Summary and Conclusions 1

The 1990 Americans with Disabilities Act (ADA) seeks to "... provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities."[1] Describing persons with disabilities as having been isolated and segregated in many ways, the law sets a national goal of assuring persons with disabilities "... equality of opportunity, full participation, independent living, and economic self-sufficiency,"[2] The ADA specifically addresses discrimination in public accommodations and services, such as transportation, operated by private entities, including those that provide over-the-road bus (OTRB) service:

> No individual shall be discriminated against on the basis of disability in the full and equal enjoyment of specified public transportation services provided by a private entity that is primarily engaged in the business of transporting people and whose operations affect commerce.[3]

However, while the ADA defines accessible service for other private providers of public transportation (railroads, for example) and instructs the U.S. Department of Transportation (DOT) to develop immediately regulations for these providers, it leaves open the definition of an accessible OTRB and accessible OTRB service.[4] (For further discussion of the Americans with Disabilities Act, see box l-A.)

[1] 42 USC 12101 (b).

[2] 42 USC 12101(a)(3) & (8).

[3] Sec. 304 of the Americans with Disabilities Act; 42 USC 12184 (a).

[4] Public Law 101-336, Sec. 305(a). The ADA defines an OTRB as a "... bus characterized by an elevated passenger deck located over a baggage compartment." Sec. 301(5).

Box l-A—Accessibility for OTRBS: The Americans With Disabilities Act

The Americans with Disabilities Act (ADA) of 1990 seeks to ensure that persons with disabilities have full access to employment, public transportation, communications, facilities, and so forth. The ADA specifically addresses public accommodations and services operated by private entities, including those offering over-the-road bus (OTRB) service. The act states that failure to make reasonable modifications necessary to provide public transportation services to persons with disabilities is discrumination, unless making such modifications would fundamentally alter the nature of the specified public transportation services. Discrimination includes failure to provide the auxiliary aids and services necessary to ensure that no person with disabilities is denied transportation services, excluded, segregated, screened out, or otherwise treated differently. The ADA specifically prohibits discrimination in OTRB service.

Section 304(b)(3) of the ADA defines discrimination by a private entity providing specified public transportation, excluding OTRBs, as:

> . . . the purchase or lease by such entity of a new vehicle (other than an automobile, a van with a seating capacity of less than 8 passengers, including the driver, or an over-the-road bus) which is to be used to provide specified public transportation. . . that is not readily accessible to and usable by individuals with disabilities . . .; except that the new vehicle need not be readily accessible to and usable by such individuals if the new vehicle is to be used solely in a demand-responsive system and if the entity can demonstrate that such a system, when viewed in its entirety, provides a level of service to such individuals equivalent to the level of service provided to the general public. . .

However, Section 304(b)(4)(A) states that discrimination includes:

> . . . the purchase or lease by such an entity of an over-the-road bus which does not comply with the regulations issued under section 306(a)(2).

Section 304(b)(4)(A) clarifies that the exclusion of OTRBs from 304(b)(3) is with respect to the compliance date and specific standards, not from the requirement for accessibility.

Under the ADA, the U.S. Department of Transportation (DOT), in conjunction with the Architectural and Transportation Barriers Compliance Board (ATBCB), must issue interim regulations and, after review of this OTA study, issue final rules in 1994 (which take effect in 1996 for large carriers and 1997 for small ones) to provide accessible OTRB service to individuals with disabilities. DOT does not have the power to allow any OTRB company to operate an inaccessible system. *In Americans Disabled for Accessible Public Transportation (ADAPT) v. Skinner*,[1] which predates the ADA, the district court held that DOT could take costs into account but could not, because of cost considerations, abrogate the rights granted by the statutes. In addition, while the ADA applies the concept of 'undue burden" to existing buildings and infrastructure, new structures and transportation services must meet accessibility standards regardless of cost considerations.

OTA could find no language in the ADA stating or implying that OTRBs can be held to a lesser standard than other modes of transportation, nor does the ADA give guidance on promulgating such a lesser standard. The requirement of Section 305 of the ADA that OTA conduct a study is not an exemption or retreat from the policies and goals of the ADA. Section 305 is a practical attempt to resolve a hotly contested issue that arose during hearings on the ADA, The committee report said:

> During its hearings on the legislation, the Committee heard conflicting testimony on the cost and reliability of wheelchair lifts or other boarding assistance devices with regard to their use on over-the-road buses. Therefore, before mandating these or any other boarding options in this Act, a

[1] 881 F.2d 1184 (3rd Cir. 1989).

thorough study of the access needs of individuals with disabilities to these buses and the cost-effectiveness of different methods of providing such access is required by the Act.[2]

Section 306 further states that DOT's regulations must apply specified previous sections of the ADA to OTRBs and must require OTRB operators to provide accessible service. Finally, Section 308 affirms that in civil actions, the court shall consider whether the transportation provider could have reasonably anticipated the need for an accessibility aid, and whether a good faith effort was made to provide such an aid.

The ADA clearly states that full access for persons with disabilities, which is, in all respects, comparable to that for persons without disabilities, should eventually be the norm for private providers of other public transportation. Thus, OTA anticipates that the standards of accessibility applied to other privately owned public transportation providers apply to OTRB service, in keeping with the language and intent of the ADA.

Comparison of Accessibility Standards for Air Carriers With Those for OTRBs

The ADA puts forward accessibility requirements for all modes of public transportation, except for aircraft, which are governed by the Air Carrier Access Act (ACM) of 1988. At first glance, the OTRB industry and the commuter air industry may seem to have a number of characteristics in common, as both transport paying passengers from one community to another. However, the mere physics of flight and the complex safety requirements that result are sufficient to require for air carriers a separate set of regulations such as those promulgated under the ACAA. For example, Federal air safety rules dictate that aircraft seats be capable of withstanding a forward force of at least 16 gs in a simulated dynamic crash,[3] while there are no comparable requirements for bus seats. This and various other aircraft requirements appear to preclude even the most earnest effort to allow persons to remain in their wheeled mobility aids onboard, while technology allowing wheelchairs and scooters on buses already exists.

In addition, air carriers provide onboard flight attendants to assist passengers on craft with 10 or more seats. On most OTRBs, drivers are the only company employees onboard, and the driver's primary responsibility is to drive the coach. Without attendants, many of the accessibility technologies used by airlines, including aisle chairs and other equipment, cannot be used, Thus, OTA concludes that the example of accessible airline service is not a suitable model for accessible OTRB service.[4]

2 U.S. Congress, House Committee on Education and Labor, *Legislative History of Public Law* 101-336, *The Americans With Disabilities Act, Serial No.* 102-A, Committee Print, December 1990, p. 249.

3 ~@ Safety Foundation, *International Aircraft Occupant Safety Conference and Workshop Proceedings* (Arlington, VA: Oct. 31-Nov. 3, 1988).

4 One other crucial difference between the ACAA and the ADA exists for smaller aircraft, which have 30 or fewer seats and are commonly used for regional transportation and commuter runs. Regulations for these aircraft stipulate that once DOT has determined that level-change devices are commonly available and on the market, they must be implemented in carrier service that is not otherwise accessible-requiring retrofitting of the vehicles if necessary. The ADA requires no carrier to retrofit vehicles, except in the case of trains, where the lifetime of a railcar is quite long.

During the ADA debate, Congress was uncertain about the feasibility of accessibility technologies for OTRBs and concerned about inflicting significant costs for ADA compliance on OTRB freed-rate transportation providers, an industry that has been in decline for several decades. Nevertheless, Congress recognized that access to OTRB service is essential for all persons with disabilities, and the act reflects this decision. Because of these concerns, the Office of Technology Assessment (OTA) was directed to examine this complex question, so that final regulations could be as constructive and farsighted as possible.

Section 305 of the ADA instructs OTA to:

> . . . undertake a study to determine —
>
> (1) the **access** needs of individuals with disabilities to over-the-road buses and over-the-road bus service; and
>
> (2) the most cost-effective methods for providing access to over-the-road buses and over-the-road bus service to individuals with disabilities, particularly individuals who use wheelchair, through all forms of boarding options.[5]

In addition, OTA was directed to:

> . . . include, at a minimum, an analysis of the following:
>
> (1) The anticipated demand by individuals with disabilities for accessible over-the-road buses and over-the-road bus service.
>
> (2) The degree to which such buses and service . . . are readily accessible to and usable by individuals with disabilities.
>
> (3) The effectiveness of various methods of providing accessibility to such buses and service to individuals with disabilities,
>
> (4) The cost of providing accessible over-the-road buses and bus service to individuals with disabilities, including consideration of recent technological and cost saving developments in equipment and devices.
>
> (5) Possible design changes in over-the-road buses that could enhance accessibility, including the installation of accessible restrooms that do not result in the loss of seating capacity.
>
> (6) The impact of accessibility requirements on the continuation of over-the-road bus service, with particular consideration of the impact of such requirements on such service to rural communities.[6]

Within 1 year of the release of this study, the ADA requires DOT, in conjunction with the Architectural and Transportation Barriers Compliance Board, to issue regulations informing public transportation operators using OTRBs of their compliance obligations under the ADA:

> . . . taking into account the purposes of the IOTA] study , . . and any recommendations resulting from such study, each private entity which uses art over-the-road bus to provide transportation to individuals to provide accessibility to such bus to individuals with disabilities, including individuals who use wheelchairs.[7]

These regulations take effect for large operators in July 1996, and for small operators in July 1997.[8] The President can delay the implementation of these regulations by 1 year if he determines that they create an undue burden for OTRB transportation providers.

This chapter summarizes the results of the OTA assessment and highlights findings that can inform and support the DOT process. A number of references are made to later chapters, which explore aspects of the analysis in more detail.

OVER-THE-ROAD BUS SERVICE IN THE UNITED STATES

Approximately 23,000 to 27,000 OTRBs currently operate in the United States. About 450 companies offering freed-route, regularly sched-

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[5] OTA considers the term "wheelchairs' in this context to include all wheelchairs, scooters, and similar devices, For the purposes of this report OTA uses the term ''wheeled mobility aids' to encompass all wheelchairs, scooters, and similar devices.

[6] Public Law 101-336, Sec. 305(b).

[7] Sec. 306(a) (2)(B)(ii) of the ADA. The Architectural and Transportation Barriers Compliance Board (ATBCB), established by Section 502 of the Rehabilitation Act of 1973, establishes minimum guidelines for accessibility standards pursuant to the Architectural Barriers Act of 1968 and Americans with Disabilities Act of 1990, ATBCB guidelines address only technical issues and specifications, and DOT must develop rules for any remaining operational issues.

[8] In the interim, before the final regulations wilt take effect, DOT has issued the following rule: "Private entities operating over-the-road buses. . . shall provide accessible service. . . shall provide assistance, as needed, to individuals with disabilities in boarding and disembarking . . . [and] shall ensure that personnel are trained to provide this assistance safely and appropriately. The entity may require up to 48 hours' advance notice only for providing boarding assistance . . .' *56 Federal Register 45641* (Sept. 6, 1991). The determinationof which companies are large or small is to be made by the Secretary of Transportation. Sec. 306(a)(2) (B)(iii).

uled service use 10,000 to 11,000 OTRBs on intercity routes or on local routes for airport, sightseeing, and other services.[9] Greyhound Lines, Inc., is by far the largest of these providers with roughly 2,300 OTRBs in 1992.[10] Another 3,000 companies use over 12,000 OTRBs for demand-responsive charter and tour operations.[11] In addition, a small number of OTRBs are owned by nonprofit organizations such as churches or community centers.[12] In 1992, a new, nonaccessible OTRB (with few optional features) typically cost $225,000 to $250,000. Optional features include restrooms, video equipment, audio systems, fold-out steps to reduce the first step height of the boarding stairs, and movable arm rests.

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OTRB scheduled, intercity service linked roughly 6,000 communities in 1992, down from 17,000 in 1968.

Fixed-Route Service

Many OTRB transportation providers, especially fixed-route operators, face formidable financial circumstances. Since the 1950s, the numbers of passengers and stops served by fixed-route bus service have declined steadily (see figure l-l). The number of passengers riding on Class I intercity carriers fell from nearly 130 million in 1971 to 37 million in 1990.[13] The primary cause for this decline was direct competition with other transportation modes, especially the automobile, but also trains and airlines.

Typical intercity bus passengers differ in several ways from passengers on other intercity public transportation systems. They are more likely to be under the age of 18 or over the age of 65, to have family incomes of less than $10,000 (1977 dollars, $22,500 in 1991 dollars), and to live in either large metropolitan areas or rural areas than riders of other forms of public transportation.[14] Slightly fewer than one-half of the passengers on intercity coaches do not own an automobile capable of a 500-mile trip.[15] According to one survey, 33 percent of all bus passengers take 1 to 3 trips per year, 36 percent take 4 to 10 trips per year, and approximately 20 percent take

[9] Current estimates are that less than 5,000 OTRBs are used in fixed-route *intercity service.* Frederic Fravel, Ecosometrics Inc., personal communication, Sept. 29, 1992.

[10] Gamble Rudd, Customer Relations, Greyhound Lines, Inc., personal communication, Feb. 11, 1993.

[11] The ADA defines a fixed-route system as ". . . a system of transportation of individuals (other than by aircraft) on which a vehicle is operated along a prescribed route according to a fixed schedule. ' Sec. 301(4). Regular-route intercity OTRB service is considered fixed-route service, and OTA uscs the term fixed-route throughout this report. A demand-responsive system is defined as any public transportation system that is not a fixed-route system. Sec. 301(3). OTA concludes that charter and tour services are demand-responsive.

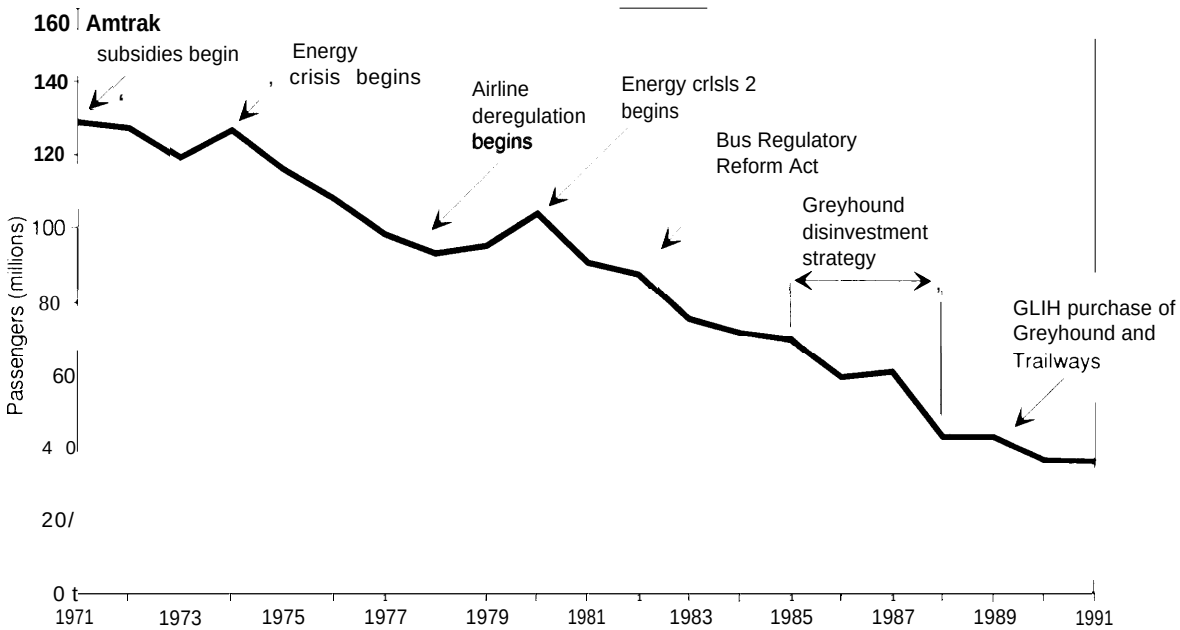
[12] Ecosometrics, Inc., ''Potential Demand for Accessible Over-the-Road Buses," OTA contractor report, August 1992.

[13] Interstate Commerce Commission (ICC) measurement of the activity of Class I carriers has varied considerably over the years. The ICC definition of Class I carriers since 1938 has been based on adjusted annual gross operating revenue in excess of a certain threshold. This threshold, initially established at $100,000, was raised to $200,000 in 1950, to $1 million in 1969, to $3 million in 1977, and to the current level of $5 million in 1988.

14 While these data date back to 1977, they are the most comprehensive data collected to date. More recent surveys, conducted by Greyhound in 1989 and 1991, show similar results.

[15] Greyhound Lines, In C., "Greyhound On Board Passenger Profile Survey, " unpublished document, 1989.

Figure 1-1—Intercity Bus Ridership: Class 1 Carriers, Regular Route Service, 1971-91



SOURCE: Interstate Commerce Commission, Office of Economics, "Transport Statistics in the United States: Second and Final Release, Passenger Carriers," unpublished reports, issued annually for the years 1970-91.

11 to 30 trips per year. Less than 10 percent take more than 30 trips per year.[16]

Until 1982, OTRB fixed-route service was regulated at both the Federal and State levels. The Bus Regulatory Reform Act (BRRA) of 1982 repealed many Federal Government restrictions on intercity bus service and preempted State regulation of service abandonment and fares. This allowed freed-route bus companies greater freedom to restructure their services and routes to maximize profits, Consequently, although intercity bus carriers had already dropped many rural points of service before the BRRA, the trend continued in the years after its enactment. In 1968, regularly scheduled intercity bus service covered approximately 17,000 points, but by 1991 the General Accounting Office estimated fewer than 6,000 points of service remained.[17]

The impact of service abandonment on rural communities is difficult to determine. Residents of many communities were able to substitute other transportation modes (primarily automobiles) and package express services (e.g., Federal Express or United Parcel Service) for intercity service and, consequently, do not report significant detrimental effects due to the loss of service. However, some individuals without access to other forms of transportation undoubtedly suffer from diminished bus service.[18]

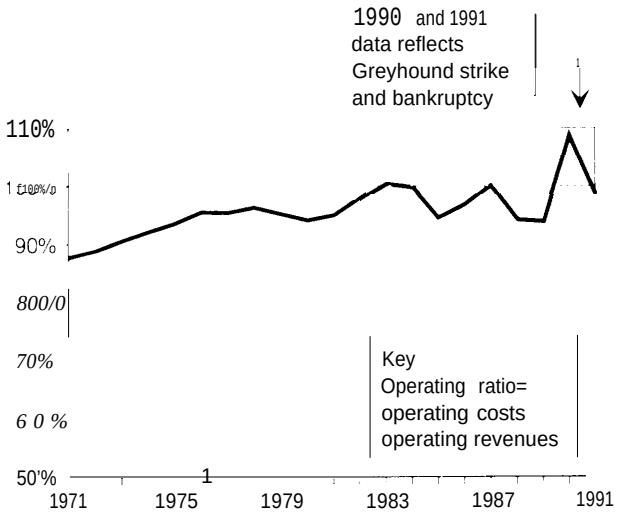
Although operators of OTRBs have restructured their service for greater profitability, companies offering fixed-route service still face

16 Greyhound Lines, Inc., "Greyhound On Board Passenger Profile Survey, " unpublished document, 1991.

17 U.S. General Accounting Office, *Availability of Intercity Bus Service Continues to Decline* (Washington DC: June 1992), P. 2. While not all of the points dropped were rural, OTRB operators indicate that most were. Remarks at Office of Technology Assessment Workshop, "Building an Accessible Intercity Bus System, " July 15, 1992.

18 Ecosometrics, Inc., "*Background* Paper on Accessibility for the Disabled and the Intercity Bus Industry, ' OTA contractor report, Mar. 31, 1991.

Figure 1-2—Intercity Bus Industry: Class I Carriers, Operating Ratios, 1971-91



SOURCE: Interstate Commerce Commission, Office of Economics, 'Transport Statistics in the United States: Second Release, Passenger Carriers," issued annually for the years 1971-91.

financial hardships. Figure 1-2 presents the operating ratios (i.e., the operating costs divided by operating revenues) for the Class I carriers. In 1971, their collective operating ratio was 88 percent, but it rose to a high of nearly 109 percent in 1990 and then down to a ratio of 98.7 percent in 1991. In practical terms, this means that a company with an operating ratio of 98.7 percent and revenues of $5 million would have $65,000, after deducting operating expenses.[19]

These aggregate figures obscure the fact that many individual fixed-route companies operate with deficits for extended periods. Indeed, some of these companies find it difficult to finance the purchase of even one new coach. OTA has confined its analysis to the impacts of the ADA on the future of OTRB companies, as an analysis of the overall future of the bus industry is beyond the scope of this report. It is clear that many OTRB operators are concerned that the implementation of the ADA will jeopardize their ability to continue service (see box l-B).

Demand-Responsive Service

By reducing restrictions on charter and tour operators, considered demand-responsive operators under the ADA, passage of the BRRA in 1982 cleared the way for more companies to enter the market. The number of firms operating exclusively charter and tour services grew from fewer than 1,000 in 1982 to over 3,000 in 1990. Many fixed-route carriers also offer charter and tour services.

Charters and tours are generally arranged far in advance of the date of travel. *Charter transportation* provides group travel where the schedule, origin, and destination are set by the members of the group. A *charter tour* includes additional services, such as meals, lodging, or attractions, again at the group's request. A *retail tour* includes the same services as a charter tour but is sold directly to the public on an individual basis by the tour operator.

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OTRBs in charter and tour service visit a variety of destinations, from tourist sites to baseball games.

19 These operating ratio data are from reports made to the Interstate Commerce Commission by the carriers with operating revenues greater than $5 million (see ch. 2).

Box l-B—An OTRB Operator Views the Future of Intercity Bus Service

In 1981, Ray Brown[1] purchased several midwestern routes from the National Trailways Bus System; the new company was called Pomona Trailways. Ray had grown up in the bus industry, working in various positions in his father's bus business before becoming president of his own.

In the past few years, Pomona Trailways has been a break-even operation, struggling to compete against airfare wars, the subsidization of Amtrak, the Greyhound reorganization and strike, and the recession. Pomona Trailways owns 11 buses, dating in age from 16 years to one brand new coach. The service runs 1,900 miles per day in regular freed-route service and also offers charter and package express services. None of the buses are accessible, although the newer coaches have an extra step for easier boarding.

Pomona serves approximately 45,000 passengers a year. Ray says in the 11 years he has been fully operational he has only had six requests for special access from individuals who use wheeled mobility aids. In two of those cases the individual had to be carried on and off the bus; the others were able to walk on and off and had their mobility aids stowed below. In addition, Pomona personnel routinely assist individuals with hearing and visual impairments in boarding and disembarking. Like other over-the-road bus operators, Pomona offers a "Helping Hand" program that allows attendants to ride at no extra charge. In one case, Ray paid his son to accompany a person with a disability for 16 hours, serving as an attendant.

Some operators believe that bus service is the last resort for travelers, whether they have disabilities or not. ''People travel by bus when there is no other way,' Ray says. "Either they don't like to fly and there is no train, they don't have a car or a license, or they can't afford any other alternative. The bus is the cheapest way to go and still people will make it their last choice. " For this reason, some operators do not believe that outfitting every bus for accessibility makes sense, because in most cases, persons with disabilities will choose the bus as a last resort. These operators doubt that making all buses accessible would ever generate enough demand to justify the cost.[2] Ray claims there is demand for accessible service within the communities in his area, but mostly in the form of vans or small buses to assist individuals in getting to work, stores, or medical appointments.

Although some operators oppose subsidies to the industry, some believe that if small operators like Pomona Trailways are forced to comply with all provisions of the Americans with Disabilities Act, the Federal Government should assist in the purchase of one or more accessible buses per operator.[3] If ridership increases as a result, and the route or service becomes profitable because of the accessibility, the subsidy could be repaid. Ray sympathizes with the need for accessible service but believes that full accessibility requirements, layered on top of already tough economic conditions, would force businesses like his under, ultimately resulting in a loss of service for everyone.

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1 "Ray Brown" and "Pomona Trailways" are fictitious names; the person and the company are real.

2 Remarks at Office of Technology Assessment Workshop, "Building an Accessible Intercity Bus System,'' July 15, 1992.

3 Ibid.

Little nonproprietary information about charter and tour passengers is available. A 1986 market research effort by one firm shows that bus retail tour patrons have a mean age of 60 and take an average of five l-day trips, 4.1 overnight trips, and 2.3 extended trips annually, primarily to socialize, attend sporting and cultural events, or go sightseeing. They have a household income of over $34,000 (1985 dollars, over $43,000 in 1991 dollars) and an average auto ownership of 1.8 autos per household.[20] This limited statistical information indicate that the median income of

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20 Lawrence F. Cunningham, ''Profiling Tour Patrons and Non-Patrons in Intercity Bus Passenger Markets," paper presented at the Annual Meeting of the Transportation Research Board, Washington DC, January 1986.

tour patrons is much higher than that of fixed-route passengers. Both tour and fixed-route passengers are more likely to be over 65 years of age than travelers on other transportation modes.

No comprehensive data exists on the financial condition of the charter and tour industry. Anecdotal data from charter and tour companies indicate that the service is, in general, more profitable than freed-route service, but this conclusion cannot be quantified,

Current Accessible Service

The Urban Mass Transportation Assistance Act of 1970 states that persons who are elderly or who have disabilities have the same rights as others to use mass transportation services. Despite this legislation, many publicly funded transit authorities did not purchase buses that were accessible for persons with mobility impairments.[21] In 1973, Section 504 of the Rehabilitation Act declared that:

> [N]o otherwise qualified individual with handicaps in the United States . . . shall, solely by reason of his or her handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.[22]

Under this act and Section 16 of the Urban Mass Transportation Act, the Urban Mass Transportation Administration adopted regulations in 1976 requiring federally funded transit agencies to make special accommodations for persons with disabilities. Many public transit authorities subsequently purchased new buses with lifts and other assistive technologies. As of early 1993, roughly 350 OTRBs equipped with vehicle-based lifts were operated by or under contract to publicly funded transportation systems. Government funds helped to purchase the accessibility technologies in most of these cases, Until the passage of the ADA, however, public transportation services using privately owned and operated OTRBs were not required to be accessible. (For an account of an incident that would be prohibited now under the ADA, in which OTRB service was denied to a person with a disability, see box 1-C.)

Few operators run charters and tours for individuals with disabilities. As of January 1993, Evergreen Travel Service, Inc. (Lynnwood, Washington) and Sunrise Plaza, Inc. (Los Angeles, California) were the only charter and tour operators to have purchased OTRBs with accessibility equipment for persons with mobility impairments without government funding. Evergreen, using an OTRB capable of securing 12 wheeled mobility aids and with room for attendants, runs tours all over the United States, Sunrise Plaza recently bought an OTRB with a lift, two tie-downs, and an accessible restroom. This OTRB was financed in part by a Japanese tour operator who was previously unable to include persons with disabilities in Japanese groups touring the United States. In addition, several OTRB operators provide charter and tour service with accessible vans.

Some tour operators also specialize in arranging accessible tours. For example, for the past 20 years or more, Flying Wheels Travel Service in Minnesota has acted as a travel agent and tour operator for accessible tours, mostly overseas because of the difficulty in locating accessible buses in the United States. Maryanke Tours, a tour operator in Central Michigan, began offering tours for persons with hearing impairments in 1991. These companies have identified a new market niche, responding to existing demand.

THE DEMAND FOR ACCESSIBLE SERVICE

OTA was explicitly asked to study ". . . the anticipated demand by individuals with disabilities for accessible over-the-road buses and accessible over-the-road bus service. ' The law directs

21 Paul S. Dempsey, "The Civil Rights of the Handicapped in Transportation: The Americans With Disabilities Act and Related Legislation,'' *Transportation Law Journal*, vol. 19, No. 2, 1991, pp. 309-333.

22 Public Law 93-112, 29 USC 794(a) (1973).

Box l-C-Raymond Smith and Janet Smith v. Greyhound Lines, Inc., 1982

Raymond and Janet Smith both have cerebral palsy. Raymond Smith uses a wheelchair; his wife Janet, although physically limited, does not. In November 1982, Raymond Smith purchased a ticket from Greyhound Lines, Inc. for bus transportation from Pittsburgh to Philadelphia, a trip of over 300 miles. Greyhound policy allows riders with disabilities to be accompanied by an attendant at no extra cost. The Smiths had previously traveled together on Greyhound under this arrangement between Pittsburgh and State College, Pennsylvania (a trip of about 140 miles). Janet Smith is able to help her husband with personal needs, such as purchasing food at rest stops, but she cannot lift him onto or off the bus without the assistance of others.

In advance of the November 1982 trip to Philadelphia, the Smiths had made arrangements for two additional people to be present to assist in boarding in Pittsburgh, and for friends to meet them on arrival to assist Raymond in leaving the bus. On arriving at the bus terminal in Pittsburgh for boarding, however, the bus driver refused to transport the Smiths and they were unable to depart for Philadelphia. In a later statement, a Greyhound official defended the driver's decision, citing the risks of road failure or accident en route that would require alighting and reboarding another bus. Greyhound reiterated its policy that, because of these possibilities, they require an attendant, at no extra charge, who can help the individual with disabilities should either of these situations arise. According to Greyhound, Janet Smith did not qualify as an able attendant.

The Smiths-denied transportation under these conditions on Greyhound buses since the November 1982 incident-filed a complaint in 1986 with the Interstate Commerce Commission(ICC), alleging that Greyhound had not complied with ICC's regulations concerning the transportation of persons with disabilities.[1] Specifically, the Smiths asked ICC to review Greyhound's actions in light of the regulations, as well as its policies and practices with regard to travelers with disabilities. Furthermore, the complaint asked ICC to order Greyhound to revise its policies with input from groups familiar with the needs of those with disabilities and to compensate the Smiths for their inconvenience, humiliation, expenses, and legal fees.

ICC ruled that Greyhound's actions in the Smith case did not violate the regulations because: 1) Greyhound did not deny transportation to Smith solely because of his disability (he had access with free passage provided to an attendant); 2) Greyhound policy expressly provides for advanced boarding and seating to accommodate persons with disabilities; and 3) it was not unreasonable for Greyhound to assume that the attendant should be capable of providing all necessary assistance to a person with disabilities en route. The decision stated that ICC rules require that carriers provide assistance "when ever possible." In addition, ICC noted that brochures provided by Greyhound clearly state that the bus driver's only job is to drive the bus and that it is reasonable for the company to want to avoid the situation where a driver alone would be forced to help a passenger with disabilities board and disembark en route, particularly in an emergency situation. Finally, the decision stated: ". . despite complainant's assurances, Greyhound had no guarantee that Mr. Smith's friends would be in Philadelphia to help him disembark. " The complaint was dismissed by ICC with one dissenting view that the Smiths had presented sufficient evidence to support a course of action.

[1] 49 CFR 1063.8.

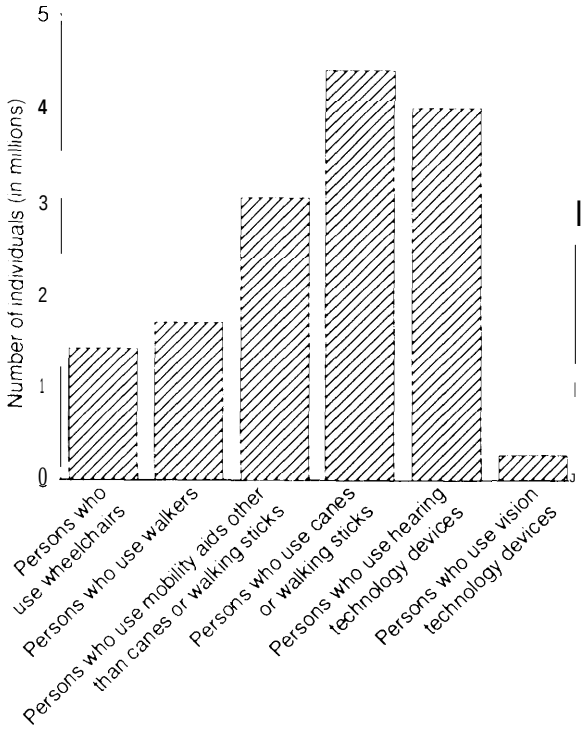
OTA to estimate how many persons with disabilities will ride accessible OTRBs; however, OTRB transportation systems must be made accessible under the law, regardless of OTA's findings about demand.

According to the 1990 National Health Interview Survey, of the total 1990 U.S. population of 249 million (figure 1-3):[23]

. 1.4 million people use wheelchairs;
• 1.7 million people use walkers;

23 These groups may overlap, because persons with disabilities may use several types of aids.

Figure 1 -3—Populations With Disabilities in the United States



SOURCE: U.S. Department of Health and Human Services, Centers for Disease Control/National Center for Health Statistics, "Assistive Technology Devices and Home Accessibility Features: Prevalence, Payment, Need and Trends," Advance *Data No.* 217, Sept. 16, 1992.

- 3.0 million people use one or more mobility technology devices, including wheelchairs, walkers, crutches, scooters, and other mobility equipment;[24]
- 4.0 million people use hearing technology devices; and
- 0.3 million people use vision technology devices.

This survey probably underestimates the number of persons with mobility and sensory disabilities, because it excludes persons who have disabilities but use no devices; moreover, it relies on self-identification and might exclude persons who use devices only rarely or who have temporary disabilities. However, few other databases with similar statistics exist.[25] A 1982 source estimated that:[26]

- 1.1 million people are legally blind;
- 5.0 million people have sight impairments that make travel difficult; and
- Up to 14 million people have experienced significant hearing loss.

No reliable data exist for persons with cognitive disabilities.[27] Depending on the breadth of the definition used, estimates of the number of persons with cognitive disabilities range from 1 *to* 20 percent of the population.

The U.S. population is aging. The U.S. census projects that the population of Americans 65 and over will grow from 12 percent in 1990 to almost 18 percent in 2020, and to nearly 23 percent in 2050 (figure 1-4). Because of a higher prevalence of disabilities in this age group, an increase in the population of individuals with disabilities is likely in the coming years. (For a profile of a senior citizen who uses public transportation services, see box l-D.)

Almost all individuals with disabilities are potential riders of OTRBs, but, of course, many would choose other transportation modes for the same reasons persons without disabilities choose to fly, drive, or take the train. How many persons with disabilities would ride on an OTRB after the

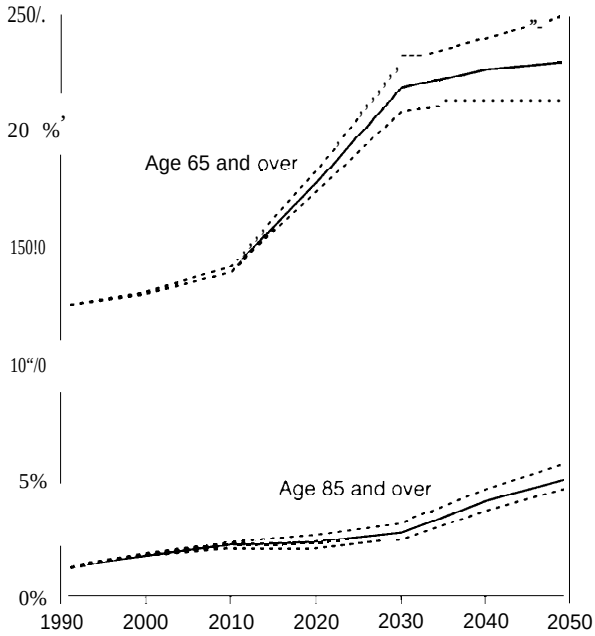
24 This number does not include persons using leg or foot braces and/or canes and walking sticks.

25 Remarks at Office of Technology Assessment Workshop, op. cit., footnote 17.

26 William H. Henderson et al., *Passenger Assistance Techniques: A Training Manual for Vehicle Operators of Systems Transporting the Elderly and Handicapped* (Fort Worth, TX: Transportation Management Associates, 1982), pp. 3-9.

27 Persons with cognitive disabilities do not often have trouble boarding or disembarking from an OTRB, but they may find it difficult to negotiate the terminal, purchase their ticket, and find the appropriate bus.

Figure 1-4-Projected Growth of Older Population as Percentage of Total Population



NOTE: Projections are based on a Lowest, a Highest, and a Middle Series of assumptions about fertility, mortality, and immigration.

SOURCE: U.S. Department of Commerce, Bureau of the Census, *Projections of the Population of the United States by Age, Sex and Race: 1988 to 2080*, Current Population Reports, P-25, No. 1018 (Washington, DC: U.S. Government Printing Office, 1989).

systems are accessible? OTA has found no data to provide a reliable quantitative answer to this question.

The primary reason for the lack of demand data is the lack of experience with accessible OTRB service. Only one State-sponsored program in Massachusetts, two demonstration projects in Canada, and limited service operated by the Denver and Golden Gate transit authorities have offered accessible intercity buses on freed routes. (For a profile of the accessible OTRB service offered by the Denver transit authority, see box l-E.) Each of these services had, or has, relatively low ridership by persons with mobility disabilities. However, questions of lift reliability (especially with early generation lifts), insufficient marketing, and limited route coverage might have contributed to low ridership.

Box I-D-Transportation Needs of a Senior Citizen

Alice Beringer[1] is an 84-year-old resident of a retirement home in Alexandria, VA. Several years ago she suffered a stroke and lost the use of her right arm and leg. She has learned to use her right leg with the use of a leg brace, but finds walking more than 50 feet tiring. She is unable to climb stairs.

Alice uses an electric cart to maneuver around her apartment and through the hallways of her building. When she wants to go somewhere else, however, Alice encounters difficulty because she must give up her cart and use a wheelchair that requires the assistance of another person. Alice wishes that she could find away to transport her electrical cart so that she could travel more freely without assistance. "If I could take it along," she says, "I could get off the bus and go. Now I have to have someone with me to push the chair and that is not always possible."

The retirement facility operates an accessible minibus. The minibus has a ramp that Alice says is so steep that it takes great effort to push her wheelchair onto it. Once inside the minibus, there are no tie-downs for Alice's chair, so she must move to another seat and stow her wheelchair in the back of the bus. She is not able to carry her electric cart with her on these trips, which usually take her to a doctor's appointment or to a store. In addition, Alice must have a companion travel with her, something that is not always feasible. Because of the discomfort and inconvenience of this process, Alice frequently relies on her son to provide transportation in his car, with her wheelchair stowed in the trunk. She says she travels well by car and prefers it over the minibus, which she uses only as a last resort.

Since losing full mobility, Alice has not attempted long distance bus travel, but flies when traveling long distance. She feels that the airlines "take very good care of you." However, several years ago, Alice had an uncomfortable experience in a Wisconsin airport where she had to be carried up stairs to board a plane. She says the experience was "disconcerting." Following the passage of the Americans with Disabilities Act, Alice called a major bus service to inquire about travel to Richmond, Virginia, about a 2-hour trip. The operator told her that, as there were no accessible buses, the driver would have to carry her, and she would have to travel with an attendant. Alice did go to Richmond, but by car.

[1] Alice Beringer" is a fictitious name; the person is real.

Box I-E—Accessible OTRB Service in One Transit Setting

Denver Regional Transit District (RTD) is a public transit system serving the Denver region, including a number of routes to outlying cities on which OTRBS are used. * RTD was one of the first transit agencies in the United States to provide service specifically for persons with disabilities, in response to 1986 Federal requirements under the Surface Transportation Assistance Act. RTD offers discounted fares to individuals with disabilities and free rides to attendants. Two types of wheelchair-accessible service are available: accessible service on regular fixed-route systems, and HandiRide, a separate transit system for riders with more severe impairments.

As of late 1992, the system operated 102 intercity coaches, of which 39 are wheelchair accessible. The large number of intercity coaches and the length of the routes are unusual for a public urban transit system. Overall, 37 percent of the intercity service operates with lift-equipped coaches, with weekend routes generally 100 percent accessible. On weekday services, the percentage of accessible trips ranges from O to 55 percent, depending on the route.

OTRB lifts were first installed in 1987, when RTD asked Stewart& Stevenson Power, Inc. to design a lift for retrofitting an MC-8 coach. The lift was subsequently redesigned not only for retrofitting MC-8s but also as a factory installation on the Neoplan Metroliners and the latest purchase of MCI coaches. These MCI MC102A3 coaches ($235,400 in 1991) are all lift-equipped, seating 47 with one wheelchair tie-down available at all times, and with a second tie-down available by folding and sliding two seats on the left side of the coach. The Stewart & Stevenson Powerlift by itself cost $12,350 in 1990. The lift and tie-down locations permanently reduce seating capacity by four seats. The baggage compartment is reduced by two cubic feet for the lift pump and controls, and in some models the rear baggage compartment is no longer accessible from the right side.

Early ridership on the accessible RTD intercity routes was quite low, at one or two wheelchair-trips per month, but that level has increased over time, as more of the fleet has become accessible. Ridership is heavier on the routes RTD designates as "intercity," as compared to the 'regional' routes that use the same equipment, possibly as a result of fewer accessible buses assigned to the regional routes. The bulk of the lift usage is on the route linking Boulder, downtown Denver, and the Denver Airport, for which 57 percent of total bus trips are scheduled to use the accessible OTRBs. The daily rate of lift usage amounts to nearly 8 lift users out of approximately 2,800 total passengers.

RTD prints an Accessible Service Brochure describing its services. The Marketing Department of RTD coordinates the Handicapped Advisory Committee, comprised of RTD staff and representatives from the disability community who regularly review services and the brochure describing them. The committee has assisted in the development of sensitivity training sessions using in-class discussions, role playing, lectures, and videotapes depicting realistic situations bus operators might encounter. RTD also periodically holds open forums to solicit additional questions and input from the disability community and offers a "training bus" to groups working with persons with disabilities. A RTD Telephone Information Center provides information about intersections and bus stops that may pose difficulties for travelers and suggests alternative routes.

1 Much of the following information is from Econometrics, he., ''Evaluation of Methods to Provide Accessibility to Over-the-Road Buses and Services," OTA contractor report, August 1992.

The experience of public transit systems since buses became accessible provides an interesting counterpoint. Several cities, among them Seattle, Minneapolis, and New York, have seen ridership by individuals with mobility disabilities increase dramatically as the transit systems became more

accessible, although ridership by persons with mobility disabilities remains a small percentage of the total (see ch, 3).

Estimating Potential OTRB Ridership

Given the limited experience with demonstration projects, OTA has attempted to extrapolate potential OTRB ridership for persons with disabilities from trip frequencies for the total population. First, "trip rates" are calculated for both freed-route and charter and tour services. A trip rate is the average number of freed-route or charter and tour trips taken by a person in the United States.

OTA estimated the fixed-route intercity per capita trip rate by taking the best estimate of U.S. fixed-route intercity ridership and dividing it by the total U.S. population. In 1990, the Interstate Commerce Commission estimated fixed-route ridership on the largest intercity carriers at approximately 28 million passengers. Increasing this number by 10 percent to account for ridership on the smaller carriers results in a figure of 31 million.[28] This figure was divided by the total 1990 U.S. population of 249 million to obtain a national fried-route trip rate of 0.125 trips per person annually .29 Similarly, three separate estimation methodologies resulted in a figure of roughly 290 million trips in 1990 for charter and tour service, and an average per capita trip rate of 1.17 trips.[30]

These trip rates are averages over the total U.S. population. Considerable debate exists about estimating OTRB trip rates for the subset of persons with disabilities, assuming all OTRB services were accessible. On the one hand, some analysts suggest that trip rates for persons with disabilities would be lower than those for the general population due to the subpopulation of persons with disabilities who have overall lower mobility, or due to the generally lower economic status of the population of persons with disabilities (i.e., they could not afford the trip). On the other hand, some researchers suggest that trip rates could be higher due to both the lower economic status of persons with disabilities (because OTRB public transportation operators are a low-cost provider) and low levels of automobile ownership. In fact, the profile of OTRB ridership resembles in many key ways

Wilderness Inquiry

A travel group arranged this camping trip for persons with disabilities.

28 These figures represent only intercity fried-route ridership. Ridership on other freed-route OTRB services, such as scheduled airport, sightseeing, and other services, was not estimated.

29 One important not, Concern the possibility of developing different per capita trip rates for different age groups and for urban v. rural populations. While such a breakdown of the national trip rate might be desirable, it is not feasible with available data.

30 The three estimation methodologies used, respectively are: 1) the statistical summary, *Transportation in America*; 2) American Bus Association (ABA) Annual Reports; and 3) two surveys commissioned by ABA. Econometrics, Inc., ' 'Potential Demand for Over-the-Road Bus Service by Persons With Disabilities, " OTA contractor report, July 15, 1992.

(including income, gender, and age characteristics) the profile of the population of persons with disabilities (see ch. 3). In addition, charter and tour trip rates for persons with disabilities could be higher than for the overall population if all OTRB services were accessible due to the convenience of having a tour operator 'scout ahead' to determine the accessibility of the tour route.[31]

Given these differences in opinion, OTA did not adjust the trip rates for differences in travel patterns between persons with disabilities and those without. Therefore, using the trip rates and the demographic figures developed above for fixed-route intercity service, if all OTRBs were accessible today, total trips made annually by persons with sensory and/or mobility impairments might include the following:[32]

- 180,000 trips by persons using wheelchairs,
- 210,000 trips by persons using walkers,
- 380,000 trips by persons using any mobility devices,[33]
- 33,000 trips by persons using vision technology devices,
- 140,000 trips by persons who are legally blind,
- 630,000 trips by persons who have sight impairments that make travel difficult,
- 500,000 trips by persons using hearing technology devices, and
- Up to 1.8 million trips by persons who have experienced significant hearing loss.

Similarly, for charter and tour services, total trips made annually by persons with sensory and/or mobility impairments might include the following:[34]

- 1.7 million trips by persons using wheelchairs,
- 2.0 million trips by persons using walkers,
- 3.6 million trips by persons using any mobility devices,[35]
- 0.3 million trips by persons using vision technology devices,
- 1.3 million trips by persons who are legally blind,
- 5.9 million trips by persons who have sight impairments that make travel difficult,
- 4.7 million trips by persons using hearing technology devices, and
- Up to 16 million trips by persons who have experienced significant hearing loss.

It should be stressed that these numbers are projections based on a simple model and are highly uncertain. Estimating travel demand for services not yet introduced is notoriously difficult. Travel preferences are often unique to the individual, and only data from an operational transportation system can give credible projections of future travel on that system.[36]

In addition to whatever new ridership occurs from passengers with disabilities, there could be other direct changes in demand as a result of making OTRBs accessible. For example, if the

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31 Remarks at office of Technology Assessment Workshop, Op. cit., footnote 17.

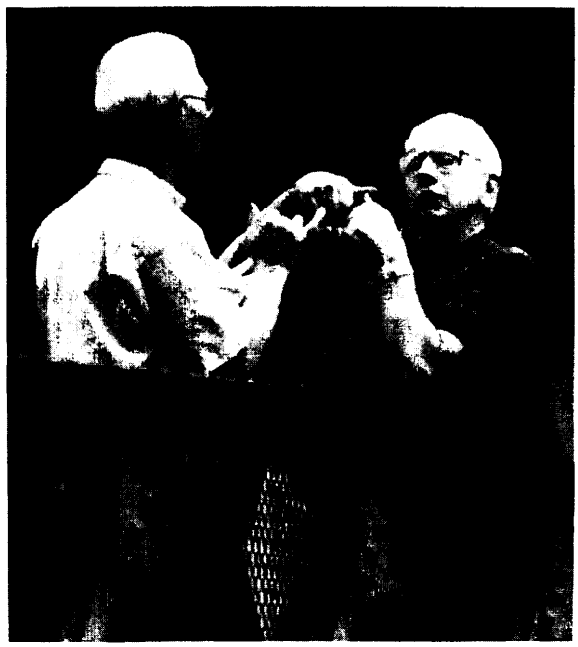
32 These figures do not include persons using leg braces or persons using canes or walking sticks, who might also require assistance, especially in the form of a lower first step, in boarding OTRBs. OTA estimates the number of fixed-route trips made annually by persons using leg braces as 110,000, and the number of fixed-route trips made by persons using canes or walking sticks at 550,000.

33 This number includes persons using crutches, walkers, wheelchairs, scooters, and other mobility equipment, but not persons using leg braces or canes and waking sticks.

34 These figures do not include persons using leg braces or persons using canes or walking sticks, who might also require assistance, especially in the form of a lower first step, in boarding OTRBs. OTA estimates the number of charter and tour trips made annually by persons using leg braces as 1 million and the number of fixed-route trips by persons using canes or walking sticks at 5.1 million.

35 This number includes persons using crutches, walkers, wheelchairs, scooters, and other mobility equipment, but not persons using leg braces and/or canes and walking sticks.

36 Demand forecasts rely heavily on Previous usage data. U.S. Congress, office of Technology Assessment, *Airport System Development*, OTA-STI-231 (Washington, DC: August 1984), pp. 159-185.


National Easter Seals Society

A quarter million people rely primarily on sign language to communicate, but many more are fluent in it.

provision of accessible service requires bus companies to raise rates, certain passengers who are price-sensitive may choose to ride other forms of public transportation, go by automobile, or not travel at all. On the other hand, passengers without disabilities might accompany family and friends with disabilities on OTRB trips, increasing the number of trips taken as a result of OTRB accessibility. Combined with the actual ridership of passengers with disabilities, these changes in ridership might result in either a net increase or decrease. (For further discussion, see app. A.) Indeed, since OTRB ridership fluctuates for other reasons (due to changes in the general economy and points of service), the causes of specific ridership changes will probably always be impossible to ascertain with confidence, even retrospectively.[37]

TECHNOLOGIES FOR ACCESSIBLE OTRBS AND OTRB SERVICE

What will constitute accessible OTRBs and OTRB service? This section reviews technologies appropriate for providing accessible service, training for industry personnel, and restroom accessibility.

Technologies that help persons with disabilities ride OTRBs fall into two categories: 1) those that assist persons with mobility impairments, and 2) those that assist persons with sensory and cognitive impairments. Although the second category addresses a very wide range of disabilities, many people in this category are assisted by the same technologies.

Accessibility for Persons With Mobility Impairments

Persons with mobility impairments include individuals who use wheeled mobility aids and those who do not. While there is much diversity within these two groups, some generalizations can be made about the technologies that can assist them.

Accessibility for Individuals Who Use Wheeled Mobility Aids

At present, to board an OTRB, most individuals who use wheelchairs or other wheeled mobility aids must leave the aid and be carried to an OTRB seat. Carrying is presently allowed in OTRB service because of the lack of other means to assist persons with mobility impairments in boarding. However, the interim DOT regulations for OTRBs state that ". . . we agree with the discussion in the Department of Justice's Title II preamble, that carrying is a disfavored method of

37 Thus, in the cost calculations presented later in this chapter, potential fluctuations in overall ridership levels due to changes in fare structures (resulting from the purchase of accessibility technologies) are not included. In addition, ridership changes due to the potential for increased crowding or delays on OTRBs are not included (see app. A).

providing assistance to an individual with a disability. ’[38] The Department of Justice preamble states: “. . . carrying an individual with a disability is considered an ineffective and therefore an unacceptable method for achieving accessibility.’ ’[39]

OTA also notes that carrying persons aboard OTRBs has severe drawbacks:

- Many persons who use wheeled mobility aids find this method of boarding the bus frightening, humiliating, and, in many cases, physically painful.[40]
- Carrying an individual up or down stairs and transferring a person from a wheeled mobility aid to another chair involves many risks. Even if those carrying or transferring the individual are well-trained, the process is always difficult and may result in injury for any of the parties involved.[41]
- Separation from the mobility aid may incur risk for certain persons if the supportive features of that aid are not available during the trip (e.g., some persons with spinal problems require the support of certain restraints built into their mobility aids to minimize the risk of injury) .42

OTA recognizes that, in the absence of a better alternative, some persons with disabilities may find carrying an acceptable interim boarding method. However, (OTA concludes that carrying as a method of boarding assistance does not meet the ADA requirement for full accessibility.

Some bus companies have suggested using special chairs, called ‘‘boarding chairs, ” to aid persons with disabilities in gaining access to OTRBs. In order to use a boarding chair, a person with a wheeled mobility aid must first transfer from the aid to the boarding chair. BUS company personnel must then get the person in the boarding chair to the seating area of the bus by either carrying the person and chair together up the bus steps or wheeling the boarding chair up a ramp. Once on the bus, a second transfer is necessary for the passenger, this time from the boarding chair to a standard bus seat. The passenger’s wheeled mobility aid is stowed in the baggage compartment. At rest stops and the end of the trip, the transfer must be repeated in reverse.

For most persons with ambulatory disabilities, there is little or no appreciable difference between carrying and using boarding chairs. Only for the most agile persons using wheeled mobility aids—those who may be able to walk a few steps unaided--does transfer to a boarding chair involve less risk or less discomfort. Most people fmd this method of boarding assistance trying; all participants are put at increased risk of injury; and separation from the supportive features of some assistive technologies can be harmful for some persons with disabilities. In addition, DOT regulations for all other forms of public transportation (except air travel, see box l-A) specifically forbid transportation entities from requiring wheeled mobility aid users to transfer to a vehicle seat. The entity may provide information on the risks of not doing so and make a recommendation, but the

38 The interim regulations go on to state that: “[H]owever, since accessible private OTRBs cannot be required by this rule, there maybe times when carrying is the only available means of providing access to an OTRB, if the entity does not exercise its discretion to provide an alternative means. It is required by the rule that any employee who provides boarding assistance-above all, who may carry or otherwise directly physically assist a passenger-must be trained to provide this assistance appropriately and safely. ” 56 *Federal Register 45756* (Sept. 6, 1991).

39 U.S. Department of Justice, ‘‘Nondiscrimination on the Basis of Disability in State and Local Government Services, ’ 56 *Federal Register 35709* (July 26, 1991).

40 Remarks at Office of Technology Assessment Workshop, “OTRB Accessibility Technologies for Persons With Disabilities, ” Mar. 17, 1992.

41 John V. Basmajian and R. Lee Kirby (eds.), *Medical Rehabilitation* (Baltimore, MD: Williams and Wilkens, 1984), p. 247.

42 Remarks at Office of Technology Assessment Workshop, op. cit., footnote 40.

final decision on such a transfer is up to the passenger.

OTA concludes that, to meet the requirements of the ADA, accessible boarding assistance devices must allow persons to remain in their wheeled mobility aids. Such devices include level-change devices that travel with the OTRB or remain at a station, and ramps that meet the appropriate slope requirements (i.e., with a slope of 1 to 12)[43]

At present, OTRB operators may choose from several safe and reliable level-change devices. Some are housed aboard an OTRB, while others are kept at stations. Most of these devices have been operationally tested in transit systems or demonstration projects. Manufacturers have developed several reliable products to meet the growing demand, but the manufacture of accessibility technologies for OTRBs is essentially a young industry. Better technologies at more affordable prices will eventually become available. In fact, several new prototype technologies are currently in development. (For more details, see ch. 4.)

In addition to vehicle- or station-based level-change devices, OTA finds that, in order to meet the requirements of the ADA, accessible OTRBs must be equipped with at least one door wide enough to accommodate a wheeled mobility aid, and with at least two accessible tie-down placements.[44] DOT presently specifies that public transportation vehicles over 22 feet in length (excluding OTRBs) must be equipped with two tie-down locations.[45] Although OTA recognizes that, in some cases, more than two passengers who use wheeled mobility aids may want to ride a specific OTRB, it is questionable whether OTRB service is sufficiently different from other forms of public transportation to warrant a change in this policy.

A man in a wheelchair uses one of several available OTRB vehicle-based lifts.

The technologies used to secure passengers in their wheeled mobility aids aboard OTRBs are still evolving. Several of these tie-down technologies are used aboard transit buses, but few have

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43 A related concern is the need to plan for evacuation of persons in the event of an emergency en route. Although on-tie-road OTRB breakdowns are not a regular occurrence, they are not uncommon. One possible solution might be a regulation specifying that OTRBs not equipped with their own lift or ramp (i.e., those equipped for use with station-based level-change devices) carry a collapsible ramp and boarding chair in order to take persons with mobility impairments off the OTRB or to transfer them to a replacement OTRB. This ramp would not necessarily have to meet ADA requirements for ramps used as routine level-change devices, but must be safe, reliable, and easy to use.

44 In the preliminary draft for the interim Federal regulations for both publicly and privately owned OTRBs promulgated on S@. 6, 1991, the Architectural and Transportation Barriers Compliance Board (ATBCB) suggested a minimum clear width for the door of 32 inches to allow for the passage of persons using wheelchairs or crutches. The American Bus Association (ABA) responded to the draft regulations stating that "... the 32 inch clear width requirement for [front] doors could not be met without major structural changes to the vehicle forward section, suspension and running gear components, and recommended a clear width of 30 inches if a width of 27 inches is allowed when structural members preclude the wider door." ATBCB agreed to the ABA recommendation, since the ADA prohibits the interim requirements from imposing structural changes on OTRBs. ATBCB has not yet made any decisions regarding OTRB technical specifications. 56 *Federal Register 45557* (Sept. 6, 1991). A second door maybe required to meet a width standard of 32 inches.

45 Vehicles under 22 feet in length (excluding automobiles and vans with a seating capacity of less than eight) must *have* one tie-down location.

been fully tested for OTRB use. OTA finds that further testing and evaluation for safety and effectiveness are needed for tie-down technologies. Movement restriction standards for wheelchairs and scooters in tie-downs and the safety of these aids in tie-downs during crash situations must also be reviewed for **OTRB** intercity, charter, and tour use (see ch. 4).

Accessibility for Persons Who Do Not Use Wheeled Mobility Aids

Many level-change devices and bus modifications are designed specifically for persons using wheeled mobility aids, but may not accommodate persons who use walkers, crutches, or other devices. In particular, some bus doorways are not tall enough to accommodate persons walking off a level-change device. **OTA** concludes that accessible level-change devices must be equipped for persons with all types of mobility impairments (i.e., they must allow individuals to use the level-change device without crouching or experiencing other undue discomfort).%

In addition, while many persons with mobility impairments are sufficiently ambulatory to negotiate OTRB stairs, seats, and aisles, certain OTRB features provide greater risk and inconvenience to these passengers. To address some of these problems, DOT already requires new OTRBs to include slip-resistant flooring, handrails, stanchions, and a minimum clear width for doorways. However, DOT is awaiting the findings of this OTA report to determine whether to require a reduction of the initial step height into an OTRB (currently 16 to 17 inches). OTA has found that such a reduction would be useful and would allow persons with many types of mobility impairments to board more easily and quickly; for example, people with crutches and canes and the frail elderly would benefit immediately .47 Therefore, OTA recommends that accessible OTRBs have means to reduce the height of the first step. Three currently available options (a retractable front step, a kneeling feature, and a step box) all reduce the first step height to 8 to 12 inches.

In addition, movable arm rests on OTRB seats make it easier for persons with mobility impairments to be seated. OTA concludes that some seats (preferably all aisle seating) on accessible OTRBs must be equipped with movable arm rests. Unless all arm rests on an OTRB are movable, signage must indicate priority seating for persons with disabilities. (Movable arm rests are currently a common optional feature on most new OTRBs.)

Accessibility for Persons With Sensory and Cognitive Disabilities

Persons with sensory and cognitive disabilities do not often have trouble boarding or disembarking from an OTRB, but they may find it difficult to negotiate the terminal, purchase tickets, and find the appropriate bus. While the specific problems faced by persons with sight, hearing, and cognitive disabilities are very different, the problems have the same root cause, which is difficulty in communicating and receiving information. These difficulties are relevant to all modes of transportation, Because they are not unique to OTRBs, they are not explained in depth in this report.

DOT has addressed concerns for persons with sensory impairments in its present regulations, which require privately operated OTRBs to provide additional lighting in doorways and stepwells and contrasting step edges.[48] Over and above these issues, however, persons with sensory and cognitive disabilities often have difficulty communicating with bus company employees and receiving important information. **OTA** finds that OTRB operators will need to pro-

46 Such a requirement is often interpreted to mean the use of a door into the OTRB that is at least 68 inches high.

47 Remarks at Office of Technology Assessment Workshop, Op. cit., footnote 40.

48 DOT has also issued regulations for station and terminal accessibility under the ADA.

Many transportation systems already use video display terminals and similar technologies to help all passengers, including those with sensory and cognitive impairments.

vide a range of methods of communicating with persons who have sensory and cognitive disabilities, both on and off the bus.

There are many ways to improve communication with persons with sensory and cognitive impairments. At present, most OTRBs are equipped with public address systems and signage indicating the destination of the bus. These simple technologies satisfy most communication needs. However, OTRB operators may wish to train workers further to interact with persons with sensory and cognitive impairments. They may also choose several versatile technologies already in use in many transportation settings, such as posters, changeable information displays, video display terminals for reporting arrival and departure information in terminals, and color-coding (or symbol-coding) of OTRBs, to allow persons with sensory and cognitive disabilities to better identify specific coaches.[49] For example, color-coded OTRBs and tickets can help persons who cannot read (as well as those who cannot read English) find the appropriate OTRB.

Training

Good staff training in both equipment use and people skills is vital to ensure the safe and courteous operation of any transportation system, especially one serving persons with disabilities. Employees must be aware of and respond to the needs of those passengers most likely to require special assistance, and understand the policies and procedures of the operator with respect to such passengers. DOT currently mandates that:

> [E]ach public or private entity which operates a fixed-route or demand-responsive system shall ensure that personnel are trained to proficiency, as appropriate to their duties, so that they operate vehicles and equipment safely and properly assist and treat individuals with disabilities who use the service in a respectful and courteous way, with appropriate attention to the difference among individuals with disabilities.[50]

This performance standard allows for improvements in training practices as they develop, and OTA finds that this rule is adequate to ensure appropriate training. Several training programs developed by public transit systems to educate their personnel could be modified for the OTRB industry, and at least one company in Massachusetts has a training program specifically tailored to OTRB service. Bus company personnel must pay special attention to the needs of persons with disabilities who are negotiating a station, purchasing tickets, and boarding and disembarking from OTRBs. For charters and tours, this might also encompass services at travel destinations.

Restrooms

Onboard restrooms or sufficiently frequent rest stops are essential for *all* OTRB passengers, including persons with disabilities. Section 306 of the ADA prohibits DOT from requiring an

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49 The ADA requires telecommunications companies to provide relay services for persons with hearing and speech impairments at no additional charge to the users. These relay services allow for communication that is functionally equivalent to two-way voice communication. Thus, bus companies will not need to invest in telecommunications devices for the deaf (TDD) or other such equipment for reservation or information services by telephone.

50 *56 Federal Register* 45641 (Sept. 6, 1991).

accessible restroom aboard an OTRB if it results in the loss of seating capacity. However, the only restrooms OTA found in production or under development reduce seating capacity .51 Thus, with today's technologies, DOT cannot require an accessible restroom aboard an OTRB. The only alternative available to DOT for providing adequate restroom access for persons with disabilities is to require sufficiently frequent rest stops. This, however, runs directly into a legal, not technical, issue relating to express service.

Section 302 of the ADA defines as discrimination the failure to make reasonable modifications unless making such modifications would fundamentally alter the nature of the services. For OTRB service, this raises the question as to whether long, nonstop trips (i.e., express service) would be altered by a requirement for frequent stops to accommodate persons with disabilities who could not use an onboard, nonaccessible restroom. Some express service provides passengers with nonstop service between major destinations, such as large cities, with trip lengths up to 5 to 6 hours. Assuming that rest stops would be necessary every 1 1/2 to 2 1/2 hours, and that such stops would take 15 to 30 minutes, it appears that more frequent rest stops might indeed alter the nature of this kind of bus service. Thus, at present, the provision of restroom service on long-duration OTRB runs for persons with disabilities may be legally impossible to require.

OTA cannot resolve these legal questions, but points out that prolonged lack of access to restrooms is not compatible with accessibility. It is unreasonable to force any passenger to endure the discomfort that comes from a prolonged period with no access to a restroom. OTA finds that OTRBs cannot be designated accessible until OTRB operators provide sufficiently frequent access to restrooms for persons with disabilities, either through on-board accessible restrooms or through providing appropriate stops.[52]

STANDARDS, IMPLEMENTAION, AND COSTS

This section discusses the standards for accessible service for fixed-route and charter and tour operators set forth in the ADA, implementation requirements for OTRBS, and the costs of complying with these accessibility standards. In addition to the regulations already put forward by DOT for accessible OTRBS, OTA defines an *accessible OTRB* as one with:

- **access** to level-change devices (onboard or at stops) that allow individuals to stay in their wheeled mobility aids,
- a sufficiently wide door to accommodate persons with mobility impairments,
- two wheeled mobility aid tie-downs,
- movable arm rests,
- a means to communicate with persons with sensory and cognitive disabilities, and
- provisions for the use of accessible restroom facilities.

For freed-route transportation systems, with the exception of publicly owned companies that operate OTRBs, the ADA requires private operators to install accessibility technologies when purchasing or leasing a vehicle.[53] Eventually, *all* scheduled freed-route service will use accessible

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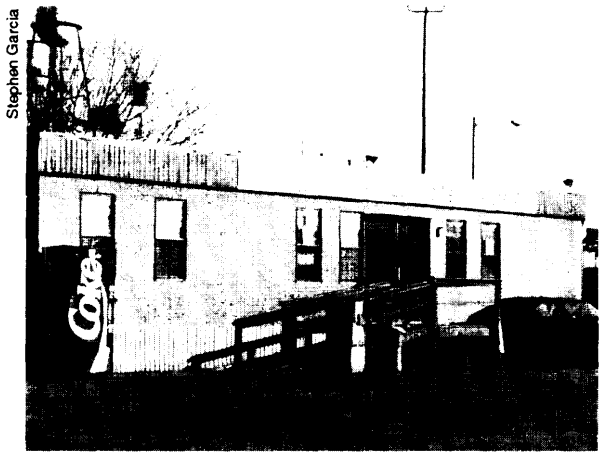
51 For example, in 1991 the State of California purchased 22 Neoplan Metroliners with accessible restrooms, which permanently displaced a minimum of three seats on each OTRB. Econometrics, Inc., ''Evaluation of Methods to Provide Accessible Over-the-Road Buses and Services, " OTA contractor report, July 31, 1992, p. 141.

52 Many transit buses and some OTRBs are equipped with stop request buttons or cords, which alert the driver to a passenger request to disembark. Such a technology might allow persons with disabilities and other passengers to signal the driver for requests for information or restroom access.

53 DOT has interpreted this standard in parallel with other transportation modes covered by the ADA to mean that OTRBs must be accessible when purchased or leased, and accessibility technologies must be installed if the vehicle is remanufactured to extend its lifetime for 5 years or more. 56 *Federal Register 45631* (Sept. 6, 1991).



OTRB stations differ greatly, so a single accessibility technology may not be practical in all situations.

vehicles.[54] In the case of privately operated OTRBs, there is some debate about whether DOT has the latitude to promulgate regulations under a different, perhaps lesser, standard of accessibility. However, OTA expects that the same standard of accessibility will be applied to all private operators of public transportation within the jurisdiction of the ADA (see box l-A). Therefore, OTA anticipates that the ADA's standard of accessible service for fixed-route private operators of other public transportation systems extends to fixed-route service using OTRBs. In other words, to meet the requirements of the ADA, all OTRBs purchased or leased for use in fixed-route service must be accessible.

Charter and tour services meet the definition of demand-responsive systems. For demand-responsive transportation systems (other than those using OTRBs and automobiles), the ADA has required each private operator to

> . . . operate such system so that, when viewed in its entirety, such system ensures a level of service to individuals with disabilities . . . equivalent to the level of service provided to individuals without disabilities.

When purchasing a new vehicle, the ADA requires these private operators to purchase an accessible vehicle, unless the operator can show that the system, when viewed in its entirety, provides the same level of service to individuals with disabilities as to those without. As with fixed-route service, OTA anticipates that the ADA's standard of accessibility for private operators of other demand-responsive transportation systems applies to demand-responsive services using OTRBs (i.e., charter and tour operations). In other words, to meet the requirements of the ADA, private operators of demand-responsive OTRB service must eventually have access to enough accessible OTRBs to accommodate the demand.[55]

Implementing OTRB Accessibility

The ADA specifies that private, freed-route, public transportation operators (those that do not utilize OTRBs, automobiles, or vans with a seating capacity of less than eight) phase in accessible service at the time of the purchase or lease of a vehicle.[56] The ADA does not require retrofitting existing vehicles.[57] OTA finds that this is also the most efficient method of introducing accessible vehicles into an OTRB transportation system, since it allows maximurn flexibility

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54 The ADA does not allow operators to provide accessible service through the use of alternative accessible vehicles or through reservation systems used solely for persons with disabilities. For example, a tour operator could not provide accessible service with an accessible van that transports passengers with disabilities while the rest of the tour patrons ride in an OTRB.

55 When the company needs t. purchase or lease an OTRB, it must buy or lease an accessible vehicle, unless it has met this standard. (No retrofitting is required.) The test of how many OTRBs are enough to provide accessible service is loose. Most fundamentally, if persons with disabilities request accessible service and are turned away a number of times (where the number is yet to be determined by DOT, law, or precedent), then the company has too few accessible OTRBs available.

56 See Sec. 304@)(4) and 302(b)(I)(D)@) of the Americans with Disabilities Act of 1990.

57 56 *Federal Register* 45532 (Sept. 6, 1991).

Table l-l—Accessible OTRB Terminology

An *accessible* ***over-the-road bus (OTRB)*** **has:**
- **access to level-change devices (onboard *or* at stops) that allow individuals to remain in their wheeled mobility aids**
- **a sufficiently wide door to accommodate persons with mobility impairments**
- **two wheeled mobility aid tie-downs**
- **movable arm rests**
- **a means to communicate with persons with sensory and cognitive disabilities**
- **provisions for the use of accessible restroom facilities**

A ***trave/er-comp/ete OTRB*** **is:**
- **an accessible OTRB *with* a vehicle-based level-change device**

A *trave/er-ready* ***OTRB is:***
- **an accessible OTRB without a vehicle-based level-change device, which relies on station-based level-change devices to elevate passengers with mobility impairments to the passenger deck**

Accessible service is:
- **the part of a transportation system that uses accessible vehicles**

SOURCE: Office of Technology Assessment, 1993.

to the operator while preventing the purchase of nonaccessible equipment[s] (see app. A).

The time period between the issuance of the DOT regulations and full accessibility of OTRB transportation systems will most likely stretch over the lifetime of an OTRB—roughly 20 years.[59] some owners ***may turn*** over their fleets more quickly, implementing accessibility technologies as they purchase OTRBs, while others may allow their fleets to age. Much may depend on the resale market for OTRBs, which is often unpredictable. During that 20-year period, OTRB companies will deploy increasing numbers of accessible buses, but the whole system will not be accessible until every OTRB is accessible in fixed-route service and enough vehicles are accessible in demand-responsive service.

When an OTRB has an accessible door, two tie-downs, movable arm rests, provisions for the use of accessible restrooms facilities and means to communicate with persons with sensory and cognitive disabilities (i.e., the ‘‘nonlevel-change accessibility features’ ‘), and has a vehicle-based level-change device, it provides accessible service wherever it goes. OTA calls this OTRB a ‘‘traveler-complete *OTRB” (see* table l-l). If an OTRB is outfitted with the nonlevel-change accessibility features but no vehicle-based level-change device, it is only accessible when it arrives at stations outfitted with station-based level-change devices. OTA calls this a ‘‘traveler-ready *OTRB,” In this* section, OTA addresses several implementation issues concerning the purchase of different types of equipment and the availability of accessible service to persons with disabilities.

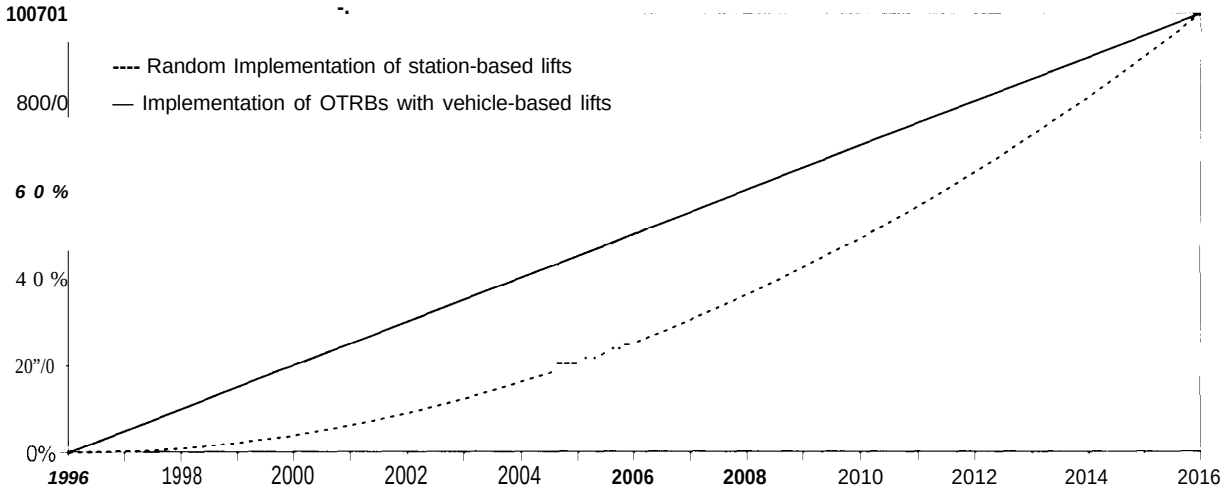
Fixed-Route Service

The implementation of accessible service for any fixed-route OTRB provider will reflect that company’s specific needs and capabilities. Implementation strategies are likely to combine traveler-complete and traveler-ready OTRBs. While the purchase of station-based level-change devices sounds appealing as a quick, low-cost route to

58 The law instructs OTA to determine the ‘‘most cost-effective’’ methods of providing access to OTRBs and OTRB service. OTA has found no precedent in case history that provides a definitive definition of most cost-effective. However, the Office of Management and Budget (OMB) defines ‘ ‘cost-effective analysis in the case where benefits cannot be quantified (as is the case in this problem) to mean an analysis to find the least costly approach. OMB Circular, No. A-94, Oct. 29, 1992, p, 4. Consequently, OTA defines the most cost-effective method to mean the least costly method of providing accessible service within the requirements set forth by the ADA.

59 OTRB companies may purchase many nonaccessible OTRBs before the regulations go into effect, delaying purchases of accessible vehicles,

Figure 1-5—Percentage of Accessible Boarding Opportunities, 1996-2016: Two Scenarios



SOURCE: Office of Technology Assessment, 1993.

implementation, OTA analysis has determined that in many situations a decision to implement accessible service with traveler-complete vehicles may serve all parties best.

Traveler-complete OTRBs are accessible wherever they go; traveler-ready OTRBs are not, unless there is a station-based level-change device at every stop. If 10 percent of a fixed-route fleet of OTRBs are traveler-ready, 10 percent of the stations have station-based level-change devices, and the OTRBs and station-based level-change devices are randomly distributed, then only 1 percent of the scheduled stops would be accessible. Even if the station-based level-change devices are placed advantageously, the number of accessible scheduled stops by the OTRBs could never exceed the number of stops that would be accessible were the OTRBs equipped with vehicle-based level-change devices. In terms of the number of accessible scheduled stops, therefore, if station-based level-change devices are introduced along with traveler-ready OTRBs, accessible service will increase more slowly than if only accessible OTRBs with vehicle-based level-change devices are chosen[60] (see figure 1-5).

In addition to these problems, the use of traveler-ready OTRBs will present DOT with a more complicated regulatory environment. OTRB operators may not ensure that traveler-ready OTRBs are matched with a station-based level-change device to board passengers, so a regulatory structure may be necessary to achieve accessible service.

While there are many potential schemes that DOT could use to monitor bus companies compliance using traveler-ready OTRBs, OTA finds that one option is preferable. Under this option, DOT would instruct companies to operate traveler-ready OTRBs on routes where all of the stops have station-based level-change devices. This strategy provides the same amount of accessible service with traveler-ready OTRBs as provided by traveler-complete OTRBs on the same routes. Since this option is tied to the purchase of

60 This comparison assumes that OTRBs with lifts and OTRBs without lifts will be purchased at the same rate.

vehicles, it also provides flexibility to the bus company and it is enforceable without registration of an ''accessibility plan' with DOT.

For these reasons, OTA finds that operators providing fixed-route service must operate a traveler-ready bus primarily on routes where the stops are equipped with station-based level-change devices. Since OTRBs break down and scheduling difficulties can arise, bus companies cannot always operate every one of their OTRBs on set routes, and some flexibility is needed. Therefore, DOT could allow new traveler-ready **OTRBs** in the interim before full accessibility is achieved to have, for example, a maximum of 10 percent of their scheduled stops in a given month at stations not equipped with a station-based level-change device. Or DOT may wish to allow a delay—for example, 2 years—between purchase of traveler-ready buses and equipping all of the stations those vehicles serve with station-based level-change devices.[61]

Some bus companies cannot schedule their bus fleets so that certain OTRBs run primarily on specific routes. These companies will have difficulty meeting accessibility requirements using both traveler-ready and travel-complete vehicles. While it might serve the companies' economic interests to adjust their operations to have a specific set of buses on certain routes, they may find that they are actually best served by purchasing only traveler-complete OTRBs.[62]

Another problem with implementing accessible service in a fixed-route OTRB system is how best to offer accessible OTRBs before complete accessibility is achieved. One way to designate accessible service is to publish schedules showing which routes and times are served by an accessible bus. Another way to match persons with disabilities to accessible service is to allow such persons to make reservations. The ADA does not allow the mandatory use of a reservation system by persons with disabilities when persons without disabilities are not also required to use it; however, while recognizing certain limitations,[63] OTA finds that reservation systems in use by companies for the general public could be employed to maximize the use of accessible vehicles.

OTA concludes that companies using a reservation system for every passenger must make a good faith effort to provide accessible service to individuals with disabilities who give notice, for example, 24 hours ahead. Companies that do not employ such a reservation system must publish schedules with clear designations of routes and times served by accessible vehicles, and, for the OTRB routes and times that are not accessible, the company

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61 In an alternative Option that does not implement accessibility as efficiently, DOT could mandate an implementation schedule in which increasing percentages of the total number of stops that will eventually use station-based lifts receive such lifts (e.g., 25 percent after 5 years, 50 percent after 10 years, and so on). However, this option may not bear any relation to OTRB investment cycles. For instance, such an implementation schedule could result in bus operators purchasing station-based lifts before there are sufficient traveler-ready OTRBs. In addition, an implementation schedule would require OTRB operators to register with DOT their plans to make their systems accessible, in order to show compliance with the regulations, and it may be difficult for companies to certify that these plans are acceptable since they involve decisions over a long time period.

62 In addition while Capital costs for station_ based lifts may be lower than for vehicle-based lifts, and **Station-bred** lifts displace "**baggage** or seating capacity, the number of station-based lifts required on certain routes, the cost of storing a lift onsite, and other factors may combine to increase the cost of implementing a station-based lift scheme beyond than of vehicle-based lifts (see app. A).

63 One limitation is that, even if all passengers use the same reservation system, passengers who do not need boarding assistance have the option of purchasing a ticket at the last minute. Yet riders who need boarding assistance do not have this option since they may not be able to board if the vehicle is not accessible to them. This point also shows one reason why a reservation system in conjunction with a number of trtivclcr-complete OTRBs could never satisfy the requirements of the ADA to provide a fully accessible fixed-route OTRB system.


Stephen Garcia

Charter and tour transportation destinations change and vary. Therefore, operators may prefer accessibility technologies that travel with the vehicle.

can specify that persons call in advance if, and only if, they need boarding assistance.[64]

Charter and Tour Service

OTA anticipates that charter and tour operators will avail themselves of only traveler-complete vehicles, because they will never be able to ensure that every stop will have a station-based level-change device. However, charter and tour companies could explore pooling arrangements as a means to provide more cost-effective accessible service.

Pooling arrangements arise when bus companies share equipment. Insurance coverage is attached to the company that employs the driver, and other costs are apportioned. Similar arrangements, in which access to lift- or ramp-equipped vehicles would be provided, could satisfy the demand-responsive requirements of providing accessible service. In other words, when persons with disabilities make arrangements with a charter and/or tour company, the company could arrange for the use of an accessible OTRB through a pooling agreement established prior to the request for service. For many companies, especially small ones, pooling arrangements could reduce the cost of providing demand-responsive accessible service, since fewer accessible vehicles may need to be purchased.

However, OTA finds that current pooling arrangements are not sufficient to assure accessible service. First, pooling agreements are not widespread throughout the industry, and they often allow companies to renege if they need the OTRB for another purpose. Second, if the demand for accessible coaches exceeds availability, then companies in a pool must determine whether and how they will purchase another accessible coach. To address these problems, DOT could require that pooling arrangements used to satisfy the demand for accessible service specify stringent obligations for participating companies. In addition, DOT could make the conditions that lead to the purchase of additional accessible service capacity more explicit for all companies. If pooling arrangements to provide accessible service were sufficiently stringent, OTA finds that DOT could consider certain pooling agreements acceptable as part of a demand-responsive system "in its entirety," and could

64 At first glance, it appears that the reservation system could be made voluntary along with a system where specific routes and OTRBs were designated as accessible in published schedules, but a second glance reveals a fundamental conflict. Any OTRB made available for a pickup requested by reservation would be most likely taken from a route that had been designated as accessible in a schedule. This reallocation of the bus would disrupt service for persons with disabilities who ride the accessible route that the bus normally serves.

Table 1-2—Reasonable Cost Estimates for Implementing Accessibility Technologies (excluding accessible restrooms) on OTRBs, Over the Lifetime of an OTRB

Capital costs of level-change devices	$7,000 to $17,000 per vehicle-based lift ($4,500 per station-based lift)
Capital costs of a second door, 2 tie-downs, collapsible seats, and movable arm rests	$5,000 to $7,000 per vehicle
Maintenance costs of level-change devices (including capital expenses for overhauls) over time with no discounting	$5,000 to $13,000 per vehicle-based lift ($2,700 per station-based lift)
Revenue over time with no discounting	$5,000 gained to $3,000 lost per vehicle[a]
Totals	
Total cost outlays assuming funds on hand	$20,000 to $35,000 per traveler-complete OTRB ($1 1,000 per traveler-ready OTRB)
Total costs assuming funds on hand arid discounting over time	$18,000 to $31,000 per traveler-complete OTRB ($1 1,000 per traveler-ready OTRB)
Total cost outlays assuming borrowing for capital expenses	$30,000 to $56,000 per traveler-complete OTRB ($19,000 per traveler-ready OTRB)
Total costs assuming borrowing for capital expenses and discounting over time	$22,000 to $39,000 per traveler-complete OTRB ($15,000 per traveler-ready OTRB)

a This figure depends on the number of seats or amount of baggage space lost due to the presence of a vehicle-based lift. Revenue gains are realized due to the increase in ridership from persons with disabilities.

SOURCE: Office of Technology Assessment, 1993.

allow the pooling of accessible buses to accommodate demand for accessible service.[65]

Costs of Accessibility Technologies

The primary costs of implementing accessibility technologies can be classified into three categories:[66]

1. capital costs (including the cost of the level-change device, any major repairs involving replacement parts that may be needed as the device ages, and features related to the main OTRB structure);
2. maintenance (including routine cycling of the lift and maintenance checks); and
3. lost revenue (that might result from reduced seating or baggage and package storage capacity).

Table 1-2 summarizes OTA's calculations of the costs for one new OTRB to be outfitted and operated with accessibility technologies (not including an accessible restroom). These estimates follow critical assumptions made by OTA (see app. A). As with all future cost estimates, there is a high degree of uncertainty.

While OTA has developed a detailed model to estimate costs for implementing OTRB accessibility (see app. A for description of the model and calculations), these cost issues can be understood in a simpler context. Additional capital costs for

65 Pooling could also be allowed for fixed-route carriers, but this does not alter the requirement for accessibility when all fixed-route vehicles are purchased or leased.

66 This list does not include employee training costs, because OTRB operators already incur such costs. Appendix A discusses other excluded costs.

accessibility features run in the neighborhood of $12,000 to $25,000. Total real costs, including capital expenditures, maintenance, and lost (or gained) revenue over time, range from $18,000 to $40,000.

Since it costs roughly $2.00 to operate an OTRB for 1 mile in freed-route service, a typical OTRB running for 1.5 million miles costs $3 million to operate. These expenses are for payroll, insurance, maintenance, fuel, and other costs (see ch. 2). In addition, new OTRBs typically cost $250,000. Comparing the additional capital, maintenance, and revenue costs for accessibility to these capital and operating costs reveals that accessibility costs are in the neighborhood of 1 percent of the total operating costs.

Two accessible restrooms were in production or development in late 1992: one produced by Neoplan that costs $2,000 in additional bus modifications (over and above an OTRB with a nonaccessible restroom) and permanently displaces three seats; and a prototype made by MCI (for a 45-foot coach) that is estimated to cost $30,000 more than a nonaccessible restroom and permanently displaces seven seats (no additional seats are lost due to tie-down occupancy).[67] Assuming the installation of an accessible restroom similar to the Neoplan restroom and a low-cost lift ($7,000) carried in the baggage compartment, it costs on average $29,000 to $34,000 more than a standard nonaccessible OTRB over 20 years for the additional real capital and operational costs of this OTRB. Assuming the installation of an accessible restroom and lift package combining the MCI restroom and a medium-cost lift,[68] it costs on average $66,000 to $81,000 more over 20 years to operate this OTRB (see app. A).

Cost of Accessibility Technologies in Fixed-Route Intercity OTRB Service

The results presented above for one accessible bus or station can be used to infer the implementation costs of a completely accessible OTRB fleet. OTRB operators will purchase accessible OTRBs when the need arises and funds are available. Thus, buses will be phased in over time as other buses are retired.

If OTRB operators can choose to purchase traveler-complete *or* traveler-ready vehicles, their choice will depend on the nature of their OTRB system. (See box 1-F for sample implementation schemes.) For example, operators in urbanized areas with many express buses (e.g., in the Northeast Corridor) will benefit more from station-based level-change technologies than will operators in rural areas with many stops. Within the tri-State area of Connecticut, Rhode Island, and Massachusetts, in late 1991, approximately 419 OTRBs traveled daily among 170 stations. Of these stations, 117 serviced at least 10 stops daily (i.e., large stations). Three-hundred thirty-one OTRBs traveled only among the large stations, and 88 of the OTRBs made at least one stop daily at a smaller station. Operators in rural areas like the State of Montana, on the other hand, will benefit more from vehicle-based technologies. On a given day (as of late 1991), only 39 buses traveled in the State, but these buses stopped at 109 stations, only 3 of which had more than 10 stops daily (i.e., Billings, Butte, and Missoula).

Thus, OTA finds that operator choice in where to use traveler-complete and traveler-ready vehicles is an important factor in minimizing costs. By mixing level-change device types, operators can minimize their overall costs (see app. A).[69]

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67 As of early 1993, it is unclear whether these restrooms will meet ADA standards.

68 MCI plans to produce its 45-foot accessible coach with an accessible restroom and an option for a Stewart and Stevenson Powerlift. Norman Littler, coordinator, Regulatory Relations, MCI, Ltd., Winnipeg, Manitoba, Canada, personal communication August 1992.

69 As noted above, some companies may be unable to use both station-based and vehicle-based lift types, because they fired it difficult to restructure their bus deployment so that certain buses only follow certain routes.

Box I-F—Four Hypothetical Implementation Scenarios for Accessible Over-the-Road Bus (OTRB) Service[1]

Case 1: A Large Carrier Providing Extensive Fixed-Route Service.

Clover Bus Lines provides freed-route over-the-road bus (OTRB) service, operating at over 700 stations in both urban and rural areas. In order to meet Americans with Disabilities Act (ADA) accessibility standards, Clover's management developed a plan to phase in both traveler-complete and traveler-ready vehicles (see table 1-1).

An analysis showed that 70 percent of Clover's passengers traveled between urban stations. To keep costs down, management decided to furnish these high-traffic stations with station-based lifts; buses traveling to these locations would be traveler-ready, with a wide door and two tie-down positions. Traveler-complete OTRBs would serve the remaining stations. In accordance with U.S. Department of Transportation regulations, Clover purchased accessible buses when its nonaccessible buses became too old to keep in service.

In 2000, Clover replaced 50 older buses with new traveler-complete OTRBs. This, in conjunction with an existing computerized reservation and information system, allowed the company to send accessible vehicles where needed. In the rare instances in which Clover could not get an accessible coach to a passenger requiring one, a boarding chair was available.

By the year 2007,50 percent of Clover's OTRB fleet had turned over. Most of Clover's high-traffic urban stations were equipped with station-based lifts, and traveler-ready OTRBs operated among them. In addition, many traveler-complete buses served rural stations. The company continued to rely on the reservation system to provide traveler-complete buses through an on-call service, all but negating the need for boarding chairs. In the year 2016, all of Clover's service was accessible, and reservations and boarding chairs were no longer necessary.

Case 2: A Small Urban Carrier Providing Commuter, Airport, and Demand-Responsive Service

Fleet Charter and Transit is a small urban carrier providing airport and charter and tour service. Fleet operates routes from nine local hotels to the airport (running four to six buses daily) and provides charters to sporting and cultural events in nearby cities, In the year1999, Fleet needed to buy several new buses. Fleet decided the least expensive method to implement accessibility was to purchase traveler-complete OTRBs, as the airport service simply had too many stops to make station-based lifts feasible. On the printed airport bus schedules, Fleet noted the times when accessible buses served the route. Since Fleet had no reservation system for its airport service, passengers needing boarding assistance were carried onboard when an accessible bus was not available. Traveler-complete OTRBs used for the airport run were also used for charter and tour service. When purchasing new buses for charter and tour service, the company ordered special video and audio equipment on traveler-complete OTRBs for passengers with sensory disabilities. When booking a charter bus, the operator asked if the customer needed accessible service.

By the year 2006, 50 percent of Fleet's fleet was accessible. In the year 2015, all of Fleet's freed-route coaches were accessible, and Fleet no longer marked special accessible routes on its schedules. Fleet was able to meet its entire demand for accessible charter service with three accessible OTRBs. On the rare occasions that the company needed a fourth accessible bus, it contracted with another carrier.

Case 3: A Small Rural Carrier Providing Fixed-Route Service

Faitsville Lines is a small rural carrier providing mostly fixed-route service. Faitsville operates 17 OTRBs among Faitsville, Baxter, Rockville, and Sterling, the last being the largest of the four towns and the only one with train or airport service. Faitsville Lines gets a little charter business from area schools, mostly taking students to

[1] All of&e names and companies used in this box are fictitous.

(Continued on next page)

Box I-F—Four Hypothetical Implementation Scenarios for Accessible Over-the-Road Bus (OTRB) Sevice-(Continued)

the symphony in Sterling. From 1970 to 1990, Faitsville's ridership had dropped by one-half, and the company often had trouble making ends meet.

In 1998, Faitsville Lines needed to replace several buses, and the owner determined that the least costly means to provide accessible service was through traveler-complete vehicles. Many of Faitsville's bus stops were simply grocery stores, car dealerships, or in one case a sporting goods retailer. The infrastructure needed to support station-based lifts was not present and was too costly to introduce. To maximize its options, Faitsville Lines set up a noncomputerized reservation system. Customers could call to reserve seats on the bus and in the process were asked whether they needed accessible service. Whenever possible, individuals who requested accessible service were provided with an accessible bus. If an accessible bus was unavailable, the bus company arranged to have employees carry the traveler aboard. In the year 2006, 50 percent of Faitsville Lines' OTRBs were traveler-complete. The same year, Rockville's public high school enrolled a student who used a wheelchair. Whenever Rockville High chartered a bus, Faitsville Lines was sure to send over a traveler-complete OTRB. Once riders got used to using the reservation system, carrying became a thing of the past.

In 2008, Faitsville Lines faced severe financial difficulties and could no longer maintain service. It was bought out by a neighboring company, Mountain Top Bus Lines, which dropped service to Baxter. Mountain Top had also been purchasing traveler-complete OTRBs, and, by 2015, Mountain Top had replaced its entire fleet with accessible OTRBs.

Case 4: An Urban Charter and Tour Company

Custom Tours specializes in overnight tours, taking its customers to nearby cities for sporting or cultural events along with shopping and sightseeing. After the ADA requirments were implemented in 1996, Custom Tours entered into a pooling arrangement with two other charter and tour companies. When customers called requesting accessible service, Custom Tours reserved the accessible bus, which was normally operated by one of the other carriers.

By the year *2005, the* pool had expanded to include one other charter and tour company, and needed two more accessible buses in order to satisfy consumer demand. Custom Tours began to market accessible tours for retired persons as one of its specialties.

In 2010, Custom Tours needed to replace two of its coaches. The company had such success with its accessible tours that it decided to discontinue its participation in the pooling agreement and to purchase both OTRBs as fully accessible with vehicle-based lifts. As a result, Custom captured the elderly tour market, giving the company a market advantage and reducing the demand for accessible service for other carriers in the area.

I Costs of Accessibility Technologies for Demand-Responsive OTRB Service

For charter and tour service, the demand for accessible service determines the number of accessible OTRBs required. However, even with the demand figures for accessible charter and tour service derived above, the resulting requirements for OTRB purchases are impossible to gauge since the impacts on a specific company are dependent on local demand. In addition, very little operational data exists for charter and tour companies.

As above, if a charter and tour company purchases a new bus with a vehicle-based lift and an accessible Neoplan (low-cost) restroom, the additional cost over the 20-year lifetime of the bus might run $20,000 for capital expenditures, and $4,600 for maintenance costs. However, this figure does not include costs due to forgone revenue. Due to the complexity of charter and tour

pricing schemes, OTA is unable to place a value on lost seating and baggage capacity. Thus, it is impossible to calculate the costs due to revenue losses. However, they are expected to be greater per bus than for fixed-route companies, since charter and tour companies operate OTRBs at higher capacity than do fixed-route operators.

IMPACT OF ACCESSIBILITY REQUIREMENTS

This section discusses the impacts of the above conclusions on: 1) privately owned public transportation systems using OTRBs; 2) persons with disabilities; and 3) rural OTRB service. In general, mostly due to the large number of bus companies and the proprietary nature of their finances, there are too few data to measure the impacts on OTRB service, except for the fixed-route industry and charter and tour industry in their entireties.

For the *fixed-route OTRB industry as a whole,* OTA calculated above that reasonable estimates of the average cost to implement vehicle-based level-change devices for each new bus will range from $10,000 to $40,000, depending on the choice of level-change technology (see app. A), or approximately 1 percent of total operating costs for that vehicle. Assuming a 20-year phase-in period, costs to the industry as a whole would rise approximately one-twentieth of 1 percent per year.

In 1991, the average operating ratio (before taxes) for Class I OTRB operators was 98.7 **percent.**[70] Therefore, on average, 1.3 percent of revenues were left over after deducting the operating expenses.[71] The change in expenses for the next several years should not significantly affect the economic health of most OTRB carriers; the l-percent change in operating expenses that would result 20 years after the implementation of regulations could do so-but only if one assumes *no* improvements or deteriorations in bus company finances, revenues, or operational factors, and assuming no government assistance.

It is unclear whether the bus industry will continue to operate at such high operating ratios. In 1991, Greyhound Lines, Inc., had Chapter 11 status through October, and the country was in a recession, limiting travel of all types in most sectors. Typical operating ratios in the mid- 1980s were from 94 to 97 percent. Even with these operating ratios, however, a l-percent change in capital and operating costs would be significant.

Thus, accessibility requirements could eventually have some effect on the level of service, as would any increase in costs. However, whether it is in restaurants or in public transportation, Congress found the loss of some service acceptable when it wrote in the ADA that accessibility is required unless it ‘‘. . . fundamentally alter[s] the nature of . . . [the] goods, services, facilities, privileges, advantages, or accommodations[.]”[72] The fixed-route bus industry has been operating under tough financial conditions for some time due to competition from other modes of transportation and due to the limitations of OTRB service. Thus, Congress may wish to consider financial assistance for this industry-not because of accessibility requirements imposed by the ADA, but from the larger perspective of transportation policy issues such as the provision of low-cost public transportation alternatives and service to rural areas (see below).

For the *charter and tour industry* as a whole, the impact of the cost of accessibility technolo-

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70 Interstate Commerce Commission, Office Of Economics, ‘*Large Class I Carriers of Passengers Selected Earnings Data” unpublished document, 1991.

71 Since 1970, the operating ratio for the Class I carriers has risen from roughly 88 percent to its present value. However, from 1980 to 1991, the average operating ratio for the Class I carriers has been especially variable, ranging from between 93 and 109 percent. For the purposes of this report, OTA has used the most recent estimate for the average operating ratio of the Class I carriers.

72 Public Law 101-336, Sec. 302@) (2)(A) (ii).

gies is difficult to gauge, especially since it is not yet clear how many OTRBs must be purchased by charter and tour companies (and because no nonproprietary, nationwide data exist for charter and tour companies). However, while the operating costs per bus-mile for the charter and tour industry (from $1.60 to $1.90) are lower than for fixed-route OTRBs, the operating ratios are believed to be better than those of most fixed-route carriers (see ch. 2). Thus, presumably more funds are available on average for charter and tour carriers to purchase accessibility technologies and to accommodate increased costs for the accessible portion of their fleet required to meet the demand for accessible service.

The impact on *persons with disabilities* of the purchase-oriented phase-in of accessibility technologies means that full accessibility for fixed-route service will not be achieved for probably 20 years-well into the next century. In addition, for a number of years, carrying will still be used as a method of boarding assistance. This means a delay in the full benefits to both persons with disabilities and the bus companies.

In addition, if the costs of accessibility are passed on to passengers in the form of price increases, some passengers may choose not to ride OTRBs. Indeed, as OTRB transportation systems are low-cost providers of public transportation, the market for OTRB transportation, in particular the intercity portion, is very price sensitive. However, given the lack of data on these issues, the nature and effect of a potential price increase are impossible to predict. However, OTA estimates the eventual change in ridership when accessibility is fully implemented to be at most 1 to 2 percent (see app. A).

Congress instructed OTA to examine the impact of accessibility requirements on *service to rural communities.* As stated above, the volume of OTRB fried-route rural service has declined dramatically over the past two decades for a variety of reasons, mostly related to the low profitability of these routes. It is unclear whether the additional costs of accessibility requirements alone will precipitate further route cuts. The loss of routes affects persons both with and without disabilities.

The need to invest in accessibility technologies may lead to abandonment of some service points. However, since fixed-route OTRB operators have been consistently dropping service points over the last two decades, without an analysis of each route and more data detailing the profitability of *all* routes, it is impossible to determine whether the cost of accessibility requirements in and of itself will cause abandonment. This analysis is not meant to minimize the impact of loss of rural service, which can be quite devastating in many areas. OTA concludes only that the extent of any potential losses in service is impossible to quantify exactly, but OTA estimates that, as with ridership, the effect will be marginal.

PUBLIC FINANCIAL ASSISTANCE FOR OTRB OWNERS

OTRB access for persons with disabilities is required by the ADA, and implementation of accessible service will proceed in accordance with the law and DOT regulations. However, the debate over implementation is likely to include discussion of additional financial assistance for OTRB operators.

Many OTRB operators, particularly those offering fixed-route service, operate with small margins for profit or capital improvements. Since the 1970s, the industry has been in decline in the number of passengers and stops served. In addition, available financial data document a decrease in the profitability of intercity OTRB transportation, especially during the 1980s. This decline is due primarily to competition with other modes of public transportation, such as airplanes, trains, and, most importantly, automobiles. This industry is far from robust and its future is in jeopardy. Continued loss of OTRB service would affect primarily the rural areas served only by this mode of public transportation and passengers who


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OTRB scheduled service is the only form of public transportation in some rural areas.

require the low-cost transportation alternative that OTRB service has provided.

With the additional costs due to accessibility requirements imposed by the ADA, some OTRB companies have said that they may be more likely to discontinue service, either partially or altogether. However, the ADA provided very few means by which to compensate private sector entities for investment in the accessibility technologies necessary for compliance with the law. Several small tax breaks were initiated, primarily to benefit the smallest companies, but no direct subsidies were enacted.

Although Congress clearly did not intend to provide further financial assistance to alleviate the financial burdens of implementing the ADA, in the case of the operators of public transportation using OTRBs, four arguments for financial assistance warrant consideration. First, since OTRB transportation is an essential service for some segments of the U.S. population, especially those with low incomes and those living in rural areas, it would be in the public interest to ensure its continuation and to avoid OTRB companies passing on the costs of accessibility in the form of higher rates for these passengers.

Second, the implementation period for accessible OTRB service will extend over a 20-year period, beginning after the 1996 enactment of regulations by DOT (already 5 years later than regulations published for other public transportation operators). Thus, the benefits to persons with disabilities of accessible OTRB service will be delayed during much of that time. Carefully crafted financial incentives, available over a limited time period, are a possible means of encouraging transportation providers to purchase accessible OTRB , earlier rather than later, thereby accelerating the implementation of accessible service.

Third, the level of financial assistance required is not excessive. OTA estimates that the implementation costs borne by OTRB fixed-route operators nationwide are less than $10 million dollars annually .73

Fourth, several new accessibility technologies are in the concept phase, but their originators lack the funding necessary to develop this equipment for the market (see box l-G). A traditional Federal role has been to support development and testing of technologies that can aid in transportation services. For example, the Canadian Government has supported the development of several accessible OTRB prototypes (see ch. 3). Government

73 This figures assumes that 5,000 OTRBs are currently used in OTRB fixed-route service and that 5 percent are turned over annually. If Congress decides to ensure that the OTRB industry continues to function at present levels of service or higher, additional funding may be necessary.

Box I-G—Concepts in Search of Development Funds

In the face of an over-the-roadbus (OTRB) indusry struggling to survive, the need for low-cost accessibility equipment is acute. Although equipment alternatives exist within a wide range of costs, all may not be practicable for some operators, and the availability of further inexpensive accessibility technologies could ease the burden of complying with Americans with Disabilities Act (ADA) standards.

Several companies have researched ideas for new accessibility technologies, but for various reasons have not gone ahead with development plans. For instance, one company has a concept for a portable lift that folds up and rides on the back of the OTRB. The lift, projected to cost $4,500 to $5,500, would take up no baggage or seating capacity. OTA has calculated that the cost savings of such a lift could be as much as 10 to 25 percent over the least expensive vehicle-based lift (see app. A). The details of the mechanism to move the lift from the rear of the bus to the doorway have been worked out, but the company is concerned about the vulnerability of the exterior parts to harsh weather conditions. Simulations and field testing are required. Another company has an idea for an accessible restroom that collapses to the size of a normal restroom when not required to be accessible. This innovation would reduce the number of seats displaced by an accessible restroom.

Representatives of these companies have explained these concepts to a number of potential buyers, many of whom are enthusiastic, but none can help the company with the need for capital to finance further development and testing. These representatives doubt whether their companies on their own can afford to invest the money it would take to develop these concepts, especially in the face of an uncertain market. Yet the investment amount is relatively modest (e.g., $250,000 for the external lift concept).

research and development (R&D) funding, provided during the early part of the implementation phase, could accelerate progress in this area and result in less costly accessibility devices available at an earlier date.

Therefore, OTA concludes that congressional support for appropriate financial assistance and/or incentives might help prevent the loss of service that could result from the implementation of accessible OTRB service. This assistance could also accelerate the implementation of accessible service. In addition, congressional support of R&D funding for accessibility technologies could be instrumental in providing safe, reliable, and low-cost accessible service.[74]

Presently, Federal and State Governments assist OTRB owners in several ways, including direct and indirect financial assistance. The two forms of assistance from the Federal Government are: 1) limited direct assistance with capital costs for accessibility technologies, and 2) tax breaks. The Federal Transit Authority's Section 18(i) program has authorized the purchase of accessibility technologies as capital expenses that are eligible for partial government funding for up to 90 percent of the cost for rural intercity bus services. In fiscal year 1992, Section 18(i) funding was $5.3 million.[75] However, this funding source was primarily intended to provide funds for the preservation of rural intercity service.

In addition, all businesses may deduct up to $15,000 per year at present in ". . . barrier re-

74 Other businesses affected by the ADA, such as restaurants, stores, and theaters, do not receive subsidies beyond small tax breaks for Capital improvements. In the case of OTRB providers, Congress may wish to consider further financial assistance due to the need of rural communities and disadvantaged groups for the public transportation services offered by OTRB operators, and the challenging financial circumstances experienced by most OTRB companies.

75 This program only addresses the needs of fixed-route service, and only freed-mute OTRB operators serving rural areas are eligible for these funds. Federal Transit Administration, "Section 18 Draft Circular Revisions Proposed Changes to FTA C 9040.1B," Aug. 9, 1992.

moval expenses . . . for the purposes of making any facility or public transportation vehicle . . . accessible and usable by handicapped and elderly individuals. "[76] The expenses cannot include new construction or comprehensive renovation costs, but can encompass expenses that are modifications to *existing* facilities or vehicles. Small companies are allowed a tax credit for 50 percent of the first $10,000 of eligible costs of complying with the ADA.[77]

I Options for OTRB Financial Assistance

Congress could choose to augment existing financial assistance mechanisms or to develop new ones. For instance, Congress could choose to:

. Augment Section 18(i) funding. Since Section 18(i) funding goes for other purposes, however, Congress will need to take care when appropriating the funds to ensure that other purposes for Section 18(i) funding are not shortchanged, while at the same time ensuring that funds for accessibility equipment are spent. Augmenting Section 18(i) funding has the added benefit of addressing OTRB systemwide concerns as well as accessibility needs. In addition, the apparatus to distribute the funds has already been developed by DOT.
. Enact a new financial assistance program specifically targeted to the purchase and operation of accessibility equipment on OTRBs, most likely at less than $10 million annually. Such a program could provide incentives for bus operators to purchase accessibility equipment earlier rather than later. For example, subsidies for accessibility equipment could be highest in the first 5 years of the program's operation and progressively decrease from that point. In addition, several public policy issues could be addressed. For instance, the program could target rural providers and be geared to maintaining low-cost transportation. Such a program could sit in the Office of the Secretary of Transportation or elsewhere in DOT.
- Support R&D for accessibility technologies on OTRBs. A traditional Federal role has been to provide monies to research, develop, and evaluate technologies that can aid in transportation services. New accessibility technologies could provide lower cost and safer equipment. Technologies to provide accessibility are continually evolving, and government R&D funding could accelerate progress in this area. Congress could initiate an R&D program specifically targeted at accessibility technologies. Such a program could be limited in duration, perhaps 5 to 8 years, and could capitalize on existing R&D developments in industry. In addition, DOT could incorporate R&D for accessibility technologies into its current assistance priorities.[78]

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76 Daniel C. Schaffer, "Tax Incentives, " *The Americans With Disabilities Act: From Policy to Practice,* Jane West (cd.) (New York, NY: Milbank Memorial Fund, 1991).

77 In addition to Federal Section 18(i) funding and tax breaks, several State Governments have supported the purchase of accessible vehicles through contracts for fixed-route accessible service. For example, the State of California has issued several contracts to private companies to provide fixed-route OTRB service to Amtrak train stations, All of these OTRBs must be accessible, and these contracts budget for the purchase of accessibility equipment. State funds have also been used to maintain OTRB service to prevent the loss of service on certain routes.

78 OTA has reviewed two additional options. First, Congress could choose to augment the current tax breaks or enact new ones for the OTRB industry. However, many bus company owners claim that, unless the tax breaks arc in the form of tax credits, they are useless for tbe bus industry because too many companies make little or no profit. In addition, this option would aid some companies much more than others, and not necessarily those with the most need. Second, Congress could choose to allocate funds through contracts for fixed-route service, to maintain rural routes or to serve other needs. However, this approach would be in all likelihood too piecemeal to address the concerns of the OTRB industry in general.