, as well as capital funding and performance measures are listed for each mode. All data in this report are for transit system fiscal year ending on or between January 1 and December 31, 1992.

**Transit Research Abstracts 1993.**

Transportation Research Board, Urban Mass Transportation Research Information Service; prepared for the FTA Office of Technical Assistance, (Drancsak M, TTS-5), October 1993, Volume 11, 404pp. Report No. FTA-DC-26-0022-93-1

Available from:  
Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Copy \$75 for U.S., Canada and Mexico  
\$78 for Others.  
Order by Title

This 1993 edition of the *Transit Research Abstracts* features 1,371 abstracts of published research reports and 488 summaries of ongoing research projects for all modes of public transit. It is published annually by the Urban Mass Transportation Research Information Service (UMTRIS) of the Transportation Research Board (TRB). UMTRIS, founded in 1981 and sponsored by FTA, is the TRB administered computerized online database on worldwide transit research. It covers all phases of conventional, new and automated transit. Material is selected from contemporary worldwide sources and covers a broad spectrum of public transit information ranging from conventional bus and rail systems to advanced and accessible public transit systems, advanced technologies, demand management, alternative fuels, clean air, and community, regional, rural and specialized transit. All citations in this and previous editions have been retrieved from the UMTRIS database and are available online to users of DIALOG Information Services File 63. For additional information, contact Jerry Maddock, Manager of TRB Information Services, at 202/334-2995.

## PLANNING AND PROJECT DEVELOPMENT

### **Designing for Transit: Manual for Integrating Public Transportation and Land Development in the San Diego Metropolitan Area.**

Metropolitan Development Board, Lieberman W; prepared for the FTA Office of Planning (Emerson D, TGM-20), 1993, 50pp. Report No. FTA-TGM-20-93-1

Available from:

Federal Transit Administration  
Office of Grants Management, TGM-20  
400 7th Street, SW, Room 9301  
Washington, DC 20590  
Phone 202/366-2360; FAX 202/366-7951  
Order No. FTA-TGM-20-93-1

This manual was designed to help planners, developers, architects, and engineers understand the physical requirements of public transit. The manual consists of 5 sections. The introduction provides background material on transit in the San Diego region and the need for its coordination with land development. Section 2 presents some guidelines on how to design more transit-oriented communities. It explains how to make residential and commercial areas more conducive to walking and to the use of buses and light rail. The next two sections provide specific design standards for public transportation facilities and vehicles, one section for bus transit and one for light rail. The final section of this manual discusses how to establish local government policies that can foster transit-oriented communities. The manual will be updated periodically.

### **Innovations in Public Involvement for Transportation Planning. Notebook.**

FHWA Office of Environment and Planning (Heanue KE, HEP-1), and the FTA Office of Planning (Weeks J, TGM-20); prepared for State Agencies, Metropolitan Planning Organizations, and other Public Involvement Agencies, January 1994, 14 leaflets. Report No. FTA-TGM-20-94-1.

Available from:

Federal Transit Administration  
Office of Grants Management, TGM-20  
400 7th Street, SW, Room 9301  
Washington, DC 20590  
Phone 202/366-2360; FAX 202/366-7951  
Order No. FTA-TGM-20-94-1

Federal regulations to implement the ISTEA of 1991 call for proactive public involvement processes that respond not only to the requirements of ISTEA but also to those of related Federal acts, such as the Clean Air Act and the Americans With Disabilities Act. This notebook contains a set of 14 leaflets, each briefly describing a different technique of public involvement suited to both metropolitan and statewide planning. It was prepared to support the public involvement processes required by the ISTEA and is intended to serve as a guide for transportation planners, citizens, public officials, and transportation providers. The set of notebook pages introduces agencies to some practical techniques of public involvement that can be used in a variety of situations. Each leaflet outlines the fundamentals of a technique along with its advantages or drawbacks, its potential applications and uses, its utility to agencies and citizens, and its resource requirements. Examples of how these techniques are being applied across the country are included in this

guidebook, along with phone numbers for agencies where the technique is being used.

**Innovations in Travel Behavior Analysis, Demand Forecasting, and Modeling Networks. Transportation Research Record No. 1413. Planning and Administration.** Transportation Research Board, National Research Council; 1993, 16 papers, 158pp. Report No. TR Record 1413

Available from:  
Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Order No. TR Record 1413

The research papers in this Record are grouped into 4 topic areas: travel behavior models and simulation; modeling telecommunications attitudes and preferences; mode choice applications; and transportation planning modeling and applications. Papers in the travel behavior models and simulation area address estimation of discrete travel choice models with no randomly distributed variables with time, a simulation model of activity scheduling behavior, and simulation for laboratory studies of the dynamics of commuter behavior under real-time information. Papers in the telecommunications area are focused on a stated preference approach to modify the adoption of telecommuting, employee attitudes and preferences toward telecommuting, and a choice model of employee participation in telecommuting. Papers in the mode choice area cover modeling rail access mode and station choice, central area mode choice and parking demand, and appreciation of nested logit models of intercity mode choice. Papers in the transportation planning modeling area describe a new structure for transportation planning models; application of a geographic information system-based modeling system to a

regional transportation problem; specification, estimation, and validation of a new trip generalization model; a new equilibrium assignment model; and a study of the geometric properties of vehicle routes that carry shipments of variable size. This is a Transportation Research Board peer-reviewed publication.

**Innovations in Travel Survey Methods. Transportation Research Record No. 1412. Planning and Administration.** Transportation Research Board, National Research Council; 1993, 12 papers, 101pp. Report No. TR Record 1412

Available from:  
Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Order No. TR Record 1412

The 12 papers in this Record present a variety of innovative techniques to monitor, collect, and disseminate travel survey information. Several papers focus on techniques of collecting travel information, such as travel diaries, origin-destination surveys of households and expansion weighting procedures to generate population estimates, factoring procedures to eliminate nonresponse bias, a two-staged household survey mail back questionnaire, and an analysis of under reporting of trips in telephone interviews. Also in this Record are papers reporting the results of video and computer applications. Video imaging technology to collect flow rate data is described; the effective use of video when roadside interviews are not possible is discussed; and the practice of image processing for the segmentation and matching of vehicles in road images is explained. Computer applications include a survey system that uses a touch-screen interface to elicit data on user

satisfaction and a data acquisition system that employs tape switch sensors on the roadway. The overall effectiveness of entering information from a telephone interview survey directly into a computer file is also studied.

### **Measuring State Transportation Program Performance.**

Transportation Research Board, Reed MF, Luettich RA, and Lamm LP; prepared for the FHWA, 1993, 102pp.  
Report No. NCHRP Report 357.

Available from:

Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Order No. NCHRP Report 357

This report contains a compendium of program performance measures and indicators commonly used by state departments of transportation. A commentary is provided that puts the performance measures in an appropriate context and assists in their use. In addition, a supplemental report is included that contains discussions of methodologies and the merits and pitfalls of comparing the performance of state departments of transportation. Top level managers and, in particular, chief administrative officers and new managers will find both reports useful in developing processes for assessing the current condition and continuing performance of their departments of transportation.

### **New Approaches to Travel Forecasting Models. A Synthesis of Four Research Proposals.**

Volpe National Transportation Systems Center (DTS-49), Spear BD; prepared for FHWA, FTA, Office of the Secretary, and the Environmental Protection Agency, January 1994, 34pp.

Available from:

Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-15

This report summarizes 4 approaches proposed by transportation consultants on how transportation planning models should and could be improved. New approaches can meet new forecasting requirements, address the impacts of new transportation technology, and exploit the travel behavior theory and methodology that has developed over the past two decades. This document identifies common themes in the approaches and elements missing from some approaches, with the aim of developing a research plan for future models. The topics highlighted include microsimulation approaches to travel demand forecasting, dynamic assignment models, use of geographic information systems (GIS) as a platform for forecasting models, and linkages between travel demand and mobile emissions models.

### **Review Of The Transportation Planning Process In The Minneapolis-St. Paul Metropolitan Area.**

Volpe National Transportation Systems Center, Lyons W, Brodesky R, Goodman C, and Salvucci F; prepared for the FTA Office of Planning (Burns D, TGM-20) and the FHWA, November 1993, 66pp.  
Report No. FTA-MA-08-9030-93-6

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/ 487-4650; FAX 703/ 321-8547  
NTIS Order No. PB94-142718

This formal, comprehensive review of the planning process in the Minneapolis-St. Paul

(Twin Cities) metropolitan area, conducted by the FHWA and FTA headquarters and regional staffs, with input from state, regional, and local transportation agencies, takes the place of the 1992 planning review of the Twin Cities metropolitan planning organization (MPO). The report states that the MPO conducts a competently managed and organized continuing, cooperative, and comprehensive (3-C) planning process, produces adequate planning products, and uses acceptable planning tools. Efforts are underway to implement a multimodal planning approach. The Federal review team's observations and suggestions on each segment of the planning process are documented in this report and intended to improve the planning process. The MPO is beginning to address the changing requirements and policies of the new law, namely, the Clean Air Act Amendments of 1990 and ISTEA. Suggestions are made to strengthen the process in developing the next long-range transportation plan, transportation improvement program, and State implementation plan. The last section of this report focuses on planning related to the evolving requirements of ISTEA, discusses issues, and provides recommendations.

**Review Of The Transportation Planning Process In The Houston Metropolitan Area.**

Volpe National Transportation Systems Center (VNTSC); prepared for the FTA Office of Planning (Burns D, TGM-20) and the FHWA, July 1993, 64pp.

Report No. FTA-MA-08-9030-93-5

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161

Phone 703/ 487-4650; FAX 703/ 321-8547

NTIS Order No. PB94-143211

The self-certification process, a prerequisite for receiving federal funds for transportation

projects and planning, requires the state and the MPO to jointly certify that the urban transportation planning process (UTPP) is in conformance with Federal regulations that encompass transit, highway, and air quality planning. This report presents the formal, comprehensive review of the planning process in the Houston metropolitan area conducted by the FHWA and FTA headquarters and regional staffs, with input from state, regional, and local agencies. The purpose of the review was to allow the FHWA and the FTA to determine how successfully the UTPP addresses regional transportation needs, whether the planning process meets the requirements of the joint planning regulations, and whether existing practices are adequate to address the new responsibilities placed on the planning process and the MPOs by the Clean Air Act Amendments and the Intermodal Surface Transportation Efficiency Act (ISTEA). Based on requirements in effect prior to ISTEA, the MPO was found to conduct a competently managed and organized continuing, cooperative, and comprehensive (3-C) planning process, to produce adequate planning products, and to use acceptable planning tools. The Federal review team observations and suggestions on each segment of the planning process are listed and intended to improve the process and to provide guidance on addressing ISTEA planning requirements. The appendices provide a listing of the planning review participants, copy of the agenda, and documentation provided by the Houston regional agencies.

**Review of the Transportation Planning Process in the Southern California Metropolitan Area.**

Volpe National Transportation Systems Center; prepared for the FTA Office of Planning (Burns D, TGM-20) and the FHWA, August 1993, 75pp.

Report No. FTA-MA-08-9030-93-3

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-142783

The state and the MPO are required to self-certify that the UTPP is in conformance with Federal regulations. This report documents the review of transportation planning in the Southern California metropolitan area that was conducted by the FHWA and the FTA headquarters and regional staffs. The purpose of the review was to determine how successfully the UTPP addresses regional transportation needs, whether the planning process meets the requirements of the joint planning regulations, and whether existing practices are adequate to address the new responsibilities placed on the planning process and the MPOs by the Clean Air Act Amendments and the ISTEA. This evaluation report summarizes the results of the review and concludes with a series of the Federal review team findings and suggestions on the planning practices. Based on the review, the Federal team concluded that the continuing, cooperative, and comprehensive (3-C) planning process produced adequate planning products and used acceptable tools. The report provides suggestions to strengthen the process in developing the next long range transportation plan, transportation improvement program and the state implementation plan.

#### **Review of the Transportation Planning Process in the Pittsburgh Metropolitan Area.**

Volpe National Transportation Systems Center; prepared for the FTA Office of Planning (Burns D, TGM-20) and the FHWA, March 1993, 54pp.  
Report No. FTA-MA-08-9030-93-4

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-141876

This report, the fourth in a series, presents a comprehensive review of the planning process in the Pittsburgh metropolitan area that was conducted by the FHWA and FTA headquarters and regional staffs. It takes the place of the 1992 planning review of the Pittsburgh metropolitan planning organization (MPO). The purpose of the review was to determine how successfully the UTPP addresses regional transportation needs, whether the planning process meets the requirements of the joint planning regulations, and whether existing practices are adequate to address the new responsibilities placed on the planning process and the MPOs by the Clean Air Act Amendments and the Intermodal Surface Transportation Efficiency Act (ISTEA). The review team findings state that the Southwestern Pennsylvania Regional Planning Commission has been in conformance with the regulations set forth in 23 CFR Part 450; and the MPO conducts a competently managed and organized 3-C planning process. This report contains the Federal review team observations and suggestions on each segment of the planning process, namely: Organization and Management of the Planning Process; Products of Planning Process; The 3-C Transportation Planning Process; Tools for Transportation Planning; and Ongoing Transit Planning.

**Transit Supportive Development in the United States: Experiences and Prospects.**  
University of California, Berkeley, National Transit Access Center, Cervero R; prepared for the FTA University Research and Training Program (Weeks D, TGM-20), December 1993, 250pp.

Report No. FTA-CA-26-0017-93-1

Available from:

Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-08

The purpose of this research is to increase the knowledge base of transit-oriented designs as a viable approach to increasing transit usage and reducing automobile dependency. "Transit supportive developments," as used in this report, refer to site designs and land-use patterns conducive to transit riding and walking. This report examines recent experiences in the U.S. with transit supportive development projects, which, by design, give attention to the particular needs of transit users and pedestrians. The study focuses on experiences in the suburbs and exurbs of large metropolitan areas which are served only by bus transit. Assessments were carried out on three levels: individual sites, neighborhoods, and communities. The study gives particular emphasis to implementation issues, noting how recent market and regulatory factors have influenced the transit-supportive design movement. This report discusses the national site-level survey of 165 U.S. transit agencies regarding local real estate projects friendly to

transit users and pedestrians, and transit supportive guidelines for urban design. Based on the national survey results, very few real estate projects were identified as transit supportive; one-quarter of the surveyed agencies had guidelines; over 40 percent of guidelines set standards for transit facility design, but only 10 percent had any standards for urban design or land use planning. Overall, transit supportive designs were found to be helpful and well intentioned, but meaningless without good quality transit and rideshare services, as well as proactive measures that reduce auto dependency. To date, the transit supportive design movement has had a larger impact on the public rather than the private sector. Auto oriented vs transit oriented neighborhoods in the San Francisco Bay Area and Southern California are compared in terms of commuting behavior. A Euro-American perspective is presented on the influence of community form and planning principles on travel behavior. The European experience shows that having good quality rail or dedicated line haul service is the key to luring commuters out of their cars. The final chapter in this report summarizes the research results, draws policy insights from the findings, and makes recommendations on how best to promote transit-supportive developments in the future.

## POLICY ANALYSIS AND EVALUATION PROGRAM

### **Impact of Community Design on Transportation. A State Transportation Policy Initiative**

University of South Florida, Florida Center for Community Design and Research, (Stallsmith E, TTS-10), November 1993, 257pp.

Available from:

University of South Florida  
Florida Center for Community  
Design and Research  
3702 Spectrum Boulevard, Suite 180  
Tampa, Florida 33612  
Phone 813/974-4042; FAX 813/974-6023  
Order by Title

This report is one of a series of publications resulting from Phase I of the State Transportation Policy Initiative, a multiphase study to reevaluate the way transportation infrastructure and services are planned and developed at the state and local levels in Florida and to formulate options for implementing the requirements of the ISTEA. The document summarizes a project that explored the relationship between community form, function and character, and transportation systems. Eighteen case studies were developed, representing eight different development types. Two case studies were developed for each of the following eight development types: Pre-20th Century Urban Centers; Pre-World War II Suburbs; New Towns; Planned Unit Developments; Mixed Use Activity Centers; Neo-Traditional Town Planning; Urban Service Areas/Urban Growth Areas; and Sprawl. In each type, one case study was located within Florida and the second one outside the State but within the continental U.S. Each case study is a 10-page

presentation. Physical and dimensional characteristics of each case are described, followed with a longer description of the relationship between the community form, organization and function, and transportation systems. The concluding section discusses the similarities and differences among all cases and summarizes the project findings. Although the cases do not represent every developmental pattern within the U.S., they do cover the majority of conditions under which most Americans dwell, and the major methods whereby development occurred.

**Report on Funding Levels and Allocation of Funds. Report of the Secretary of Transportation to the United States Congress Pursuant to Section 3(j) of the Federal Transit Act, as Amended.** FTA Office of Policy (Day J, TBP-10); prepared for the U.S. Congress, April 1994, 280pp.

Report No. FTA-TBP-10-94-1

Available from:

Federal Transit Administration  
Office of Policy, TBP-10  
400 7th Street, SW, Room 9300  
Washington, DC 20590  
Phone 202/366-4060; FAX 202/366-7116  
Order No. FTA-TBP-10-94-1  
or  
NTIS Order No. PB94-167384

The *Report on Funding Levels and Allocation of Funds* is the annual report to Congress required by Section 3(j) of the Federal Transit Act. It provides the Department of Transportation recommendations to Congress for the allocation of FY 1995 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 line or a busway/high occupancy vehicle (HOV) facility, are referred to as *New Starts* and considered to be major capital investments. The first section of this report discusses the budget proposal, New Starts policy and principles including the new Major Capital Investment Policy, projects recommended and not recommended for FY 1995 funding, and a summary Table of FY 1995 New Starts Ratings. The five projects recommended for FY 1995 New Starts funding, a total of \$397 million, are the following: Dallas/South Oak Cliff, Texas; Los Angeles/MOS-3, California; New York/Queens, New York; Portland/Westside, Oregon; and St. Louis/Metrolink, Missouri. Appendix A contains the *Requirements of Section 3(j) of the Federal Transit Act, as amended by ISTEA*. Appendix B, *New Starts Project Profiles*, provides background information to support FY 1995 funding including profiles of approximately 72 projects in various stages of development, i.e., under construction, final design, preliminary engineering, alternative analysis, and in system planning.

**Planning and Programming, Land Use, Public Participation and Computer Technology in Transportation.** **Transportation Research Record No. 1400.** Transportation Research Board; prepared for FTA Office of Mobility Enhancement, (Arling B, TTS-10), 1993, 112pp. Report No. TR Record 1400

Available from:

Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Order No. TR Record 1400

The 16 papers in this volume focus on planning and programming, public involvement, and transportation land use interactions and computer technology in transportation. The planning and programming papers focus on new procedures for priority ranking of highway projects; alternative performance measures, with more emphasis on human factors; a statistical appraisal method for programming projects; and a network procedure for optimization of capital budgeting. In the area of public involvement in transportation planning, existing practices are discussed and new approaches are suggested for integrating the public into agency decisionmaking; constituency groups and their effects on traditional transportation advocacy groups are examined; state approach to public involvement is detailed; and a methodology and its application in a case study of citizen participation is described. The papers on transportation and land use include an assessment of the concepts of local and regional accessibility to test the implications for shaping travel alternatives of alternative forms of development; an examination of the claim that transportation benefits can be delivered through nontraditional neighborhood design; a test sampling of surveying methodologies for statistically reliable trip characteristic surveys of land development; a study of residential choice to determine whether residents choose to live at densities necessary to support various types of transit service; and a discussion of the effects of proximity to light rail transit stations on the value of single family homes. The three remaining papers focus on computer technology, namely, a trial program undertaken by a state DOT to use pen-based computers for job-site data acquisition, technology transfer applications using the electronic bulletin board system, and the effect of downsizing information technology on engineering operations.

## REGIONAL MOBILITY

### **Business Community Transportation Management Program: Lessons from Charlotte, North Carolina.**

Charlotte Uptown Development Corporation, Uptown Transportation Council; prepared for the FTA Office of Policy (Hedges C, TBP-30), November 1993, 18 pp.  
Report No. FTA-NC-06-0011-93-1

Available from:  
Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-07

This brief report summarizes the activities, findings, conclusions and recommendations from a 27-month project (1989-92) involving federal funds and the private non-profit business development group in uptown Charlotte. Funds were used to support the Charlotte Uptown Development Corporation (CUDC) Transportation Management Organization (TMO), and the Uptown Transportation Council (UTC). The project's goal was to increase employer awareness and participation in transportation management activities. The methods used included routine meetings of selected Employee Transportation Coordinators (ETC), occasional education and training sessions for Chief Executive Officers of local businesses, and development of special materials and information packages. The group served as a catalyst for a transit terminal feasibility study, a transit mall study, zoning ordinance revisions, and investigations of changes to regional bus services. A variety of improvements in parking management practices also resulted. Some of the lessons

learned were: that a business community approach to problem solving could be successfully applied to transportation management; and that employer-based working relationships formed through the ETCs have been very productive in uptown Charlotte. The UTC and CUDC intend to continue work with the ETC program.

**Case Study of the Denver Regional Transportation District ECO Pass Program.**  
Volpe National Transportation Systems Center; prepared for the FTA Office of Mobility Enhancement (McKeown S, TTS-10), November 1993, 76pp.  
Report No. FTA-MA-26-0006-94-1

Available from:  
Federal Transit Administration  
Office of Technical Assistance and Safety  
400 7th Street, SW, Room 6107  
Washington, DC 20590  
Phone 202/366-0244; FAX 202/366-3765  
Order No. DOT-VNTSC-FTA-93-7

This case study report documents the Denver Regional Transportation District (RTD) ECO Pass Program and evaluates its impacts. The main goal of the ECO Pass Program is to increase transit ridership. ECO Pass is an annual, unlimited-use photo identification pass covering transportation on all RTD transit routes. Employers in Denver may purchase passes for their employees as a tax-free benefit and may deduct the cost as a business expense. The program uses a group insurance concept for pricing and enrollment. A typical transit commuter may save up to \$900 in monthly passes or \$1,200 in cash fares annually. ECO Pass users are assured a ride home in an

emergency through a guaranteed ride home program. RTD has been enrolling a number of employers in ECO Pass since its inception in 1991. Although ECO Pass seems to be an example of a rather successful and creative program for increasing transit ridership in the Denver region, the evaluation could draw no clear-cut and objective conclusions because no data collection mechanism was implemented simultaneously with the program. ECO Pass appears to have influenced some people to shift to transit commuting, but more information is needed to quantify the impacts and to determine which factors are critical in producing positive impacts. The report recommends that the Denver RTD establish an appropriate data collection mechanism to permit a thorough and quantitative evaluation of this innovative program in the future.

#### **Corporate Amenities, Trip Chaining, and Transportation Demand Management.**

The Transportation Management Association Group/City of Brentwood TN; prepared for the FTA Office of Mobility Enhancement (Stallsmith E, TTS-10), March 1994, 158 pp. Report Number FTA-TN-08-7002-94-1.

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-163110

Trip chaining is the act of linking one or more trips onto the morning or evening commute trip. The purpose of this study was to examine the impacts of trip chaining and onsite corporate amenities on transportation demand

management (TDM) measures. This study begins with an examination of the phenomenon of trip chaining and concludes with an analysis of worksite amenity use by commuters as a substitute for trip making. Trip chaining data from several locations were reviewed to establish an understanding of trip chaining behavior and the impact on commute alternatives. The report defines and explores the concept of onsite amenities and services as a substitute for trip making during, before, and after the work day. Amenities such as cafeterias, child care facilities, banking and others are examined. The methodology used to observe how employee use of onsite services and amenities relate to trip making included conducting interviews with senior management, and the distribution and use of a weekly employee Activity Diary by the employees of two participating suburban companies (Comdata Corporation and Service Merchandise Company). Diary survey results are presented and include a demographic profile of respondents at both companies as well as information on commute travel behavior and onsite activity behavior of the respondents. The final chapter of this report provides policy recommendations in the areas of land use, air quality, corporate policy, as well as suggestions for future research. In summary, the study examined commute trip chaining and the impact of its relationship on site amenities and concluded that a system of site services and employer incentives will be necessary to bring about behavioral changes that favor shared-ride trip making and successful TDM programs. Travel pattern data reveal that trip chaining creates a strong deterrent to rideshare arrangements.

**Guidance Manual for Implementing Effective Employer Based Travel Demand Programs.**

Comsis Corporation, and The Institute of Transportation Engineers; prepared for the FHWA Office of Traffic Management/IVHS (Berman W, HTV-31), and the FTA Office of Mobility Enhancement (Goodman J, TTS-10), November 1993, 123pp.  
Report No. DOT-T-94-05

Available from:  
Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-05

Worksite travel demand management (TDM) has become increasingly accepted as a tool to reduce peak period traffic congestion and air pollution. Many businesses are embracing TDM programs and many states and local areas are encouraging or requiring employers to implement TDM programs at their worksites. Much has been written to guide employers in implementing and marketing TDM programs, but little guidance has been offered on TDM program planning and TDM strategy selection. The primary purpose of this document is to guide employers in selecting TDM strategies. The manual suggests a process for TDM development and implementation and offers guidance on the selection of effective TDM strategies to produce a needed level of trip reduction. The guidance offered will help develop a more effective TDM program in less time and with less frustration. Basically the manual provides an overview of the "big picture" of TDM planning, then guides the user in identifying what strategies make sense and in determining the appropriate measures needed to achieve a desired or required trip reduction. By choosing the right level of effort, the user will

reap the benefits of a successful TDM program with a minimum of time and money expended. The appendices, in this report, provide additional information for moving beyond the basics. This manual is intended to help employers, developers, property owners and managers, transportation management associations, and others (planning or evaluating employer-based TDM programs) to create effective programs that reduce commute trips.

**Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis.**

Comsis Corporation, and The Institute of Transportation Engineers; prepared for the FHWA Office of Traffic Management/IVHS (Berman W, HTV-31), and the FTA Office of Mobility Enhancement (Goodman J, TTS-10), September 1993, 439pp.  
Report No. DOT-T-94-02

Available from:  
Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-02

This is a comprehensive guide and reference manual on the subject of travel demand management (TDM). Much controversy and speculation as to the strength, role, and validity of TDM solutions has led to misunderstandings of the role and potential of TDM. This report is the main product of a study designed to provide the most comprehensive, accurate, and usable guidance on TDM. The report provides the user with a set of materials, statistics, guides and tools of significant value that not only increase the basic understanding of what TDM is, but also on how to design and evaluate programs which will deliver the optimal potential that these strategies can offer. This reference manual has been prepared in

three sections. *Part I: Overview: TDM Programs*--covers definitions and concepts, starting from what TDM is and why it exists, to where it fits in as a transportation strategy, to the types of information that are important and available when working with TDM, to barriers faced in implementation and the path to their remedy. *Part II: Inventory and Review of TDM Measures*--is the most substantial portion of the report. It catalogues and presents detailed information profiles on each of the 11 different categories of TDM measures. *Part III: Synthesis of TDM Findings*--begins the integration process leading toward building of TDM actions into comprehensive programs, i.e., summarizes and interprets the findings on TDM into a synthesis; it is more of a cross-cutting of information and guidance.

**Livable Communities Initiative. Paper.** Federal Transit Administration, Office of Mobility Enhancement (Thomas E, TTS-10 and Stallsmith E, TTS-10), June 1994, 8pp. Report No. FTA-TTS-10-94-1

Available from:  
Federal Transit Administration  
Office of Mobility Enhancement, TTS-10  
400 7th Street, SW, Room 6103  
Washington, DC 20590  
Phone 202/366-0264; FAX 203/366-3765  
Order by Title.

The purpose of this paper is to inform the transportation community that the FTA is launching a multifaceted *Livable Communities Initiative* to encourage active participation in planning and developing transit facilities and services that support community needs; to improve access to jobs, educational opportunities, health care, social services, and recreational facilities; to foster economic opportunity; and to promote a clean, safe and secure environment. This initiative will

demonstrate how transit facilities and services can be physically and functionally related to community needs when the community plays an active role in the local planning and design process for such facilities and services. The objectives of the FTA *Livable Communities Initiative* are: 1) to strengthen linkages between transit and community development planning including land use policies supportive of transit; 2) to stimulate greater involvement in the local planning and design process by neighborhood and community organizations, small and minority businesses, persons with disabilities and other stakeholders who are not currently participants in the process; 3) to increase access to or generate employment through high quality community-oriented transit services and facilities; and 4) to serve as the transportation linkage to the Housing and Urban Development (HUD) Empowerment Zones and Enterprise Communities Program. A \$30 million set-aside for the FY 1995 budget proposal under the Section 3 Discretionary Grants Program for capital projects has been requested. Any public agency with authority to administer a federal grant program is considered an eligible recipient for the purpose of a Section 3 grant. This would include local and state governments, transit agencies, and MPOs. For additional information, contact the FTA Office of Mobility Enhancement at 202/366-0264.

#### **Overview of Travel Demand Management Measures.**

Cosis Corporation and The Institute of Transportation Engineers, in association with Georgia Institute of Technology, K.T. Analytics, Inc., and R.H. Pratt Consultant, Inc.; prepared for the FTA Office of Mobility Enhancement (TTS-10), and FHWA Office of Traffic Management/IVHS (HTV-31), January 1994, 24pp.  
Report No. FTA-TTS-10-94-1

Available from:  
Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-11

This report provides an overview of the travel demand management (TDM) concept and its utility in addressing congestion and air quality problems. This introductory document describes the components of TDM strategies, how they relate to longer term congestion avoidance strategies, and the potential level of impact of successful TDM programs. One section specifically explores the myths and realities of successful TDM programs. The document stresses the importance of commitment, constituency, coordination, and continuity in putting together a successful TDM program. The document should be of particular use to non-transportation executives unfamiliar with the TDM concept.

**Parking Cash Out. A TDM Status Report.**  
K.T. Analytics, Inc.; prepared for the FTA Office of Mobility Enhancement (McKeown S, TTS-10), February 1994, 8pp.  
Report No. FTA-TTS-10-94-1

Available from:  
Federal Transit Administration  
Office of Mobility Enhancement, TTS-10  
Washington, DC 20590  
Phone 202/366-0244; FAX 202/366-3765  
Order by Title

This is a transportation demand management (TDM) status report on the parking cash out concept that addresses employer paid parking (subsidized parking). Studies have identified employer paid parking as an invitation to drive to work alone and at cross purposes with costly public policies designed to reduce traffic congestion, energy consumption, and air

pollution. This report provides an overview of the parking cash out concept including differences that separate it from the general travel allowance, charge parking and other subsidies targeted toward transit or carpool users. Effectiveness and implementation issues are also discussed along with a variety of policy issues related to cash out implementation, namely, legislation, tax codes, and labor agreements. Cost benefit implications for employees, employers, building owners, and developers are directed to planners of cash out programs. Evidence from experience with other parking pricing approaches suggests that the cash out program should be effective in reducing commuter solo driving. The report recommends that future research be focused on the specific effectiveness and implementation issues related to the cash out program. This brief status report should be of interest to planners and agencies considering congestion management and air quality programs.

**RTAP Training Resources Catalog for Rural and Specialized Transit Systems. A Rural Transit Assistance Program of the Federal Transit Administration.**  
RTAP National Resource Center, Community Transportation Association of America; prepared for the FTA National Rural Transit Assistance Program (RTAP), 1994, Notebook.  
Report No. FTA-DC-26-0000-94-1

Available from:  
RTAP National Resource Center  
1440 New York Avenue, NW, Suite 440  
Washington, DC 20005  
Phone 202/628-1480; FAX 202/737-9197  
Hotline 800/527-8279 (voice/TDD)  
Order by Title

This is the fourth update of the *Training Resources Catalog for Rural and Specialized Transit Systems* produced through the FTA

National Rural Transit Assistance Program (RTAP) and administered by the American Public Works Association. The Catalog is a compendium of available training programs and resources that is bound in a loose leaf notebook to facilitate planned annual updates. The goal of the Catalog is to identify rural transit training programs, audio-visual materials and publications that can be used and/or adapted for state and local use. Training products in this Catalog have been gathered from various sources and may need tailoring to fit individual needs. Each chapter consists of separate sections for training programs and training resources. This Catalog consists of an Introduction; Main Text; RTAP Training Network (which lists the names and addresses of State RTAP contacts); Title Index; and a Keyword Index. The main text of this Catalog presents bibliographic descriptions of available training programs and resources for the following 14 categories: 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; and Vehicle Maintenance. This Catalog is a valuable resource for agencies and persons interested in rural and specialized transit.

**Workshop on Transit Fare Policy and Management Research Needs and Priorities. Transportation Research Circular Number 421.**

Transportation Research Board; Turnbull KF, Texas Transportation Institute; prepared for FTA Office of Mobility Enhancement, (Arrillaga B, TTS-10), April 1994, 81pp. Report No. TR Circular 421.

Available from:

Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Order No. T R Circular 421

These proceedings summarize the highlights from the *Workshop on Transit Fare Policy and Management Research Needs and Priorities*, held in the summer of 1993 in Woods Hole, Massachusetts. The three day 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. The results of this workshop are documented in this report and provide the basis for the development of an ongoing research program advancing the state-of-the-practice related to fare policies, fare management, and fare collection methods and technologies. The report documents the following four resource papers delivered at the conference: *Transit Fare Issues in the 1990s*; *Evolving Fare Technologies*; *Transit Finance, Economics and Pricing*; and *Transit Fare Management and Operation Issues*; as well as the Transit Cooperative Research Program project update titled *Fare Policies, Structures and Technologies*. Summary discussions of the four working groups, which were organized around the four resource paper topics, are also included in this report along with a list of participants. 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.

# SAFETY AND SECURITY

## **Transit System Security Program Planning Guide.**

Ketron Division of The Bionetics Corporation, under contract to Volpe National Transportation Systems Center, Balog JN, Schwarz AN, and Doyle BC; prepared for the FTA Office of Safety (Meade J, TTS-3), January 1994, 130pp.  
Report No. FTA-MA-90-7001-94-1

Available from:

Federal Transit Administration  
Office of Safety, TTS-3  
400 7th Street, SW, Room 6432  
Washington, DC 20590  
Phone 202/366-0244; FAX 203/366-3765  
Order No. FTA-MA-90-7001-94-1  
or  
NTIS Order No. PB94-161973

The goal of the FTA Safety and Security Program is to achieve the highest practical level of safety and security in all transit modes. To protect passengers, employees, revenues, and property, all transit systems are encouraged to develop, implement, and maintain a System Security Plan and Program. The purpose of this Guide is to help transit systems develop, outline, and write their security plan in order to implement an effective security program. This Guide is a "Do It Yourself/Self Instructional" type of manual for developing a transit system security plan and program. The Guide has been developed so that a transit agency could model its plan on appropriate sections in the Guide. Each aspect of a transit security plan is discussed to ensure that when complete, the plan/document will demonstrate management's commitment and policy regarding security; introduce the

concept of a system security program; describe the transit system; establish the management of the plan; detail the security program by assigning responsibilities; explain how threats and vulnerabilities can be identified, assessed, and resolved; describe how the plan itself can be implemented to establish or revise the program; and describe how the security plan can be evaluated and modified. Additional information in the appendices will help make the complete security plan a valuable security reference. The Guide also includes a bibliography of approximately 200 documents.

## **Safe Operating Procedures for Alternative Fuel Buses. A Synthesis of Transit Practice. TCRP Synthesis 1.**

Transportation Research Board, Hemsley GV; prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1993, 48pp.  
Report No. TCRP Synthesis 1

Available from:

Federal Transit Administration  
Office of Technical Assistance and Safety,  
400 7th Street, SW, Room 6107  
Phone 202/366-0231; FAX 202/366-3765  
Order No. TCRP Synthesis 1

This synthesis report will be of interest to transit agency managers, maintenance managers, and other persons concerned with the operation of bus fleets using alternative fuels to meet national and local requirements related to air quality and energy diversification. Information on the use of methanol, ethanol, compressed natural gas (CNG), liquefied petroleum gas (LPG), liquefied natural gas (LNG), and other alternatives is included. The

purpose of the report, is to provide information to transit operators on how transit agencies in the U.S., experienced in alternative fuel use, have addressed the advantages and disadvantages of alternative fuels and the necessary changes in storage, handling, operating and fueling procedures that are required for safe operations. The document provides information on the practices used to store, transport, and handle alternative fuels including LNG, LPG, CNG, ethanol, and methanol and discusses the benefits and effectiveness of these practices. The study concludes that the five alternative fuels studied in this synthesis report are all potentially viable options that would allow transit agencies to meet the provisions of the Clean Air Act. 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.

**Implementation Guidelines for Drug and Alcohol Regulations in Mass Transit.**

Battelle Transportation Systems, DeGennaro G, Kerr D, Keller W, Seaman J; prepared for the FTA Office of Safety (Meade J, TTS-3), April 1994, 125pp.

Report No. FTA-OH-26-0001-94-1

Available from:

Federal Transit Administration

Office of Safety, TTS-3

400 7th Street, SW, Room 6432

Washington, DC 20590

Phone 202/366-0244; FAX 202/366-3765

Order No. FTA-OH-26-0001-94-1

These guidelines will assist transit agencies in developing drug and alcohol testing programs that satisfy the FTA regulations that were 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 are directed to transit agencies receiving federal funding under sections 3, 9, and 18 of the Federal Transit Act, and section 103(e)(4) of the U.S. Code. The guidelines will assist state agencies that receive FTA funding and contractors who perform certain services for transit agencies. All of these types of organizations are subject to these regulations. 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. Pertinent 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.

## TECHNOLOGY DEVELOPMENT

**Conducting Pre-Award and Post Delivery Audits for Rail Vehicle Procurements.** Booz, Allen and Hamilton, Inc.; prepared for the FTA Office of Grants Management (Izumi G, TGM-10), May 1994, 70pp. Report No. FTA-DC-90-7713-94-1

Available from:  
Federal Transit Administration  
Office of Grants Management, TGM-10  
400 7th Street, SW, Room 9311  
Washington, DC 20590  
Phone 202/366-6475; FAX 202/366-7951  
Order No. FTA-DC-90-7713-94-1  
or  
NTIS Order No. PB94-187036

The purpose of this manual is to help recipients of federal funds comply with federal regulations pertaining to the purchase of rail vehicles, namely, the *Pre-Award and Post Delivery Rule*. The manual provides guidance to recipients of federal funds to help demonstrate compliance with: 1) pre-award review requirements **before** entering into a contract with a rail vehicle manufacturer, and 2) the post-delivery review requirements **before** the title of the rail vehicle is transferred to the recipient. Section 1 of this report describes the requirements of the Pre-Award and Post-Delivery Rule (certifications and documents). Sections 2 and 3 suggest procedures for conducting the pre-award and post-delivery reviews. Section 4 provides examples of complying with the Rule, namely, Buy America certification calculations, and purchaser requirements certification information. Section 5 presents and discusses some of the most frequently asked questions regarding the reviews. The five appendices in

this manual provide samples of review certifications, lists of typical rail vehicle components, Buy America waivers, sample visual inspection and performance test sheets, and a list of the FTA offices, including the regional offices. For additional information on rail audit reviews, contact Mr. George Izumi, Federal Transit Administration, Grants Management Office, Washington, DC 20590, 202/366-6475.

### **Conducting Pre-Award and Post-Delivery Bus Audit Reviews.**

Booz, Allen and Hamilton, Inc.; prepared for the FTA Office of Grants Management (Izumi G, TGM-10), September 1993, 78pp. Report No. FTA-DC-90-7713-93-1

Available from:  
Technology Sharing Program  
Department of Transportation  
400 7th Street, SW (M-443.2)  
Washington, DC 20590  
Order No. DOT-T-94-06  
or  
NTIS Order No. PB94-151800

This report discusses the federal regulations pertaining to the procurement of transit buses by recipients of federal funds, namely, the *Pre-Award and Post-Delivery Audits of Rolling Stock Purchases, Title 49 of the Code of Federal Regulations*. The manual provides guidance to recipients of federal funds to help them comply with the two parts of the rule: (1) the pre-award requirements **before** entering into a contract with a manufacturer for the procurement of buses, and (2) the post-delivery review requirements **before** the title of the vehicles is transferred to the recipient, or

before the buses are placed into transit service. For additional information, contact Mr. George Izumi, Federal Transit Administration, at 202/366-6475.

**Integration of Bicycles and Transit. A Synthesis of Transit Practice 4.**

Transportation Research Board, Doolittle JT, Jr, and Porter EK; prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1994, 58pp. Report No. TCRP Synthesis 4

*See page 43, TCRP Synthesis 4, for complete citation.*

**Low-Floor Transit Buses. A Synthesis of Transit Practice 2.**

Transportation Research Board, King RD; prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1994, 43pp. Report No. TCRP Synthesis 2

*See page 44, TCRP Synthesis 2, for complete citation.*

**Rail Transit Corrugations.**

Maryland Mass Transit Administration, Daniels LE; prepared for the Office of Engineering Evaluations (Mora J, TTS-20), December 1993, 148 pp.

Report No. FTA-MD-06-0131-93-1.

Available from:

National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-142015

This report places a number of fundamental aspects of rail corrugations in perspective, namely: support structures and conditions that tend to produce rail corrugations, the uniformity of rail corrugations across the

industry, the dynamic properties of track and their relations to corrugations. This report documents the results of a study of rail corrugations in the rail transit industry that includes: (1) a survey of rail corrugations in 18 of the 25 North American rail transit systems (heavy and light rail transit); (2) field measurements of rail corrugation patterns and track dynamic responses on 3 representative transit systems (WMATA, SEPTA, Baltimore MTA); (3) laboratory measurements of rail pad properties and their effect on the frequency response of a 2-block tie track system used in the Baltimore MTA; and (4) development of an analytic model to predict long-term rail deformation under repeated rolling contact. The report presents rail corrugation occurrences for vehicles, track and 5 types of support structures in the industry; discusses agency preventive maintenance practices of rail grinding and rail lubrication; and compares corrugation wave shapes and dynamic responses from a range of operating conditions. The results of laboratory studies on the sensitivity of track dynamic response at corrugating frequencies to track component stiffness (rail pads) are presented. A methodology for determining long-term rail deformation under repeated rolling loads for representative rail materials is offered, along with corrugation mitigation guidelines. The results of this study provide substantial evidence that rail corrugations are the result of multiple wave-producing mechanisms and that there are large differences in performances between categories of tracks, structures and other system elements that must be quantified in engineering terms as a fundamental prerequisite to defining rail corrugations.

**Rapid Transit (Rail) Fare Collection Survey.**

American Public Transit Association (APTA), Fare Collection Committee, September 1993, 100pp.

Available from:  
American Public Transit Association  
1201 New York Avenue, NW  
Washington, DC 20005  
Phone 202/898-4089; FAX 202/898-4049  
Order by Title

This report documents the Rapid Rail Transit Fare Collection Survey conducted by the APTA Fare Collection Committee with the intent of sharing information that will benefit the industry. The survey report is a compendium of information on fare policy and fare collection systems that can be used to better understand the approaches various rail transit systems currently employ (or plan to employ) to specific fare collection issues. The survey questionnaire is described and reproduced in Appendix A. Of the forty-one questionnaires mailed to rail transit systems in July 1992, 33 systems responded. The survey results are tabulated in Appendices B1 through B8 and provide the following information: rail system characteristics, including route miles, number of stations, ridership and revenue; fare collection system and fare media in use or planned; equipment inventory; reliability; personnel activities; and in-house vs contract services for revenue collection and equipment maintenance. This report includes survey information on the following rail systems: Heavy/Light Rail Combined (3); Heavy Rail Systems (10); Light Rail (12); Commuter Rail (6); and Automated Fixed Guideway Systems (2).

**Roster of North American Rapid Transit Cars, 1993.**

American Public Transit Association (APTA),  
Rolling Stock Equipment Committee, Cihak F,  
Gregerman EM, 1993 Edition, 232 pp.  
Report No. APTA-1993

Available from:  
American Public Transit Association

1201 New York Avenue, NW  
Washington, DC 20005  
Phone 202/898-4089; FAX 202/898-4049  
Order by Title  
APTA Member Price - \$45.00  
List Price \$100.00

The *Roster of North American Rapid Transit Cars* document is a compilation of rapid rail transit cars between 1945 and 1993, and in service as of July 1993. It includes cars in the U.S., Canada, and Mexico. Data includes cost, performance, dimensions, weights, electrical equipment, heating and ventilating systems, traction motors, propulsion equipment, lighting systems, and trucks and suspensions. The Roster is organized in alphabetical order by transit systems. The following systems are documented in this report. Chicago Transit Authority; Greater Cleveland Regional Transit Authority; Massachusetts Bay Transportation Authority; Mass Transit Administration; Maryland Department of Transportation; Metropolitan Atlanta Rapid Transit Authority; Metro-Dade Transit Agency; New York City Transit Authority; Port Authority Transit Corporation; Port Authority of New York and New Jersey; San Francisco Bay Area Rapid Transit District; Southeastern Pennsylvania Transportation Authority; Societe de Transport de la Communaute Urbaine de Montreal; Toronto Transit Commission; and Washington Metropolitan Area Transit Authority. This 1993 edition has been prepared in a new format with 345 characteristics shown for all heavy railcars in operation as of 1993.

**Study of the Maximum Axle Weight Limits of Public Transit Vehicles on the Interstate System. Report to the United States Congress from the Secretary of Transportation Pursuant to Section 1023(h) of the Intermodal Surface Transportation Efficiency Act of 1991. Draft Copy.**  
Federal Highway Administration (Klimik T,

HIA-20), and Federal Transit Administration (Mancini B, TTS-20); prepared for the U.S. Congress, April 1994, 26pp.

Available from:

Federal Transit Administration  
Office of Engineering Evaluations, TTS-20  
400 7th Street, SW, Room 6423  
Washington, DC 20590  
Phone 202/366-8063; FAX 202/366-3765  
Order by Title

This report discusses the issue of overweight public transit buses on the Interstate System. The study is a response to a directive in the ISTEA that requires the Secretary to conduct a study of the maximum axle weight limits of public transit vehicles on the Interstate System. The FHWA and FTA conducted this study by soliciting comments through a notice in the Federal Register. This report documents the 17 questions published in the Federal Register notice regarding transit buses and how compliance with Interstate System weight limits might be achieved. Each question is accompanied with a discussion of the respondents comments. Thirty three comments were received--15 from transit bus operators; 7 from State DOTs in California, Connecticut, Hawaii, Iowa, Montana, New York and

Washington; 1 from California Highway Patrol; 5 from bus manufacturers; 2 from design or research firms; 1 from a bus component manufacturer; 1 from a public transit association; and 1 from an individual. The study shows that the rear axles of some standard size transit buses exceed the 20,000-pound single-axle Interstate System weight limit, even when empty. When fully loaded with sitting and standing passengers, some axles are as much as 8,000 pounds overweight. There was general agreement among the respondents about the accuracy of the rear axle overweights shown on the charts in this report. High weights are caused by equipment requirements imposed by government regulations, the need for a sturdy vehicle to achieve an acceptable service life, and the position of the engine cantilevered behind the rear axle, as well as inattention to weight-saving (but expensive) technology. The report states that until a new bus fleet can replace the old, accommodations must be made to allow existing buses to use the Interstate System. The FHWA and the FTA jointly recommend that Congress amend 23 U.S.C. 127 to create a phase-in plan which will ensure that public transit buses purchased with federal funds are eventually brought into compliance with the weight limits.

## TRANSIT ACCESSIBILITY

**ADA Private Transportation Handbook.** International Taxicab and Livery Association; Employment Advisory Services, Inc.; Government Affairs Management Associates; and Isaacs and Associates, Inc.; prepared for the FTA (Tate R, TTS-30) and Project Action National Institute for Accessible Transportation, 1994, approximately 400pp. Report No. FTA-DC-26-0028-93-1

Available from:

Project Action

1350 New York Avenue, NW, Suite 711

Washington, DC 20005

Phone 202/347-3066; FAX 202/737-7914

800-659-NIAT (Voice/TTY)

Order by Title

Little understanding and a great deal of confusion still exists in the private sector industry regarding applicable Americans With Disabilities Act of 1990 (ADA) regulations and compliances. The purpose of this *ADA Private Transportation Handbook* is to serve as a comprehensive resource guide and reference manual. The handbook is designed to help clarify the many complex ADA issues and requirements, and to elevate the private sector's understanding of these issues and requirements to an action-oriented level of knowledge. The manual covers ADA transportation related rules contained in Titles I and III for employment and public accommodations (and Title II as it relates to contracting and other issues for private organizations), provides helpful tips for compliance with the law, and lists valuable resources for further assistance. It helps organizations make determinations that establish the set of rules to be followed, i.e.,

determinations such as--whether the system is *primarily engaged or not primarily engaged* in the business of transporting people, and whether it operates a *fixed route or demand responsive system*. This manual serves as a very important and useful tool for the industry including, but not limited to, the following service providers: airport transportation systems; vanpools; taxicab companies; private university transportation systems; charter, tour, and intercity bus companies; rural public and human service agency transportation services operated by private not-for-profit organizations; operators contracting with both public and private entities; hotel/motel shuttle services; and vehicle rental agencies.

**Innovative Technologies and Practices for Accessible Transportation. CTAP Publication.**

Project Action, and Community Transportation Association of America; prepared for the Community Transportation Assistance Project (CTAP), Department of Health and Human Services, May 1994, 37pp.

Report No. DOT-DHHS-JC-94-1

Available from:

Community Transportation Association of America, CTAP

1440 New York Avenue, NW, Suite 440

Washington, DC 20005

Phone 202/628-1480; FAX 202/737-9197

800-527-8279 (voice/TDD)

Order by Title

Innovative accessible technologies and practices are changing the face of public transit. The need for transit systems to comply with the requirements of the Americans with

Disabilities Act (ADA) of 1990, to know about the range of applied technologies currently on the market, and to be aware of the shift in focus toward universal accessibility helped generate this report. This publication aims to help transit system operators comply with the requirements of the ADA and cope with the large number of passengers with disabilities now using the newly accessible public transit systems. Technologies and practices profiled in this report are cost-effective and even ground-breaking. This publication consists of the following nine chapters: Vehicle Lift and Ramp Technology and Standee Strategies; Low-Floor Bus Technology; Securement Technology; Talking Bus Stops and Buses; Smart Card Technology; Signage Technology; Interactive Computer Training Technology; Information Technologies; and Detectable Warning Devices. Each chapter is divided into functional areas that provide: a general description of the technology or practice; information on the applicable law or guideline; how the device or strategy works; principal features and status of practical applications. The concluding insight is that the desire to provide the most accessible and passenger friendly transportation for all users, coupled with the need to comply with ADA requirements, has created an unprecedented market for innovative technologies and practices in transit.

#### **PROJECT ACTION 1994 Products and Publications Resource Guide**

The National Institute for Accessible Transportation, Project Action; prepared for the FTA (Tate R, TTS-30) and Project Action National Institute for Accessible Transportation, 1994, 11pp.  
Report No. FTA-DC-26-0028-94-1

Available from:  
Project Action  
1350 New York Avenue, NW, Suite 711

Washington, DC 20005  
Phone 202/347-3066; FAX 202/737-7914  
800-659-NIAT (Voice/TTY)  
Order by Title

This Project Action resource guide lists research product and publication deliverables related to accessible transit for persons with disabilities. The project deliverables (such as final reports, guides, maps, and videos) range from identifying persons with disabilities and their transit needs, and training transit consumers, providers and travelers, to marketing a modal switch, using accessible technology, and creating tactile map products and training.

#### **Wheelchair Lift Maintenance: A Handbook for Rural Transit Providers. With Videotape.**

Kansas University Transportation Center; prepared for Kansas Department of Transportation Office of Public Transportation and the FTA Office of Safety (Ferguson C, TTS-3), September 1993, 70 pp.  
Report No. FTA-KS-06-0003-93-1.

Available from:  
National Technical Information Service/NTIS  
Springfield, Virginia 22161  
Phone 703/487-4650; FAX 703/321-8547  
NTIS Order No. PB94-780152

This is a training package of wheelchair lift maintenance procedures designed to assist rural and specialized transit operators in providing a lift service that is safe for the passenger. It consists of a handbook and a lift maintenance videotape for rural operations titled *Lifting to Safety and Reliability*. The purpose of the handbook is to provide guidelines for general maintenance procedures for accessibility equipment such as lifts, ramps, and wheelchair securement devices. The handbook focuses on preventive maintenance

for the more common active wheelchair lift designs, namely, the upright stanchion lift and the perpendicular arm lift. Separate sections in this handbook illustrate and provide recommendations regarding the basic generic lift components, preventive maintenance, testing and troubleshooting for wheelchair lift problems, general maintenance guidelines for additional accessibility equipment, and review questions. The companion videotape reinforces and illustrates some of the handbook's recommended procedures.

Although the maintenance procedures in this manual are intended for universal application, they do not rule out close adherence to the recommendations and suggestions provided in the manufacturer's manual. Specific concerns or questions about wheelchair lifts are to be directed to the dealer or manufacturer. Appendix 2 of this handbook provides a resource guide identifying some of the lift and securement manufacturers in the United States.

## TRANSIT COOPERATIVE RESEARCH PROGRAM

**Incentive Programs to Improve Transit Employee Performance. A Synthesis of Transit Practice. TCRP Synthesis 3.** Transportation Research Board, Hartman RJ, Kurtz EM, and Mosher EK; prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1994, 45pp, \$16. Report No. TCRP Synthesis 3

Available from:  
Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Order No. TCRP Synthesis 3

This synthesis is a snapshot of the transit industry today. It is meant to provide information about employee incentive programs and their use in transit organizations. The synthesis considers a range of possibilities, including direct payment of cash and a variety of initiatives that will tend to increase the quality of performance. This report describes the survey findings with respect to the information that a transit manager needs to know in assessing whether incentives offer the correct management tool for the organization. In addition, issues that others have encountered in the practice of establishing, managing, and evaluating incentive plans are presented. Specific tools used to describe various incentive approaches in transit organizations are included, and major caveats related to introducing a particular strategy are noted. Case study reviews of two different approaches being tried in transit agencies are also included, namely: the Capital Metro Transit Authority, Austin, Texas and the Toronto Transit Commission. The synthesis

closes with a section on summary observations for the user to consider in establishing an incentive program, a series of conclusions based on the survey results and follow-up phone interviews, and recommendations for further research. A survey conducted for the synthesis indicates that most respondents intend that their program be linked to larger management strategies, and that employees should be involved in development. This synthesis will be of interest to transit agency general managers, human resource officials, compensation managers, operations and maintenance managers, labor officials, and others interested in an overview of current practice in employee incentive programs. This synthesis is an immediately useful document.

**Integration of Bicycles and Transit. A Synthesis of Transit Practice. TCRP Synthesis 4.**

Transportation Research Board, Doolittle JT, Jr, and Porter EK; prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1994, 53pp, \$12. Report No. TCRP Synthesis 4

Available from:  
Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418  
Phone 202/334-3213; FAX 202/334-2519  
Order No. TCRP Synthesis 4

This synthesis will be of interest to transit agency managers, bicyclists, and others interested in the subject of integrating bicycle and transit operations, including issues of safety, equipment procurement, scheduling, and interjurisdictional cooperation. The

purpose of this synthesis is to describe the techniques associated with the policy and operations issues involved in integrating bicycle and transit services, and solutions that have been implemented in various operating environments across the country. Emphasis is on implementation on North American transit systems. The report identifies those program characteristics which are least disruptive to normal transit operations yet effectively extend services to bicyclists. Information from more than 20 transit agencies in the U.S. that are successfully integrating bicycles into their operations, supplemented by site visits and a review of the literature, was used to compile this report. The agencies represent urban bus, rail, commuter rail, rural bus, and ferry systems. Information on bicycle-on-bus, bicycle-on-rail, and bicycle-on-ferry programs is discussed in separate chapters. Each of these chapters covers equipment and facilities, procedures and regulations, selection and procurement process, and operating experiences. The synthesis concludes with a chapter on process overview, conclusions, and recommended research. Bicycles and their owners can be transported on buses and vans, passenger railcars, and ferries. Each program should be tailored to suit the local setting and operating modes and environments of each transit agency.

**Low-Floor Transit Buses. A Synthesis of Transit Practice. TCRP Synthesis 2.**

Transportation Research Board, King RD; prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1994, 44pp, \$12.

Report No. TCRP Synthesis 2

Available from:

Transportation Research Board  
2101 Constitution Avenue, NW  
Washington, DC 20418

Phone 202/334-3213; FAX 202/334-2519  
Order No. TCRP Synthesis 2

This TCRP synthesis report will be of interest to transit agency managers; operations, maintenance, and planning managers; and others concerned with the operational experiences of low-floor transit buses in fixed route service, and with the viability of this technology in meeting the transit industry's accessibility goals. Information on low-floor transit buses operating in the U.S. and Canada is presented. This includes technical specifications as well as status reports on buses manufactured in North America, buses under development, and buses in Europe. This report describes findings from four transit agencies with standard size, low-floor transit buses in service in relation to passengers, maintenance, operations, drivers, planning and administration. In addition, it presents some general insights from transit agencies operating smaller low-floor transit vehicles (used in paratransit service), and, in particular, describes concerns relative to road clearance, winter operations, operations in high water, and impacts on operating practices. The report contains technical specifications from U.S., Canadian, and European manufacturers for all these buses. Overall, the study findings affirm that the emergence of low-floor bus technology in the U.S. and Canada is well underway. At the end of 1993, 221 low-floor transit buses were in operation at transportation agencies in the U.S. and Canada, and 490 low-floor buses were on order. The overall experience with the 221 heavy-duty, standard-size, low-floor buses in operation today is positive. TCRP synthesis reports can serve as handbooks or design manuals because each one is a compendium of the best knowledge available on measures found to be successful in resolving specific problems. This synthesis is an immediately useful document.

**Safe Operating Procedures for Alternative Fuel Buses. A Synthesis of Transit Practice. TCRP Synthesis 1.**

Transportation Research Board, Hemsley GV; prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1993, 48pp, \$16.

Report No. TCRP Synthesis 1

Available from:

Transportation Research Board  
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Phone 202/334-3213; FAX 202/334-2519  
Order No. TCRP Synthesis 1

TCRP synthesis series reports can serve as handbooks or design manuals because each one is a compendium of the best knowledge available. This synthesis report will be of interest to transit agency managers, maintenance managers, and others concerned with the operation of bus fleets using alternative fuels to meet national and local requirements related to air quality and energy diversification. Information on the use of methanol, ethanol, compressed natural gas (CNG), liquefied petroleum gas (LPG), liquefied natural gas (LNG), and other alternatives is included. The purpose of the report, is to provide information to transit operators on how transit agencies in the U.S., experienced in alternative fuel use, have addressed the advantages and disadvantages of alternative fuels and the necessary changes in storage, handling, operating and fueling procedures that are required for safe operations. The document provides information on the practices used to store, transport, and handle alternative fuels including LNG, LPG, CNG, ethanol, and methanol and discusses the benefits and effectiveness of these practices. This synthesis addresses the following specific aspects of alternative fuels and handling practices: training procedures;

fuel storage and handling; maintenance operations; facility requirements; vehicle related issues; costs; and environmental considerations. The study concludes that the five alternative fuels studied in this synthesis report are all potentially viable options that would allow transit agencies to meet the provisions of the Clean Air Act. 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.

**Transit Cooperative Research Program: Annual Report 1993.**

Transportation Research Board, prepared for the FTA Transit Cooperative Research Program (Arrillaga B, TTS-10), 1993, 65pp.  
Report No. TCRP Annual Report 1993

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Phone 202/334-3213; FAX 202/334-2519  
Order No. TCRP Annual Report 1993

The Transit Cooperative Research Program (TCRP) was established in 1992 to provide a continuing program of applied research on transit issues. 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. The annual research program is the foundation of the TCRP. This annual report provides an overview of the TCRP. It discusses the formulation, financing, organization, contracting, and monitoring of the Program, as well as the dissemination and application of research results. In addition, the report presents the current status of the 57 projects

now in progress as well as detailed discussions of each project's progress. Basically, TCRP processes are designed to ensure maximum exposure of the research activities while they

are in progress in the hope that research results will more quickly find their way into practice in the form of policies, procedures, and specifications by the transit industry.

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