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The United States Architectural & Transportation
Barriers Compliance Board

**SECUREMENT
OF
WHEELCHAIRS
AND OTHER
MOBILITY
AIDS ON
TRANSIT
VEHICLES**

ARCHITECTURAL AND TRANSPORTATION BARRIERS
COMPLIANCE BOARD

1331 F Street, N.W.
Suite 1000

Washington, D.C. 20004-1111

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**SECUREMENT OF WHEELCHAIRS
AND OTHER MOBILITY AIDS ON
TRANSIT VEHICLES**

Prepared for:

**Architectural and Transportation
Barriers Compliance Board
1331 F Street, N.W. • Suite 1000
Washington, D.C. 20004-1111**

Prepared by:

**Dale E. Daucher, P.E.
Falls Church, VA**

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In increasing numbers, disabled and older Americans are overcoming physical limitations by using a wide variety of mobility aids to extend their range of travel. The golf carts of the sunbelt neighborhoods are being augmented by personal 3- and 4-wheeled vehicles that can be seen daily on our city sidewalks and public transit systems. As a public or private transit authority, the responsibility of safe, efficient service now is enlarged to affording ridership to people using a wide variety of mobility aids. In considering not only the many types of mobility aid devices, but the variety and sizes of lifts, and the numerous makes of buses and vans, it can be easily seen that there is no single, definitive solution to accessibility on mass transit vehicles. But, since the need is real and the solutions, although not all-encompassing, are a good beginning, the experience of two transit accessibility leaders can be tapped for guidance. Both Southern California Rapid Transit District (SCRTD) and Seattle Metro have taken the initiative to involve the ridership in needs assessment and have established policies, educated operators and informed the public to achieve greater accessibility in their bus transit systems.

NEEDS ASSESSMENT

In August 1987, SCRTD, using an analytical approach to assess needs and establish policies, held a technical fair to determine what types of wheelchairs could be safely accommodated on its buses. Over 30 representatives from transit and governmental agencies met with representatives from wheelchair manufacturers. SCRTD tested 14 wheelchair and mobility aid devices on 6 different lift/bus types. Four test criteria were evaluated:

Length

The length of the wheelchair was compared to the length of the lift. Wheelchair lengths varied from 28 to 47 1/2 inches.

Lift platform lengths varied from 43 to 55 1/2 inches. When a wheelchair was longer than the lift platform, the problem was noted. People using wheelchairs were observed entering and exiting the bus using the lift.

Maneuverability

The use of wheelchairs was tested for ability to maneuver from the lift to the securement area. Sixty-four percent (64%) of people using wheelchairs experienced problems maneuvering in aisles varying in width from 32 to 37 inches particularly when standees were present. For some persons, backing the wheelchair onto the lift seemed to afford better maneuverability and quicker securement.

Securement On The Lift

This was examined primarily from the ability of the lift to provide a secure "ride" during operation. Solid lift platforms presented few problems, but collapsible stairs did not remain level while ascending or descending, causing the wheelchair to move forward or backward.

Securement In The Travel Area

Securement devices preventing the wheelchair from moving were tested both with and without the wheelchair occupied.

Although the use of wheelchair brakes was encouraged, this alone was considered inadequate securement. The wheel securement clamp was appropriate for manual wheelchairs but not for certain powered wheelchairs or 3-wheeled devices. Two floor mounted securement straps and an over-the-shoulder seat belt used in combination were found to accom-

modate all wheelchairs tested. Detailed information, including the dimensions of the lifts and buses used in the tests, as well as the dimensions and weights of the three- and four-wheeled mobility aids tested can be found in the brochure "RTD Accessibility Policy" printed in July, 1989 and distributed by SCRTD. Availability of the SCRTD brochure and other supplemental information is described at the end of this brochure.

Seattle Metro, as early as 1978, was assessing needs and establishing policy using a subjective approach. It gathered information from the community by having regular meetings with the Elderly and Handicapped Task Committee (EHTAC). Further information was obtained from the community-at-large through meetings with a citizens' task committee. In these formative years, Metro also met regularly with a task group of bus drivers.

ESTABLISH POLICIES

Both SCRTD and Seattle Metro followed up their assessment of user needs by establishing policies in five significant areas:

1. Who can use the lift?

SCRTD allows only riders using wheelchairs that fit on the platform without wheelchair overhang to ride the lift. Seattle allows wheelchair riders, people using walkers, crutches or canes, people who can walk unassisted but cannot climb steps and attendants who accompany persons in wheelchairs to ride the lift.

2. When can a person with a disability use the bus?

SCRTD allows a wheelchair user to board a bus that has an accessible decal, even if the bus is not on a designated accessible route. The person can board at the driver's discretion, at any location where the lift can be operated

safely. Seattle Metro will allow mobility impaired persons on accessible buses to board or alight only at designated stops on designated routes.

3. Maneuverability through the bus.

The majority of SCRTD buses have lifts at the rear door and the securement area is directly opposite the lift. SCRTD, as a policy, encourages, but does not require, backing onto the lift to allow for easier entry into the securement area and wheel clamp.

Seattle Metro riders in wheelchairs are also encouraged to back onto the lift because all Seattle lifts are at the front door, thus requiring maneuvering past the fare box, past the facing seats, and backing into the securement area and wheel clamp. On buses with wheelwells under the facing seats, drivers may require other passengers to move from their seats while the rider in the wheelchair maneuvers to the securement area.

4. Securing the wheelchair.

Both SCRTD and Seattle Metro ask riders in wheelchairs to lock the brakes while on the moving lift. Both SCRTD and Seattle Metro drivers are taught to ask if a rider needs assistance in securing the wheelchair in the securement area. However, since the drivers are also taught that the safety of their passengers is ultimately the driver's responsibility, a few go beyond the norm of asking if the rider is secured, and actually attach the straps.

5. Future Procurements.

SCRTD's policy is to make every effort to procure buses with lifts that are safe and have level platforms of adequate size. The procurement policy does not specify the location of the lift at the front or rear door. Consequently, GMC (now TMC), which provides a lift at the

rear door only, has been the successful low bidder in supplying most of SCR TD's buses.

The securement devices for buses with rear door lifts, can be seen in Figures 1. and 2.

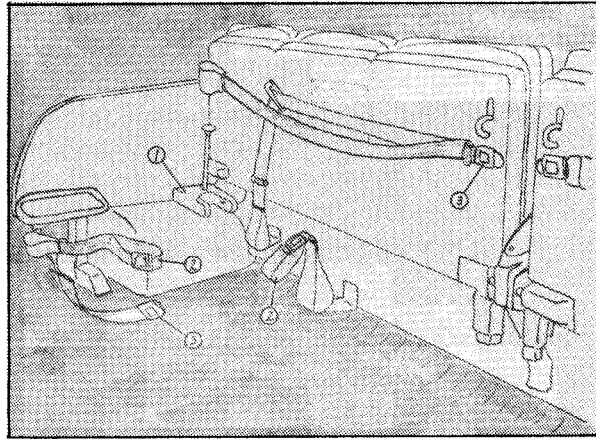


Figure 1. SCR TD securement area

1. Wheel clamp mounted to seat;
2. Loop-ended vehicle restraint belts (two), bracket mounted;
3. Automotive type 3-point passenger seat belt.

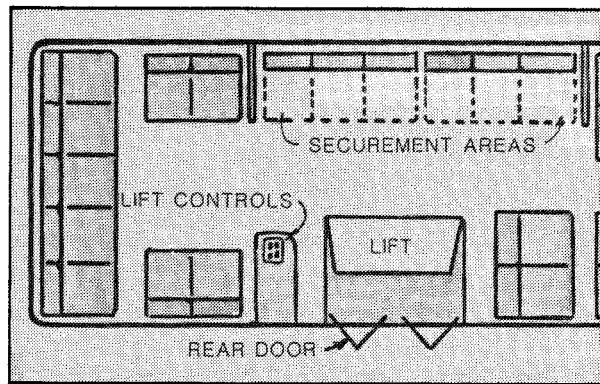


Figure 2. SCR TD interior layout

All belts are furnished with inertial retractors. Inertial retractors provide for smooth belt movement and a constant tension, thus allowing for ease of extension and complete retraction. One disadvantage of these devices is that they allow movement of the secured mobility aid during normal bus starts and stops. This movement can be disconcerting for the person riding in the wheelchair.

Seattle Metro's procurement policy, as reflected by its January 1987 purchase documents for articulated buses, includes a lift and securement layout, complete with illustration, requiring a front door lift. The securement area, located in the front of the bus, has provisions for two mobility aids or wheelchairs, accomplished by providing a folding double transverse seat and a single folding longitudinal seat located on each side of the aisle. The securement devices for buses with front door lifts can be seen in Figures 3. and 4.

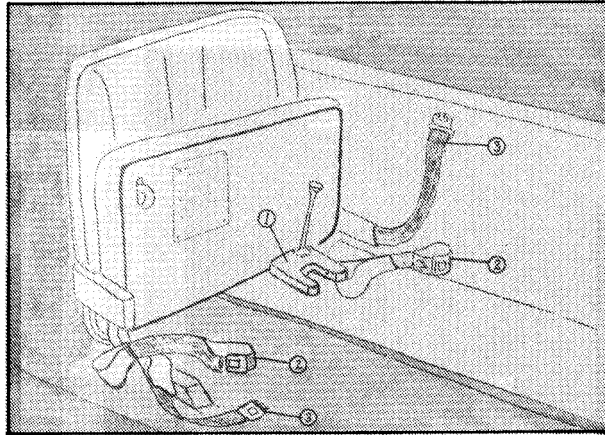


Figure 3. Seattle Metro securement area

1. Wheel clamp mounted to folding seat;
2. Loop-ended red vehicle restraint belts (two), bracket mounted;
3. Automotive type passenger lap belt.

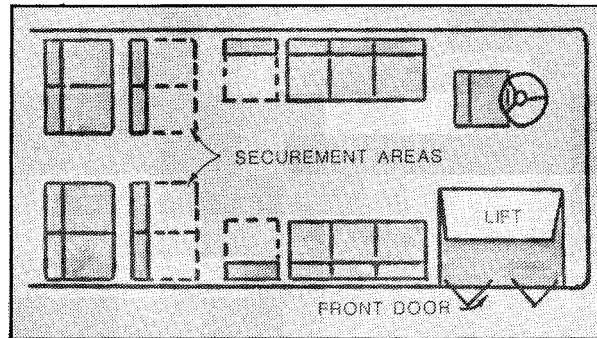


Figure 4. Seattle Metro interior layout

All belt retractors are ratchet-type to provide positive locking when belts are in secured position. The ratchet retractors allow no movement during normal bus starts and stops. This stability can be reassuring to the person riding in the wheelchair or mobility aid. One disadvantage of the ratchet retractor is that the belt must be extended and retracted smoothly and slowly or else the ratchet will lock prematurely.

In Seattle, wheelchair securement instructions are printed in black on a white background on 18-gauge aluminum and are mounted on the seat backs as shown in Figures 1. and 3.

Figures 5. and 6. illustrate the securement of two different types of mobility aids.

Figure 5. shows a three-wheeled vehicle secured in SCR TD's rear door securement area using the two loop-ended securement straps. The automotive 3-point belt is in position to secure the rider. The dotted lines show the 3-wheel mobility aid control mechanism tilted forward, when possible, as required by SCR TD, to avoid possible injury to the rider in the event of a sudden stop.

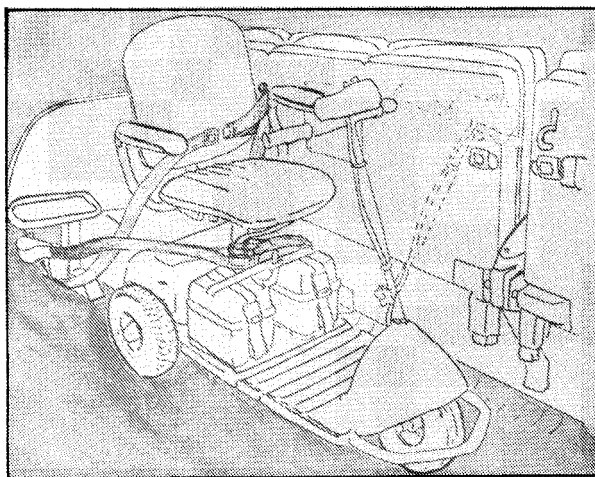


Figure 5. SCR TD, 3-wheeled scooter

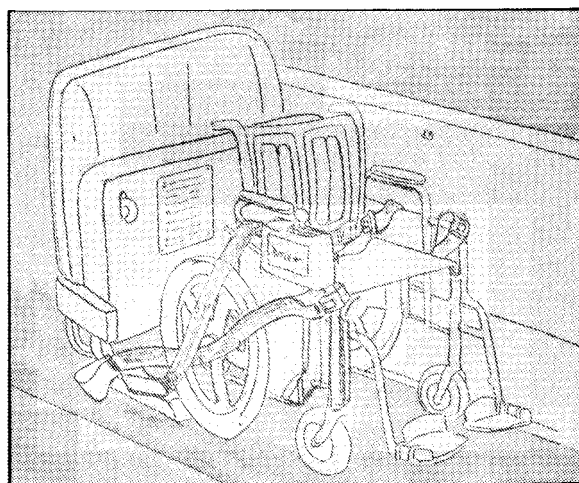


Figure 6. Seattle Metro, power wheelchair

Figure 6. shows a motorized wheelchair secured in Seattle Metro's front door securement area using the two loop-ended securement straps. If the "mag" wheel fits and locks in the wheel clamp, only the loop-ended strap on the right side of the wheelchair is required. The automotive lap belt is in position to secure the rider.

EDUCATED DRIVERS

Both SCRTD and Seattle Metro recognize that the success of transit service ultimately depends on knowledgeable and courteous bus drivers. Both cities provide regular training for drivers, have frequent refresher courses on procedures, and have an award system to encourage better and more courteous service to persons with disabilities. Seattle Metro has a 1 1/2 hour training session centered around a 15-minute video that demonstrates the approved use of the lift and securement equipment. The drivers learn not only how the equipment should be operated, but, equally important, are taught just how vital this service is in fulfilling the needs of people with disabilities. For many of these people, public transportation is essential in the conduct of business, social and cultural activities.

Both the video and the driver's manual underscore Seattle Metro's "people" approach to accessible service. The following issues are specifically addressed in the driver's training manual:

Types of Wheelchairs Allowed

Manual, standard chairs, large motorized chairs, custom and racing chairs, chairs with permanently reclined backs, 3-wheeled scooters.

Seat Belt Use

The use of the automotive type seat belt is an option for the passenger. It is not a restraint device to use in securing a wheelchair or other mobility aid.

Restraint Device Use

Wheelchairs and other mobility aids must be secured on both sides using either a loop-ended (red) restraint belt and wheel clamp or, if the

wheel clamp is not used, two loop-ended restraint belts.

PUBLIC RELATIONS

At both SCRTRD and Seattle Metro, bus drivers are taught that their knowledge and awareness are equally essential in providing effective service. Knowledge of boarding and securement procedures along with the confidence attained by frequent use of these procedures will be required. However, equally necessary is the awareness and practice of courteous and thoughtful service extended to every person who enters the bus.

The experiences of SCRTRD and Seattle Metro over the years has been that successful accessible service results from:

- 1. Positive experiences for both passengers and drivers alike, including, but not limited to, a reward system for drivers who provide courteous service,**
- 2. Overcoming fear of failure, rejection, or being injured, on the part of the rider with a disability,**
- 3. Understanding by passengers and drivers alike, that time will be needed to accept changes.**

One excellent piece of advice offered the driver is, "When you are in doubt as to whether a person needs help, ALWAYS ASK before giving help." (Quotation taken from the Seattle Metro drivers' manual.)

INFORMED PUBLIC

SCRTRD distributes a brochure, "RTD Accessible Service for Passengers Using Wheelchairs." The brochure contains a complete map of the transit routes, identifies accessible

routes, and informs passengers with disabilities about service and equipment. The “how to” portion centers around commonly asked questions:

- *Who can use bus lifts?***
- *Which buses are accessible?***
- *When can people with disabilities or wheelchair users ride?***
- *How do people with disabilities or wheelchair users board?***
- *Where and how to secure wheelchairs?***
- *How to exit the bus?***
- *What to do if problems are encountered?***
- *What to expect in the future?***

The brochure asks people to bring concerns and suggestions to the attention of the Public Relations Department and invites interested persons to attend orientation sessions on accessible service. SCRTD, in its brochure “RTD Accessible Policy” also follows the commonly asked questions approach:

- *What types of wheelchairs are allowed on RTD buses?***
- *What features should consumers or riders look for when purchasing a wheelchair for use on a bus?***
- *What measurements to look for when purchasing a wheelchair for use on a bus?***
- *What wheelchair measurements can be used on all RTD lift buses?***

****Is the rider's wheelchair stable enough for use on a lift?***

****Should boarding be made facing forwards or backwards onto the lift?***

****How to secure my wheelchair?***

****What to do to ensure a safe trip on the bus?***

CONCLUSION

The SCRTD and Seattle Metro have achieved success in developing accessible bus transportation through initiative and comprehensive planning, developing procedures, driver education and public awareness activities. This effort has gained national recognition from disabled consumers and professional organizations alike.

Recently, the Massachusetts Bay Transportation Authority (MBTA), Boston, announced that it has developed a securement system which appears to be similar to those used by Seattle and SCRTD. Also, the Lane Transit District is distributing a memo describing its securement system. These are examples of the efforts transit agencies across the country are making to try to accommodate a broad range of current and potential passengers with disabilities. The details and specifications for the MBTA and Lane systems could not be included in this brochure but contacts are listed below for more information.

This brochure has been prepared to assist local and regional transit authorities by providing information on the successful policies and equipment two transportation authorities have developed over a period of more than ten years. It is hoped that other transit authorities will build upon the experience of SCRTD and Seattle Metro in developing accessible bus systems in their own communities.

RESOURCES

The following is a list of contacts and resources that are currently available:

POINTS OF CONTACT

SCRTD

Terry Moren
Planning Department
Southern California Rapid Transit District
425 South Main Street
Los Angeles, California 90013
(213) 372-4864

Seattle Metro

Sue Stewart
Safety Officer
Municipality of Metropolitan Seattle
11911 East Marginal Way, South Bldg. A
Seattle, Washington, 98168
(206) 684-2828

MBTA

Herbert Pence
Manager of Project Administration
Massachusetts Bay Transportation Authority
Rail Equipment Department
80 Broadway
Everett, Massachusetts 02149
(617) 722-3471

Lane Transit

Micki Kaplan
Lane Transit District
P.O. Box 2710
Eugene, Oregon 97402
(503) 687-5581

Brochures

SCR TD

“RTD Accessible Service for Passengers Using Wheelchairs” (Effective January, 1989)

“RTD Accessible Policy” - printed July, 1989

Procurement Specifications

Seattle Metro

“Manufacture and Delivery of Articulated Dual Power Buses with Wheelchair Lifts” - Contract T/F 26-85, dated January 1987, pp C30, C42, C43, C77, C78

Driver Education

Seattle Metro

Wayne Huston: (206) 684-2825

Video “Easy Ridin” 15-minutes

“Riders and Disabilities”

Operators Manual for “Accessible Service”, dated July 1981

Transit Operating Instructions, “The Book”, September 2, 1989

Technical

Tony Chavira
Equipment Maintenance Department
SCR TD
900 Lyon Street
Los Angeles, California 90012
(213) 972-5800

Retrofitting

The purchase of wheel clamps and restraint belts to retrofit buses should be accomplished with the assistance of the bus manufacturers' purchasing and engineering departments. The figures in this brochure are illustrative and are not intended to substitute for sound engineering relating to the location and suitable strength of necessary support brackets.

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