TRANSIT COOPERATIVE RESEARCH PROGRAM

TCRP Synthesis 4

Integration of Bicycles and Transit

Transportation Research Board
National Research Council

TRANSIT COOPERATIVE RESEARCH PROGRAM

Synthesis of Transit Practice 4

Integration of Bicycles and Transit

JOHN T. DOOLITTLE, JR.
Doolittle and Associates
Mystic, Connecticut

ELLEN KRET PORTER
Consultant
Seattle, Washington

TOPIC PANEL

JOHN FEGAN, *Federal Highway Administration*
WILLIAM FELDMAN, *New Jersey Department of Transportation*
RICK GERHART, *Tri-County Metropolitan Transportation District of Oregon*
FRANZ K. GIMMLER, *Federal Transit Administration*
JOSHUA D. LEHMAN, *Massachusetts Department of Transportation*
ROBERT LEWIS, *Washington Metropolitan Area Transit Authority*
MIKE NEVAREZ, *City of Phoenix Public Transit Department*
RICHARD PAIN, *Transportation Research Board*
ROBERT PATTEN, *Rails-to-Trails Conservancy*
FRED L. WILLIAMS, *Federal Transit Administration*

Transportation Research Board
National Research Council

Research Sponsored by the Federal Transit Administration in Cooperation with the Transit Development Corporation

NATIONAL ACADEMY PRESS
Washington, D.C. 1994

TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it

The need for TCRP was originally identified in *TRB Special Report 213--Research for Public Transit New Directions*, published in 1987 and based on a study sponsored by the Federal Transit Administration (FTA) A report by the American Public Transit Association (APTA), *Transportation 2000*, also recognized the need for local, problem-solving research TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992 Proposed by the U S Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA, the National Academy of Sciences, acting through the Transportation Research Board (TRB), and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at anytime It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end-users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners

The TCRP provides a forum where transit agencies can cooperatively address common operational problems TCRP results support and complement other ongoing transit research and training programs

TCRP SYNTHESIS 4 **Price $12.00**

Project SB-l
SSN 1073-4880
ISBN 0-309-05656-x
Library of Congress Catalog Card No 94-060582

NOTICE

The project that is the subject of this report was a part of the Transit Cooperative Research Program conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council Such approval reflects the Governing Board's judgment that the project concerned is appropriate with respect to both the purposes and resources of the National Research Council.

The members of the technical advisory panel selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and while they have been accepted as appropriate by the technical panel, they are not necessarily those of the Transportation Research Board, the Transit Development Corporation, the National Research Council, or the Federal Transit Administration of the U S Department of Transportation

Each report is reviewed and accepted for publication by the technical panel according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

Special Notice

The Transportation Research Board, the Transit Development Corporation, the National Research Council, and the Federal Transit Administration (sponsor of the Transit Cooperative Research Program) do not endorse products or manufacturers Trade or manufacturers' names appear herein solely because they are considered essential to the clarity and completeness of the project reporting

Published reports of the

TRANSIT COOPERATIVE RESEARCH PROGRAM

are available from

Transportation Research Board
National Research Council
2101 Constitution Avenue, N.W
Washington, D C 20418

Printed in the United States of America

PREFACE

A vast storehouse of information exists on many subjects of concern to the transit industry. This information has resulted from research and from the successful application of solutions to problems by individuals or organizations. There is a continuing need to provide a systematic means for compiling this information and making it available to the entire transit community in a usable format. The Transit Cooperative Research Program includes a synthesis series designed to search for and synthesize useful knowledge from all available sources and to prepare documented reports on current practices in subject areas of concern to the transit industry.

This synthesis series reports on various practices, making specific recommendations where appropriate but without the detailed directions usually found in handbooks or design manuals. Nonetheless, these documents can serve similar purposes, for each is a compendium of the best knowledge available on measures found to be successful in resolving specific problems. The extent to which these reports are useful will be tempered by the user's knowledge and experience in the particular problem area.

FOREWORD

This synthesis will be of interest to transit agency managers, bicyclists, and other personnel interested in the subject of integrating bicycles and transit operations, including the issues of safety, equipment procurement, scheduling, and interjurisdictional cooperation. Information on bicycle-on-bus, bicycle-on-rail, and bicycle-on-ferry programs is included.

Administrators, engineers, and researchers are continually faced with issues on which there is much information, either in the form of reports or in terms of undocumented experience and practice. Unfortunately, this information often is scattered and or not readily available in the literature, and, as a consequence, in seeking solutions, full information on what has been learned about a problem frequently is not assembled. Costly research findings may go unused, valuable experience may be overlooked, and full consideration may not be given to the available methods of solving or alleviating the problem. In an effort to correct this situation, the Transit Cooperative Research Program (TCRP) Synthesis Project, carried out by the Transportation Research Board as the research agency, has the objective of reporting on common transit issues and synthesizing available information. The synthesis reports from this endeavor constitute a TCRP publication series in which various forms of relevant information are assembled into single, concise documents pertaining to a specific issue or closely related problem.

Intermodal transportation, spurred by the Intermodal Surface Transportation Efficiency Act of 1991 and other factors, has resulted in an increased number of transit agencies attempting to serve the bicycling community in addition to their traditional patrons. Transit agencies have worked with bicycle interest groups to provide accommodations, including parking facilities and on-vehicle storage, to enhance the compatibility of such dual-mode travel. While many agencies have only limited experience with bicycle-transit interaction, others have demonstrated effective methods for initiating and sustaining such efforts. This report of the Transportation Research Board (TRB) describes the characteristics of various bicycle-transit programs, including operation, equipment, and other issues for bus, rail, and ferry applications. It includes experiences from various transit agencies in the United States that are successfully integrating bicycles into their operations, as well as information derived from the literature on the subject.

To develop this synthesis in a comprehensive manner and to ensure inclusion of significant knowledge, available information was assembled from numerous sources, including

a large number of public transportation agencies. A topic panel of experts in the subject area was established to guide the researchers in organizing and evaluating the collected data, and to review the final synthesis report.

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. As the processes of advancement continue, new knowledge can be expected to be added to that now on hand.

CONTENTS

ACKNOWLEDGMENTS

John T. Doolittle, Jr., Doolittle and Associates, and Ellen Kret Porter, Seattle, Washington were responsible for collection of the data and preparation of the report.

Valuable assistance in the preparation of this synthesis was provided by the Topic Panel, consisting of John Fegan, Bicycle Program Manager, Federal Highway Administration; William Feldman, Section Chief, New Jersey Department of Transportation; Franz K. Gimmler, Deputy Associate Administrator for Safety, Office of Technical Assistance, Federal Transit Administration; Joshua D. Lehman, Program Coordinator, Massachusetts Department of Transportation; Robert Lewis, Development and Transit Analyst, Washington Metropolitan Area Transit Authority; Mike Nevarez, Project Manager, City of Phoenix Public Transit Department; Robert Patten, Transportation Policy Assistant, Rails-to-Trails Conservancy; Richard Pain, Transportation Safety Coordinator, Transportation Research Board; Rick Gerhart, Director, Planning and Scheduling, Tri-County Metropolitan District of Oregon; and Fred L. Williams, Program Analyst, Division of Industry Analysis, Office of Policy, Federal Transit Administration.

The Principal Investigators responsible for the conduct of the synthesis were Sally D. Liff, Manager, Synthesis Studies, and Donna L. Vlasak, Senior Program Officer. This synthesis was edited by Linda S. Mason.

Valuable assistance was provided by Trudy Tolliver, Planner III, Tri-County Metropolitan Transportation District of Oregon; Michael E. Williams, University of Washington; Scott A. Sabol, Program Officer, National Cooperative Highway Research Program, Transportation Research Board; and W. Campbell Graeub and Gwen Chisholm-Smith, Senior Program Officers, Transit Cooperative Research Program, Transportation Research Board.

Information on current practice was provided by many transit agencies. Their cooperation and assistance were most helpful.

INTEGRATION OF BICYCLES AND TRANSIT

SUMMARY

Communities across America seeking to reduce reliance on single occupant vehicle (SOV) travel are looking for ways to realize the full potential of integrating bicycle and transit methods of travel. The benefits of bicycle-transit travel in comparison with automobile travel are readily recognized: lower air pollutant emissions, reduced highway congestion, lower capital costs for park-and-ride facilities, and improved neighborhood environments. There are additional benefits gained from merging bicycles with transit which each mode alone cannot provide: transit enables the bicyclist to take longer trips; bicycle access enlarges transit's catchment area; transit enables the bicyclist to pass over or through topographical barriers; and bicyclists can increase transit ridership during surplus capacity periods such as weekends and midday. Many transit agencies have recognized the potential of integrating the two modes and are operating a variety of services that include bicycles in or on the exterior of buses, bicycles in passenger rail cars, bicycle storage facilities and access improvements. In the near future, many more communities and their transit agencies will be exploring ways to merge bicycles with transit services and facilities. Advances in equipment design, the activism of bicycle constituencies, broad-based political support, and the growing awareness of the general public and transit agency personnel are contributing to the expansion of integrated bicycle-transit services.

The emphasis of this synthesis is on implementation on North American transit systems. It addresses the wide range of policy and operational decisions needed in order to provide bicycle-transit services. It identifies those program characteristics which are least disruptive to normal transit operations yet effectively extend transit services to bicyclists who are also transit riders.

Information from more than 20 transit agencies, supplemented by site visits and a review of the literature was used to compile this synthesis. The agencies represent urban bus, urban rail, commuter rail, rural bus, and ferry systems.

Europe and Japan offer much relevant experience from which American communities could benefit. Bicycle use is promoted through comprehensive improvements to transit station access, bicycle parking facilities at commuter train and bus terminals, provisions for the transport of bicycles on trains, and innovative bicycle rental programs.

Clearly defined program objectives enable a transit agency to define operating policies consistent with its expectations. Typical goals include providing an alternative to the SOV, extending the catchment area of transit services, helping meet air quality standards, and reducing auto trips and parking needs at park-and-ride lots and rail stations.

A transit agency's setting has a large effect on a program's success. Service area

characteristics such as development density, transit passenger load factors, the public's overall interest in and support for bicycle transportation, land use, topography, and air quality influence the interest and demand for bicycle-transit integration.

Accommodations for bicycles on transit and at transit facilities have been made in a number of ways. Options include carrying bicycles on racks mounted to the exterior of a bus or van; carrying bicycles inside a transit vehicle; providing parking equipment at transit locations; and constructing access improvements. Much current activity involves the installation of front-mounted racks on buses. Designs are continually evolving and to date no single rack has been standardized. The first transit agencies to begin carrying bicycles on racks often designed specifications and had a local metal shop fabricate the racks. Today, the marketplace has recognized the potential demand for equipment and several commercial vendors are manufacturing proprietary designs, several of which are compatible with automatic bus washing operations.

Design considerations focus primarily on four performance characteristics: *safety* for the bicycle-transit traveler, fellow passengers, bicycles, and buses; *ease of use*, to encourage travel and to allow for schedule adherence; *capacity* of the rack; and *compatibility* with existing equipment and servicing procedures such as bus washing.

Operating procedures and regulations should be responsive to community interests and needs. Whether a program includes bicycles on or in transit vehicles or bicycle parking facilities, guidelines are needed to address fees and permits, hours of permitted travel or use, bicycle size and condition, loading and unloading procedures, storage instructions, and safety precautions such as training requirements.

Providing bicycle parking at transit facilities enables bicyclists to make a convenient intermodal transfer. Within the bicycle community, three classes of bicycle storage are used: Class I for high-security protection of bicycles and accessories against theft and weather, Class II for racks that secure the bicycle frame and both wheels, and Class III for racks that require user-supplied fastening devices, e.g., cables or U-locks.

The development and operation of bicycle-transit programs requires the involvement of many transit agency departments, including planning, marketing, engineering, security, operations, and maintenance. Because each department assumes its functional responsibilities for the new service, transit agencies have not found a need to hire additional staff.

Marketing plays an important role in the introduction of any new product or service. Market research, a comprehensive promotional plan, and program evaluation are major elements of any bicycle-transit program. Coordination of transit agency promotional activities with those of bicycle clubs and advocacy groups and local governments offers wide exposure and can generate additional interest.

Before implementing programs for transporting bicycles in or on vehicles, transit agency managers have been especially concerned about possible impacts on safety, operations, and vehicle servicing. To date, the safety record has been very good in terms of both personal safety and that of transit property and bicycles. Vehicle operator concerns about schedule delays have not been realized. For bus systems in which not all buses are outfitted with racks, vehicle route assignment is somewhat complicated but this problem disappears once an operating base or system is fully equipped.

The information collected for this synthesis also indicates areas for further research. Evaluations of operating programs would provide useful information about ridership, and customer characteristics, as well as feedback on what users and other passengers like and dislike about the program. Studies of savings in vehicle miles traveled (VMT) and advantages for air quality would help substantiate potential benefits. Effective approaches for enlisting multi-jurisdictional cooperation and actions would facilitate much-needed access improvements to transit facilities. American experimentation with European methods for transporting bicycles on commuter and intercity rail service would provide precedents for the expansion of such services.

CHAPTER ONE

INTRODUCTION

SIGNIFICANCE OF BICYCLE-TRANSIT INTEGRATION

Over the past decade, bicycles have gained recognition as a credible form of transportation for commuting as well as recreation. Many states, regions, and municipalities have bicycle coordinators on staff to further develop and promote bicycle transportation. Non-motorized transportation modes are now an element of the federally mandated regional transportation planning process. Merging bicycle transport with transit services further enhances the potential of both modes of travel. Congress recognized the potential of transportation linkages and providing non-motorized travel options in the passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). ISTEA encourages a multi-modal approach to transportation planning in which non-motorized choices for making the same trip are evaluated for their true economic costs and benefits. ISTEA also encourages an intermodal approach in which one or more modes of travel are linked together in such a way that the traveler considers a journey to be one trip rather than several disjointed segments. Furthermore, by lowering the barriers to flexible funding of transportation improvements, new sources of financing are available to bicycle-transit integration projects and programs.

Many North American transit agencies have gained experience with successful approaches to bicycle-transit integration. They carry bicycles inside or on the exterior of buses, transport bicycles in passenger rail cars, provide bicycle storage facilities and have made some station and transit center access improvements. Communities interested in observing additional bicycle-transit linkage techniques can look abroad. While transit service in the United States has developed automobile park-and-ride lots to serve growing suburban areas, Japanese and European services have invested heavily in bicycle-and-ride improvements, including bicycle lanes and paths to transit stations, secure and convenient bicycle parking facilities, provisions for the transport of bicycles on trains, and innovative bicycle rental programs *(1).* A Federal Highway Administration (FHWA) report *(1)* states that in American suburbs and smaller cities more than half of access trips to transit are made by automobile and that for both long and short trips, the automobile is the predominant mode of travel Europeans and Japanese walk and bicycle to many more short-distance destinations than Americans as a result of differences in land use, and urban design, provision of facilities that safely accommodate bicycles and pedestrians For longer trips, both within and between metropolitan areas, their rail systems continue to retain a significant share of the market. North American communities can benefit from the experiences and innovations tested in bicycle-friendly countries.

The purpose of this synthesis is to describe 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. Experiences in other countries are also referenced in order to provide a broader view of the state of the practice. Some problems encountered by North American transit operators have been resolved in other countries. The information in this report will be useful to transit officials considering accommodating bicycles on their systems as well as to those considering refinements or expansions to existing programs.

SYNTHESIS ORGANIZATION

This report is organized into seven chapters describing the state of the practice for bicycle-transit integration. Chapter One describes what policy and operations issues are involved in designing and implementing a program, how existing programs began and what goals have been established. It ends with a list of the equipment and facilities in operation in the United States. Chapter Two discusses how a transit agency's setting influences program design and what management approaches have been used. Chapters Three, Four, and Five cover bicycle-bus, bicycle-rail, and bicycle-ferry operations. Each of these chapters covers equipment and facilities, procedures and regulations, the selection and procurement process, and operating experiences. Bicycle parking and access improvements are described in Chapter Six. The synthesis concludes with a chapter containing a process overview, conclusions, and recommended research.

The primary source of information has been transit operators currently using some form of bicycle program. Transit operators provided reports, customer brochures, training manuals and tapes, and internal documents such as standard operating procedures. They also responded to a lengthy telephone interview, the questionnaire for which is reproduced in Appendix A. A summary of the topics covered in the survey is presented in Table One.

TABLE ONE
SURVEY TOPICS FOR DISCUSSION

1. Respondent information
2. Description of program components
   - Bicycle-bus
   - Bicycle-rail
   - Bicycle parking equipment and facilities
   - Access improvements
3. Program status
4. Program origins
5. Bicycle transit program goals and objectives
6. Special situations affecting the program
7. Program structure and staffing
8. Planning requirements
9. Consideration in equipment selection and facility planning
10. Equipment purchasing procedures
11. Marketing activities supporting the program
12. Impacts on agency operations
13. Impacts on vehicle and facility servicing and maintenance
14. Financial requirements
15. Level of use
16. Administrative and legal issues
17. Recommendations

TABLE TWO
TRANSIT AGENCY SURVEY RESPONDENTS

AGENCY	LOCATION	PROGRAM COMPONENTS
Ann Arbor Transportation Authority	Ann Arbor, Michigan	Bicycle Parking
Bay Area Rapid Transit District (BART)	San Francisco Bay Area	Bicycle on Rail Bicycle Parking
Capital Metropolitan Transit Authority (Capital Metro)	Austin, Texas	Bicycle Parking
Central Contra Costa Transit Authority (CCCTA)	Concord and Walnut Creek, California	Bicycle in Bus
City of Phoenix Transit System	Phoenix, Arizona	Bicycle on Bus Bicycle Parking
Clallam Transit System (The Bus)	Clallam County, Olympic Peninsula, Washington State	Bicycle in and on Bus Bicycle Parking
Golden Gate Bridge, Highway and Transportation District (Golden Gate Transit)	San Francisco Bay Area	Bicycle in Bus Bicycle on Ferry
LINK	Chelan and Douglas Counties, Washington	Bicycle on Bus Bicycle Parking
Los Angeles County Metropolitan Transportation Authority (MTA)	Los Angeles County	Bicycle on Bus
Municipality of Metropolitan Seattle (METRO)	Seattle and King County, Washington	Bicycle on Bus Bicycle Parking
Metropolitan Transportation Authority (MTA)	New York City	Bicycle on Rail
Pierce Transit Public Transportation Benefit Area (Pierce Transit)	Tacoma and Pierce County, Washington	Bicycle in Bus Bicycle Parking
Roaring Fork Transit Agency	Aspen, Colorado	Bicycle on Bus
Sacramento Regional Transit District (RTD)	Sacramento, California	Bicycle in Bus Bicycle on Rail Bicycle Parking
San Diego Transit	San Diego, California	Bicycle on Bus
Southeastern Pennsylvania Transportation Authority (SEPTA)	Philadelphia, Pennsylvania	Bicycle on Rail
New York City Department of Transportation, Staten Island Ferry	New York City	Bicycle on Ferry
Sun Tran	Tucson, Arizona	Bicycle on Bus Bicycle Parking
Tri-County Metropolitan Transportation District of Oregon (Tri-Met)	Portland, Oregon	Bicycle on Bus Bicycle on Rail Bicycle Parking
Washington Metropolitan Area Transit Authority (WMATA)	Washington, D.C.	Bicycle on Rail Bicycle Parking
Washington State Ferries	Puget Sound Region,	Bicycle on Ferry Washington

Interviews were held during 1993 and 1994. Often, more than one individual was contacted to obtain the different perspectives of those responsible for marketing, maintenance, and operations. The 21 transit agencies represent a broad spectrum of sizes and modes. The transit systems differ in stage of implementation, duration of operations, and type of bicycle program. Table Two lists the transit systems, the region served, and the type of program in operation.

Site visits were made to four systems representing several modes and approaches. The purpose of these visits was to obtain detailed plans, observe the programs in action, and gather updated information. The four site visits were to Tri-County Metropolitan Transportation District of Oregon (Tri-Met) in Portland; Roaring Fork Transit Agency in Aspen, Colorado; City of Phoenix Public Transit; and the Los Angeles County Metropolitan Transportation Authority.

Additional information was obtained from national bicycle advocacy organizations and a review of recent articles and reports on the subject of bicycles and transit and from equipment vendors who supplied drawings, specifications, and cost information on some of the equipment options available in the marketplace.

POLICY AND OPERATIONS ISSUES

Advocates of policies for accommodating bicycles and their riders on transit systems suggest that such programs at best provide a means of increasing transit ridership and at least provide another travel option and thereby help achieve various environmental, energy conservation and traffic mitigation benefits of transit Additional benefits include improved community relations and expansion of the constituency which supports public transit.

Transit managers who have rejected or discouraged various proposals to accommodate bicycles on transit systems argue that such programs create negative impacts on operating speed, reliability, safety, security, maintainability, and costs that are disproportionate to the benefits of such programs. These dire expectations have not been confirmed by actual operating experiences.

Each of the groups affected by a bicycle-transit program has its own perspective and brings its own set of expectations and concerns to the planning process. For transit users, potential schedule delays caused by handling bicycles may be the most important issue. For transit agencies, the critical issues may be the effect of bus-mounted racks during bus servicing and washing or safety during late-hour operations. For cyclist/transit users, hours of access to the system and regulations for use may be the most important issues. Program characteristics that can be integrated into normal operations while providing safe, flexible, and the most reasonable accommodations to bicycles and their users based on the experience of transit systems with established programs are identified in this synthesis.

Transit agencies considering implementation of a program to accommodate bicycles on their transit systems must deal with a wide range of policy issues. These issues can generally be divided into three types: whether and how accommodating bicycles helps achieve the agency's overall operating objectives; what the mechanics of such a program are, and how they are established; and how to determine whether the program is achieving its contribution to the policy objectives it was designed to support.

The decision-making process leading to the establishment of such programs usually deals with a combination of interactive policy and operational issues. The impetus for consideration of such programs often comes from a source outside of transit management, such as a bicycle interest group or an "outside" planning group. The initiatives often come to transit board members from community members and bicycle advocates, and occasionally from transit agency planners. This situation can result in a decision-making process in which proponents may tend to exaggerate the benefits of such programs, and opponents overemphasize the difficulties of establishing and managing such programs.

The policy objectives of accommodating bicycles on transit are based broadly on increasing transit use by people who use bicycles for other parts of their journey and encouraging other travelers to use bicycles and transit in lieu of their automobiles. Advocates generally frame their proposals in the context of meeting community transportation objectives; implementing ISTEA, the Clean Air Act, the Americans with Disabilities Act (ADA), and other federal regulatory requirements; implementing state and local regulatory requirements; and reducing barriers to the use of transit.

Among the policy issues transit agencies have noted in considering the establishment and operation of such programs are the following:

- How best to obtain public, private, and interest group participation in planning the programs,
- How to balance the demands of such programs with other operating priorities,
- How to fund the programs,
- How to optimize the integration of the program with existing operations to provide maximum access to bicycles and minimal disruption of routine operations, and
- How to enhance community relations.

The resolution of these policy issues is reflected in a program's goals, objectives, and design framework.

Following agreement on a program's basic policy framework, a wide range of practical operational decisions must be made that define the specific services and facilities and the conditions under which they will be provided. These issues include the following:

- The types and level of service and facilities that will be made available to bicycles and their riders,
- How to staff and administer the program,
- Design, acquisition, fabrication, and installation of any special equipment needed to accommodate bicycles,
- Development and enforcement of any operating rules and regulations relating to bicycles on the system,
- How to market the availability of bicycle accommodations,
- The costs and the sources of capital and operating funds for the program,
- Whether to have a demonstration program, and how to evaluate its success,
- Training and involvement of operating employees,
- How to establish and maintain a productive relationship with users and bicycle advocacy groups,
- Developing reasonable changes in vehicle and facility maintenance procedures,
- Minimizing adverse impacts on transit operations,
- Ensuring proper security for bicycles,
- Minimizing risks and potential tort liability, and ensuring adequate levels of safety, and

- Dealing with potential unintended consequences of such a program (such as how to deal with excess demand or bicycles that are left on racks by users).

Once these operational decisions are resolved and the program implemented, they often need to be reexamined and modified in the light of experience gained.

PROGRAM ORIGINS AND GOALS

As described earlier, a bicycle program often has its origin outside the transit agency. The first programs were designed to transport bicycles across major highway bridges which did not permit bicyclists access on sidewalks or traffic lanes. Planning advisory groups, state agencies, city council representatives, or bicycle advocacy groups may be responsible for proposing a bicycle program. This was the experience of Phoenix, Portland, Seattle, Tucson, San Diego, Philadelphia, and Washington D.C., to name a few.

In Portland, local support for establishing a program of bicycles on transit was strong enough to allow organizers to obtain 7,500 signatures on a petition requesting Tri-Met to transport bicycles. The agency's first response was to propose testing bicycles to be carried on the inside of buses with bicycle securement in the wheelchair tie-down locations. However, this approach was opposed by persons with disabilities. The result was a one-year demonstration project using front-mounted racks on buses and allowing bicycles on the light rail system. The demonstration was determined to be a success, and the agency is expanding the program system-wide on a permanent basis.

For several rail systems including the Bay Area Rapid Transit District (BART), the Washington Metropolitan Area Transportation Authority (WMATA), and the Sacramento RTA, bicycle access and parking was a component of rail system planning. In some cases, stations were equipped with bicycle pathways and locker or rack facilities when the stations opened. Allowing bicycles in rail cars, however, has often resulted from initiatives of bicycle advocacy groups and recreational clubs.

Interest in establishing a program also may originate from a variety of sources within the operating agency. A new executive director from an agency operating a bicycle-on-transit program may want to see the practice established at the new agency. Marketing and planning staffs of transit agencies in recreational and tourist locations may propose carrying bicycles on buses as a way of increasing ridership during low ridership service hours. Agency employees who are avid cyclists may propose the idea.

Goals for bicycle transit programs usually center on five interrelated themes:

- To promote alternatives to SOVs,
- To extend a transit system's catchment area by making transit accessible to riders beginning or ending their trip beyond walking distances to bus stops or rail stations,
- To help meet regional goals for air quality,
- To reduce auto trips and parking at rail stations or park-and-ride facilities, and
- To support community urban design and land use goals.

Local bicycle program goals often are linked to transportation policy and planning requirements. Federal planning guidelines call for states and regions to consider intermodal connections, multimodal choices, and regionally significant non-motorized forms of transportation. In severe air quality non-attainment areas, the Environmental Protection Agency (EPA) requires states to adopt employer trip reduction programs to improve air quality. In general terms, these programs require employers to develop commuting alternatives that reduce their employee SOV trips. Commuter SOV trip reduction programs in effect in the non-attainment areas of Washington and Arizona are examples. The city of Aspen is trying to reduce vehicle miles traveled (VMT) by 40 percent to meet federal clean air standards, and the Roaring Fork bicycle program is an element of that effort.

Bicycle-transit programs are also used to support regional mobility plans, as in Sacramento and Portland. The City of Sacramento and the County have adopted bicycle facility development plans. Seventeen of the RTA's light rail stations are located within three blocks of a city or county bicycle route or path. In Portland, light rail station parking facilities and transport on the light rail system are complemented by the bicycle routes and bicycle lanes developed by local jurisdictions to connect neighborhoods to the rail system In the Portland region, many park-and-ride lots are at capacity and feeder bus services are stretched too thin. Bicycle access is viewed as one solution to this access problem.

A clear statement of program objectives can establish realistic expectations for accommodating bicycles on transit. While the program may support overall transit agency goals and regulatory mandates, more specific objectives should identify markets to be served, levels of service, and interagency coordination opportunities. The more clearly defined the objectives are, the easier it is to design operating policies and service components consistent with expectations and with current operations.

SERVICE, EQUIPMENT, AND FACILITY COMPONENTS

Transit agencies have accommodated bicycles and bicyclists with several types of improvements. Bicycles can be transported in the interior or on the exterior of transit vehicles, stored in racks or lockers at transit stops or stations, or provided with safe access to transit stops or stations. Options currently in use in the United States are listed in Table Three. From this list a transit agency can select those components which best respond to the needs of its customers and which are most compatible with its operations. Additional options to consider can be found in descriptions of Japanese and European programs *(1,2).*

TABLE THREE SUMMARY OF EQUIPMENT AND FACILITY OPTIONS ON U.S. TRANSIT SYSTEMS

Bicycle on Bus	**Bicycle on Rail**
Front racks	Passenger car interior
Rear racks	Storage options being developed
Bus interior, including in luggage compartments	AMTRAK baggage cars
Trailers	
Bicycle Parking	**Access Design**
Lockers	Bicycle lanes and paths
Racks	Signage and lighting
Covered parking sites	Station design and siting

Bicycles are carried in or on all modes of transit in a variety of settings: vans; urban and rural bus systems; light, urban, commuter, and intercity rail cars; and ferries. Bicycles can be physically accommodated in a number of ways:

- Carried on the exterior of transit vehicles (usually buses and vans),
- Carried inside transit vehicles (usually rail cars and ferries),
- Transported in trailers (usually pulled by vans),
- Parked at transit facilities such as bus stops, transit transfer centers, rail stations, or park-and-ride lots, and
- Provided with improved access ways, such as bicycle lanes and paths, to transit loading points.

Buses can accommodate bicycles on front- or rear-mounted racks, inside the bus, either in the passenger compartment or in under-bus storage areas, and in specially designed trailers pulled behind the bus. The racks currently in use vary in capacity from two bicycles on a typical front-mounted rack to five bicycles on the San Diego rear-mounted rack. When van systems provide accommodations for bicycles, they use either exterior racks or a trailer for carrying bicycles. The trailers offer the highest capacity, but also present the greatest degree of operating complications.

On those rail systems in the United States that allow bicycles, passengers carry their bicycles into the rail cars and usually are required to hold them during the trip. Storage equipment is not typically used to secure bicycles in either light, heavy, or commuter rail cars, and passengers are responsible for keeping their bicycles out of harm's way. Some European systems provide equipment in the rail cars for securing the bicycles. Designs include ceiling hooks and floor fastening devices (2). In American intercity travel, bicycles are handled as baggage and must be checked through for transport in baggage cars.

A partial listing of North American transit agencies that accommodate bicycles on either the exterior or the interior of transit vehicles appears in Appendix B. This list was compiled from available sources and does not identify every program in operation.

Bicycle parking accommodations are located at bus stops, transit centers, park-and-ride lots, and rail stations to allow for convenient intermodal transfers. Parking equipment includes a variety of enclosed storage lockers (known in the bicycle community as Class I units), secure open-air racks (Class II) and less protective racks (Class III). Lockers typically store one or two bicycles per unit. Racks can accommodate 2 to 12 bicycles. Overhead protection for unenclosed parking racks is another improvement option.

Access design improvements include bicycle-compatible station access roadways, designated bicycle paths through park-and-ride lots, bicycle lanes on station access roads, bicycle route and parking signage, lighting, station design (including location of bicycle parking facilities) and siting, and bicycle paths from neighboring communities.

CHAPTER TWO

CENTRAL THEMES FOR BICYCLE-TRANSIT INTEGRATION

The extent of integration of bicycles and transit in the United States is small but growing. The interviews conducted during the preparation of this synthesis reveal a broad spectrum of current practices among a selection of systems which do accommodate bicycles to some extent or other. These practices generally tend to be influenced by the local circumstances in which the transit system operates, including community interest in bicycles, the attitude of policy makers and managers, and the operating environment of the system. How the local setting has influenced policy and operations decisions is presented here.

Management of any type of bicycle-transit program requires staff resources, administrative procedures, identification of funding sources, and marketing activities. Management practices that apply to bus, rail, ferry, parking, and access improvement programs are described in this chapter.

THE SETTING

The setting within which a bicycle program is developed and operated has a large impact on its ultimate success. This setting is determined by the transit system's service area characteristics, regulatory constraints, and community involvement. These factors will influence whether a program is adopted, what its scope becomes, and the level of program acceptance from the users, other transit riders, the community at large, and operating personnel and management.

Service Area Characteristics

Service area characteristics influence a transit operator's interest in and support for bicycle integration. They are also contributing factors in program design and performance and in the public's response. Service area characteristics which appear to be conducive to the implementation of bicycle programs include the following:

- *Low density--Low* density non-urban service areas are good candidates because bicycles can extend the effective catchment area, much as park-and-ride lots do but at a lower cost and at both ends of a trip. The lower bus ridership and lower traffic congestion in such areas are also generally more comfortable environments for bicyclists. In such areas, bicyclists have less competition for the transit system.
- *Excess capacity--Systems* with excess passenger capacity can expand their service options without reducing service quality to current riders or adversely affecting service delivery.
- *Active non-transit bicycle programs--Service* areas with designated bicycle routes, good signs, and a municipal or regional bicycle coordinator provide valuable support and often create other bicycle facilities which complement the development of a good bicycle-transit program.
- *Pedestrian-friendly environments--Areas* that are safer and friendlier for pedestrians tend to be safer and friendlier for bicyclists as well. Grade-separated or exclusive pedestrian ways and transit malls can encourage general bicycle use and attract cyclists to transit services. Use conflicts among bicyclists, pedestrians, and transit may require mitigating measures and conscientious design treatments.
- *Strong bicycle advocacy groups--An* active and well-organized bicycle constituency can generate responsive transit agency programs and encourage higher utilization of the facilities and services.
- *Colleges and universities--Academic* settings typically supply an active bicycle-riding population. A strong bicycle program can also be used as a means of marketing broader use of the transit system to students.
- *Recreational and tourist attractions--Areas* that attract tourists and sports enthusiasts are often favorable locations for bicycle and transit integration. In San Diego, rack-equipped buses connect hotels with beach areas. In Aspen, rack-equipped buses bring riders close to national forests whose roads have been closed to auto traffic. Buses also carry bicycles and passengers up into the mountains, while riders pedal their way down. In Philadelphia and Washington D.C., extensive rail systems offer bicyclists access to historical, cultural, and scenic attractions.
- *Air quality non-attainment areas--Areas* confronted with severe air quality conditions tend to be willing to experiment with bicycle-transit arrangements to provide residents with less polluting travel options. Both Seattle and Aspen have justified their programs, in part, on air quality improvement objectives.
- *Corridors with bicycle access barriers--Topographical* barriers such as lakes, tunnels, and bridges require cyclists to find alternative means through the travel corridor. Dangerous sections of highway and crowded urban traffic often pose another type of obstacle to bicycle use. Transit can provide safe passage through these environments.
- *An "inside" bicycle user--Unexpectedly,* a frequent phenomenon among the active programs is the presence in the transit agency of bicycle users and enthusiasts. Such "insiders" were found in a number of cases and in a variety of responsibilities, including local elected officials, city planners, transit planners, and vehicle operators and mechanics. They are often the catalyst for establishing and maintaining enduring programs.

Weather conditions should be considered but in most locations there appear to be a sufficient number of months with temperate weather to accommodate some bicycle service. For instance in Aspen, Colorado, and Wenatchee, Washington, buses carry bicycle racks between April and November, after which they are removed and side-mounted ski racks are installed. In Phoenix, racks continue to be used during summer's 100+ degree days, although the number of users is somewhat lower than during cooler months. There is extensive bicycle use in rainy Seattle and cold

Madison, Wisconsin. Several agencies without bicycle programs, however, cite weather conditions as a reason for not adding the service.

Service area characteristics also may pose challenges to establishing a bicycle-transit program, even if there is extensive bicycle activity in the region.

- *Urban congestion--Congested* urban areas are the most difficult in which to operate a bicycle on transit program. A bus operator with a loaded bicycle rack must compensate for tighter turning radii, narrow lanes, and short maneuvering distances between vehicles and deal with bicycle handling and heavy passenger loading at the same time. Crowded passenger conditions on some urban rail systems leave little space for bicycles on station platforms or in passenger cars.
- *Larger transit systems--Larger* agencies tend to have a more complicated decision-making process, and the balance of power between planners and operating managers tends to favor the latter. Expectations about program costs may also deter large systems.
- *Crime-prone locations--Crime-ridden* areas pose challenges for bicycle security in parking lockers and racks. There is also concern that lockers may be used for storage of illegal substances or shelter for homeless persons.

Regulatory Factors

The accommodations for bicycles that transit systems can provide is in some cases regulated by state vehicle codes that may restrict bicycle transport on transit vehicles. Some state vehicle codes limit the dimensions of racks mounted on buses when they change the overall vehicle length or width. For example, California vehicle codes required that bicycle racks extend no more than 18 in. from the front of the bus. This restriction was recently increased to 36 in. to accommodate a program at the Los Angeles County MTA.

Several of the transit agencies that responded to the survey have had their vehicles and racks inspected by the state agency responsible for transit vehicle safety, typically the highway patrol or public utility commission

Community Involvement

Most agencies participating in the survey reported the involvement of some kind of advisory or planning group that included external agencies and bicycle interest groups in such activities as planning programs, resolving operating difficulties, or promoting the service to users. The tasks undertaken by these groups, as well as the number and type of participants, vary by agency.

The degree to which the public is involved ranges from standing citizen advisory committees to open forum meetings during which the public is invited to comment, to formal public hearings on service changes or grant applications for projects that support the programs.

The Roaring Fork case demonstrates how bicycle advocacy groups, local planning agencies, and a transit system can team up to move a program forward. The Roaring Fork Bicycle Advisory Committee began as an outreach program to educate the public about the program and to develop guidelines for improved operations. Its members include representatives from bicycle shops, bicycle clubs, the city planning department, and the transit system. Two issues resolved by this group were (1) how to deal with some abuse of the system by school-age riders, and (2) how to deal with demand that was in excess of available capacity. Bicycles were being turned away because the four-bicycle capacity racks were fully occupied at certain times and places.

For the first problem, the Committee developed operating rules for users, including minimum age requirements. For the second problem, it suggested changes to the service plan limiting the number of loading points near Aspen. Many of the Committee's recommendations were adopted by the transit board and implemented.

The Committee also worked on educating the community about the limitations on the availability of bicycle racks. It made clear to users that Roaring Fork Transit could not guarantee an open rack space on every bus, and that during high-use periods travelers may have to wait for the next available bus, or store their bicycle in a parking rack for the day. This increased level of knowledge of service limitations helped to improve users' appreciation of the service and reduce the number of incidents where users were turned away.

Other examples of the role of advisory groups:

- Phoenix uses a Citizens Task Force in an advisory capacity. In designing its original demonstration project, the group suggested preferred fastening equipment, the best process for quickly loading and unloading bicycles, and bus routes on which to conduct the demonstration.
- BART has a committee to monitor program use and review complaints. It comprises representatives from BART's passenger services, field service, agency police, and insurance, safety, and planning departments, as well as representatives from the East Bay Bicycle Coalition and the San Francisco Bicycle Coalition.
- WMATA has included the Washington Area Bicycle Association in planning its program and in coordinating with other agencies and groups. The Bicycle Subcommittee of the area's Council of Governments reviews WMATA's bicycle plans.
- Tri-Met worked with Portland's Bicycle Transportation Alliance and an ad hoc citizens advisory group in the design of its demonstration project. It also obtained resolutions of support from the Portland Area Bicycle Coalition, the City Council and Mayor of Portland, and two cities and one county served by the program.
- SEPTA has worked extensively with the Bicycle Coalition of the Delaware Valley in selecting divisions for bicycle-transit programs, conducting surveys, and reviewing regulations.

These working relationships provide a forum for two-way communication between users and providers. Experienced cyclists and transit riders provide insight to service needs and to potential operational problems from the user's perspective. They can often suggest simple solutions.

These committees also offer transit agencies a forum for explaining operating and maintenance issues, helping users gain an understanding of the program's requirements and limitations, and giving advocacy groups an appreciation for the work involved in delivering the service. Including local and regional planning and transportation officials in program design and modification also increases the opportunity for interagency coordination and implementation of additional supportive programs and facilities.

The experience of the transit operators that have established programs suggests that obtaining input from the user community throughout the planning process can improve the design and

TABLE FOUR
ILLUSTRATIVE MEMBERSHIP AND TASKS FOR
A BICYCLE-TRANSIT ADVISORY COMMITTEE

Membership:

Transit agency representatives:

- Planning
- Operations
- Maintenance
- Marketing
- Risk management or safety
- Security, enforcement, or field service
- Customer services
- Engineering

Community representative:

- Bicycle clubs
- Bicycle coalition or advocacy group
- Bicycle shops
- Community at large representative
- Chamber of commerce

Coordinating agencies:

- Bicycle coordinator
- City or county transportation planners
- Traffic engineering officials
- MPO intermodal coordinator

Tasks:

- Identify target markets
- Select demonstration routes
- Develop design criteria for equipment
- Develop guidelines and operating procedures
- Review training materials
- Monitor use and complaints
- Conduct program evaluation

development of the program, improve mutual understanding between user groups and the operating agency, and help create realistic user expectations. They also serve as a valuable marketing tool and can help mitigate conflicts.

A bicycle advisory committee should consist of members with an interest in resolving the large number of policy and operational issues. A sample list of suggested representatives is shown in Table Four. Examples of the tasks such committees can and have accomplished are also listed. These activities are based on the recommendations of agencies interviewed. In some cases, such as Los Angeles, the transit agency participates in a larger bicycle advisory committee established by and for another agency--in this case, the City of Los Angeles.

MANAGEMENT OF BICYCLE-TRANSIT PROGRAMS

Administration

The typical pattern for administering bicycle programs is a variation on a basic theme with the following components:

- An internal project/program manager or coordinator, often from the planning department or a special projects office, and often a bicycle enthusiast,
- An internal agency task force consisting of representatives from the major internal departments with an interest or stake in the program,
- A technical leader from maintenance or engineering, who is responsible for developing design criteria and technical specifications for equipment, and
- An advisory group, which includes non-agency organizations with an interest in bicycle-transit programs, a knowledge of user needs and constituency characteristics, and some expertise in the issues relating to program success.

Successful programs are generally supported by top-level policy makers and managers and are led by a project manager who has the ability to draw the interested parties together and make decisions and create compromises by consensus.

Options for program management range from centralized control in one department to broad dispersion of responsibilities among the cognizant functional units. While bicycle on transit programs are administered wholly by transit agencies, bicycle parking programs and bicycle access programs offer opportunities for involving other local agencies and contractors.

In most cases, demonstration programs have persuaded top management either of the political necessity and/or the operational feasibility of the programs, that risks can be minimized, and that the benefits are broader than merely the number of bicycle users on any given day. Such benefits include broadening the agencies' supportive constituency and positive community relations. If grassroots organizations are requesting bicycle access, then initiation of the program demonstrates that the transit agency is responsive to community needs.

Support of the program by the operational staff depends on the setting and the operating environment. Strong leadership from top management is often persuasive in gaining support from and acceptance by the operating personnel.

Staffing Requirements

The initiation of bicycle programs usually requires a substantial amount of effort by agency staff, who are called on to carry out this duty in addition to their existing duties. Additional staffing has generally not been needed to implement or operate any of the programs included in this report. In the agencies responding to the survey, all bicycle program duties have been assumed by existing personnel and incorporated into existing job responsibilities.

Program administrators estimate that 10-20 percent of their time is dedicated to bicycle program matters including management, customer relations, education, promotion, and interagency coordination. Maintenance managers estimate that 5-10 percent of their time is spent on bicycle-related functions including equipment design, contracts, equipment delivery, and installation.

Funding

Agencies have used both normal transit operating and capital grant funds, special bicycle program funds, and combinations thereof to develop, implement, and operate their programs. Demonstration stages are often funded by a special grant or project fund from an outside agency, as was the case in Phoenix. Once the programs are established and institutionalized, funding generally

becomes part of the overall operating and capital budgeting decision process for an agency.

Federal transportation and air quality funding sources have been widely used for equipment acquisition. ISTEA guidelines favor intermodal coordination and integration. Although funds are no longer earmarked specifically for bicycle programs, bicycle programs and projects can compete with other projects on a statewide or regional basis.

Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Organizations (RTPOs) now have a major portion of the responsibility for project selection and allocation of Surface Transportation Program funds. Newly established regional intermodal guidelines govern these funding opportunities. These agency planners often include advocates for bicycle programs who may be more receptive to funding bicycle projects than transit agency planners may be.

An assortment of federal, state, regional MPO, and local funds have been used to acquire bicycle equipment. The primary source of federal support is the *Congestion Mitigation and Air Quality Improvement Program* (CMAQ), which is a categorical funding program in Title I of ISTEA that provides funds for projects and activities to reduce congestion and improve air quality. In this federal legislation, bicycle transportation facilities are defined as "new or improved lanes, paths, or shoulders for use by bicyclists, traffic control devices, shelters, and parking facilities for bicyclists" (3). Projects must contribute to achieving National Ambient Air Quality Standards and be included in local Transportation Improvement Program (TIPs) to qualify for CMAQ funds. The funds may be used for the construction of bicycle facilities and for non-construction projects related to safe bicycle use, such as bus-mounted racks for transporting bicycles. The projects must be principally for transportation and must demonstrate a measurable air quality benefit based on reductions of VMT.

Surface Transportation Program (STP) funds may be used for either bicycle facility construction or for programs related to bicycle use, if such projects are included in regional or state plans. These plans must provide for the development of transportation facilities, including bicycles and transit modes, which will function as an intermodal transportation system for the region and the state (3).

In addition, 10 percent of each state's annual STP funds are available for *Transportation Enhancement Activities*, which by definition include two kinds of bicycle-related projects: The provision of facilities for pedestrians and bicycles and the preservation of abandoned railway corridors and their conversion to pedestrian and bicycle use (3).

Section 25 of The Federal Transit Act, as amended through June 1992, permits funding to improve bicycle and pedestrian access to transit facilities, to provide shelters and parking facilities for bicycles, and to install racks or other equipment for transporting bicycles on transit vehicles (3).

The federal share of costs under STP and CMAQ is 80 percent and requires a 20 percent state or local match. Federal Transit Administration funds are about 90 percent federal and 10 percent local match.

Lockers and racks at rail systems typically have been included in the project's total capital funding package. None of the new rail construction sites contacted as part of this synthesis reported separate funding requests for bicycle projects, although some states consider the use of STP funds.

Some states have assisted in funding bicycle programs. Arizona provided the 20 percent match for federal funds for equipment purchases in Phoenix and Tucson. The California Department of Transportation assisted funding of San Diego Transit's rear-mounted racks over a decade ago.

Local agency revenues and tax support were used in Aspen and Portland. Tri-Met fully funded its demonstration project and part of its expansion. The agency received CMAQ funds for the additional racks required for the system to be 100 percent bicycle accessible.

Marketing

Marketing plays an important role in the introduction of any new product or service. Market research, a comprehensive promotional plan, and program evaluation are major elements of any bicycle-transit program. Coordination of these activities with those of bicycle clubs and localities offers wider exposure and can generate additional information as well as interest.

Market Research and Evaluation

Many of the programs observed during the preparation of this synthesis started as demonstration projects, then expanded to a larger application. The demonstration projects tend to focus on identifying and solving specific technical and operating aspects of the program. The demonstrations usually lead to minor changes in the details of the program and wider implementation of the program.

Typically, very little market research has been conducted prior to program implementation, and there are few examples of formal follow-up customer surveys. Advisory groups have been a primary source of information about potential users and travel needs, and of guidance during demonstration projects. Demonstration projects have been used to provide in-service tests of the feasibility of bicycle-bus programs on different types of routes.

Few transit systems have clearly defined their target customers, or established an objective basis for determining the success or failure of either demonstration or permanent programs. Trends in use may be a more meaningful measure than the absolute number of bicycles carried by transit or parked at its facilities. Several system managers regard the implementation of the programs as useful public relations activities which help to improve the public's perception of the agency's responsiveness--regardless of the level of use of the bicycle facilities. Information on operating cost impacts is not available, although transit managers have expressed concern over anticipated operating costs.

There has been some effort to count the number of users. For systems requiring permits, the number of permits sold or issued indicates the level of interest but does not report on frequency of use. For bus operations, the practice of monitoring actual boardings depends in part on whether the transit agency has its vehicle operators count all or other types of passengers. Automatic fare boxes greatly facilitate counts by vehicle operators. Rail systems typically do not make counts except on a sample basis. Use of parking facilities is monitored through the number of lockers leased and maintenance inspections of lockers and parking racks. Additional discussion of program use is provided in Chapters Three and Four under the heading *Operating Experience.*

Promotion

Transit systems have adopted a variety of approaches for promoting bicycle services. Most agencies have made the promotion of the bicycle program an integral part of overall promotional activities. The primary technique is a brochure describing the agency's bicycle program with text and diagrams. Several display very attractive and distinctive designs which clearly convey the concept of joint bicycle-transit services. Brochures describe regulations, availability of service and parking equipment, and restrictions and fees and provide a step-by-step guide on how to use the service and equipment. A phone number to call for additional information is also included. Drawings and photographs of equipment help potential users understand operating procedures. Several examples are presented in Appendix C. Brochures are typically distributed to bicycle shops, bicycle clubs, libraries, transit centers, and in-vehicle information racks. Tri-Met marketed its service directly to the bicycling community by mailing brochures to over 4,000 persons on the Bicycle Transportation Alliance mailing list. Bicycle program information is also typically printed on route timetables and system maps.

In addition to its standard program description brochure, Philadelphia's SEPTA prepared a pamphlet suggesting eight cultural and scenic destinations for bicycle touring accessible by its commuter and urban rail systems.

Special events are held to gain the attention of the public media. Examples are bicycle fairs and Ride-To-Work Days. Tri-Met hosted a bicycle fair to kick off its program. San Diego offered free test rides. Phoenix and Sacramento distributed press releases. Several agencies report that they plan to bolster special activities in order to attract media attention as new bicycle services are made available.

CHAPTER THREE

BICYCLE-BUS PROGRAMS

The nature and extent of bicycle-bus programs vary extensively among the systems surveyed and the systems visited. The elements of these variations include the following:

- Whether the program is in demonstration or fully operational,
- Whether the program is in service system-wide or limited to certain routes,
- Whether bicycle access is limited to certain times of day or days of the week,
- How use of the system is regulated: whether a supplemental fee or fare is charged and whether a permit is required,
- How bicycles are physically accommodated on buses and at bus stops,
- How the program is managed by the transit agency,
- How internal operating practices are adapted to accommodate the programs, and
- How internal maintenance practices are accommodated.

TRANSPORT PRACTICES

A primary concern for transit operators is how to carry a bicycle on a bus. The basic options are as follows:

- Using a rack mounted on the front of the bus,
- Using a rack mounted on the rear of the bus,
- Allowing the bicycle to be carried in the passenger compartment,
- Storing the bicycle in under-the-bus luggage compartments, and
- Providing trailers for carrying bicycles.

The advantages and disadvantages of each of these techniques are summarized in Table Five. Most bicycle-bus programs are using front-mounted racks. Many of these have been designed by transit agency employees to meet locally developed performance requirements and are tailor made to fit on the various types of buses in the fleet. Some have been redesigned to improve rack performance. More recently, several commercial vendors have begun offering off-the-shelf products compatible with local needs.

Rear-Mounted Racks

Some of the earliest efforts to develop a bicycle rack were undertaken at San Diego Transit Corporation in 1976 in order to provide bicycle transport across a bridge lacking bicycle access. San Diego Transit and the California Department of Transportation (Caltrans) developed a five-unit rack that is mounted on the rear of the bus, covering the engine compartment door. San Diego Transit has rear-mounted racks on 18 buses operating on 4 out of a total of 30 local routes. The racks are now in service on routes to congested beach areas and universities.

San Diego Transit does not recommend rear-mounted racks for service elsewhere, and these racks have not proven to be popular with other transit systems. Some of their disadvantageous characteristics include the following:

- Their large size, and the relative difficulty of removing them from the bus,
- The need to remove them to service the engine or clean the bus,
- Their interference with access to the engine during road calls,
- The fact that drivers cannot see the racks and monitor the safety and security of the bicycles while in service, and
- The fact that the driver cannot always determine when an alighting rider is a bicycle user who needs access to a bicycle before the bus pulls away from the stop.

Seattle's METRO experimented with rear-mounted racks, then switched to the front-mounted style for the reasons stated above.

Front-Mounted Racks

Front-mounted racks are the most popular method of carrying bicycles on transit coaches. Among the notable design or retrofit considerations that were related by the surveys or noted in the field visits were the following:

- Use of both suspended and supported racks, fastened respectively to a bus's front frame or bumper assembly,
- Use of racks that either suspend bicycles from brackets or prongs or support bicycle wheels in trays or wells,
- Changes in the method of securing bicycles to the racks, with a trend toward Velcro straps and/or clamping arms,
- Alterations to the hardware for mounting racks to the bus chassis, depending on the design of individual bus fleets, and
- Installation of plastic shields on the fronts of buses to reduce damage inflicted by handle bars.

Racks that support bicycle wheels in trays or other devices fold up when not in use. Bicyclists release and lower the rack for use. A rack folded up against the front of the bus can withstand automatic bus washing because susceptible parts are shielded from washer equipment. Racks that suspend bicycles from brackets or prongs do not fold up and may be damaged by washing equipment. More discussion of rack design can be found in the section *Selection and Procurement of Equipment.*

Several systems, including Tri-Met in Portland and Phoenix Transit, have operated demonstration programs with front racks that have resulted in system-wide implementation. During 1991, Phoenix conducted a six-month demonstration on three routes with

TABLE FIVE
ADVANTAGES AND DISADVANTAGES OF TYPES OF BICYCLE RACKS

Type	Advantages	Disadvantages
Rear-mounted; 5 bicycles in San Diego	High capacity; Do not block driver's vision; Do not block Headlights	Activity cannot be monitored by driver; Must be removed to service engine; Awkward on road calls; Slow loading process
Front-mounted; 2 bicycles supported in trays or wells	Easily observed activity; Racks are easily removed; Do not restrict access to engine; Quick loading and unloading helps schedule adherence; Independent bicycle removal; Racks fold up when not in use	Some bicycle tire sizes are hard to fit; Limited capacity
Front-mounted; 2 bicycles suspended on brackets or prongs	Easily observed activity; Racks are easily removed; Do not restrict access to engine; Quick loading and unloading helps schedule adherence	Can distort headlights; May be hard to handle walk-through style bicycles; Limited capacity; Racks do not fold up when not in use
Front-mounted; 4 bicycles suspended on brackets or prongs	Easily observed activity; Racks are easily removed; Do not restrict access to engine; higher capacity	Bicycles cannot be loaded and unloaded independently; May cause schedule delays; Racks do not fold up when not in use
In-vehicle transport	No special equipment; do not interfere with bus operations or servicing	Potential conflicts with passengers; Space limitations on high ridership routes; Potential conflicts with passengers in wheelchairs; Vehicle operator opposition
Trailers	High capacity	Activity cannot be monitored by driver; Awkward to maneuver; Slows bus operations

45 rack-equipped buses. Its success led to system-wide expansion to 350 Phoenix Transit buses, as well as 50 vehicles serving smaller cities operating on 47 local and 20 express routes. Each rack holds two bicycles.

Portland also began its program as a demonstration, installing front-mounted bicycle racks on 79 buses operating on 7 of its 75 routes. Each rack holds two bicycles. See Figure 1.

Demonstration routes were selected from customer information obtained from a survey, advice from a Citizen Advisory Committee, geographical distribution, and bus assignment limitations. The demonstration's success lead the agency to a two-part expansion program. In the first phase, an additional 325 racks were installed. A second phase, scheduled for completion in July 1994, will equip the entire 600-bus fleet.

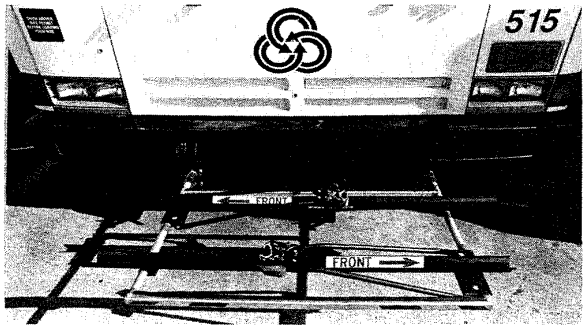


FIGURE 1 *Example of a front-mounted rack for two bicycles. (Courtesy of Tri-Met)*

Roaring Fork Transit Agency has a program that has been in service for over a decade. Roaring Fork has equipped 90 percent of its fleet, or about 50 buses, with front-mounted racks which carry four bicycles. Buses which operate exclusively in the City of Aspen are not equipped with racks, inasmuch as the entire area of this small city can be covered on a bicycle in a matter of minutes. Vanpool vehicles are also equipped with bicycle racks.

Seattle METRO operated service for several years with front-mounted racks on 10 routes connecting portions of the service area linked by a bridge that is not accessible to bicyclists. At the encouragement of local officials, the agency pursued a strategy for accommodating bicycles throughout its service area. Following a test permitting bicycles to be transported in the passenger compartments of its buses, the agency decided to retrofit its entire fleet with newly designed front-mounted racks and provide bicycle-bus service system-wide.

Equipping buses to carry racks creates a new dimension to fleet management and maintenance. For systems that are not providing the service system-wide, garage managers must ensure that each morning buses assigned to routes that carry bicycles are in fact equipped with racks. This often means that a larger number of

buses than are needed for bicycle routes are equipped to carry racks to give the maintenance and operating crews greater flexibility. Racks often can be moved around to any bus having the required receptacle or fittings. For example, the fleet requirement for the Los Angeles demonstration route is 16 buses, but about 25 vehicles are equipped to accept racks.

Bicycles in Buses

Pierce Transit (serving greater Tacoma, Washington) and Sacramento Transit allow full-size bicycles in buses serving all routes, with two exceptions. During crowded conditions, a driver may require bicycle riders to board the next available bus. Bicycles are also not allowed on some peak period buses. Pierce Transit allows a total of six bicycles per bus, with three stowed in each of the two areas with folding seats for wheelchair tie-downs. If these areas are being used for wheelchairs, bicycles are to be kept in the wide aisle behind the rear door. Sacramento allows one bicycle per bus. Transit systems in Dallas, Texas, Toronto, Canada, and Windham, Connecticut also permit bicycles in their vehicles during selected service.

Seattle METRO conducted a 1-month demonstration permitting bicycles on board with mixed results. Unlike neighboring Pierce Transit and Sacramento's Regional Transit, METRO does not operate with the same levels of excess capacity and much of its service is in the dense urban core.

The Golden Gate Transportation District allows bicycles to be brought on board on one route. This route connects communities to a BART station via a bridge that does not have bicycle access. When the regional planning agency decided to subsidize bus service across the bridge using toll revenues from the bridge, the bicycle community asked that bicycles be allowed in buses on this service. The District has allowed bicycles inside buses for a trial period of 6 months, beginning in October 1993. Buses are equipped with wheelchair tie-downs across from the rear door. Bicycles are boarded through the rear door, and the wheel is placed in the tie-down position with the rear wheel in the wheelchair clamp. Cyclists are responsible for loading, securing, and unloading the bicycles, and must provide their own straps or bungee cords for securing the bicycles on the tie downs. Cyclists may pay their fare prior to bicycle loading and must remain with their bicycles for the duration of the trip. Two bicycles are allowed to be stowed in the tie down area on a first come, first served basis. The driver may ask the cyclist not to board or to get off the bus and wait for the next bus, if the bus becomes too crowded or if a patron using a wheelchair boards the bus.

Folding bicycles are usually allowed in buses, although some transit agencies may require the use of a carrying case or box.

Roaring Fork operates some longer distance express service using over-the-road coaches with under-floor baggage compartments. Bicycle riders are allowed to put their bicycles in the luggage storage areas on these buses during the non-skiing season. Riders must open the storage compartment doors themselves, put the bicycles in the storage area themselves, and secure the door without assistance from the driver.

PROCEDURES AND REGULATIONS

The extent to which procedures and regulations have been developed to govern bicycle programs varies substantially among the properties responding to the survey. The general topics that tend to be covered include the following:

- Fees and permits,
- Restrictions on the hours that bicycles can be carried,
- Restrictions on the age of users,
- Restrictions on bicycle size and condition,
- Safety precautions,
- Loading and unloading procedures, and
- Storage instructions for in-vehicle transport.

Fees and Permits

There are two approaches to the issue of fees and permits. The first approach suggests that for a program to be well utilized, any institutional barriers to bicycle transport, such as fees and permits, should be minimized. According to this view, fees and permit requirements are a barrier and will discourage potential riders. Permits have the effect of discouraging the casual user, tourist, and other non-resident; they require staff to administer; and create another administrative role for vehicle operators who must determine whether a bicycle rider has a valid permit before a bicycle is placed on a rack or in the bus.

The second approach contends that a permitting process provides an opportunity to maintain a record of customers, which is useful for follow-up surveys and to educate cyclists about operating procedures and rules. The assumption is that if the riding public abides by the rules, then the program will operate safely and bicycles will not have a detrimental impact on system operations. Under this approach, bicycle users are provided with some instruction or information relating to the use of the bicycle accommodations as a part of the permitting process.

The permitting process allows the transit system to screen riders for age requirements and to discourage program abuse. The permitting process also requires that users read the rules and regulations and be prepared to follow loading instructions. It also establishes clearer grounds for enforcement. Bicyclist safety and that of fellow passengers are emphasized. User preparedness is important during peak periods to minimize schedule delays. Fees for permits are viewed as a way to help pay for the administrative costs of the permitting process. Examples of permitting requirements and rules and regulations are provided in Appendix D.

No bus systems report charging an additional fare for carrying bicycles. Sacramento and Portland require permits and charge a small fee for a permit. Both systems also operate light rail service on which the permit is also valid. The permit for Sacramento costs $5, and is valid for 3 years. Tri-Met also charges $5 for permits, and all permits are valid until June 30, 1995 (at which time they will be reissued). Permits are available at transit agency offices. Sacramento sells its permits at its pass sales outlets as well. Tri-Met extended its permit sales to local bicycle shops to be more convenient and prints a summary of the rules on the back of the permit.

In part because the system carries a large percentage of users who are not permanent residents, Roaring Fork does not require a permit. Phoenix also has no permit requirement. Seattle METRO is not planning to require permits on its system-wide bus program.

Whether permits are appropriate to a given system depends on the program's ridership goals, service area characteristics, and the number and types of modes operated. For example, if the target

market is off-peak recreational and tourist based, then permits may pose a serious barrier for the casual user. If the target market is peak period commuters, then permits and fees may provide a means of educating customers and determining whether they are qualified users.

Time of Use

Restrictions on the times of day that bicycles may be carried on buses are either capacity related or safety related. Some of the front-mounted bicycle racks hold the bicycles in such a way as to partially obstruct or diffuse the headlights. This has lead to restricting bicycle carriage to daylight hours. Roaring Fork Transit does not allow bicycles on its front racks after 7:30 p.m. because of their interference with headlights. The buses carry front racks from which bicycles hang and partially cover headlights.

When bicycles cannot be accommodated on all trips of a route, timetables identify trips with rack-equipped buses.

In transit systems that allow bicycles inside buses, drivers have the authority to deny access to bicycles if there are too many passengers on the bus to accommodate bicycles safely and conveniently. Passengers in wheelchairs have first priority at all times for use of the tie-down areas that are sometimes used for bicycles. Sacramento does not allow bicycles in buses during weekday peak commuting periods. Pierce Transit leaves the decision on whether to allow a bicycle on board to the driver's discretion.

If such time-of-use restrictions apply, it is essential to make certain that the hours of access and restrictions are clearly communicated to the riding public. Some systems note these on public timetables and other promotional materials. Restrictions can be listed conveniently on the back of required permits.

Age Requirements

Several agencies have restricted participation to people over a minimum age. Some allow youths between the ages 8 and 15 on the system with bicycles when accompanied by a bicyclist aged 18 or older. Other systems allow children of all ages to bring their bicycles if accompanied by an adult.

Size and Kinds of Bicycles and Accessories

One practical problem in carrying bicycles on racks is the difficulty of accommodating all sizes of bicycles. Bicycles that are too small are difficult to secure, particularly on bottom wheel supported racks. "Walk-through" style bicycles without a top tube cannot be as easily secured on racks which suspend bicycles on brackets or prongs. Bicycles that are too large may extend beyond the width of the front of the bus or may take up too much space on the rack. Some bicycle tire sizes may cause problems (e.g., wide "mountain bike" type tires). Bicycle trailers and bicycles with child seats create additional problems. Child seats generally must be removed before putting a bicycle on the rack. Trailers are prohibited.

Restrictions on the sizes of bicycles that can be carried are fairly constant among systems. They can be no longer than 80 inches and no higher than 48 inches. Especially important for interior transport is that bicycles not be excessively dirty or greasy. It is the responsibility of bus operators to enforce whatever restrictions are in place.

Safety

Safety of operations is of major concern to all transit systems. No transit agency in the survey indicated that the program had diminished its ability to provide safe operations, and each had a specific element of its program focus on ensuring that carrying bicycles did not compromise safe operations or create any new conflicts with safety. In addition, many aspects of program design are directed at ensuring safe conduct of the bicycle programs.

The standard operating procedures that have been established have a major element of safety and accident prevention. Among the safety-specific elements of these procedures are the following:

- Using front-mounted racks where activity can be directly observed by bus drivers,
- Maintaining good eye contact between the driver and the bicyclist while loading and unloading bicycles,
- Maintaining verbal and visual communication between drivers and cyclists to prevent buses from pulling away before bicycles can be loaded or unloaded,
- Avoiding interference with the other duties of the driver,
- Avoiding interference with the driver's ability to see other activities in and around the bus,
- Exiting the front door of the bus and indicating to the driver the intent to remove a bicycle from the rack, and
- Returning to the sidewalk or curbside after removing bicycles until the bus departs, rather than riding the bicycle directly into traffic.

Most systems communicate in various ways to the bicyclists that the agency is not responsible for bodily injuries, bicycle damages, or loss incurred while bicycles are on transit property. This indemnification statement is included in brochures, on signs on the buses or on the bicycle rack, or as part of the permit or training process. In Phoenix, this disclaimer is displayed on a panel on the front of the bus in a way that it can be seen by the bicyclist as the bicycle is mounted on the rack. Permit applicants are usually requested to sign a waiver of liability.

Loading and Unloading Procedures

The process of loading and unloading bicycles is a critical element of a successful bicycle program. It must be fast enough not to interfere with schedule adherence, yet thorough enough to allow bicyclists to load and fasten their bicycles securely. The process must be monitored by drivers, and communication between the driver and the bicyclist must be easy and effective.

Passengers are responsible for loading, securing, and removing bicycles from racks and vehicles. Although bus operators are trained in the operation of the racks, they usually are required to remain in their seats and are able to offer only verbal advice, except in emergencies or when a bus is at a layover or transfer point.

Written and schematic instructions for loading bicycles are usually included in promotional brochures, standard operating procedures, and permit applications. Video training tapes have the added benefit of a visual demonstration. The key points made in these

materials define the responsibility of the bicyclist, including the need to display user permits, if they are required; how to communicate with the driver while loading and retreiving the bicycle; how to use the bicycle rack, including the order in which the rack positions should be filled, direction of bicycle placement, and fastening and removal procedures; and how to ensure that the remaining bicycles are secured when removing one from the rack.

Special circumstances may require restrictions on loading locations. Because San Diego has rear-mounted racks which are out of the driver's vision, the agency has established safe loading locations and requests customers to use only bus stops that are designated as bicycle boarding stops.

Seattle operates much of its downtown service through a bus tunnel. Bicycles may be loaded and unloaded only at the two end stations because any additional dwell time within the tunnel would significantly reduce the facility's capacity. Bicycles will not be loaded or unloaded at street-level stops in the downtown zone. Roaring Fork Transit bicycle racks can carry four bicycles. Rack-equipped routes connect outlying residential and recreational areas to the city of Aspen. To alleviate first-on and first-off loading problems (bicycles cannot be removed independently of each other) the agency limits the number of bus stops near its urban core where bicycles can be loaded or unloaded. This restriction reduced loading difficulties and delays that the system had experienced.

The alighting process is equally important. Bicyclists must clearly communicate to the driver where they intend to alight so that the driver can be alert to this impending transaction and maneuver the bus at the stop in such a way as to allow easy and safe removal of the bicycle. Some systems encourage exiting by the front door, so that the passenger and the driver can maintain communications and the driver can be alerted that a bicycle needs to be removed at the next stop. Failure to maintain such communication and departing from the rear door may result in a bus leaving a stop before a bicyclist can retrieve the bicycle from a front rack. Leaving the bus by the front door, however, can sometimes create conflicts between the alighting bicyclist and boarding passengers.

Procedures for bringing a bicycle inside a bus differ from those for rack-equipped buses. Specifics of this approach include:

- Displaying any required permits and paying fares,
- Communicating with drivers,
- Using the front door for loading and unloading, except on systems with rear-door wheelchair lifts that use tie-downs for bicycles,
- Boarding only after all other passengers are on the bus,
- Knowing where to put the bicycle once on the bus,
- Knowing how to maintain control of the bicycle while on the bus, and
- Knowing to defer to a wheelchair patron when necessary.

Drivers are instructed not to put the bus in motion until bicycles are stowed in order to ease the loading process and to prevent injury to other passengers.

RURAL APPLICATIONS

The bicycle programs of two rural transit systems in Washington State--Clallam Transit and LINK, in Chelan and Douglas Counties--provide useful illustrations of the means for developing and implementing bicycle programs in this operating environment.

Clallam Transit System
Clallam County, Washington

This agency on the Olympic Peninsula of Washington began its bicycle program in April 1993. All routes accommodate bicycles either with racks or in the vehicle. Ten of the agency's 30 buses are equipped with front-mounted racks. Bicycles are allowed in the passenger compartment of the other transit buses at the discretion of the driver, depending on the passenger load. Bicycles are put in the below-floor storage compartment of the larger over-the-road coaches operated by the agency. The agency intends to equip the entire transit fleet with racks within the next 2 years. It is currently applying for a grant to procure and install parking racks or lockers at 12 transfer points.

The agency's decision to adopt a bicycle program was influenced by bicycle clubs, an awareness of other systems' bicycle programs, and the emergence of an intermodal philosophy at the regional planning level. Buses with racks were assigned to two routes for the initial service, based on discussions with bicycle groups and the agency's citizens advisory committee. These two routes are the longest ones (60 and 20 miles) and have the highest overall ridership. They connect small rural towns to the urban center of Port Angeles.

The topography and land use of the service area present a special rural situation. The service area is very long, but very narrow, and is bordered on the north and west by water and on the south by mountains. The area is a major recreational center. A two-lane highway provides the only east-west access to the small towns in the L-shaped service area. This highway travels through national forests and parks on an extremely narrow right of way carved between lakes and mountains. On many sections of this road, there are no shoulders to allow for the side-by-side travel of bicycles and automobile/truck traffic.

The Olympic National Park is a major recreational attraction in the region. The National Park Service is encouraging cyclists to use the transit system for transport on the dangerously narrow portions of the highway as it passes through the park. Bicycle rider kiosks are located at points where the road narrows, and transit schedules and loading procedures are posted in the kiosks.

Bicycles may be loaded and unloaded at any posted bus stop. Permits are not required and there are no restrictions on the time of day that bicycles are carried. Riders are responsible for loading and unloading bicycles. The front-mounted racks are designed to handle four bicycles. Bicycles carried on the interior of buses must be secured with bungee cords carried by the driver.

The major complaint about the rack in use is that it is not user friendly, in that loading and unloading of bicycles can take up to 4 minutes. The agency is currently experimenting with removing the existing fastening system and replacing it with straps or bungee cords.

Racks are easily installed on and removed from a bus. Twelve buses are equipped with receptacles to carry the 10 racks now in use. Increasing the number of buses equipped with receptacles for the rack would increase fleet assignment flexibility.

In spite of the long time required for loading and unloading bicycles on the system, there has been no significant impact on

schedule adherence. This is due in part to low levels of utilization. Counts have not been made of the number of bicycles carried. Management speculates that the majority of the users are youths. Traffic conditions on the narrow highway and high bus passenger loads create more delays than handling the bicycles. There have been no injury or liability claims related to bicycles to date.

LINK

Chelan and Douglas Counties, Washington

This rural system serves Chelan and Douglas counties in central Washington. LINK's service area consists of the small towns and rural areas of the two counties. The service area includes a number of recreation attractions, including Lake Chelan and Lake Wenatchee.

LINK began operating bus service in December 1991, and in April 1992 decided to begin a bicycle demonstration program named "BIKE Link" during the period from June 1 to Labor Day. Favorable public response and successful operation led to a second year of operation in 1993, with the period of operation extended to April through October. LINK is in the process of ordering lockers for its transit center.

Seven of the 15 vehicles operated by LINK are equipped with front-mounted racks that are secured on the vehicles using trailer hitch sleeves. The bicycle rack consists of two prongs that protrude from the front of the bus onto which the bicycles are loaded and then secured using a rubber grommet and a Velcro strap. A retractable hook from the rack is fitted onto the front wheel of the outermost bicycle for additional security. During the winter months, the bicycle racks are replaced by ski racks.

The marketing staff developed BIKE Link in response to requests from the public. The target markets are inter-community commuters and recreational travelers. The routes selected for bicycle service connect small towns with recreation destinations. Two routes provided bicycle service in the first year. During the second year of operation, two more bus routes were added to the network. These routes are very long, ranging from 22 miles to 40 miles.

Loading and unloading of bicycles is restricted to outlying areas, and none is permitted in the urban center of Wenatchee. The purpose of the program is to provide inter-community bicycle access. There are no age restrictions, and no permits are required. The entire LINK system is free to riders, and there are no charges for taking bicycles on LINK.

Drivers are trained with a combination of videotape instruction and hands-on experience. Customer relations is a primary focus for LINK driver training. Vehicle operators are allowed and encouraged to help cyclists load bicycles onto the rack as required. A brochure explains the program.

The front-mounted racks can hold four bicycles. The equipment was designed in-house and manufactured by a local metalsmith shop. The design was modified after the first year to improve the arrangement for the fastening straps.

All of LINK's vehicles are equipped with a receptacle for attaching the racks. One person can readily lift and install the rack on any coach. Racks are inspected before the season and repairs are made at that time. The impact of the racks on operations and maintenance has been minimal. Bicycles are not permitted inside LINK's coaches.

TRAINING

User Training

Service area characteristics and target markets influence training needs. In service areas of lower densities, training may not be as important an issue. Drivers can take the time to tell users what to do without unduly delaying large numbers of other riders. Heavily utilized systems may not be willing to take this risk.

While some systems provide no training for bicyclists, others have programs that include a video training film and a mock-up rack for practice during the permit application process. Most systems simply provide instructions for users in promotional brochures. Tri-Met in Portland, which allows bicycle loading and unloading along its downtown transit mall during peak travel periods, requires permit applicants to watch a training film demonstrating procedures and describing rules of operation as a part of the permit application process. Tri-Met also requires customers to familiarize themselves with a demonstration rack to gain hands-on practice.

Providing training opportunities may serve another purpose. Riders who might not be comfortable using a bicycle rack or boarding a bus with a bicycle for the first time during regular on-street operations may appreciate the opportunity to practice on training equipment. In this case, training opportunities may encourage usage.

Operating Staff Training

Training staff to carry out responsibilities in a bicycle-bus program generally is focused on training vehicle operators and customer service representatives, and to a lesser extent on training service and maintenance personnel.

The role of drivers in bicycle-bus programs is particularly important, inasmuch as they are the direct supervisors of the activity of bicyclists, and are responsible for overseeing the activities on the bus in service. Although bus drivers are usually not required to load bicycles in the normal course of duty, they need to be familiar with both the administrative and operational aspects of the program. They also need to know all the rules and procedures for safe bicycle transport and bus operation. They must know how to use the racks in order to oversee the loading and unloading, and in case of difficulties or emergencies.

Some agencies have developed standard operating procedures that describe the rules and procedures and delineate the responsibilities of the drivers and the bicyclists. They are issued to operating personnel.

A special one-time training for drivers is needed at the outset of new programs. After that, the training requirements can be incorporated in normal training for new drivers, and in routine or periodic retraining for current operating personnel. Not all transit systems have developed special training programs to address bicycle transit operations.

Tri-Met and Phoenix have provided their drivers with instructions on rack operation, in addition to necessary driving adjustments for safe turning and stopping clearances. Tri-Met provides a comprehensive driver training program. Training is provided in small groups to all operators who drive on routes affected. The 2-hour program includes a video presentation, classroom instruction, and hands-on field activities. Drivers must demonstrate their

knowledge of how to load and unload a bicycle, including raising and lowering the folding racks; adjust side convex mirrors to cover the area just in front of the bus; and adjust for the additional clearance needed for making turns and pulling up behind parked vehicles. They must demonstrate a knowledge of the rules and regulations. Tri-Met also conducts coordination workshops with representatives of legal affairs, fare inspectors, and transit police. Figure 2 indicates how mirror position increases the operator's field of vision. Figure 3 shows mirror placement in conjunction with a front-mounted bicycle rack.

At Pierce Transit, bicycle program training has been integrated into the retraining curriculum which its drivers receive at periodic intervals.

One important aspect of the role of drivers in some systems is the need to deny access to bicycles in discretionary circumstances, such as if a bicycle is too large or small or too dirty to be allowed on board, or if the bus is too crowded. In addition, the driver is the person who must deny access when racks are loaded. This can be especially difficult on the last run on a route where the bicyclist has no other way to get the bicycle home on a bus that day. Drivers, supervisors, and radio dispatchers need to work together to deal with such issues as they arise. Parking facilities offer one option allowing the bicyclist to board the bus while the bicycle is securely stored overnight.

Customer service representatives should be knowledgeable of the rules and regulations, the routes and time periods during which bicycles are accommodated, and the basic mechanics of the racks

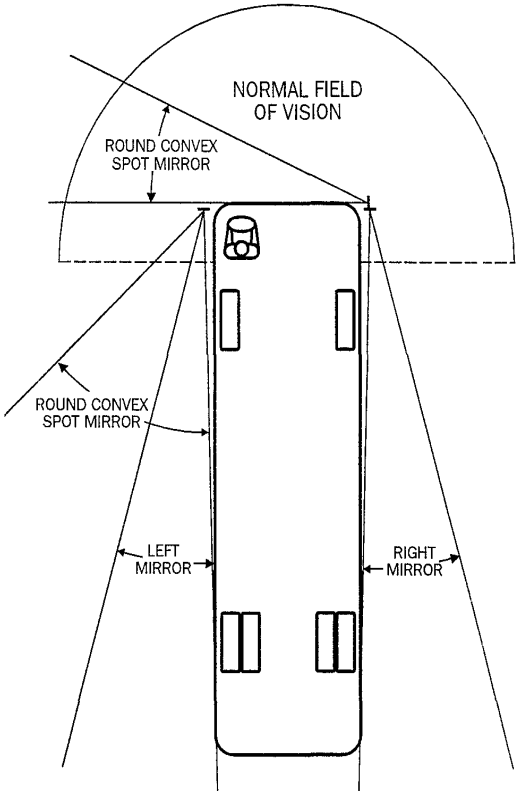


FIGURE 2 *Range of vision as enhanced by convex mirrors. (Courtesy of Tri-Met)*

FIGURE 3 *Mirror placement relative to bike rack (Courtesy of Tri-Met)*

or the procedures for interior transport. If permits are required, customer service representatives should know the procedure and cost for acquiring one.

Training for service and maintenance personnel is mostly on the job. The basic requirements include:

- Installing and removing rack receptacles or mounts,
- Installing and removing racks from the receptacles or mounts,
- Dealing with defect cards which indicate problems with racks,
- Inspecting the racks periodically to make certain that they are in working condition,
- Ensuring that the straps, buckles, or Velcro fasteners are functional, and
- Dealing with the racks during cleaning and servicing.

SELECTION AND PROCUREMENT OF EQUIPMENT

The selection and procurement of equipment to support bicycles on buses is usually carried out in a manner that is similar to other special procurements at transit agencies The development of specifications and requirements is usually under the direction a staff person who is responsible for the project, often with the advice and consent of a bicycle advisory committee, and are then integrated into the standard procurement documents of the agency by the procurement staff. The procurement is carried out under the normal operating or capital expense procurements, with any additional requirements for programming or approval that may be required if the procurement is to be funded by state or federal grant funds.

Although a front-mounted rack is the most popular method of transporting bicycles on buses, no standard rack has yet been accepted by the transit agencies using them. New designs are continually evolving. The first transit agencies to carry bicycles on racks often designed specifications and had a local metalshop fabricate the units. Or, as in Los Angeles, the racks were designed and fabricated by the transit property maintenance department. More recently, the marketplace has recognized the potential

demand for rack equipment and several commercial vendors are manufacturing proprietary designs.

Agencies typically begin the procurement process by examining equipment currently operating at other systems. In some cases they may find a flaw significant enough to reject a particular rack design. In other cases, they may modify the design to suit the characteristics of their system and local conditions. For example, local topography in Seattle made the Phoenix rack impractical for Seattle METRO because Phoenix is flat, whereas Seattle is very hilly. Bicycle wheels on the Phoenix rack extend below the bumper of the bus. This poses a safety hazard for buses operating on Seattle's steep hills, with the more severe angles of approach and departure.

Design Criteria

Considerations for designing and selecting racks and fastening equipment focus on safety, ease of use, maintanence of on-time performance, and minimization of impacts on vehicle maintenance and servicing. Design criteria may be formulated by a bicycle advisory committee, or by an in-house committee composed of planning, operations, engineering, and maintenance personnel.

Preserving the safety of operations is the most essential design requirement. Considerations include minimizing any obstruction of the driver's vision, minimizing interference with headlights and wipers, and preventing the rack and bicycle from extending beyond and below the front and sides of the bus. In addition, the preference for front racks over rear-mounted racks is largely a safety consideration, inasmuch as drivers are able to monitor the loading and unloading and the security of the bicycles enroute.

Security of bicycles during transport is another safety and liability concern. This includes the ability both to secure the rack to the bus, and to secure bicycles to the rack. Each site visit revealed substantial local efforts and ingenuity in solving these problems. A related consideration is the arrangement of bicycles on the rack. This requires a compromise among four factors:

- The need to minimize dwell time while loading and unloading,
- The need to secure bicycles to the racks effectively,
- The need to prevent damage to bicycles and to the bus, and
- The need to provide capacity.

Prevention of interference with in-service operations is an objective of most transit managers. This requires making the rack easy to use by bicyclists and easy to observe by drivers. The more convenient the rack and fastening equipment, the less impact bicycle loading will have on schedule adherence. The concern over on-time performance led Phoenix to the design criterion that bicycles be loaded and unloaded independently of each other, without having to move other bicycles on the rack. Another consideration is the need to accommodate different types and sizes of bicycles, including mountain, step-through, and children's bicycles.

Impact on bus servicing and maintenance is a major concern of maintenance managers. Rack design must consider the need to minimize interference with routine maintenance procedures. Racks that fold up are designed to remain on the bus through automatic washers. Several systems require that the racks be sufficiently lightweight to be removed by one person. This is especially important during road calls, at which time one mechanic may be required to remove the rack if the bus is to be towed. Compatibility with different bus fleet designs is also essential.

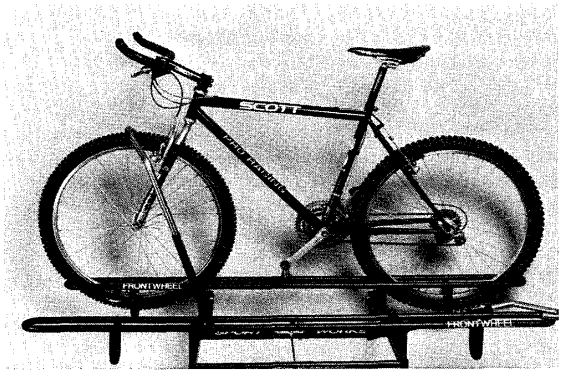


FIGURE 4 *Example of rack with wheel wells to accommodate two bicycles (Courtesy of Sportworks NW, Inc.)*

A typical front-mounted rack has three components: the mounting bracket or receptacle (or fittings and hitches, as they are called by some agencies) and frame, which attach to the bus and hold the other parts of the rack; the wheel trays or brackets or prongs onto which bicycles are loaded; the fastening devices for securing bicycles on the rack while the bus is in motion.

The first part of the rack is secured permanently to the bus frame, bumper, or chassis of the bus. These mounting brackets or receptacles are designed to allow both secure fastening of the racks to the bus and easy removal of the rack for servicing or other reasons. The means of fastening this portion of the rack to the bus may vary among bus types, and the design of each is unique to that bus type. Many of these fastening devices have been designed and built at the individual properties.

The second section of the rack is the portion that actually holds bicycles. This section needs to be secured to one of the types of permanent receptacles mounted on the bus. Platform designs that support bicycle wheels in trays or wells typically fold up against the front of the bus; designs that suspend bicycles from brackets or prongs remain in their upright position.

The third part of the rack consists of straps, clamps, or hooks that are used to secure the bicycle to the rack. The growing practice is to use nylon or similar material straps, with Velcro strips for securing them. Another design relies on a spring-loaded hook-like devise that secures a bicycle's front wheel to the rack. Figure 4 is an example of a platform design, with wheel wells and a spring-mounted support arm.

Cost, while of concern to transit systems, was not an overriding design criterion.

Technical Specifications

An approved set of design criteria leads to the development of technical specifications that further delineate rack performance and configuration requirements. Maintenance personnel or capital facility engineers usually are responsible for preparing these technical specifications.

Mounting brackets vary by type and model of bus. Those observed on the site visits in Los Angeles, Phoenix, and Roaring Fork were developed by the staff of the property. Some bus manufacturers have begun to supply the required front end fittings. Future vehicle procurements may include specifications for factory installation of at least that element of the rack that is mounted on the bus frame.

Similarly, many of the platform-style racks and brackets on which bicycles are loaded are local agency designs. These are manufactured from original designs developed by the transit agency, modified from off-the-shelf components, or a combination of the two. Many of the racks borrow designs and components from popular automobile bicycle racks.

Those relying on trays with channels for wheels may pose difficulties for some of the extra-wide bicycle tires. If the tires cannot fit down into the channels, the fastening equipment may not work properly. On the other hand, wider channels may not be tight enough for securing narrow touring tires or for some children's bicycles.

Materials for fastening bicycles to the racks have undergone the most modification. Most agencies have had to alter their original design. Roaring Fork switched from bungee cords to Velcro straps attached to the frame by grommets. Phoenix began with a nylon clip, switched to nylon webbing and buckle, and then switched again to double-sided Velcro straps. The causes for the changes include parts being damaged or removed by customers, damage to bicycles, the short useful life of nylon in a sunny climate, and metal buckles becoming too hot and too cumbersome to handle. Tri-Met's frame is equipped with a clamp onto which bicycles are fastened. Based on the results of its demonstration project, Portland added Velcro straps to all clamp units and included a diagram of how to use the clamp in the information packet given to permit purchasers.

The end products of the design, specification, and procurement process have produced a general pattern and consensus. The trends in rack design include:

- Two-bicycle capacity,
- Platform-style racks that fold up when not in use,
- Custom-made mounting brackets to fit each model in the fleet,
- Use of lighter weight materials for the frame,
- Redundant fastening systems, including Velcro straps, and
- Off-the-shelf components combined with locally manufactured brackets and parts.

Any regulatory limitations that affect design must also be considered. These regulatory restrictions may pertain to rack extension, placement, or height. For example, California vehicle codes prohibit the extension from the vehicle beyond 36 inches.

Procurement

Acquisition of racks is handled in the normal procurement process and according to the existing procurement regulations of the agency that are appropriate to the source of funds being used. The process may vary with the size of the procurement, and whether the procurement is supported by grant funds and is therefore subject to the specific procurement limitations of the grant program.

In general, racks may be acquired in one of three ways: Agency maintenance personnel develop a prototype and vendors manufacture the units; vendors design the prototype and supply completed racks; vendors supply components and transit agency mechanics modify, assemble, and install the brackets and racks. Purchasing decisions can be a function of local circumstances, program size, and fleet characteristics. For example, a smaller transit system may pair up with a neighboring larger property and simply add its request onto that of the primary purchaser. Similarly, several small or medium-sized properties could team up and achieve some savings. The benefits of this arrangement are a lower unit cost as a result of the larger purchase order and less duplication of effort.

At Phoenix Transit, the first 40 racks used in the agency's demonstration program were designed and manufactured in-house, using some off-the-shelf components. The rack's initial design was altered several times to improve performance. The patent for the rack design belongs to a Phoenix Transit employee. Once the transit system was satisfied with the rack's design as confirmed by the demonstration project, bids for the manufacture of 300 additional units were solicited. Five manufacturers competed for the bid.

A similar procedure was repeated at Portland, where a prototype was developed by an in-house mechanic and vendors produced the units. This is a hybrid unit combining a specially designed mounting bracket and frame with off-the-shelf wheel trays and fastening arm. Vendor interest has increased in Portland. For its initial demonstration order, one bid was received for the first solicitation for 79 mounting brackets and frames. For its second order of 325 racks, four bids were received. Tri-Met's maintenance department assembles all components and installs the units on the buses at its facilities.

Seattle METRO went to the marketplace for design. It received responses from 13 vendors for its initial request for bidders' information. It required all bidders to submit a prototype design and the agency tested submittals from the three finalists.

Roaring Fork purchased off-the-shelf mounting devices that are designed for use as trailer hitches from vendors, modified them, and installed them on their buses. For new vehicle purchases, specifications require the adapted hitches to be installed at the factory.

Capital Costs

Most transit systems began their programs with little idea of the unit cost per rack. A summary of the unit prices and approximate order size are presented in Table Six. Costs for installation and spare parts are included.

A unit cost in the range of $300-$350 appears to be fairly consistent. Specialized installation requirements for required mountings may affect the total cost.

TABLE SIX
UNIT COSTS OF BUS-MOUNTED BICYCLE RACKS

System	Location	Order Size	Unit Cost
Phoenix	Front	350	$286-$300
Roaring Fork	Front	50	$300-$350
San Diego	Rear	18	$1,800
Tri-Met	Front	79 demo racks	$414
Tri-Met	Front	350	$300

Source: Survey of transit agencies

Useful lives of equipment components can only be estimated. Brackets holding the rack frame are estimated to last the lifetime of the vehicle. Racks themselves are forecast to be replaced in 5 to 8 years. Fastening equipment is subject to the greatest wear and is the most degradable; it is usually replaced as needed but at least annually.

OPERATING EXPERIENCE

A bicycle program's real test comes during in-service operation. The primary aspects of operations on which these programs have an impact include the following:

- Transportation operations, including personnel who drive the buses and deal with the day-to-day operation and security of the services and oversee the interaction between the competing demands of bus operations and those of the bicyclists;
- Vehicle maintenance, which must deal with the racks while servicing and maintaining the buses and develop any retrofits or revisions to the hardware; and
- Customer service and telephone information representatives who respond to inquiries and complaints.

A track record of safety has been achieved. Evaluation practices are uneven among surveyed agencies for measuring levels of use and achievement of objectives. Little information has been collected on operating costs.

Impact on Operations

The primary concern of operating personnel is the impact of bicycle transport on safety and on schedule adherence. For bicycle-bus programs, rack design has been influenced by the need to minimize dwell times for loading and removal. Very few schedule delays have been reported by the agencies surveyed. Managers report no systematic impact on schedule adherence, although they acknowledge that some drivers may disagree with this observation. Low usage rates have contributed to on-time performance.

Anecdotal reports in Aspen and Portland indicate some operational problems, but on-time reports do not suggest a systematic problem. A driver survey by Portland Tri-Met showed that 20 percent of the operators feel that bicycles affect their ability to maintain a schedule. Although 60 percent reported no schedule delays, some drivers reported that rack users are taking too long to load their bicycles and that cyclists were using the bus for very short trips.

Tri-Met drivers estimate that it takes riders over 1.5 minutes for the loading and unloading procedure. During the demonstration, more than half the drivers reported that users had problems getting their bicycles to fit securely in the rack. Over time these problems dissipate as users become familiar with the equipment.

The principal problem at Aspen has been that the demand for bicycle racks has exceeded capacity, particularly at certain times of the day and at the major transfer center on the system. This has created some instances in which bicycles have not been accommodated, and bicyclists have not been able to make a return trip on the bus. Parking facilities can be provided to allow for the safe storage of bicycles that can not be transported via the bus.

Vehicle operator response in Phoenix has been good, with few complaints noted.

Impact on Servicing and Maintenance

Overall the impact of bicycle-bus programs on bus maintenance practices, staffing, and costs have been minimal. Vehicle assignment, bus washing, bus maintenance, and damage to buses are areas of concern for bus-mounted racks

Vehicle assignment during limited demonstration programs and in systems that are not totally accessible to bicycles is somewhat complicated by the racks. If a bus with a rack is taken out of service, available spares may not be rack equipped. Vehicles assigned to service only during the peak period also may not have a rack installed, inconveniencing cyclists. One solution to this problem is to anticipate shortages and therefore equip a larger number of buses than are needed for bicycle routes with the mounting brackets, so that the racks can be moved around and installed on more buses Most of these problems are alleviated as more vehicles receive the racks

Front racks should not require removal for normal bus washing. Although some racks with earlier designs were bent during bus washing, newer configurations and components are proving to be less susceptible to damage. Sun Tran in Tucson experienced problems with racks being bent during washing, and now removes them with some difficulty. Roaring Fork's U-shaped frames also get bent in washing. Newer racks fold up closer to the front panel without pieces extending out the side or front.

San Diego routinely removes its rear-mounted racks for servicing and washing. The weight and bulk of the rack requires two people to remove and replace it. Road calls could create a problem if two service technicians are not sent out, because the rack limits access to the engine compartment.

Phoenix has experienced some problems with bicycle handlebars damaging the fronts of some model buses and has begun to install plastic shields on the fronts of these models.

Bicycle rack equipment has been added to inspection and maintenance schedules without incident. The major maintenance requirement of the racks themselves is the inspection and replacement of the straps that fasten bicycles to the racks. These must be replaced when they begin to wear and before they fail. Tri-Met schedules inspects every 1,500 to 2,000 miles and estimates that 15 minutes are needed to ensure fasteners are secure and the rack is operational.

Impact on Safety and Security

Of chief concern to all transit managers is the impact of the programs on operating safety. The number of reported incidents is low. There are three areas for concern:

- The personal safety of cyclists, bus operators, transit passengers, and the public at large;
- The protection of transit property from damages; and
- The safety and security of bicycles from damage during transport and from theft.

Safety assurance measures include adoption of safety procedures: adding mirrors to increase bus operators' line of sight; regularly scheduled staff training; customer training; regularly scheduled equipment inspections; working groups of transit personnel to address safety and other concerns; and, an informed general public.

There is a hesitancy to allow bicycles inside buses due to the

perceived increase in exposure to accidents when passengers and bicycle equipment interact in a moving bus. Pierce Transit, which transports bicycles inside its buses, reports two claims for minor damages during one year of operation. The damages occurred when dirt from a bicycle soiled the clothing of a passenger. The second incident occurred when a bicycle fell while the bus was moving and was slightly damaged. No compensation was paid. Pierce Transit operates many routes with excess capacity and gives its drivers the authority to deny bicycle transport during crowded conditions.

Bicycle safety during transport is a major concern of cyclists. Finding durable fastening equipment and wheel trays serviceable to a variety of bicycle designs and sizes (touring, mountain, and children's) has been a challenge. Bicycles have fallen off during demonstration projects and adjustments to the fastening devices have been made. Parts that easily wear out, such as Velcro straps, should be replaced routinely before failure. Other components should be inspected regularly for signs of failure.

Levels of Use

Anecdotal reports from operations and maintenance managers suggest that the programs attract a modest but significant number of users, but that the agencies have gained broad public support for taking the trouble to implement them. A few systems, including Phoenix Transit and Tri-Met, routinely monitor daily cyclist boardings but most agencies do not. Without measures of use it is difficult to determine the actual response to a bicycle-transit program.

Counts at Phoenix Transit show an average of 1,000 bicycle boardings each day, out of a total 104,000 passenger boardings. Tri-Met's monthly reports show use fluctuating with the seasons. Buses carried more than 1,000 bicycles in September 1993 (or approximately 35 each day) and about 700 in February 1994 (or 23 daily). Pierce Transit estimates that 50 bicycles are carried onboard its buses each day. San Diego Transit reports six per day.

Rates of use fluctuate with the level of promotional effort and resultant community awareness, with the season, and with the amount of service available. While a demonstration project provides an opportunity for a transit agency to experiment with equipment and program design it may not be a good indicator of the number of customers who would be using a system-wide service. A critical mass of bicycle-accessible service, perhaps one half of all routes or trips, may be required before rates of use reflect long-term interest in the program.

Information about user characteristics has been collected at Phoenix, Roaring Fork, and Tri-Met. They found most users were men. In Phoenix, 90 percent used bicycle racks for commuting to work. Racks were used for multiple trip purposes, because another 50 percent reported shopping and recreational trip purposes. The average trip length was 7 miles. An average total trip time of almost one hour consisted of a 9-minute bicycle ride to the bus stop, a 41-minute bus ride, and an 8-minute ride to the final destination.

On Tri-Met's bus service, the highest activity is on routes serving recreational areas and college campuses. Although weekend service has many fewer hours of operation than weekdays, almost the same number of daily riders are using the racks. During the demonstration period, permit holders were found to be regular Tri-Met users who averaged seven transit trips with their bicycle over a 6-month period.

Roaring Fork cyclists primarily use bus transport services for commuting to Aspen. Other markets are tourists and serious recreational cyclists. No specific counts have been made of bicycle use. However, the occasional "turning away" of bicyclists because of full racks is some indication of a high level of use.

The scarcity of user and non-user attitude information makes it difficult to reach a conclusion about perceptions of these programs. In Phoenix, the public reacted favorably to the demonstration program, with 93 percent of respondents indicating that it was a needed service, 86 percent reporting the service as good to excellent, and 89 percent seeing no delays in routes with bicycle racks.

Non-bicycle passengers of Roaring Fork services have complained about loading and unloading time delays, but mostly over delays caused by disputes over how to handle bicycles that could not fit onto racks already filled to capacity.

CHAPTER FOUR

BICYCLE-RAIL PROGRAMS

The logistics of carrying bicycles on rail transit systems differ significantly from accommodating bicycles on bus systems. These logistics are affected by the type of rail transit system under consideration (heavy or light rail systems, old or new systems). The discussions below are not uniformly applicable to all types of systems, and the special considerations for the various system types should be kept in mind. Among the characteristics of the rail environment that influence the design of bicycle programs are the following:

- Moving bicycles through access and egress turnstiles and other fare barriers,
- Gaining physical access to platforms, and maneuvering bicycles on stairs and elevators,
- Securing bicycles onboard trains,
- Maneuvering among large numbers of passengers,
- Avoiding door-closing problems when taking bicycles on and off rail cars,
- Avoiding problems with gaps between the cars and platforms,
- Boarding and alighting at low platform stations on some light rail and commuter rail stations, and
- The relative lack of direct contact between bicyclists and operating personnel.

The service area characteristics of rail systems tend to be very different from those with successful bicycle on bus programs. Rail systems handle greater passenger loads than buses and tend to operate in areas of higher density and higher incidence of street crime and vandalism. Bicycle-rail program designs must accommodate the larger capacity and high-speed operating environment.

Rail systems also have fewer opportunities for control than do bus systems, particularly in the systems that have no fare barriers. Cyclists on buses are under the direct supervision of bus operators. Cyclists on rail services must negotiate their bicycles through the system safely without creating problems for other riders while usually out of view of transit personnel.

Physical access to rail systems can offer special challenges to cyclists. Rail customers sometimes must maneuver bicycles through two or three levels of stations connected by stairs and high-capacity escalators. Some systems provide elevators from street level to platform levels, but these are not necessarily convenient or appropriate for bicycles. Stations equipped with elevators are rare on the older systems that are not yet fully accessible to wheelchairs. Crowded turnstile areas, mezzanines, stairways, escalators, cars, and platforms can sometimes make manipulating a bicycle on rail systems difficult. Despite these potential difficulties, bicycle on rail programs are currently operating on light rail, heavy rail, and commuter rail systems across the country.

European rail systems have been innovators of bicycle-rail integration by finding solutions to these problems. Methods for accommodating bicycles are described in several published reports (*1,2,4,5).* Before any approaches and technologies can be transferred to North American counterparts, differences in community settings and operating environments should be given careful consideration.

TRANSPORT PRACTICES

The characteristics of the three types of rail operations influence the design of bicycle programs for these systems:

- Commuter rail systems, connecting urban cores with outlying communities, typically serve longer commuter trips and operate with fewer stops. Bicycling to stations extends the reach of these systems and reduces the potential need for accommodating automobiles at these stations. Access to platforms and trains is relatively easy because station platforms are usually at ground level and there are no turnstiles. On the other hand, bicyclists must deal with stairs into the rail cars, and car configurations that have a higher density of seating with fewer open areas in which bicycles can be stowed.
- Heavy rail systems operate through near-suburban and urban areas and primarily serve a commuter market. A person carrying a bicycle may encounter obstacles in gaining access to stations, platforms, and trains. The relatively open floor arrangement of rapid transit cars is generally more suitable for stowing a bicycle, although some of the newer rail systems with higher density seating are less accommodating. Frequent stops and shorter dwell times make boarding and alighting more challenging and create greater potential for delays and for door-closing incidents.
- Light rail transit systems tend to have a mixture of the characteristics of rail and bus systems, with generally fewer subway configurations than found in heavy rail systems. They have a tendency to combine low and high platform operations; exclusive right of way and mixed traffic operations; at grade, subway, and elevated operations; and turnstile and onboard fare collection systems. Depending on the design of the system, they can be easy or hard for bicycle transport.

Although the physical capacity of most rail systems to accommodate bicycles is greater than that of bus operations, some systems impose limitations on the number of bicycles that can be carried. On all systems, boarding is on a first come, first served basis and travelers in wheelchairs have first priority over bicycles for boarding and exiting.

On light rail systems, the number of bicycles that can be carried is a function of agency policy and is influenced by the size and configuration of the cars and of the train. Two bicycles are typically allowed on one-car trains. Some agencies increase the number of allowed bicycles during the non-commute period Santa Clara County Transit raises the limit from two to four per car. Portland allows six bicycles on its two-car trains, two in the

first car and four in the second. During its demonstration program, Portland allowed one bicycle on a one-car train and three bicycles on two-car trains. The increase in capacity was achieved by using one wheelchair tie-down position in addition to the operator's cab wall location.

On BART and WMATA, bicycles are allowed only in the last car of a train in designated bicycle areas. BART allows no more than seven bicycles in these cars, and WMATA allows no more than four bicycles on each train. If designated areas are occupied by either customers or bicycles, cyclists on the platform are supposed to wait for the next train.

PROCEDURES AND REGULATIONS

Several aspects of the nature of these rail systems create the need for more formal program regulations and administration:

- The relative lack of continuous oversight of bicyclists by operating personnel,
- The need for users to be familiar with how to use the system, and
- The fact that these systems operate in large urban areas within highly structured operating environments.

The ability of management to assure oversight of bicycle activity on a rail system is much less certain than on bus operations. On many light rail operations with "honor fare" collection systems, a bicycle rider may not come in contact with any operating personnel in the process of entering the system, boarding the train, riding on the train, leaving the train, or leaving the station. Similarly, the likelihood of a bicycle user seeking and gaining assistance is less certain than on a bus operation.

The list of activities that are the subject of the procedures and regulations for bicycle-rail programs is similar to that for bicycle on bus programs, but the regulations are sometimes more extensive, especially with respect to peak hour access. Rail program regulations address fees and permits, time of use, age requirements, equipment size and condition, safety precautions, procedures for transporting bicycles through stations and fare gates, loading and unloading procedures, and on- board and wayside storage.

Fees and Permits

Most rail systems require cyclists to purchase and display a permit as a condition of access to the system. Permits are not transferable among users, and there is no additional fare charge for taking a bicycle on the systems.

- Tri-Met and Sacramento each use a single bicycle permit for their light rail and bus services. The $5 permit is valid for 2-3 years.
- Bicycle access to BART's rail transit system requires a $3 permit that is valid for three years, and can be obtained by mail or in person at a BART's passenger service office.
- WMATA's rail system bicycle pass sells for $15 and is valid for three years. It must be applied for at a WMATA office, and a written safety test must be passed before the permit is issued.
- SEPTA's permits cost $5 and expire at the end of the calendar year regardless of the date of purchase. SEPTA's customer services office issues the permits upon proof of age and photo identification. A mail-in procedure also has been initiated, requiring liability release forms to be notarized. Permits are valid on commuter trains and subway/elevated trains. Bicycles are not permitted on the system's buses or light rail vehicles. The Port Authority Transit Corporation (PATCO) serving Philadelphia and suburban New Jersey communities has very similar permit requirements but the permits are not interchangeable on the two systems.
- Cyclists on Metro-Dade County's rail system must acquire a $5 permit.

Permits serve as a contract between the agency and rider which requires the rider to read and abide by the program's rules and regulations.

Any transit agency employee may request that a bicyclist display a valid pass. Most agencies require that permits be displayed on the exterior of a cyclist's clothing and be visible at all times while using the facilities. Failure to obey the rules is cause for revocation of the permit.

Some rail systems do not require cyclists to have permits. These include Metropolitan Atlanta Rapid Transit Authority (MARTA), the Metropolitan Transportation Authority of New York City (MTA), and the Santa Clara County Transportation Agency for its light rail service.

Time of Use

Most of the rail systems included in this synthesis limit bicycle access to off peak periods when the systems are less crowded. Bicycles are often not allowed on rail systems during peak travel periods. For example, WMATA allows bicycles on rail weekdays only after 7 p.m., but bicycles can be carried all day Saturday, Sunday, and most holidays. Portland prohibits bicycle access between 6:00-9:00 a.m. and 3:00-6:00 p.m. on weekdays in the peak direction of travel. SEPTA allows bicycles between 10:00 a.m. and 3:00 and between 7:00 p.m. and 6:00 a.m. Monday through Friday, all day Saturday and Sunday and most holidays. Similar restrictions apply at Sacramento's Regional Transit, Metro-Dade County and NJ Transit rail operations.

Some systems make a distinction based on direction of travel in peak periods, with access allowed only in the reverse commute direction. BART allows reverse commuting, but prohibits bicycle access to designated crowded stations. It allows bicycle transport in both directions before 6:30 a.m., between 9:30 a.m. and 3:30 p.m., and after 6:30 p.m. weekdays.

Bicycle groups are urging transit systems to carry bicycles during peak commuter hours because of their members' strong interest in cycling to work in normal commuting periods. Several options to accommodate travel to work are being tested. One is to allow bicycle transport in the reverse direction of the predominant direction of travel. Reverse direction-peak period travel provides cyclists access to suburban employment sites beyond the immediate vicinity of the transit station or the area served by bus routes. Rail lines linked together across a metropolitan area pose a complication for reverse direction travel because at some point in the system reverse direction travel overlaps peak direction travel. Other options for consideration are designating lower use stations

and some portion of normal commuting hours when passenger loads are lighter as available to passengers with bicycles.

Although there are no official regulations on the time of permitted access to New York City's trains and stations, the agency's information brochure strongly urges avoiding the rush hour and other times when the number of people make it likely that a bicycle will be in the way or pose a hazard. Bicyclists are encouraged to use express trains because they make fewer stops and have less boarding and exiting.

Santa Clara County Transit and MARTA do not report time of use restrictions.

Age Requirements

Most systems distinguish between adult and youth bicycle users. Two categories of permits are commonly issued. Youth permits allow children under 16 years of age to transport bicycles under the supervision of an adult permit holder. The specific limitations vary. WMATA issues youth permits, and issues adult permits to persons 16 years of age or over. BART issues permits to persons over 14, and to those under 14 if accompanied by a person 18 or over. Portland issues youth permits to travelers between the ages of 8 and 15, and regular permits to those 16 and over.

Waivers, indemnifying and releasing agencies from specified liabilities, must usually be signed by persons 18 years of age or older. Younger permit holders must have their waiver signed by a parent or guardian.

Sizes and Condition of Bicycles

Limitations on the size and condition of bicycles on rail systems are similar to those on bus systems. However, because racks are not employed, frame shape and tire size often are not limiting factors. Bicycle size is typically limited to 80 inches long and 48 inches high. BART also allows tandem bicycles no longer than 96 inches. SEPTA specifies a bicycle with a wheel diameter not in excess of 27 inches. Because bicycles are carried inside vehicles with other passengers, they must be clean and free of dirt and grease. Excessively dirty bicycles may be denied access. No systems allow motorized bicycles.

SEPTA also has recommendations for the fitness of its passengers with bicycles. Cyclists must be able to lift their bicycles approximately 2 feet off the ground, with one hand. This manuever is required for climbing and descending the stairs of trains. To access subway and elevated lines riders must be able to lift bicycles over turnstiles, as well up and down the station stairs.

Safety

Safety is the underlying principle of all operating rules for transporting bicycles, as in all other aspects of a transit agency. While bus operators can maintain direct verbal and eye contact with cyclists while loading a bicycle, there are few points at which to monitor transport safety on rail systems.

At stations with faregates, attendants can monitor access and check for valid permits. Security personnel, fare checkers (in barrier free systems), platform attendants, and supervisors can monitor bicyclists' compliance with transport, loading, and storage regulations. However, these observations are limited in frequency, and may not be high on the list of priorities for these officials. Train operators do not have responsibility for supervising bicyclists. Users must understand that bicycles are not to block train doors and that in case of emergency, bicycles must be left on the train.

This lack of supervision has resulted in some program abuse. A survey of light rail vehicle operators conducted by Tri-Met revealed cases of passengers without valid permits, more than the maximum number of permitted bicycles, and underage youth entering with their bicycles. The survey indicated a need for increased enforcement by personnel other than train operators. Because it uses an honor fare system, abuses are not restricted to only bicyclists.

Loading, Unloading, and Storage Procedures

Carrying a bicycle on rail systems typically requires the customer to maneuver through stations, turnstiles, escalators, stairs, and sometimes through full height "iron maiden" turnstiles at exits. Instructions to users usually include the following guidelines:

- Use only elevators, not escalators. Use of stairs may or may not be permitted, depending on station design.
- When boarding elevators, handicapped persons have a priority over cyclists.
- Bicycles must be walked through stations and elsewhere in the system.
- At fare gate control points, cyclists must follow instructions for permit display, fare payment, and entry through the service gate.
- Bicycles are not to be left unattended unless required to do so during fare payment.
- Bicyclists are to wait towards the rear of the platform, to reduce conflict with the movement of other passengers.
- Allow all other passengers to exit and enter before boarding with bicycle.
- Board through designated doors only. In single car trains this is typically the rear door; in multi-car trains, these are doors in the last car.

These guidelines help to eliminate conflicts between riders in wheelchairs and those with bicycles.

Safe operations require that bicycles be carefully handled when on trains, and that the potential for damage and injury be minimized. Instructions to users in permit documents often include a diagram showing exactly where in the rail car bicycles are to be placed. The precise location is a function of car design and size. In all cases, bicycles must be positioned so they do not block aisles or doors. In light rail vehicles, storage locations are the cab wall or wheelchair tie-down locations, with seats folded up. In heavy rail cars, the two end sections of the last rail car are usually identified as storage locations for bicycles. For travel on SEPTA's commuter lines bicycles occupy the areas designated for wheelchairs, when not in use, so cyclists must enter the train at the door that displays the wheelchair pictogram.

At the present time, rail transit cars on American transit systems are not equipped to secure bicycles. Passengers must hold their bicycles (with kick stands remaining up) at all times while on the train. Tri-Met is currently testing fabric fasteners attached to

the cabwall handrail of its existing light rail vehicles. Design of the new "California Car" is to include provisions for securing bicycles. European rail manufacturers have developed methods to free passengers from holding bicycles while improving passenger safety from moving bicycles. (4)

BICYCLES ON INTERCITY RAIL

Amtrak's policy requires bicycles to be disassembled, boxed, and handled as checked baggage. Bicycles are carried on those trains which have baggage cars, but they must be boarded and taken off the train only at those stations that have baggage handling facilities. They must be checked at least 30 minutes prior to departure at the station for a fee of $5.00 per bicycle per trip. Bicycles must be packaged in cartons that are acceptable to AMTRAK, and the weight of the packed bicycle cannot exceed 50 pounds.

A list of all stations with such facilities is provided on the national and regional schedules of AMTRAK. About one-third of all AMTRAK stations are equipped to handle baggage. Most trains, except Metroliners, are equipped with baggage cars. Bicycles, as with other baggage, are insured for up to $500 in value per passenger. Additional coverage up to $2,500 must be declared and paid for at time of check in.

Bicycles are not allowed in passenger compartments, and no bicycles are allowed on local services that do not have baggage cars or on Metroliners. AMTRAK provides transfers to over-the-road bus services for some segments of its system. Whether these carriers accept bicycles is up to each such carrier.

The bicycling community is encouraging Amtrak to be more user-friendly by providing opportunities for individuals to either leave bicycles securely parked at stations or travel with bicycles onboard with few or no special requirements. *(5)*

TRAINING

Operating Staff

Operating personnel must be familiar with all rules, regulations and procedures. Standard operating procedure (SOP) manuals include updated instructions. Good customer relations can be emphasized noting that bicycles are not to be merely tolerated but that their transport is to be encouraged by knowledgeable service personnel. Customer service representatives should know program services and any restrictions that apply. Security police should also be aware of all program requirements and the correct procedures to follow for any passenger misconduct.

User Training

Types and degree of user training vary widely among rail systems. At one end are those systems that do not require permits or that passengers read any material describing program policies. Bicycle program brochures are simply made available at the normal outlets for transit agency publications. At the other end of the spectrum are those systems requiring cyclists to take a written test or view a video. The Tri-Met training tape reviews all program guidelines and demonstrates safe methods for transporting bicycles. In the middle of this range are the systems that require a permit that is accompanied by a brochure describing rules and procedures. A summary of program restrictions and policies can be printed on the reverse side of permits to provide bicyclists a convenient reminder.

OPERATING EXPERIENCE

Impact on Operations

Bicycle-rail programs have experienced minimal service impacts. Discussions with operating personnel indicate that the reasons for this are one or more of the following: (1) low levels of usage at many systems, (2) the emphasis on safety in program regulations, and (3) customer training and awareness. Very few formal program evaluations have been conducted.

Light rail operators at Tri-Met encountered many instances of violations which affected the safe operation of rail services. This typically involved too many cyclists in a rail car, and bicycles on crowded trains. Working with vehicle operators, fare inspectors, transit police, and supervisors, the agency has been able to identify the location and time period when these violations typically occur. Increased surveillance during these at-risk periods and locations has mitigated service problems

Levels of Use

The number of permits an agency issues is an indicator of the public's interest in bicycle-rail integration. Sacramento has issued 2,165 permits since 1990. Tri-Met has issued 1,536 permits during the first 8 months of its fiscal year. During its 1-year demonstration, 1,349 permits were sold. WMATA has issued approximately 2,000 permits since its bicycle-rail program began. SEPTA sold 506 permits in 1993 and as of March 1994, 235 permits have been issued. More important than the absolute number is the trend in the number of permit applications. As the public becomes more aware of the opportunities afforded by the program through promotional campaigns and media attention more bicyclists may be applying for permits and using the service. Additional information is contained in a recent FHWA report. *(1)*

Most rail systems do not monitor daily bicycle boardings. Tri-Met conducts sample counts each month. It also records rule violations and actions taken. Use appears to fluctuate with the weather: daily bicycle boardings on its light rail system were in the range of 70 in September 1993 and 60 in February 1994.

CHAPTER FIVE

BICYCLE-FERRY PROGRAMS

Three bicycle-ferry case studies provide a look at the state of the practice for the maritime operating environment. Circumstances to consider in program design are: mixed loading/unloading of bicycles and automobile/truck traffic; vessel and personal safety; large volumes of pedestrians and motor vehicle traffic transported in one vessel; and schedule adherence demands of the loading/unloading process.

GOLDEN GATE BRIDGE HIGHWAY AND TRANSPORTATION DISTRICT

Golden Gate operates two ferry routes between San Francisco and Marin County, California, across the San Francisco Bay. The vessels provide passenger-only ferry operations that serve an important segment of the cross- bay commuting and recreational travel market.

Bicycles are allowed on the ferries at all times. There has been no need to limit the number of bicycles, because there has not been enough use to create a problem for the ferry operators. The highest bicycle use occurs on weekends, when the commuter travel is at a minimum. The management estimates that recreation is the principal trip purpose for bicycle passengers.

Golden Gate provides bicycle racks at terminals for passengers who ride bicycles to the ferry and then take the ferry across the bay. One terminal is located on a road that has a bicycle lane. There are no onboard facilities for securing bicycles, which are commonly "stacked in the corner" onboard.

There is no restriction on the use of bicycles by time of day, and there is no charge for taking bicycles onboard. Bicycles have been allowed onboard for several years, and there have been no passenger complaints or liability claims filed.

Planning department staff serve as coordinators with regional and local bicycle committees and the District's Passenger Advisory Committee. Although the District does not have its own bicycle advisory committee, its planners work with four regional and local bicycle committees, including East Bay, Marin County, San Francisco, and the Bay Area Bicycle Committees.

Golden Gate advises other ferry systems planing to carry bicycles to design a specific area for storing bicycles onboard that will assure the safety of the passengers and the bicycles.

WASHINGTON STATE FERRIES

Washington State Ferries of the Washington State Department of Transportation operate a substantial amount of ferry service on the Puget Sound, including a number of commuter routes to Seattle. There are 10 routes with auto ferries, and two with passenger-only vessels.

Bicycles are allowed on all trips at all times. There is a limit of five bicycles on passenger-only ferries, because of Coast Guard regulations regarding clear passage in corridors. No permits are required for bicycles on the ferry system. Bicycle parking racks are located at most terminals, but there are no lockers. Cyclists pay the standard walk-on pedestrian fare plus a surcharge for the bicycle that ranges from $0.25 to $2.50, depending on the length of the trip.

The current loading practice is for bicycles to be loaded and unloaded on the car deck prior to boarding and unloarding of motor vehicles. Cyclists are not allowed to board their bicycles using the upper deck pedestrian boarding ramps. Bicycles are placed in designated locations. Lockers or racks are not provided for bicycle storage. During the crossing, bicyclists either remain with their bicycles or secure them to a railing or post. This practice has caused some problems for the crews and for other passengers, and cyclists complain that their bicycles are getting scratched in transit.

Loading late arrivals is a major safety problem, because they must be boarded in mixed traffic while cars and trucks are also being boarded. The narrow boarding ramps, poor visibility of bicyclists by drivers, and variable practices of the boarding crew in instructing vehicles and bicyclists, create potential safety hazards. Slick metal decks and ramp grates can be dangerous for cyclists. Another dangerous point of interaction between bicycles and motor vehicles is at ticket booths.

A formalized bicycle-ferry program has not yet been adopted. The planning staff is currently coordinating the development of a bicycle-ferry program. To date, the attitude of crew members has been tolerance of cyclists and bicycle transport has not been encouraged. This is expected to change as the system strives to become more customer friendly and seeks more non-motorized traffic as the vehicle carrying capacity of the system is approached during peak travel periods. A new bicycle program is expected to be uniformly applied throughout the large system and incorporated into the long-range plan.

A Bicycle Committee brings together ferry staff from operations, terminals, and ticket sales, with representatives of bicycle clubs and local planning and engineering agencies. Among this group's objectives are to develop designs for safer access, especially through ticket booths prior to boarding, to improve loading procedures, and to determine the best procedures and facilities for securing bicycles onboard.

STATEN ISLAND FERRY

The New York City Department of Transportation Maritime Division operates the Staten Island Ferry. Bicycles are permitted onboard with a bicycle ticket, issued at no charge There are no restrictions on time of use. Parking equipment is not provided at the terminals or on the vessels. Cyclists are instructed to stay with their bicycles.

CHAPTER SIX

BICYCLE PARKING AND ACCESS PROGRAMS

Parking bicycles at transit facilities allows for a convenient intermodal transfer. Providing convenient and secure places to park bicycles at transit stops and stations is a means of extending the reach of transit programs without carrying the bicycles on buses or trains. It may provide the potential for greater intermodalism than either bicycle racks on buses or bicycle-on-rail programs alone. Transit agencies prohibiting bicycles on their vehicles during peak-period commuting often supply parking equipment at stations. Parking may be the preferred choice for some transit customers who only want to use the bicycle as a means of access to one end of the transit trip. It is also a convenient alternative in cases in which the bicycle-carrying capacity of a bus or rail vehicle is committed to other bicycles, and a place is needed for storing the bicycle at the stop or station

One important adjunct to accommodating bicycles on transit systems is to provide an improved means of riding bicycles to and from transit services and facilities. The development of bicycle-compatible roadways for safe shared use, for example, increases the safety of riding bicycles and encourages their use. Existing bicycle facilities and amenities often reflect the presence of a significant constituency of bicycle riders, and a readily approachable market for transit.

PARKING PRACTICES

Within the bicycle community, three categories of bicycle storage are used: Class I for high security protection of bicycles and accessories against theft and weather, typically lockers; Class II for racks that secure a bicycle frame and both wheels with a user-supplied padlock; and Class III for parking racks requiring user-supplied fastening devices, e.g., cables or high performance U-locks. (6) A combination of Class I with either Class II or Class III serves most needs. Racks can be used by anyone, whereas lockers are generally restricted to renters with rights to specific lockers. Lockers provide the security and weather protection often desired by owners of expensive bicycles and those who ride daily, whereas racks offer convenience at no cost to the user.

A comparison of the advantages and disadvantages of the three commonly used parking classifications is presented in Table Seven. While each class includes several options, the table lists the advantages and disadvantages of the most commonly used examples in North America. For additional information about parking equipment, including design options and manufacturer listings, consult the sources listed in Appendix E.

Descriptions of parking programs in Europe and Asia suggest innovations for North American communities to consider: parking garages, bicycle rental programs, bicycle cages, mixed-use facilities including parking, bicycle repair and rental. Many sources of information are available. *(1,2,4-7)*

Lockers are a popular choice for new bicycle parking programs especially at park-and-ride lots and train stations. They offer more security from theft and vandalism than racks for a bicycle parked for several hours in unattended areas. That security comes at a high per unit capital cost, approximately five to ten times that of rack parking. Despite these higher costs, transit systems have recognized that lockers provide the security that some cyclists require. When locker costs are compared to those for an automobile parking facility, the benefits are clear.

Bicycle racks come in a variety of styles and sizes. The major characteristics of the racks are a metal frame secured to the ground or structure in which a bicycle can be placed and locked by a cable or chain or U-lock provided by the user. Fees are not charged for use of parking racks and they are accessible to anyone who may wish to use them. Popular designs include bike rails (shaped like an inverted U) and ribbons racks (shaped like a series of waves). Some bicycle interest groups consider these two designs to be minimum standards for convenient, secure facilities. Parking racks can be provided at lower operating and capital costs than lockers, and can generally accommodate more bicycles without the necessity of a rental agreement. Racks, however, provide less protection from the weather, theft, and vandalism. Protective overhead shelters with open sides could improve the protection afforded by racks.

Bicycle parking equipment has been installed by the majority of transit systems responding to the survey. The most frequently cited locations are park and ride lots, transit transfer centers, and rail stations. A few systems have installed parking equipment at regular bus stops located on the system that are not a part of some other passenger facility. Agencies have selected either bicycle lockers, bicycle racks, or a combination of both for securing bicycles at such locations. Lockers typically provide enclosed storage for one or two bicycles per unit. Lockers are installed in combinations of two to eight units per site. Racks provide open storage for bicycles, and come in several designs holding 2 to 16 bicycles per unit.

Promotion of lockers and parking racks is incorporated into bicycle-transit marketing activities. Brochures describing these programs identify parking locations, type of equipment, locker fees, and a phone number to call for more information.

An example of the intermodal linkages secure bicycle parking equipment provides can be found in the park-and-ride lots in Snohomish County, Washington. Community Transit and Washington Department of Transportation provide bicycle lockers for people who ride bicycles to these locations, and then connect either with a car pool, a van pool, or a commuter bus.

Roaring Fork Transit is moving to provide racks and lockers at its transit center in Aspen as a means of providing a storage place for bicycles that cannot be accommodated on home bound trips when the racks on the buses are already fully loaded.

FEES AND LEASES

While racks are available on a first come, first served basis, lockers are reserved ahead of time. Lockers are leased on the basis of 1, 3, 6, or 12 months. Monthly fees range from $2.00 to more

TABLE SEVEN
ADVANTAGES AND DISADVANTAGES OF BICYCLE PARKING EQUIPMENT

Type	Advantages	Disadvantages
Class I: Lockers	Greater security from theft and Vandalism Greater protection from weather and debris Guaranteed availability	Requires advance reservation and lease Administration of leases and keys Maintenance of locks and enclosure Monitoring for unintended uses
Class II: Racks	Protection of lock from Tampering Security to bicycle frame and Wheels Available on first come, first serve basis Simple installation	Exposure to weather, unless covered shelter is provided Bicycle accessories are exposed to theft and vandalism Not as easy to use as Class III
Class III: Racks such as inverted U and ribbon-racks	Easy to use Low cost Widest selection of designs and sizes Small space requirements for siting Available on first come, first serve Basis Simple installation	Bicycle accessories are exposed to theft and vandalism Exposure to weather, unless covered shelter is provided Not all designs provide a sufficient amount of security

than $8.00, depending on the city. Some systems offer a discount for longer term rentals. An agreement between the transit agency and the bicyclist gives the signer exclusive use the locker for the length of the agreement. A coin-operated locker could offer more flexibility for locker use but would involve additional administrative, security and operational responsibilities, e.g., coin collection and counting, on the part of the transit agency. Interviews did not indicate their use.

In addition to rental fees, a key deposit is required which is later refunded on termination of the lease and return of the key. Key deposits are designed to cover the cost of re-keying a lock or of removing and replacing the locking mechanism. Fifteen dollars is a typical key deposit. The agency typically retains a copy of all keys so that they can make duplicates for lost keys, and so that they can gain access to the unit if necessary.

Agencies typically require renters to sign a bicycle locker agreement that describes the terms and conditions of the lease and releases the agency from liability for damages. The lease document sets forth the responsibilities of each party. These provisions include:

- Restriction to bicycle storage while using transit services,
- Use is non-transferable,
- Period of the lease,
- Payment schedule and amounts,
- Reasons for termination of permit, and
- Termination procedures.

SELECTION AND PROCUREMENT OF EQUIPMENT

Design Criteria

The major considerations in selecting parking equipment include:

- Ease of use,
- Security,
- Durability,
- Compatibility with site conditions, e.g., site size, and
- Attractiveness.

Numerous vendors supply municipalities, universities, employers, and transit agencies with parking units. Racks may also be manufactured locally.

Lockers

Several design factors determine a locker's security, durability, and cost:

- Shell material and finish,
- Frame construction,
- Hardware materials and locking mechanism,
- Interior construction, and
- Installation features.

Materials currently used in locker construction are particle board, galvanized steel, stainless steel, and fiberglass. The long-term performance of these materials widely fluctuates in unprotected outdoor locations. Rain, snow, and extreme heat are conditions that contribute to corrosion and warping. Fiberglass and stainless steel panels have been found to be the most weather resistant.

Frame construction also determines performance. Damaged frames tend to warp, making doors on the lockers not fit squarely into their frames. In addition to making operation difficult, the small openings in the door frame are easy targets for a thief's crow bar.

Hardware elements include handles, housings, latch bars, and hinges. Locking mechanisms ranging from simple cylinder styles to high performance dual-locking mechanisms offer varying degrees of security from break-ins. Locks are keyed and set into locker doors.

Several locker designs offer double-sided access having interior rectangular chambers divided by an interior partition. Another option is a double stacked, double-sided design promoted for installation in parking garages Installation requirements include area requirements, attachment methods, surface slope, and composition. Manufacturers often produce standard sized units with a predetermined capacity. It may be possible to request non-standard sizes at a negotiated price

The experience of transit agencies indicates a trend toward offering cyclists two parking options: lockers for security and racks for convenience. In planning its order for 30 lockers, Pierce Transit tested four designs and selected a fiberglass model with a pop-out T-handle assembly with a removable high security inner cylinder lock. The locking mechanism is viewed as critical to successful performance.

Siting

Some systems have developed standards for the installation of bicycle parking facilities. Regional Transit in Sacramento established a target of 40 lockers for each large park-and-ride lot. In 1992, Tri-Met began its locker program, and has assigned them based on a priority of one locker per 1,000 boarding and alighting passengers per location. Fifty-two lockers have been installed at 10 sites. Pierce Transit has recently installed four lockers at all park-and-ride lots with 125 or more stalls and at all transit centers. All parking facilities should be convenient to transit services in a well lit visible location, preferably with some protection from the weather.

WMATA adjusts locker installation according to demand. The agency entered an agreement with a developer at one of its station under which parking equipment was installed in a garage jointly developed with a private contractor. Plantings integrate the racks into the setting at a convenient location.

ADMINISTRATIVE OPTIONS

While bicycle-transit programs are administered wholly from within the transit agency, bicycle parking programs and bicycle access programs offer opportunities for involving other local agencies and contractors. To successfully transport bicycles on or in transit vehicles, the program should to be fully integrated with all aspects of operations. Bicycle parking, however, is a function for which a transit agency may not be well equipped. It requires day-to-day administration of locker agreements, dispensing of keys, and locker maintenance and servicing. There are several administrative alternatives to consider.

- The transit system is fully responsible for bicycle parking. Planners and equipment purchasers acquire the equipment, facility maintenance technicians install the lockers or racks, customer service representatives lease the lockers, and mechanics service the units.
- The transit agency retains responsibility for purchasing, installing and maintaining parking units, but local jurisdictions are responsible for leasing agreements and lock servicing. Interlocal agreements facilitate this arrangement.
- The transit agency purchases and retains ownership of lockers, and all other responsibilities are assumed by a contractor, possibly a bicycle sales/repair store or a private not-for-profit cyclist organization. Fee levels continue to be set by the transit agency.
- Local jurisdictions purchase and manage lockers. This option requires the full cooperation and funding from cities and towns. Joint development is another option, involving the participation of private developers.

Reported experience suggests that transit agencies should investigate the last three of these options. Maintenance departments are often not equipped or trained to service locks and repair panels. As a result, leasing may be inconveniently delayed while awaiting locker repair. Local jurisdictions located closer to locker sites than transit agency customer service representatives may be able to handle leasing arrangements with interested customers more conveniently

FACILITIES TO IMPROVE BICYCLE ACCESS TO TRANSIT SERVICE

Several types of design projects have the potential to complement and supplement bicycle transport and parking programs. Bicycle interest groups suggest that the following improvements would increase the safety of riding bicycles and encourage their use:

- Bicycle-compatible roadways or bicycle lanes on station access roads,
- Bicycle paths through park-and-ride lots,
- Priority siting of parking equipment near the bus/train loading zone,
- Bicycle paths from neighboring communities that are shorter in length than roadways,
- Clearly visible signs using the bicycle symbol for bicycle routes, parking facilities, and bus stops serving bicyclists,
- Station design and siting accommodating to bicycles, e.g. curb cuts at parking locations, locating parking equipment so that the cyclists not be required to carry bicycles up or down stairs or through large crowds of travelers, and parking equipment in the clear view of the general public, or station attendants,
- Lighting, and
- Overhead protection from weather conditions at parking sites.

The responsibility for access design improvements such as these are sometimes outside the jurisdiction of the transit agency, in part because many of these improvements take place on property not belonging to the transit agency. Such projects are often part of larger bicycle programs of other agencies. Bicycle coordinators from regional agencies, city governments, and state departments of transportation typically take part in the development of such facilities. Projects to provide longer distance access to transit facilities by bicycles are usually developed by a highway department or a parks department, but can be the product of interagency planning and development agreements.

Within transit property facility and responsibility boundaries,

there are some key design elements that need to be incorporated into facility design. Some of these have been incorporated already as a result of the Americans with Disabilities Act. Curb cuts, ramps, and station elevators are a few. Others include bicycle lanes through park-and-ride lots, use of the bicycle symbol to designate available services and facilities, lighting, and to some extent siting.

There is at least one more technique for integrating the two transportation modes. Bicycle paths alongside active transit rail lines provide travelers two transport options in the same corridor.

(8) The trails provide a bicycle link to transit stations for communities located between stations. They also offer another means for traveling through the corridor. An example of a side-by-side configuration is in the Chicago metropolitan area where the Illinois Prairie Path serves suburban cyclists alongside commuter rail operations. An example of one use over the other is in Vancouver, British Columbia where BC Transit has converted several miles of surface level right-of-way under elevated sections of SkyTrain to bicycle/pedestrian use.

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDED RESEARCH

CONCLUSIONS

Bicycles and their owners can be transported on buses and vans, passenger rail cars, and ferries. Each program should be tailored to suit the local setting and operating modes and environments of each transit agency. Communities should select those equipment components and operating policies that best match the needs of its bicyclists to transit's operating conditions. Decisions for equipment purchases and operating policies often require trade-offs in program objectives. Convenience, capacity, schedule adherence, and durability are all important considerations, but one program, piece of equipment, or facility will not likely be able to fully satisfy all objectives. Users and service providers should be prepared to compromise on one or more of these and other issues.

A planning process, such as the one outlined in Table Eight, can help move a transit agency toward that end. The process overview is a composite of the steps followed either formally or informally at several transit agencies. This process will not guarantee program success but rather may be used to help organize the many activities needed for a program to progress from an idea to a component of revenue service.

Demonstration programs are one method for initiating bicycle-transit service. The advantages are numerous. These allow the transit agency to gain experience with selecting equipment, operating and servicing the equipment, testing loading procedures as well as obtaining user responses. By operating the service out of one garage on a limited number of routes the agency can review and evaluate program results, design and test modifications, and make an informed decision as to whether the program should be expanded to a wider service area. Demonstration periods of 6 to 12 months have been tried.

A bicycle-transit program can be implemented without significant adverse impacts to current operations. Mechanically, the equipment is operational. Racks on the fronts of buses have not interfered with driving and late model designs do not interfere with automatic bus washing procedures. From a policy perspective, the rules and regulations appear to be effective for ensuring safe and convenient use. Operating personnel concerns about schedule adherence have not materialized. Bicycles on front-mounted racks do not directly interfere with peak-period service as long as dwell times are minimized. The ability to transport bicycles inside vehicles during peak periods is determined by passenger loads and urban density.

Rates of use vary from community to community. At the top of the range is the Phoenix area, where on average 1,000 bicyclists board buses with their bicycles each day. Many agencies, however, do not count the number of bicycle boardings and the general consensus of operating personnel is that use is fairly low. There are exceptions, such as Roaring Fork, which sometimes has to turn away bicycles. Without widespread use, it is difficult to adequately test the performance of both the equipment and operating policies.

Current use rates may not be a fair measure of market potential and public interest because of barriers that are beyond the control of the transit agency. Access improvements such as signage and bicycle lane and path improvements are facilities cited as important in encouraging bicycle use, but for the most part are not the direct responsibility of transit agencies. If communities decide that this form of transportation is one they want to see provided and used, several organizations can assist in coordinating, planning, and financing these efforts. Local, regional, and state transportation planning, engineering, and highway departments, together with the bicycle community and private businesses can work in conjunction with the transit agency to develop the bicycle market. It is through joint undertakings that bicycle-transit services can reach their full potential.

Many transit agency managers and operating personnel have recognized that bicycle-transit programs are one of many services which can be adapted and developed to serve a wider constituency of passengers. A similar integration occurred when programs to accommodate passengers with disabilities were initiated. Wheelchair lifts and tie-down equipment are now routinely used throughout the country.

During the early stages of program development when just a handful of transit agencies were going ahead with transporting bicycles, maintenance and engineering departments were the innovators for solving equipment needs. Prototype racks were designed in-house and fabrication took place locally. As demand has expanded to an enlarged market, equipment vendors have responded to product demand and are continually developing new and improved designs. Parking equipment is readily available from the marketplace.

Additional points to keep in mind, based on the information collected for this synthesis include:

- Before racks are put into service on buses, consider testing several styles of bicycles for security during bus operations,
- Recreation and commuting to the workplace are the common trip purposes of bicycle-transit travelers,
- Market research and promotional activities are very important for introducing a new service,
- High usage can create priority problems,
- Safety issues for bicyclists and other passengers associated with implementing or refining a program must be considered thoroughly,
- Wayside storage is needed when high usage denies access,
- Examine opportunities for relaxing reverse peak-period travel restrictions recognizing that system design may require some access restrictions,
- Evaluate passenger loads and station volumes to identify stations that could comfortably and safely accommodate bicycles,
- Comprehensive regulations, user and staff training, and regular enforcement promote safety and serve to protect the agency from lawsuits claiming negligence,
- Where joint development is occurring around stations, transit systems should consider incorporating parking equipment into agreements.

TABLE EIGHT
PROCESS OVERVIEW

1. Examine operating environment
    - Identify beneficial service area characteristics
    - Determine level of support from the organized bicycle community
    - Assess opportunities for coordination with local and regional agencies
    - Obtain support of upper management and board
2. Set goals and identify target markets
    - Conduct market research
    - Form an internal multidepartmental working group
    - Form an external technical advisory committee
    - Identify constraints, including financial and regulatory
    - Develop bicycle elements for short- and long-range plans
    - Design a framework identifying components and service area
3. Formulate operating rules and regulations for inclusion in standard operating procedures and customer information
    - Establish standards for minimum service, i e minimum number of lockers per site, minimum number of routes or trips per route etc.
    - Decide on use of permits and fees
    - Set time of day restrictions, if any
    - Outline loading, storage and unloading procedures
    - Determine age categories
    - Select demonstration routes, services and facilities
4. Operate a demonstration program for 6 to 12 months
    - Prepare equipment design criteria
    - Formulate specifications and purchase equipment
    - Conduct pilot testing
    - Prepare and conduct staff training
    - Prepare and conduct user training
    - Design and conduct promotional campaign
    - Operate demonstration service
5. Evaluate demonstration program
    - Conduct user and staff survey
    - Monitor use
    - Acquire technical advisory committee input
    - Modify equipment, regulations, training, promotion, and services as suggested by evaluation results
    - Assess potential for system-wide or limited expansion
6. Establish a permanent program or abandon
    - Schedule incremental expansion
    - Maintain demonstration service
    - Revamp demonstration design
7. Evaluate on-going program
    - monitor use
    - conduct periodic user and staff survey
    - continue to work with technical advisory group as needed
    - continue promotional activities

RECOMMENDATIONS FOR FURTHER RESEARCH

Over the past few years bicycle-transit integration has progressed and met some recognized level of achievement. The information collected for this synthesis indicates that there are several areas in which additional information would be helpful. The results could benefit agencies currently operating bicycle-transit programs as well as those considering implementation.

Transit agencies and industry experts have suggested the following topics for further research:

- Methods for program evaluation to quantify benefits and costs, measures of use,
- Factory installation of bus rack mountings and fittings or even the entire bicycle rack in addition to retrofitting in-service fleets,
- Transferring European techniques of bicycle storage on intra- and intercity rail service,
- Methods for removing institutional barriers that stand in the way of multi-jurisdictional and comprehensive bicycle transportation planning and project implementation,
- More technical research on bicycle parking program practices and technical merits of equipment, and
- Determination of the potential for full-range bicycle access to significantly displace SOV use, and how best to achieve that potential.

REFERENCES

1. Replogle, Michael and Harriet Parcells in cooperation with the National Association of Railroad Passengers, *Linking Bicycles/ Pedestrian Facilities with Transit*, U.S. Federal Highway Administration, October 1992.
2. Wynne, George G, A Study of Bicycle and Pedestrian Programs in European Countries, *Case Study No 16 of the National Bicycle and Walking Study*, U.S. Federal Highway Administration, January 1992.
3. *Bicycle and Pedestrian Provisions under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991*, FHWA-PD-92-028, Federal Highway Administration, Washington, D.C., 1992.
4. Tingey, Bruce W., Tom Godefrooij and Thomas Krag, *Bikes and Trains Provisions for Bicycles made by Railways of Western Europe*, European Cyclists' Federation, Copenhagen, November 1992.
5. Corless, James and Allen Greenberg, editor,"Linking Bicycles with Trains: Opportunities for Amtrak to Increase Ridership and Revenues by Increasing Bicycle Access," League of American Wheelmen in consultation with the National Association of Railroad Passengers and the Environmental Defense Fund, June 1993.
6. Pugh, B., "Bicycle Parking Cookbook" North Highlands, California.
7. "Bicycle and Pedestrian Policies and Programs in Asia, Australia, and New Zealand," *Case Study No. 17 of the National Bicycling and Walking Study*, U.S. Federal Highway Administration, 1993.
8. Brilliot, Michael and Julie A. Winterich, "Rails-With-Trails: Sharing Corridors for Recreation and Transportation," Rails-to-Trails Conservancy, 1993.

APPENDIX A

TELEPHONE INTERVIEW GUIDE

INTEGRATION OF BICYCLES AND TRANSIT
SURVEY

1. Contact Information

Agency Name _____
Address: _____
Contact Person: _____
Title: _____
Phone No.. _____
FAX No.. _____

2. **What are the components of the bicycle transit program** ?

_____ Bike on bus
_____ front racks _____ number of buses _____ %
_____ in vehicle _____ number of routes _____%
_____ rear racks

_____Bike on light rail
_____ Bike on heavy rail
_____ Bike on commuter rail
_____ number or % or rail cars with tie-downs
_____ number of tie-downs per car or train set

_____ Bike parking at rail stations
_____ Bike parking at bus stops or transit center
_____ Bike parking at park & ride lots
_____ lockers _____ number
_____ racks _____ number

_____ number of stations/bus routes served
_____ number of stations/bus routes in system

_____ Access design
_____ street improvements
_____ bikeways

Other (describe):_____

3. What is the status of the program?

Planning _____
Demo _____
Operation _____
Length of time in each stage.

4. How did the program originate?

Transit staff _____
Transit board _____
Advisory group _____
Other _____

5. Describe goals and **objectives for the bicycle transit program.**

_____
_____

How are these linked to state, regional, and community goals: (e.g.,intermodal)
_____

6. Describe any special situations in your area affecting bicycle transit programs. For example, extensive bike paths, employer programs, topography, university location, or barriers. _____
_____
_____
_____
_____

7. What is the program structure and how is it staffed?

A. Who is in charge of the program _____
B. Who does the manager report to _____
C. How many staff people are involved in the program planning_____
_____

D. What additional staffing was required to implement and operate the program
_____

E. What external agency or citizen groups were involved in planning the program

_____

F. How are external agencies or groups participating in the program, e.g., public agencies, neighboring jurisdictions, bicycle advocacy groups or clubs

_____
_____
_____

8. Describe planning of bike transit programs.

A. How is bicycle/transit planning integrated into service and strategic planning

_____
_____
_____

B. What interagency coordination was required _____

_____

C. Are there bicycle elements related to transit in state, regional and local transportation plans?

_____
_____
_____

D. Are there any Highway, street or traffic engineering department activities for bike access

_____
_____
_____

E. How are bike on transit routes selected

_____

F. What are the time of day restrictions on bike access

_____

G. What permits or special fees are required ?

_____

H. Are there identified bike routes to stations/stops

_____

I. Does usage vary by the type of bike route access, i.e., separated bike path or mixed traffic facility. _____

J. What standards been established for storage and on-vehicle equipment (i.e,, number of racks or lockers per location) _____

_____
_____
_____

K. What has been done to deal with bike parking security, vandalism, and theft _____

_____
_____

Are these major issues _____

L. What are the capacity limitations of the bike facilities. _____

_____

Are services/equipment over subscribed _____

_____

9. What considerations went into selecting bike related equipment and facility planning?

A. Safety of operations: visibility over racks, turning radii _____

_____

B. Security of bikes _____
C. Location of storage units, racks on vehicles _____
D. Impact on operations, servicing and maintenance: towing, washing _____

_____

E. Compatibility with existing equipment and procedures _____
F. Availability (off-the-shelf technology) _____
G. Ease of use for the user and transit agency personnel _____
H. Maintenance requirements, durability _____
I. Cost _____
J. Labor relations _____
K. Liability _____

10. Describe equipment purchasing procedures.

A. What kinds of equipment are provided by the agency for bike use? Include manufacturer and model.

On board equipment_____

Way side equipment _____

B. How were these decisions made _____

C. Who developed the specifications _____

D. Was the equipment purchased or made by the agency _____

E. Had the equipment been used elsewhere _____

F. What kinds of suppliers were found _____

G. What was the level of competition _____

H. Was the price consistent with estimates _____

I. Has the equipment met your expectations_____

J. What special manufacturing, assembly, and installation requirements _____

K. What modifications have been made to the equipment since purchase _____

L. Europeans use original design equipment, i.e., specs for new vehicles include bike tie-downs and racks. Has your agency considered that options for new purchases instead of retrofitting.? _____

11. What marketing activities have been undertaken in support of the program?

A. What is the target market (e.g. commuters, suburban employment sites, park & ride lots, recreational) _____

B. Size of the target market _____

C. How was the market identified _____

D. What market research was conducted _____

E. What promotion techniques have been used _____

F. Which have been the most successful _____

G. What follow-up evaluations have been conducted _____

H. What information is there relating to:
user characteristics _____

trip characteristics _____

user and non-user attitudes _____

I. How do the results to date relate to the expected program results _____

J. What further improvements are planned? _____

K. What groups outside the transit agency participated in marketing, bicycle clubs? __

12. What has been the programs impact on transit operations?

A. What role did operations personnel have in planning and implementation decisions

B. Describe special driver training _____

C. Describe training for other personnel (rail station attendants, supervisors, service and maintenance) _____
_____

D. What has been the response of the drivers and supervisors _____
_____

E. What is the impact on schedule adherence on bus routes that carry bikes _____
_____

F. What is the impact on vehicle assignment practices _____
_____

G. Describe safety and security problems _____
_____

13. What has been the program's impact on vehicle and facility service and maintenance?

A. What are the changes in routine servicing and maintenance activities (e.g. removal of bike racks for bus washing) _____
_____
_____
_____

B. What changes has been made of preventive maintenance requirements _____
_____
_____
_____

C. What kinds of damage has there been to vehicles, bicycles, lockers, racks _____
_____
_____
_____

D. What are the repair and replacement schedules _____
_____

E. What is the impact of thee program on maintenance staffing and costs _____
_____

14. What are the financial impacts of the program?

A. What are the direct program operating and capital coals. _____
_____
_____
_____

B. Have actual costs matched forecasts _____
_____

C. What unexpected costs have been incurred _____
_____

D. What funding has been used
Federal (Transit's Sect. III of ISTEA, STP's 10% Enhancement, or other Surface Transp. $) _____
_____
state _____
_____
local _____
_____
public/private partnerships _____
_____
other _____
_____

15. What continuing communication with bike users are maintained?

A. Is any user training provided _____
_____

B. Is there a bike advisory committee _____
_____

C. Does it meet and provide input regularly _____
_____

D. What user suggestions for improvement have there been _____
_____

E. What complaints relating to the program have been received _____
_____

F. What is the level of use of the services and facilities_____
_____
_____
_____
Are non-transit riders using lockers for bike storage_____
_____

G. How does this compare with expectations _____
_____

H. What is being done to increase use_____
_____

I. is planning of further activities being done _____
_____

16. What administrative and local issues presented themselves?

A. Was there a statutory restriction on carrying bikes_____
_____

B. What risk management issues developed, (number of claims, use of disclaimers of liability) _____
_____
_____

C. Were there any jurisdictional, interagency problems _____
_____

D. What support was there for the program at the policy and general management level _____
_____

E. Has the agency embraced the program _____
_____

F. Are there any residual issues in managing the program _____
_____

G. What changes are being considered_____
_____

17. What advice do you have fore others considering bike program?

_____
_____
_____

APPENDIX B
PARTIAL LISTING OF TRANSIT AGENCY
BICYCLE PROGRAMS IN NORTH AMERICA

AGENCY	LOCATION	PROGRAM COMPONENTS
Ann Arbor Transportation Authority	Ann Arbor, Michigan	Bicycle Parking
Bay Area Rapid Transit District (BART)	San Francisco Bay Area	Bicycle on Rail Bicycle Parking
Broward County Division of Mass Transit	Pompano Beach, Florida	Bicycle on Bus
Capital Metropolitan Transit Authority (Capital Metro)	Austin, Texas	Bicycle Parking
Central Contra Costa Transit Authority (CCCTA)	Concord and Walnut Creek, California	Bicycle on Bus
City of Phoenix Transit System	Phoenix, Arizona	Bicycle on Bus Bicycle Parking
Clallam Transit System (The Bus)	Clallam County, Olympic Peninsula, Washington State	Bicycle on Bus Bicycle Parking
Dallas Area Rapid Transit (DART)	Dallas, Texas	Bicycle on Bus
Duluth Transit Authority	Duluth, Minnesota	Bicycle on Bus
Golden Gate Bridge, Highway and Transportation District (Golden Gate Transit)	San Francisco Bay Area	Bicycle on Bus Bicycle on Ferry
Hillsborough Area Regional Transit Authority (HART)	Tampa, Florida	Bicycle on Bus
Lane Transit District	Eugene, Oregon	Bicycle on Bus
LEETRAN	Fort Meyer and Lee County, Florida	Bicycle on Bus
LINK	Chelan and Douglas Counties, Washington	Bicycle on Bus Bicycle Parking
Los Angeles County Metropolitan Transportation Authority (MTA)	Los Angeles County	Bicycle on Bus
Massachusetts Bay Transportation Authority (MBTA)	Boston, Massachusetts	Bicycle on Rail Bicycle Parking
Metro-Dade Transit Agency	Miami, Florida	Bicycle on Rail Bicycle Parking

AGENCY	LOCATION	PROGRAM COMPONENTS
Metropolitan Atlanta Rapid Transit Authority (MARTA)	Atlanta, Georgia	Bicycle on Rail
Metropolitan Transit System	San Diego, California	Bicycle on Bus
Metropolitan Transportation Authority (MTA) * New York City Transit * Metro-North Commuter Rail	New York City	Bicycle on Rail
Montreal Urban Community Transit Corporation	Montreal, Quebec	Bicycle on Rail Bicycle Parking
Municipality of Metropolitan Seattle (METRO)	Seattle and King County, Washington	Bicycle on Bus Bicycle Parking
New Jersey Transit Corporation (NJ Transit)	New Jersey	Bicycle on Rail
New York City Department of Transportation, Staten Island Ferry	New York City	Bicycle on Ferry
Pierce Transit Public Transportation Benefit Area (Pierce Transit)	Tacoma and Pierce County, Washington	Bicycle on Bus Bicycle Parking
Port Authority Transit Corporation (PATCO)	Lindenwold, New Jersey	Bicycle on Rail
Roaring Forks Transit Agency	Aspen, Colorado	Bicycle on Bus
Sacramento Regional Transit District (RTA)	Sacramento, California	Bicycle on Bus Bicycle on Rail Bicycle Parking
Salem Area Mass Transit District	Salem, Oregon	Bicycle on Bus
San Diego Transit	San Diego, California	Bicycle on Bus
San Jose County Transit Authority (SCCTA)	San Jose, California	Bicycle on Bus
San Mateo Couty Transit District (SamTrans)	San Mateo County, California	Bicycle on Bus
Santa Clara County Transportion Agency (County Transit)	Santa Clara County, California	Bicycle on Bus Bicycle on Rail
Santa Cruz Transit District	Santa Cruz, California	Bicycle on Bus
Sonoma County Transit	Santa Rosa, California	Bicycle on Bus

AGENCY	LOCATION	PROGRAM COMPONENTS
Southeastern Pennsylvania Transportation Authority (SEPTA)	Philadelphia, Pennsylvania	Bicycle on Rail
Space Coast Area Transit	Brevard County, Florida	Bicycle on Bus
Sun Tran	Tucson, Arizona	Bicycle on Bus Bicycle Parking
Toronto Transit Commission	Toronto, Ontario	Bicycle on Bus
Tri-County Metropolitan Transportation District of Oregon (Tri-Met)	Portland, Oregon	Bicycle on Bus Bicycle on Rail Bicycle Parking
Vancouver Regional Transit System (BC Transit)	Vancouver, British Columbia	Bicycle Parking
Washington Metropolitan Area Transit Authority (WMATA)	Washington, D.C.	Bicycle on Rail Bicycle Parking
Washington State Ferries	Puget Sound Region, Washington	Bicycle on Ferry
Yolo County Transit Authority, (YCTA)	Yolo County, California	Bicycle on Bus

Sources: Agency brochures and interviews; *Pro Bike News*, November 1992; Florida Bicycle/Pedestrian Commuter Assistance Center, Florida State University; and Bicycle Parking Foundation.

APPENDIX C

SAMPLE PROMOTIONAL BROCHURES FOR BICYCLE PROGRAMS

Roaring Fork Transit Agency
Bike on Bus Brochure

Restrictions

There are several additional restrictions which help streamline our bikes on buses program:

- Except for the Airport Business Center stop, bicycles may not be loaded or unloaded between Rubey Park Transit Center and the Intercept Lot (the intersection of Brush Creek Road and Highway 82). Loading/unloading is not restricted at stops downvalley of the Intercept Lot.
- Children under the age of 14 must be accompanied by a riding adult to load and unload the child's bike.
- Bicycles with child carriers or panniers are not allowed, as they are too heavy/bulky for RFTA racks.
- No bicycles are allowed on RFTA front-rack busses after 7:30 p.m., as the tires and spokes diffuse the headlights. If you get stuck somewhere, there are racks at most RFTA stops throughout the valley.
- Bicycles are allowed in cargo bay racks after 7:30 p.m. However there is no guarantee that a cargo bay bus will be available. If you are counting on riding RFTA with your bike, ride before 7:30 p.m.
- RFTA is not responsible for bikes placed on our bus racks.

This may sound like a lot of rules. Maybe it is. But your understanding how the system works will make the program that much more successful. RFTA is one of the few transit agencies in the country that allows for bikes on buses. We hope you will take advantage of the program, and we thank you for your help. Together, we can make it work for all our passengers.

RFTA
ROARING FORK TRANSIT AGENCY
ASPEN, COLORADO

Our Heroes

This brochure was printed with the support of many of our local bicycle stores. From repairs, to apparel, to advice on good rides, they can help you through your summer season.

High Country Bikes
132 Midland Ave, Basalt, CO. 81621
303-927-3760

ASPEN VELO SPORT BIKE SHOP
303/925-1495 **303/925-8083**

THE HUB OF ASPEN
303/925-7970

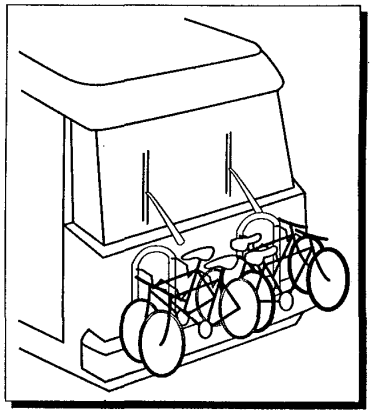
Ajax Bike & Sports
303/925-7662

Illustrations by Thompson Hughes Systems, Inc.
927-4768

Printed on Recycled Paper

RFTA
ROARING FORK TRANSIT AGENCY
ASPEN, COLORADO

Bikes On Buses– It's A Loaded Question



The Roaring Fork Transit Agency provides bicycle racks on its valley fleet, allowing cyclists to ride the bus with their bikes between Aspen and Carbondale, and points in between.

RFTA wants the program to continue to succeed, and needs your help. If you're a cyclist, please take the time to read through this pamphlet. Even if you've been using the rack system for years, you'll probably find some surprises; information which you need to know.

Thank you for your help, and your support.

Printed on Recycled Paper

RFTA
ROARING FORK TRANSIT AGENCY
ASPEN, COLORADO

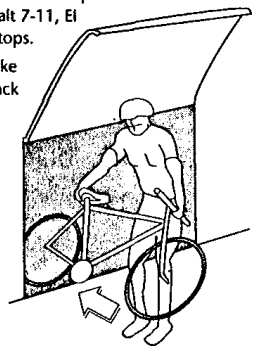
Four is Company, Five is a Crowd

There is only room for four bicycles on a RFTA bus. It is a first-come, first-serve system. If the racks are full, you will need to lock up your bike at the stop, pedal to your destination, or wait for the next bus..

RFTA is currently working on rack alternatives which may increase capacity, but has not yet found an acceptable solution. Thanks for your patience with this limitation.

Note:

- Bicycle parking is available at RFTA's Aspen Village, Old Snowmass, Basalt 7-11, El Jebel and Carbondale bus stops.
- It's a good idea to have a bike lock with you, in case the rack is full.
- Snowmass town shuttles run the connection up Brush Creek to Snowmass in the off-seasons, and can only accommodate two bikes. So only two bikes can transfer to Snowmass Village in the spring and fall.



Loading your Bike

There is an optimal way to load your bike on RFTA racks. Correct loading is key to your safety, the safety of your bicycle, and the safety of others using the road.

Cargo-bay Buses

RFTA cargo-bays are equipped with racks holding two bikes per bay. To load your bike, simply open the cargo doors, slide your bicycle in rear-tire first, and rest the bike on the padded support. Close the cargo door. CHECK TO SEE THAT CARGO DOOR IS LATCHED by pulling up on the bottom of the cargo-bay door.

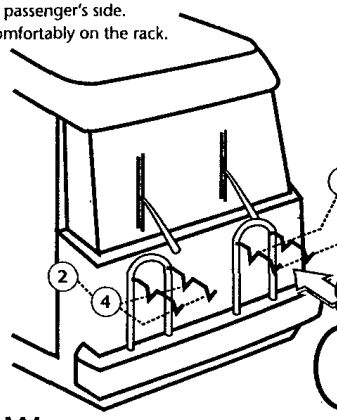
When you exit the bus, be sure to notify the driver that you will be unloading a bike. After retrieving your bike from the cargo bay, make sure the cargo door is latched. Then signal the driver that you are clear with a wave of your hand.

Front-Rack Buses

RFTA's older buses have front-loaded racks. These racks are staggered, so loading order is important. If possible, bicycles should be loaded:

1) driver's side; 2) passenger's side;
3) driver's side; 4) passenger's side.

This allows all bikes to fit comfortably on the rack.



The Secret of Wrap

The first bicycle on each rack must be loaded with the rear tire toward the center of the bus, and the handlebars toward the outside of the bus. This keeps your handlebars from interfering with the windshield wipers, and allows the front tire to "wrap-around" the front of the bus, making the bus less wide. Be sure to slide your bike as far toward the center of the bus as possible to minimize width over-hang.

If possible, the second bicycle on each rack should also be loaded with your handlebars toward the outside of the bus. This is preferable, as it allows your front tire to wrap.

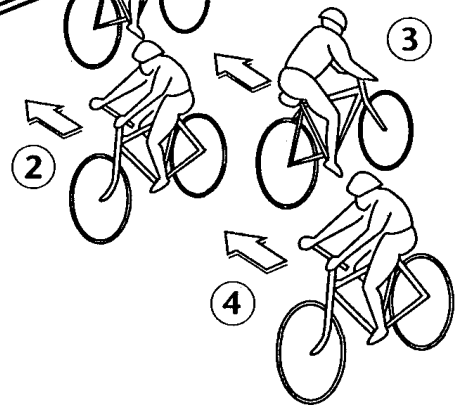
HOWEVER, if your bike is the exact same size as the first bike on the rack, your handlebars and seat will conflict with the other bicycle. In this event, you will need to place your bike with handlebars toward the middle of the bus. Be sure to slide your bike as far toward the center of the bus as possible to minimize width over-hang.

Remember: if possible, load bicycles

1) driver's side; 2) passenger's side;
3) driver's side; 4) passenger's side;
...with all seats in the middle.

Who's on First?

If there are several riders loading at the same stop, find out who's getting off first, and load their bicycle on the outside. That way they won't have to remove your bike to unload their own.

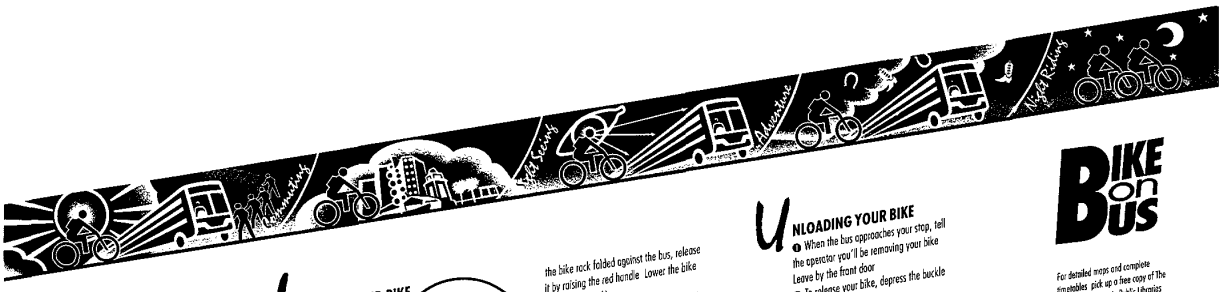


Space-Age Security

Once you have your bike on the rack, secure it with the attached velcro closure. The Velcro strap is designed to go directly from it's anchor to your bike. This will help stabilize your bike when the bus rolls over dips in the road.

Note: Bring the strap directly to your bike, not over the top of the rack. This ensures enough strap to secure two bikes, and will hold the bikes down on the rack.

Phoenix Transit System
Bike on Bus Brochure



BIKE on BUS

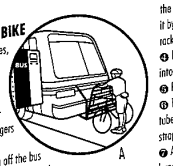
BIKES AND BUSES MAKE A GREAT TEAM.

We proved it on a six-month trial run, when we put custom built bicycle racks on some of our buses * People loved 'em!
So now we're expanding our BIKE ON BUS service to all City of Phoenix Transit System, City of Scottsdale Connection and all Regional Public Transportation Authority buses around the Valley Local and express routes both Whether you're headed for work, for school, for shopping or for fun, you and your bike can ride the same bus All for the usual fare Keeping more cars off the road can help make the air a little cleaner It's a chance for you to keep in shape, too And maybe see some new scenery while you're at it

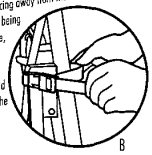
Thanks to our Citizens Task Force for helping us pick the three best routes for the trial run. BIKE ON BUS service is not available on DASH, the Downtown Area Shuttle

LOADING YOUR BIKE

1. As the bus approaches, have your bike ready to go Tell the bus operator you're going to use the bike rack Load your bike while other passengers are boarding
2. If passengers getting off the bus wish to remove their bikes, let them do so first
3. If only one bike is being loaded, put it in the position nearest the bus, handlebars toward the curb We've put labels on the racks as reminders (If the bus arrives with the bike rack folded against the bus, release it by raising the red handle Lower the bike rack) (see fig A)
4. Lift the seat tube post (on the bike rack) into its upright position Unclip the strap
5. Roll your bicycle into the wheel slots
6. Pull the strap around your bicycle's seat tube Buckle securely in place Tighten the strap if necessary (see fig B)
7. A second bike should be loaded with handlebars facing away from the curb If two bikes are being loaded at once, the one going the shortest distance should be loaded in the front position

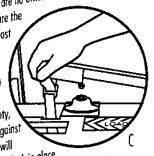


A


B

UNLOADING YOUR BIKE

1. When the bus approaches your stop, tell the operator you'll be removing your bike Leave by the front door
2. To release your bike, depress the buckle tab and pull on the strap
3. Lift your bike out of the wheel slots
4. If there are no other bikes to be loaded, please secure the seat tube post in its down position (see fig C) If the bike rack is empty, fold it up against the bus It will automatically lock in place
5. Move away from the bus quickly and let the operator know it's safe to leave

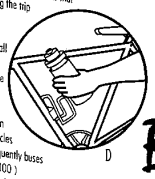

C

For detailed maps and complete timetables pick up a free copy of The Bus Book at Phoenix Public Libraries or at Phoenix Transit System's downtown terminal. You'll also find copies of this pamphlet at many bicycle stores in the Valley The transit systems involved are not responsible for damages incurred or caused by bicycles on transit system property.
The BIKE ON BUS Program is funded by the City of Phoenix and the Arizona Department of Transportation The program is conducted in cooperation with the Regional Public Transportation Authority (RPTA) and City of Phoenix Transit

For more information call
253-5000

GETTING THE MOST FROM BIKE ON BUS SERVICE

- Remember safety comes first When you're loading or unloading your bike NEVER step to the street side of the bus These could be moving traffic
- For safety reasons the bus operator may not leave the bus to help load or unload bicycles
- Have your bike ready to go Remove water bottles pumps or other items that might fall off during the trip (see fig D)
- You can load or unload bicycles at all signed bus stops
- Bicycle racks are available on a first come first served basis Each rack can carry only two bicycles (To check how frequently buses run, phone 253 5000)
- Your bicycle can be no larger than 80 inches long by 48 inches high No motorized bikes allowed


D

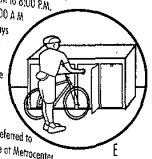
YOU PAY THE USUAL FARE YOUR BIKE RIDES FREE

Local Service: FULL FARE
$1 or 2 tokens or 1 Local Service Ticket
All Day Pass $3 Monthly Pass $28
Local Service: DISCOUNT FARES
50¢ or 1 token or 1 Discount Ticket
All Day Pass $1 50 Monthly Pass $14
If you have a verifiable disability, if you're 65 or older or if you're age 6 18 you can get reduced fares on local routes You'll need proper I D
Express Service:
$1 50 or 3 tokens or 1 Express Service Ticker Monthly pass $42 No discount fares

BIKE LOCKERS

Six bike lockers have been installed at the Paradise Valley Transit Center and two at the Sunnyslope Transit Center Each locker holds one bike (see fig E)

There's a monthly rental fee of $5 plus a $60 deposit Rental periods are for three, six and twelve months Payments may only be made by check or money order to the Public Transit Department and are to be paid in full for the term of the agreement Contracts are available at the downtown bus terminal 1st Street and Washington Monday through Saturday, from 6:00 A.M to 8:00 P.M. weekdays and from 7:00 A M to 7:00 P.M on Saturdays or at the North Phoenix Maintenance Facility 2010 West Desert Cove Avenue, weekdays from 8:00 A M to 5:00 P.M. There are open air bike stands (some are still referred to as bike racks) available at Metrocenter Sunnyslope and Paradise Valley Transit Center and at the Shadow Mountain Park and Ride, and 79th Avenue and McDowell Park-and-Ride (Bring your own lock)


E

PLEASE NOTE

Express routes and some local routes don't run on Saturdays There is no Sunday service For schedules and maps of the bus routes, see The Bus Book or phone 253 5000 If you have questions or comments about our BIKE ON BUS service, call our Customer Relations Department at 262 1868

HOW YOU CAN RIDE THE BUS AND RIDE YOUR BIKE ALL AROUND THE VALLEY!

BIKE on BUS

We now have bicycle racks on all local and express bus routes

Chelan and Douglas Counties, Washington
Rural Bike on Bus Brochure

Ride the bus and ride your bike – all in the same trip.

Link your trips together. Bicycling is great fun and wonderful exercise. But sometimes there are long distances between you and where you want to go. That's why Link offers you bicycle rack service on all inter-community buses.

Four bicycles can fit on a BikeLink rack. Space though, is on a first-come basis. Riders are also responsible for loading/unloading their own bikes (read the enclosed instructions). If necessary, a bus driver can give you assistance. Bikes are not allowed inside the bus.

And please remember, while most Link bus stops can be used for BikeLink service, there are a few that present safety concerns. No bikes will be allowed to load/unload at these stops. In most cases, the stops can be identified with a "**no bike"** symbol on the bus stop sign.

The BikeLink service is a great way to commute to and from work or for recreation. We hope that you will use this service on a regular basis and take advantage of the many ways that a bike and bus can make getting from here to there a whole lot of fun.

Ahoru en un solo viaje usted puede pasear en el autobús con su bicicletu.

Link ayuda combinar el deporte de pasear en bicicleta utilizando el autobus. Los autobuses sirviendo las rutas 20 y 21, 22, 23, 24, 25, y 27 (intre-communidad) están armados con una barra especial para transportar bicicletas.

Cuatro bicicletas pueden caber sobre la barra. Los espacios para bicicletas se ocuparan en orden de acuerdo a su ilegada. No se permiten bicicletas adentro del autobus. Cada pasajero es responsible de montar y quitar su propia bicicleta. El Conductor del autobus tambien puede asistirle.

Por favor recuerde primero es la seguridad. Usted puede usar las paradas anotadas de estas rutas para subir y montar su bicicleta al. Pero en casos donde la parada este en una area peligrosa, no se permitira utilizar esa parada. Estas paradas seran anotadas con un letreo indicando "no bicicletas"

Additional Reminders

• Remember – safety always comes first. NEVER step into the street side of the bus because of moving traffic.

• At a bus stop have your bike ready to go as the bus approaches. Remove water bottles, pumps or other items that might fall off during a trip.

• Your bicycle must be no larger than 80 inches long or 48 inches high. No motorized bikes allowed.

• Bikes with child carriers can not be accomodated because of limited space.

• Link is not responsible for damages incurred to or caused by bicycles on transit system property, and is not liable for damage to bicycle that are loaded improperly.

Recuerdu…

• Recuerde-Primero es la serguridad. Favor de tener mucho cuidado cuando usted se acerca al autobús para montar y desmontar subicicleta. Por el peligro del tráfico, NUNCA dede caminar al lado del autobús junto la carretera.

• Cuando vea que el autobus se aproxima, tenga su bicicleta lista para montar en la barra bicicletera. Favor de quitarle cualquier aparato que pueda caerse cuando el autobus camina en marcha. Por ejemplo-la botella para agua, la bomba de aire para inflar las ilantas, ect.

• Su bicicleta no debe ser mas grande de 80 pulgadas de largo 0 48 pulgadas de alto, No se permiten bicicletas motorizadas.

• Bicicletas equipadas con asientos para niños no se pueden acomodar por el limite de espacio.

• Link no sera responsible por cualquier daño que pueda occurir de o a las bicicletas cuando están sobre la propiedad del sistema de transito. Link no sera responsable por cualquier daño a las bicicletas si es que no están montadas en la barra bicicletera correctamente.

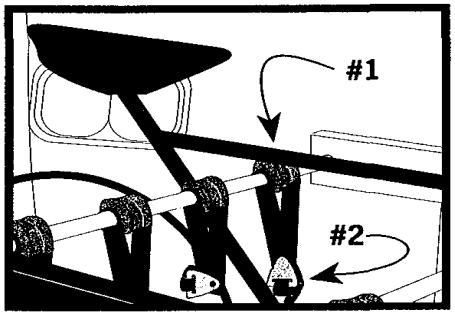
Inter-Community Service

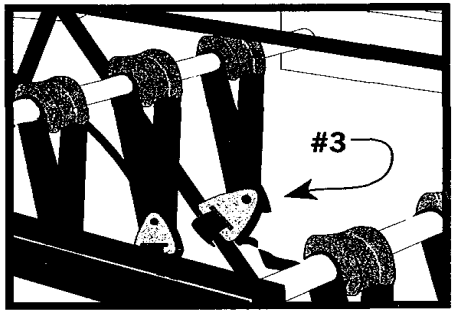
Chelan Routes #20 & #21
Leavenworth Route #22
Rock Island Route #23
Malaga Route #24
Waterville Route #25
Lake Wenatchee Route #27

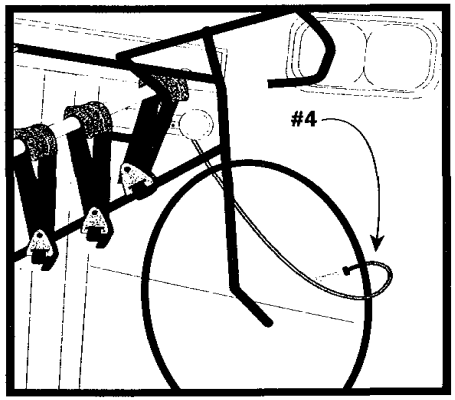
Effective
April 5 - October 30, 1993

Link

In English y Español







LOADING YOUR BIKE

1- As the bus approaches, have your bike gear ready to go. Please tell the driver where you are going, only inter-community service is available. Quickly load while other riders are boarding.

2- If a fellow bus rider wishes to remove their bike, allow them to do so first.

3- If only one bike is being loaded place it in the inner position, closest to the bus. If more than one bike Is to be placed on the rack put the bike that Is to be removed first in the outer position.

4- Lift your bicycle onto the foam pads (illustration #1).

5- Unfasten the velcro straps on the securing fasteners (illustration #2).

6- Rotate the v-shaped clamps toward your bike frame and wrap the velcro straps around the frame (illustration #3). Thread the strap through the securing fastener's loop before pressing the velcro against itself to secure your bike frame.

7- At the rear of the bike rack you will see a round spool with a retractable cord, one on each side. On the side where the outer front bike tire is, pull out the retractable cord and fasten the hook around the front tire (illustration #4).

UNLOADING YOUR BIKE

1- When the bus approaches your stop, tell the driver you will be removing your bike.

2- To remove the bike, reverse the order of steps #4-#7, "Loading your bike" Be ready to lend a hand when your fellow biker wants to get off the bus before you, and needs to remove your bike first.

3- If no other bikes are going to be put on at that stop, close all loose velcro straps.

4- Move away from the bus quickly and let the driver know it is safe to leave. Please, do not cross in front of the bus. Wait until the bus leaves.

MONTANDO SU BICICLETA

1- Cuando vea que el autobus se aproxima, debe tener su bicicleta lista. Avisale al Conductor tocante su destinacion. (Este servicio solamente es obtenible para viajes de intre-comunidad). Rapidamente monte la bicicleta mientras otras personas suban al autobus.

2- Siotras personas necesitán bajar sus bicicletas primero, favor de esperar un momento.

3- Si solo hay una bicicleta para montar, favor de ponerla en el espacio interior, mas cercano al autobus. Cuando es possible, si hay mas de una bicicleta para montar, favor de montar la bicicleta que se necesita quitar primero en el espacio exterior.

4- Monte su bicicleta sobre los forros esponjosos. (Vea la illustraci6n #1).

5- Desabroche las bandas de velcro del broche de seguridad. (Vea la illustracion #2).

6- Guie las abrazaderas (2 por cada bicicleta) hacia a la bicicleta y ajuste el eskeleto de la bicicleta con las bandas de velcro. (Vea la illustracion #3). Debe insertar la banda dentro el diente del broche antes de ajustar el velcro para asegurar bien su bicicleta.

7- Al lado posterior de la barra se encuentra un carrete redondo con un cordon retratable, hay uno en cada lado de la barra. Jale y ajuste el cordon sobre la Ilanta delantera de la bicicleta, la cual este en el espacio exterior de la barra. (Vea la illustracion #4)

COMO DESMONTAR SU BICICLETA

1- Cuando el autobus se acerca a la parada donde usted quiere Ilegar, avisele al Conductor que usted necesita desmontar su bicicleta.

2- Para desmontar la bicicleta del la barra bicicletera, simplemente reverse los pasos del #4 - #7.

3- En el caso que no queden mas bicicletas sobre la barra cuando usted desmonte su bicicleta, por favor de dejar todas las bandas de velcro bien abrochadas.

4- Lo mas pronto possible, necesita alejarse del autobus y avisarle al Conductor cuando el autobus puede seguir adelante sin peligro. Por favor no cruze en frente del autobus, espere hasta que el autobus se retire.

Although you can load/unload your bike at most Link bus stops, there a few that present safety concerns. No bikes will be allowed to load/unload at the stops that are identified with the symbol shown here.

Unsafe loading areas are primarily where the bus isn't able to pull out of the lane of traffic.

The following are examples of "No Bike" stops:
- Wenatchee Avenue in Wenatchee
- Food Giant bus stop in Leavenworth
- Lady of the Lake bus stop in Chelan
- Slide Water bus stop in Chelan

In Manson, bikes will only be loaded at the Manson Bay Park bus stop.

In areas where bus stop signs are not in place yet, bikes can only be loaded if the bus is able to pull out of the lane of traffic.

Please call the Guest Service Center if you have questions regarding "No Bike" stops.

Bicycle Safety

- Operate your bike at a safe speed. Know your abilities and ride appropriately.
- A helmet protects your head in case of a fall and also makes you more visible. Be sure your helmet's A.N.S.I. or Snell safety rated.
- Eye protection reduces glare and keeps bugs and rocks out of your eyes.
- Cycling gloves cushion your hands and protect against scrapes in a fall.
- Wear comfortable, high visibility clothing: bright colors during the day and white or reflecting clothing at night. Using a reflective vest increases visibility in traffic.
- Use a rear view mirror to keep track of traffic approaching from behind. A rear view mirror can be attached to your helmet, your eyeglasses or the handlebars of your bicycle.

Trail Courtesy

- Stay on trails and roads. Short-cutting switchbacks or traveling off trails kills vegetation and causes erosion.
- Keep your forest clean and be careful with fire.
- Stop when approaching horses. Remove your bike from the trail. Be sure and talk to the horseperson so the horse recognizes you as human (taking off helmet is a good idea).
- Respect other types of trail users, stop when approaching and let them pass.
- Report any unsatisfactory conditions to the nearest Forest Ranger.

Sugerencias para su Seguridad

- Un casco para ciclista no solo proteje la cabeza en caso de un accidente, tambien ayuda hacer el ciclista más visible.
- Protección para los ojos ayuda reducir la luz intensa del sol, tambien proteje los ojos contra insectos y pedazos de piedras.
- Guantes especiales para ciclistas pueden ayudar protejer las manos en caso de un accidente.
- Use ropa comfortable, de alta visibilidad. Durante el dia, use colores llamativos y en la noche use ropa del color blanco o ropa refléctiva. Usando un chaleco refléctivo siempre ayuda aumentar su visibilidad.
- Use un espejo de retrovisión para poder revisar el tráfico a su espalda. Usted puede montar el espejo de retrovisión sobre su casco, sus anteojos o sobre el manillar de la bicicleta.

Destinations to explore by bike...

Lake Wenatchee Area
1 Fish Lake #6402
2 Deep Creek #6100 6101
3 Little Chumstick Creek #6106
4 Merry Canyon #7800
5 Camp Road #7707
6 Clark Canyon #7704
Moon Canyon #7804
7 Eagle Creek #7620

Lower Wenatchee River Valley
8 Icicle Canyon
9 Mountain Home Road #7300
10 Hay Canyon #699
11 Mission Creek Road #7100
12 Douglas County Park

Wenatchee Valley
13 Rocky Reach Dam Park
Swakane Creek #7415
14 Wenatchee Confluence State Park
Walla Walla Point Park
Wenatchee Riverfront Park
15 Squilchuck State Park
Devils Gulch

Lake Chelan Area
16 25 Mile Creek
Devils Backbone
17 NavarreCoulee
18 Fields Point
19 Lakeside Park
20 Riverwalk Park
Don Morse Park
21 Chelan Falls Park
Beebe Bridge Park
22 Echo Valley Rec Area
23 Old Mill Bay Park
24 Manson Bay Park

Entiat Valley
25 Entiat Park
26 Entiat River Road #5700

Douglas County
27 Orondo River Park
28 Pine Canyon
29 Badger Mountain
30 Daroga Park
31 Lincoln Rock State Park
32 Douglas County River Park
Rock Island Hydro Park

Information for specific areas...

Chelan Ranger District
428 W. Woodin Ave., Chelan
(509) 682-2576, 664-2702

Entiat Ranger District
2108 Entiat Way, Entiat
(509) 784-1511

Leavenworth Ranger District
600 Sherbourne, Leavenworth
(509) 782-1413

Lake Wenatchee Ranger District
22976 State Hwy 207, Leavenworth
(509) 763-3103 or 3211, 664-2704

Wenatchee National Forest
PO Box 811, Wenatchee
(509) 662-4335

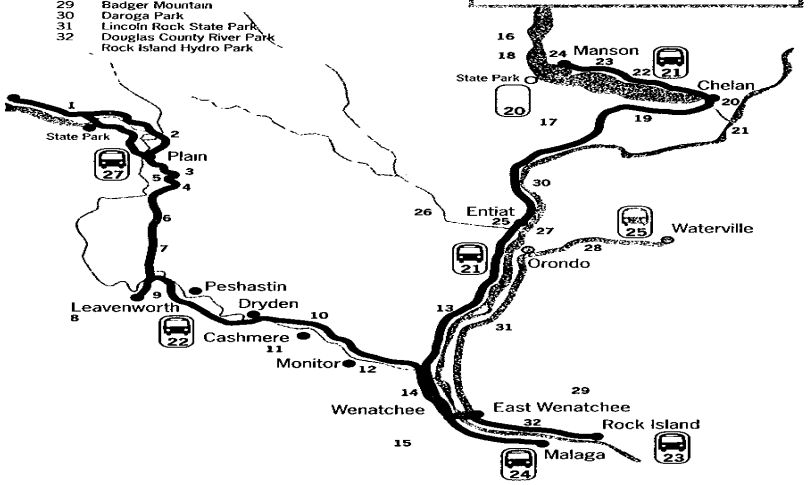
Wenatchee Area Visitor Bureau
2 South Chelan Ave., Wenatchee
(509) 662-4774 or 1-800-57APPLE

East Wenatchee Chamber of Commerce
44 Rock Island Rd. Suite 3, East Wenatchee
(509) 884-2514 or 1-800-245-EWCC

Lake Chelan Chamber of Commerce
Columbia & Johnson, Chelan
(509) 682-3503 or 1-800-4CHELAN

Leavenworth Chamber of Commerce
894 State Hwy 2, Leavenworth
(509) 548-5807

BikeLink
Guest Service Center
Centro de Informacion
662-1155
(800) 851-LINK
Both numbers TDD accessible
Accesible para llamadas de TDD



New York Transit Authority
Bike on Rail Brochure

Bicycles, like subways and buses, are good for the environment. The more people leave their cars and ride a bike, hop a bus or take the subway, the more we can reduce pollution in the air we breathe.

Even so, bicycles can create hazards in the subway system. In stations, aboard trams or on staircases and elevators, they can pose real safety problems for both passengers and transit operations.

If you are thinking about bringing your bicycle on the subway, we ask that you keep in mind the rules* covering bulky items like bicycles:

No person may carry on or bring to any facility or conveyance any item that:
1. Is so long as to extend outside the window or door of a subway car, bus or other conveyance;

2. constitutes a hazard to the operation of the authority, interferes with passenger traffic, or impedes service; and

3. constitutes a danger or hazard to other persons.

- Codified at 21 New York Codes, Rules and Regulations, Section 1050.9(g)

If you violate these rules, you risk eviction or a fine. Here are some general tips to help you use the system safely.

BICYCLE SAFETY TIPS

Avoid crowded trains and stations.

This means avoiding not only rush hours, but other times when the number of people and/or close quarters make it likely that a bicycle will be in the way or otherwise pose a hazard. Use the lines designated by letter (A, B, C, D, E, F, G, etc.) since they have roomier stations and subway cars. Also, choose express trains since they make fewer stops and have less boarding and exiting.

Enter and exit the station through the service gate.

When entering, deposit token, roll the turnstile, and enter through the service gate.

Do not try to lift your bicycle over the turnstiles or carry it through a high-wheel revolving entrance or exit. If you get off at a station where there is only a high-wheel exit, wait for the next train and go to the nearest accessible station.

Wait until everyone has gotten on or off before boarding the train.

This will reduce the chance that someone trips over your bicycle and also will allow you to see if the train is crowded.

Stand near either end of the subway car.

Never put your bicycle where it blocks the aisle or the subway car doors. You impede passenger flow if you do. If the only space available is near the door, the train is too crowded. Wait for the next uncrowded train.

Stay with your bicycle.

Stand with your bicycle and be prepared to move it to allow others to pass. (If, however, there is a train or station evacuation, you must leave your bicycle behind to ensure a swift and safe exit for all.) Make sure all items on the bicycle are secured.

Photographs by Felix Candelaria; Bicycles courtesy of Toga Bike Shop 110 West End Ave NYC 212 799-8625

Carry your bicycle on staircases. Do not use escalators.

Wait until the staircase is not crowded. Carry it, don't bump it on the stairs because you could lose control.

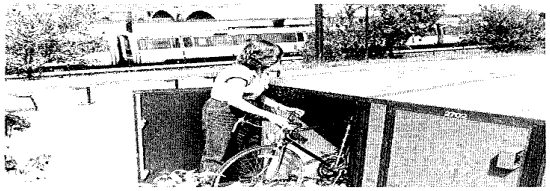
Follow instructions from the Transit Police and train and station personnel.

Our employees' primary responsibility is for the safety of our customers and transit operations. Based on station or train conditions, Transit Police and other personnel decide if your bicycle is posing a hazard, hindering passenger movement, or interfering with train operations.

Courtesy and common sense are the keys to bicycle safety.

Remember, we are working to ensure your safety and that of others.

Washington Metropolitan Area Transit Authority
Bike on Rail Brochure



Metrorail Stations with Bicycle Lockers and/or Racks	
Addison Road	6 Racks
Ballston	22 Racks
Benning Road	2 Racks
Bethesda	22 Lockers
Braddock Road	20 Racks/12 Lockers
Brookland-CUA	8 Racks/6 Lockers
Capitol Heights	6 Racks
Cheverly	10 Racks/4 Lockers
Clarendon	8 Lockers
Cleveland Park	16 Racks/12 Lockers
Court House	10 Racks/8 Lockers
Deanwood	6 Racks
Dunn Loring	22 Racks/24 Lockers
Dupont Circle	21 Racks/44 Lockers
Eisenhower Avenue	10 Racks/4 Lockers
Eastern Market	4 Lockers
East Falls Church	42 Racks/32 Lockers
Foggy Bottom-GWU	11 Racks/28 Lockers
Fort Totten	9 Racks/4 Lockers
Friendship Heights	20 Racks/30 Lockers
Grosvenor	8 Racks/32 Lockers
Huntington	20 Racks/24 Lockers
King Street	20 Racks/8 Lockers
Landover	10 Racks/4 Lockers
Medical Center	16 Racks/20 Lockers
Minnesota Avenue	4 Racks
National Airport	8 Racks/12 Lockers
New Carrollton	15 Racks/8 Lockers
Pentagon City	13 Racks/12 Lockers
Potomac Avenue	10 Racks/2 Lockers
Rhode Island Avenue	20 Racks
Rockville	24 Racks/30 Lockers
Shady Grove	32 Racks/16 Lockers
Silver Spring	34 Racks/42 Lockers
Stadium-Armory	10 Racks
Takoma	31 Racks/32 Lockers
Tenleytown	18 Racks/20 Lockers
Twinbrook	26 Racks/20 Lockers
Vienna	46 Racks/42 Lockers
Union Station	8 Lockers
Van Ness-UDC	20 Racks/8 Lockers
Virginia Square-GMU	10 Racks/32 Lockers
West Falls Church	20 Racks/24 Lockers
White Flint	16 Racks/20 Lockers
Woodley Park-Zoo	6 Racks/4 Lockers

Rules and Regulations for Metro Bike-on-Rail

WMATA's Bike-on-Rail Program affects non-collapsible, operational bicycles. Folding bicycles, and those non-collapsible bicycles which are disassembled and enclosed in a suitable carrying bag or box are already permitted. A folding bicycle is one in which the frame folds and the two wheels come together.

Bicycles *may not* be transported on Metrobuses at any time. Bicycles allowed under this program are the "conventional, two-wheeled" type. Motor-powered bicycles, tandem bicycles, motorcycles, mopeds, tricycles and bicycles with training wheels are not allowed.

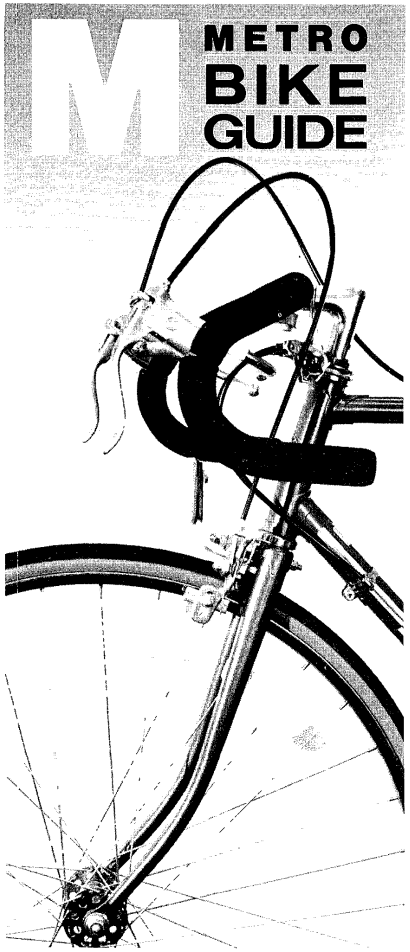
Metro Bike-on-Rail Permits are not transferable. Permits must be displayed on exterior of a bicyclist's clothing and should be visible at all times while in the Metrorail system.

On days when bicycles are permitted, Metrorail Station Managers or Metro Transit Police may, at their discretion, during periods of passenger congestion, temporarily deny bicyclists access to station mezzanines and platforms until the congestion is cleared.

Bicycle riding anywhere in Metro Stations or station areas, including but not limited to station platforms, mezzanines and corridors, is *strictly prohibited* except in parking areas and areas intended for vehicular traffic.

In case of emergency evacuation of a Metro train, and upon direction of a Metro Train Operator, Metro Station Manager, Metro Transit Police or City or County Police or Fire Official, bicycles shall be placed on top of the seats and abandoned on the trains. WMATA assumes no responsibility for their loss or damage. In addition to these rules and regulations, bicyclists must abide by the instructions and directives of Metro Station Managers, Metro Train Operators, Metro Transit Police or City or County Police or Fire Officials. Cyclists failing to abide by these rules and regulations are subject to revocation of their permits. Additionally, the Public Conduct Ordinances of the respective local jurisdictions provide for the possibility of fines and/or arrest and prosecution for violation of these ordinances. Bike-on-Rail permits must be surrendered to these officials on demand in case of an alleged rule infraction.

Washington Metropolitan Area Transit Authority
600 Fifth Street, N.W. Washington, DC 20001



Now you can enjoy the convenience of bringing your on board Metrorail trains.

All you need to do is get a Metro Bike-on-Rail permit. The Metro System provides convenient connections with several bike trails in the Washington metropolitan area. To get more information about bike trails in the area, contact your local city or county Bicycle Affairs Office.

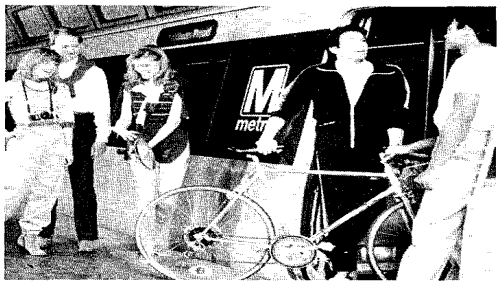
It's Easy to Obtain a Metro Bike-on-Rail Permit

Anyone, 12 years of age or older, can obtain a Metro Bike-on-Rail permit. Children, ages 12 through 15, are eligible for Metro Bike-on-Rail permits, as long as the child is accompanied by a responsible adult (18 years of age or older with a valid Bike-on-Rail permit) each time he/she takes a bicycle aboard a train.

To obtain a Metro Bike-on-Rail permit, you must attend a Registration/Safety Orientation session. Children, ages 12 through 15, must be accompanied by a parent or legal guardian, during the session. These sessions begin promptly each Monday at 12 Noon and each Tuesday at 8AM at WMATA's Headquarters Building located at 600 Fifth Street, NW, in Washington, DC. (Approximately one-half block from the Judiciary Square Metro Station on the Red Line.) During the months of April through October, additional sessions are held on the first Wednesday of each month, from 4:30PM to 6:30PM, and the first Saturday of each month, from 1OAM to 12 Noon, at the same location. Appointments are not required.

Registration/Safety Orientation sessions last approximately 30 minutes, and include studying the rules governing Bike-on-Rail and taking a written test. Metro Bike-on-Rail permits are only issued *after* you have successfully completed the written test and paid a non-refundable $15 fee. Permits are issued for a five-year period, and include the bicyclist's photograph. Permits are attached to a clip and must be displayed on the exterior of your clothing, visible at all times while in the Metro System.

Your Metro Bike-on-Rail permit is your responsibility. If it is lost or stolen, you should report it *within 48 hours* to the WMATA Office of Marketing at 962-1327 A replacement fee of $5 is required.



Bringing Your Bicycle On Metrorail

Entering the Metrorail Station

Always use the elevator to enter the Metrorail station and to move between the mezzanine and platform levels. If the bicycle will cause inconvenience or injury to other passengers, wait for the next elevator. Disabled and elderly passengers have priority over bicyclists on elevators.

Paying Your Fare

When approaching the faregates, show your Metro Bike-on-Rail permit to the Station Manager. Park your bicycle out of the way of other passengers, walk through the faregate and process your farecard. Exit through the service gate next to the Information Kiosk to retrieve your bicycle and bring it through the service gate. At stations where the elevator bypasses the mezzanine, process your farecard in the special farecard processor on the platform, located lust outside the elevator.

Waiting for and Boarding the Train

Bicyclists must use the two end sections of the last car of the train *at all* times. Bicycles cannot be taken through the middle door of the car nor down the aisle of the car. No more than four bicycles are allowed on a train at one time, two at each end of the last car. On the platform, wait for the train as far away from the granite edge as possible and do not allow the bicycle to interfere with other passengers on the platform, or with passengers getting on or off the train.

Wait until all exiting and entering passengers have cleared the doorway before moving the bicycle into the car.

Once on-board the train, hold the bicycle firmly at all times. Kickstands must be kept up, and bicycles must not block car doors. The bicyclist is responsible for damage to the bicycle or rail car, and for injury to passengers caused by the bicycle. At your destination station, use care when exiting the car.

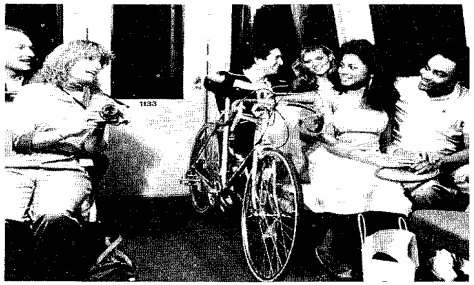
At the Destination Station

Remember to take the elevator to move between the platform and mezzanine levels, and when exiting the station. Once on the mezzanine, park the bicycle out of the way of other passengers, and walk through the faregate, processing your farecard. Re-enter through the service gate to retrieve your bicycle, bringing your bicycle with you through the service gate.

When Can You Bring Your Bicycle on Metrorail?

Bicyclists with valid Metro Bike-on-Rail permits may bring their bicycles on-board Metro trains Monday through Friday AFTER 7 PM; all day on Saturdays and Sundays; and on the following holidays: New Year's Day, Martin Luther King's Birthday Observed, George Washington's Birthday Observed, Memorial Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day.

Bicycles *are not permitted* in the Metrorail system on the Fourth of July. Metro reserves the right to suspend, with prior notice, the transport of bicycles on Metrorail when an area special event could cause a large increase in ridership.



Bicycle Lockers and Racks

For added convenience, bicycle lockers are available for rent at many Metrorail stations, at the following rates:

3 Month Rental $25
6 Month Rental $45
1 Year Rental $70

A $10 key deposit is required at the time the bicycle locker is rented and is refundable upon return of the key. Bicycle racks are available at some Metrorail stations, at no cost. Metrorail stations with bicycle lockers and/or racks are listed below. For additional information about bicycle locker rentals, call Metro at 962-1327 weekdays between 8AM and 4PM.

APPENDIX D

BICYCLE PERMITS, RULES, AND REGULATIONS

Sacramento Regional Transit District
Standard Operating Procedure

BICYCLE POLICY AND PERMIT PROGRAM

PURPOSE

This procedure will establish a uniform and consistent method for transporting bicycles on-board District vehicles.

POLICY

Bicycles will be permitted on board LRVs and buses during off-peak hours only when in compliance with conditions set forth in this procedure.

RESPONSIBILITIES

Marketing: A statement of the bicycle policy will be included in all appropriate RT publications and signage will be designed for the interior of District vehicles and posting at light rail stations. Marketing will also disseminate information to local bike shops and bicycle clubs to encourage the sale of permits in appropriate retail outlets. Additionally, Marketing will prepare a comprehensive booklet on bicycle policy for customer use.

Operations Support: Post signage in the designated areas which clearly explains the District's bicycle policy. These areas should include:

- All display cases at light rail stations

- Decals on existing bike lockers

Light Rail Maintenance: Place decals in designated areas of the LRV.

LRV Operators: All bicycles observed being brought onto the LRVs must be reported to Metro Control.

Division(s)	Department(s)	Section(s)	Proc. No.
All	All	All	GM-SOP-90-005

Date	Rev. No.	Sr. Staff Approval	GM Approval	Page
5/25/90	032792-A			1 of 4

SOP01 (Rev. 8/91)

Sacramento Regional Transit District
Standard Operating Procedure

LRV Supervisors/Fare Inspectors: As part of their regular duties, supervisors and inspectors will monitor passengers with bicycles to ensure compliance with this procedure. Passengers boarding with bicycles should be prepared to show a valid permit upon request.

Coach Operators: Passengers boarding with bicycles must be in full compliance with this procedure. Coach operators will report all bicycle boardings to Control.

Transportation Road Supervisors: As part of their regular duties, road supervisors will monitor passengers with bicycles to ensure compliance with this procedure. Passengers boarding with bicycles should be prepared to show a valid permit upon request.

Customer Service: Bicycle permits will be sold through the front reception area and RT's sales outlet on the K Street Mall. The Customer Service Department will maintain a file of all bicycle permit applications and will mail out reminder notices for renewal of permits.

Revenue Prepayment: Bicycle permits can be purchased via mail or by charge card on the telepass number. Revenue Prepayment will provide the Customer Service Department with copies for filing of permits.

Boarding Times

Bicycles will not be permitted on buses or LRVs during weekday peak periods (6:00 a.m. - 9:00 a.m. and 3:30 p.m. - 6:00 a.m.). On Saturdays, Sundays and holidays, bicycles with permits may be transported at any time.

Permits

Bicycles cannot be transported on any District vehicle without a valid permit. The permits will be sold through RT and will cost $5.00 for each permit. The permit shall be issued for a period of three (3) years from date of issue. An application for the permit will be filled out and a copy kept on file by the Customer Service Department. The application will state

Division(s)	Department(s)	Section(s)	Proc. No.
All	All	All	GM-SOP-90-005

Date	Rev. No.	Sr. Staff Approval	GM Approval	Page
5/25/90	032792-A			2 of 4

SOP01 (Rev. 8/91)

Sacramento Regional Transit District
Standard Operating Procedure

the rules and conditions for boarding with bicycles. Applicants will sign a statement affirming that they have read and understood the regulations. The conditions for boarding with a bicycle, together with a drawing of the boarding and transport areas and restrictions, will be supplied to applicants at time of permit purchase. Permits may be revoked at any time if user is found to be in non-compliance with this procedure. Written notice of RT's intention to revoke the permit will be sent to signature on application.

Regional Transit employees/dependents may use their RT photo identification card as a permit; however, they must comply with all rules and regulations of the program.

LRV Boarding Procedure

A maximum of two bicycles will be allowed on each LRV. Passengers must board bicycles through rear doors only. Bicycles will be confined to the rear wheelchair seating area with seat cushion raised. The bicycle can not protrude into the aisle and must be secured by owner. Bicycles which are excessively dirty or which might soil/damage the seating compartment will not be allowed on the LRV. Bicycles may not displace or inconvenience any rail passenger.

Bus Boarding Procedure

Only one bicycle will be permitted on each bus. Bicycles must be secured in the aisle as close to the rear seat as possible. In no event may a bicycle be stored ahead of the rear passenger door.

Restrictions

Bicycles may be restricted from being transported at any time due to passenger loads or limited seating. Bicycles which are excessively dirty or greasy or which might soil/damage the seating compartment will not be allowed on RT vehicles. Bicycles must be no longer than 80 inches long by 48 inches high. No motorized bicycles will be allowed on board RT vehicles.

Division(s)	Department(s)	Section(s)	Proc. No.
All	All	All	GM-SOP-90-005

Date	Rev. No.	Sr. Staff Approval	GM Approval	Page
5/25/90	032792-A			3 of 4

SOP01 (Rev. 8/91)

Sacramento Regional Transit District
Standard Operating Procedure

SAFETY REQUIREMENTS

The following safety measures should be observed with regard to this procedure:

Employees: Regional Transit employees are not responsible to assist with loading or unloading bicycles.

Patrons: Bus Operators must remain stopped while bicycle is being stowed at rear of the bus to ensure that other patrons will not be injured as the bike is passing through the coach.

Public: Bicycles will be required to board buses last so as not to impair clearance with passenger boarding/exiting.

Division(s)	Department(s)	Section(s)	Proc. No.
All	All	All	GM-SOP-90-005

Date	Rev. No.	Sr. Staff Approval	GM Approval	Page
5/25/90	032792-A			4 of 4

SOP01 (Rev. 8/91)

Bikes On Tri-Met Program
Rules and Regulations

It is the responsibility of the cyclists to *read* and *comply* with the following:

The permit program is valid for a period of two years, July 1, 1993 through June 30, 1995. The cost of a permit is $5; replacement cost for a lost permit is also $5.

Bikes are permitted on MAX and only buses equipped with exterior-mounted bike racks. Bikes are not permitted inside buses, on Vintage Trolley, or Special Needs Transportation/Paratransit vehicles.

Tri-Met may alter, at any time, the conditions of the permit, rules or elements of the program. A copy of the current rules and regulations shall be maintained on file at Tri-Met and available for customers.

Rules of Program Use:

1. Only single seat, two-wheel bicycles will be permitted on MAX and bus racks; motorpowered vehicles not allowed.

2. Permits are issued after the completion of a training/orientation program; a permit is for the sole use of the applicant and is not transferrable.

3. Regular permits will only be issued to applicants age 16 or older. Proof of age will be required prior to purchase of the permit. Youth permits will be issued to applicants ages 8-15. Each youth, with a valid youth permit, must be accompanied by an adult (18 years or older), with a valid permit, when using the system. Proof of age will be required at the time the application is submitted. An adult accompanying a youth must carry proof of age.

4. For buses, the permits must be shown to the Operator prior to boarding. For MAX, permits must be shown if requested by the Operator or any other uniformed Tri-Met official or a police officer.

5. Permits are the sole property of Tri-Met and will be subject to confiscation from the cyclist if the cyclist violates the rules and regulations of the bike demonstration program. Customers may appeal the revocation in accordance with Section 28.20 of the Tri-Met code.

6. At any time, Tri-Met Supervisors, Fare Inspectors or police officers may inspect bicycle permits and/or refuse entrance to cyclists due to crowded vehicles or platforms or unsafe conditions.

7. Bicycles must be walked in bus and MAX stations or station areas such as platforms, and pedestrian corridors.

MAX Specific Rules:

8. A bicycle shall not be boarded on MAX at the following times:
   - Weekdays from 6:30 a.m. to 9:00 a.m. in the westbound or toward Portland direction.
   - Weekdays from 3:00 p.m. to 6:00 p.m. in the eastbound or toward Gresham direction .
   - During Rose Festival-from the Fnday preceding the Starlight Parade through the Sunday following the Grand Floral Parade. These restnctions do not apply to police officers.
   - Dunng ice and snow conditions.
9. Two bicycles may be boarded at the rear door of a single-car train. On trains consisting of two cars, a maximum of six bicycles may be boarded: two at the rear door of the first car; two at the front door of the second car; and two at the rear door of the second car.

10. Allow waiting passengers to enter and exit the train before boarding a bike.

11. A bicycle must be lifted up and down the stairs when boarding and deboarding MAX. The bicycle shall either be placed against the cab wall, at the top of the steps, or be placed at one of the two adjacent wheelchair tie-down locations (with the row of seats folded up), and must be held securely by the cyclist at all times. No part of the bicycle should extend into the stairwells or aisle.

12. Bicycles must be kept clean and free of dirt and grease.

Bus Specific Rules:

13. A maximum of two bicycles may be loaded on buses equipped with a bike rack.

14. Loading and securement of bikes on the front-mounted bicycle rack is the responsibility of the bicyclists. Follow these procedures:

    a. Show the Operator your permit, load and secure your bike on the front mounted rack, and enter the bus and pay your fare.
    b. Before leaving the bus, tell the Operator you will be unloading a bicycle.
    c. After removing your bike, fold up the rack if it is empty.
    d. If a bike rack is inoperative or broken, notify the Operator and wait for the next available bike-rack equipped bus.

Note: As additional bike racks are purchased and Installed more routes will be available; call 239-3044, the Bike Program Hotline for the latest information

TRI-COUNTY METROPOLITAN TRANSPORTATION
DISTRICT OF OREGON (TRI-MET)

BIKES ON TRI-MET PROGRAM

RELEASE OF LIABILITY AND INDEMNIFICATION

Release:

I understand that it is a privilege, not a right, to bring a bicycle on a Tri-Met vehicle and that I do so at my own risk. I hereby release Tri-Met, its directors, officers, representatives, agents and employees from any and all liability for injury to me or said bicycle or other property I may have with me, incurred by reason of any act or omission, either by me, a third party, or by Tri-Met, its directors, officers, representatives, agents or employees, and connected with the presence of the bicycle on Tri-Met operated property. I waive all claims of injury to me or damage to the bicycle and other property connected with the bicycle on a Tri-Met vehicle.

Indemnification:

I recognize that a bicycle aboard a transit vehicle poses a potential hazard to me and other transit patrons in the event of sudden stop, acceleration, collision, fire or other emergency. I agree to indemnify, hold harmless and defend Tri-Met, its directors, officers, representatives, agents and employees from all costs, damage, attorney fees or expenses, direct or indirect, for injury to other persons and their property, incurred by reason of any negligent act or failure to act on my part, in connection with the presence of said bicycle on Tri-Met property. I recognize that this provision makes me personally liable for injuries to Tri-Met patrons and employees and for damage to property arising by reason of negligent use of the bicycle on Tri-Met trains or buses.

I expressly agree that the foregoing release, waiver, and indemnity agreement is intended to be as broad and inclusive as is permitted by the law of the State of Oregon and if any portion thereof is held invalid, it is agreed that the balance shall, not withstanding, continue in full legal force and effect.

I HAVE READ THIS RELEASE OF LIABILITY AND AGREEMENT TO INDEMNIFY, DEFEND AND HOLD HARMLESS, AND FULLY UNDERSTAND THE SIGNIFICANCE OF BOTH. I AGREE TO BE BOUND BY THE PROVISIONS OF BOTH IN RETURN FOR TRI-MET GRANTING ME PERMISSION TO BRING A BICYCLE ON ITS TRANSIT VEHICLES WHILE RIDING AS A PASSENGER.

_____ _____

Signature of Permittee Date

_____

Signature of Legal Guardian
(if Permittee is under age 16)

_____

Relationship of Legal Guardian to Permittee

Original copy shoule be retained by Tri-Met
Pink copy is for customer

10/93

APPENDIX E

SOURCES FOR BICYCLE PARKING INFORMATION

1. **Florida Bicycle/Pedestrian Commuter Assistance Center**
   College of Business, Florida State University
   Tallahassee, Florida, 32306-3037

Provides a listing of current manufacturers of parking equipment. A handbook and course for developing a successful bicycle/pedestrian commuter program are also available.

2. **Bicycle Parking Guide**
   777-108 San Antonio Road
   Palo Alto, California 94303-4826

Contains a listing of bicycle parking products, manufacturers and costs. There is a charge for the Guide.

3. **Bicycle Parking Foundation**
   P.O. Box 7342
   Philadelphia, Pennsylvania, 19101

The foundation was formed in 1988 to assist bicycling organizations in making their communities more "bike friendly" by installing attractive new bike racks as a public service. The Foundation designs and fabricates racks, offers workshops, distributes information about bicycle parking equipment, and works with employers and institutions for determining the appropriate type and location for bicycle parking equipment.

4. **"Bicycle Parking Cookbook"**
   P.O. Box 974
   No. Highlands, California 95660-0974

A "Bicycle Parking Cookbook" is available for a fee. It describes characteristics of the three classes of equipment, example manufacturer designs, and sample bicycle parking zoning ordinances from Sacramento City and County.

THE TRANSPORTATION RESEARCH BOARD is a unit of the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering It evolved in 1974 from the Highway Research Board, which was established in 1920. The TRB incorporates all former HRB activities and also performs additional functions under a broader scope involving all modes of transportation and the interactions of transportation with society. The Board's purpose is to stimulate research concerning the nature and performance of transportation systems, to disseminate information that the research produces, and to encourage the application of appropriate research findings. The Board's program is carried out by more than 270 committees, task forces, and panels composed of more than 3,300 administrators, engineers, social scientists, attorneys, educators, and others concerned with transportation; they serve without compensation. The program is supported by state transportation and highway departments, the modal administrations of the U.S. Department of Transportation, the Association of American Railroads, the National Highway Traffic Safety Administration, and other organizations and individuals interested in the development of transportation.

The National Academy of Sciences is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr Bruce Alberts is president of the National Academy of Sciences.

The National Academy of Engineering was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Robert M.White is president of the National Academy of Engineering.

The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Kenneth
I. Shine is president of the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Bruce Alberts and Dr. Robert M. White are chairman and vice chairman, respectively, of the National Research Council.