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National Workshop on Bus-Wheelchair Accessibility

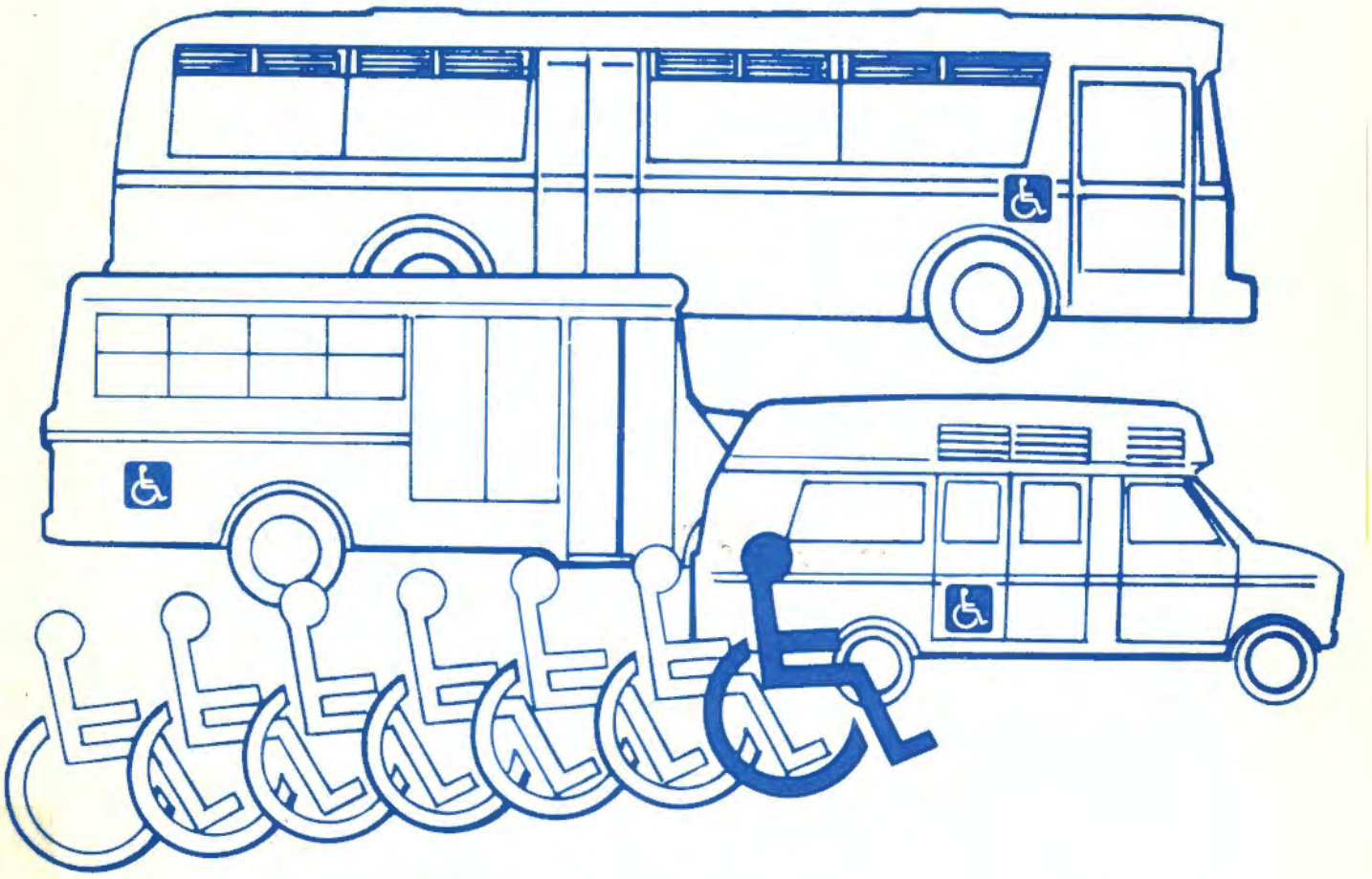
Guideline Specifications for Wheelchair Securement Devices

U.S. Department of Transportation

Urban Mass Transportation Administration

Office of Technical Assistance
Office of Bus and Paratransit Systems

May 7–9, 1986



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National Workshop on Bus-Wheelchair Accessibility

Guideline Specifications for Wheelchair Securement Devices

May 7-9, 1986
Seattle, Washington

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ACKNOWLEDGMENTS

These guideline specifications are the culmination of many hours of hard work by persons representing all facets of the accessible transit and paratransit industry. The Urban Mass Transportation Administration (UMTA) recognized that the technology associated with accessible transportation could be improved and sponsored an Advisory Panel in order to develop industry guideline specifications. Representing different viewpoints and different interests, the members of the Advisory Panel met, discussed issues, and developed these guideline specifications. It is a credit to the Advisory Panel and the dedication of its members that a formal vote never had to be taken and that the guideline specifications were developed on the basis of consensus.

Several people need to be acknowledged for the assistance they provided to the Advisory Panel in the development of these guidelines. George I. Izumi, the UMTA Project Manager, was responsible for planning and organizing the Advisory Panel, planning for the Workshop, and contributed greatly to the development of the guidelines. Vincent R. DeMarco, the UMTA Program Manager, was responsible for guiding the efforts of the Advisory Panel and for planning and conducting the Workshop. Two other persons from the U.S. Department of Transportation also provided assistance. Christina Chang of the Transportation Systems Center helped to organize and run the Workshop and prepare Workshop Proceedings. Scott York of the National Highway Traffic Safety Administration participated in the Advisory Panel meetings and assisted in clarifying certain safety issues. The Battelle project team of Gerald A. Francis (consultant), Martin Gombert (ATE Management and Service Company, Inc.), Rolland D. King, and David M. Norstrom was responsible for developing the draft guideline specifications and serving as a technical resource to the Advisory Panel. Special recognition is given to Mr. Norstrom who skillfully managed the guideline development process and led the discussions of the Advisory Panel meetings that obtained a general consensus of the Advisory Panel on each guideline subject. Finally, appreciation goes to each member of the Advisory Panel who gave of their time and contributed their expertise to the development of these industry guidelines.

PREFACE

On September 17, 1985, the Administrator, Ralph L. Stanley, of the Urban Mass Transportation Administration called together a meeting with representatives of transit agencies, handicapped organizations, rehabilitation specialists and manufacturers of buses and wheelchair lifts to hear first hand the problems and issues regarding transit bus wheelchair accessibility. As a result of this meeting, the Administrator requested that an UMTA Advisory Panel be formed to plan a National Bus Wheelchair Accessibility Workshop and to guide the development of a set of guideline specifications for the equipment required for transit bus and paratransit vehicle wheelchair accessibility. A contract was issued to Battelle to assist UMTA in this effort.

As a result of surveying the transit industry for input and meeting with the Advisory Panel, Battelle prepared a draft set of guideline specifications for wheelchair lifts, securement devices and ramps for presentation and discussion at the National Bus Wheelchair Accessibility Workshop held in Seattle, Washington, on May 7 through 9, 1986. Using the inputs developed during the Workshop and the written comments submitted following the Workshop, the Advisory Panel prepared these final guideline specifications.

These guideline specifications are advisory in nature. The intention of the guideline specifications is to provide transit agencies with a model that they could use, as appropriate, in the development of their specifications for wheelchair accessibility. In the guideline specifications, where the word "should" is used, the recommendation of the Advisory Panel is that the suggested item or value be included in a general specification. Where the word "may" is used, the Advisory Panel recommends that the item or choice of values be considered for inclusion based upon local operating conditions. The Advisory Panel has developed these guidelines for use throughout the United States. It recognizes that unique local conditions could make an item suggested for inclusion inappropriate and a local public transportation provider would be required to make the appropriate changes (e.g. to accommodate extreme environmental conditions).

This guideline specification is one of four specifications developed by the Advisory Panel, which developed separate guideline specifications for passive wheelchair lifts (those used primarily on transit buses), active wheelchair lifts (those used primarily on paratransit vehicles), ramps and securement devices. Members of the Advisory Panel participated actively in the development of each individual guideline specification based upon their experience and interest. Although the Advisory Panel discussed many related accessibility issues, these guideline specifications focus only on the technical requirements of a specific piece of equipment. They have been prepared to assist in the purchase of such equipment either separately or as part of an overall vehicle procurement.

ADVISORY PANEL

The following individuals participated in the Advisory Panel for the development of the draft guideline specifications of passive wheelchair lifts, active wheelchair lifts, ramps, and wheelchair securement devices.

Mr. Tom Bonnell, The Braun Corporation, Winamac, Indiana

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1.0 GENERAL

1.1 Scope

These guideline specifications relate to wheelchair securement devices that are used on public transportation vehicles. The securement devices are designed to accommodate wheelchairs that do not exceed 250 pounds in weight. Maximum safety all for passengers and reliable securement device operation are of primary concern in these guideline specifications.

1.2 Definitions

The following definitions apply for this document.

Accessible Vehicle - A vehicle that has been equipped to allow boarding by passengers who by reason of handicap are physically unable to board the vehicle that has not been so equipped.

Active Lift - An active lift is one that when stowed may interfere with the use of the vehicle entrance where the lift is located and that when being raised or lowered operates primarily outside the body of the vehicle.

Fail-safe - A characteristic of a system and its elements whereby any malfunction affecting safety will cause the system to revert to a known safe state.

Interlock - The arrangement in which the operation or position of one mechanism automatically allows or prevents the operation of another.

Lift or Wheelchair Lift - A level change device used to assist those with limited mobility in the use of transit and paratransit services. The term lift and wheelchair lift are used interchangeably in this document.

Maintenance Personnel Skill Levels - Maintenance personnel skills used in this document are defined in accordance with the White Book specifications as follows:

5M: Specialist Mechanic or Class A Mechanic Leader
4M: Journeyman or Class A Mechanic
3M: Service Mechanic or Class B Serviceman
2M: Mechanic Helper or Coach Serviceman
1M: Cleaner, Fueler, Oiler, Hostler, or Shifter.

May - This term is to be construed as permissive.

Paratransit Operation - Paratransit operation refers to a public transportation operation (service, vehicles, facilities, etc.) that is not a transit operation.

Should - The term is to be construed as recommended by the Advisory Panel.

Transit Operation - Transit operation refers to a public transportation operation (service, vehicles, facilities, etc.) that operates with fixed routes and schedules.

White Book - This term is the common name for "Baseline Advance Design Transit Coach Specifications," originally published by UMTA on April 4, 1977. It is now available from the American Public Transit Association.

Wheelchair - A seating arrangement that is positioned on wheels, may be powered or unpowered, and can be used to assist mobility limited individuals.

Wheelchair Securement Device - A device anchored to a vehicle and used to limit the movement of a wheelchair when the vehicle is in motion.

1.3 Abbreviations

The following abbreviations may be found in the guidelines.

ANSI --- American National Standards Institute

ASME --- American Society of Mechanical Engineers

CSA --- Canadian Standards Association

FMVSS --- Federal Motor Vehicle Safety Standard

GVWR --- Gross Vehicle Weight Rating

NHTSA --- National Highway Traffic Safety Administration

SAE --- Society of Automotive Engineers

UFAS --- Uniform Federal Accessibility Standards

UMTA --- Urban Mass Transportation Administration

VA --- Veterans Administration

1.4 Reference Documents

(1) American Public Transit Association. "Baseline Advanced Design Transit Coach Specifications," includes Addendums 1 through 20 that were made to the April 1977 issue of "Baseline Advanced Design Transit Coach Specifications," published by Urban Mass Transportation Administration. (Commonly known as The White Book.) American Public Transit Association. April 1983.

(2) California Administrative Code, Title 13, Chapter 2, Subchapter 4, Article 15. Wheelchair Lifts.

(3) Canadian Standards Association. "Motor Vehicles for the Transportation of Physically Disabled Persons," CAN3-D409-M84. Ontario, Canada: Rexdale. April 1984.

(4) Canyon Research Group, Inc. "A Requirements Analysis Document for Transit Vehicle Wheelchair Lift Devices." Prepared for Urban Mass Transportation Administration, Westlake Village, California. June 1978.

(5) Doag, Virginia S. and Smith, Robert M. (California Oepartment of Transportation). Wheelchair Securement on Bus and Paratransit Vehicles. Prepared for Urban Mass Transportation Administration, Sacramento, California. July 1981.

(6) "Federal Motor Vehicle Safety Standard," Code of Federal Regulations, Title 49, Part 571 No. 207, Seating Systems, and No. 210, Seat Belt Assembly Anchorages.

(7) Henderson, William H., Dabney, Raymond L., and Thomas, David D. Passenger Assistance Techniques: A Training Manual For Vehicle Operators of Systems Transporting the Elderly and Handicapped, Third Edition. Fort Worth, Texas: Transportation Management Associates. 1984.

(8) "Uniform Federal Accessibility Standards." Federal Register (49FR31528). August 7, 1984.

(9) "Veterans Administration Wheelchair Lift Systems: VA Standard Design and Test Criteria for Safety and Quality of Automatic Wheelchair Lift System for Passenger Motor Vehicles." Federal Register (43FR21390). May 17, 1978.

(10) "Wheelchair Securement Systems in Transit Vehicles: A Summary Report." Summary proceedings of the National Workshop on Wheelchair Securement in Transit Vehicles of December 7-10, 1980.

2.0 TECHNICAL REQUIREMENTS

2.1 General Requirements

2.1.1 Useful Life

When used and maintained in accordance with manufacturer recommended procedures, a wheelchair securement device should be designed to have a useful life equal to the useful life of the vehicle on which it is used.

Rationale: The securement system may be belts, clamps, lock-pin devices, or a combination thereof. Once installed the system becomes a part of

the vehicle. As with other components of the vehicle, with normal maintenance, including repair and replacement of parts, and proper use, the securement device should last as long as the vehicle. Normal maintenance should include replacement of belts and other parts subject to wear and damage (e.g., the severe stretching of belts in an accident), and should be replaced as recommended by manufacturers.

Useful life of a standard size transit bus is 12 years. Smaller vehicles have shorter useful lives. For example, a converted van used for public transportation typically has a useful life of 3 to 5 years.

2.1.2 Wheelchair to be Accommodated

The contractor should provide information on the dimensions and characteristics of wheelchairs that can be accommodated by the securement system.

Rationale: Existing securement systems have a trade-off between the time and convenience of securement and the wheelchairs that can be accommodated. The contractor should identify the wheelchair characteristics and dimensions that can be secured in order for the system operator to design appropriate operating policies. (For example, wheelchairs with small, solid tires may not be accommodated by a clamp system.)

2.1.3 Wheelchair Orientation

The selection of wheelchair orientation in a transit vehicle involves the consideration of safety, capacity, ride comfort, and vehicle interior factors. The order of preference for wheelchair orientation for passenger safety in transit vehicles is:

(1) Rearward facing with padded head and back support
(2) Forward facing
(3) Rearward facing without support
(4) Side facing of the wheelchair with padded support to prevent motion toward the front of the vehicle
(5) Side facing without support

The procuring agency should specify wheelchair orientation based on their consideration of the above factors.

Rationale: Tests simulating a frontal crash have indicated that the safest orientation is rearward facing coupled with padded head and back support. The next safest is forward facing. Less safe is rear facing without support and side facing with a barrier next to the wheelchair. Least safe is side facing with no barrier.

The Advisory Panel was able to reach consensus as to recommended wheelchair orientation for standard size transit vehicles (Gross Vehicle Weight Rating [GVWR] greater than 30,000 pounds). For those class of

vehicles the forward facing was preferred with a rearward facing as a second choice.

The Advisory Panel was not able to reach consensus as to recommended wheelchair orientation for smaller size transit vehicles. However, they were in agreement as to the rank with respect to safety.

In smaller vehicles, limiting wheelchair securement to a forward or rearward facing position poses problems in terms of reducing the capacity of the vehicle to accommodate wheelchairs. Discussions among the Advisory Panel showed a divergence of opinion between safety and capacity considerations. Accident data indicate that approximately 60 percent of occupant injury accidents are frontal. Forward facing or rearward facing with barriers are safer orientations than side facing in frontal accidents. With 40 percent of the occupant injury accidents being side, rear, or other impact locations and with side facing orientation providing more wheelchair loading capacity, operators face a trade-off between capacity and potential accident impacts. For operators of small vehicles, a local decision will need to be made concerning orientation and capacity. By analyzing its needs and its accident history, a local operator should choose an orientation that best meets the local conditions and needs.

2.1.4 Storage

When not being used for securement, the securement devices should be located or stored in a manner that does not interfere with passenger movement; does not present protrusions, obstacles, or other conditions that would be hazardous in normal operations or a crash environment; is reasonably protected from vandalism; and can be readily accessed when needed for use.

Rationale: A securement system should not introduce any hazardous conditions into a vehicle. By ensuring that the securement system is located or stored in a manner that will not interfere with passenger movement, hazardous conditions are minimized.

Transit systems report that vandalism is a problem that impairs the operation of a securement system. Although vandalism cannot be totally prevented, the securement system should be designed and located in a manner that will minimize vandalism. This guideline also applies when occupant restraint belts are specified.

2.2 Securement Process

2.2.1 Engaging and Releasing Wheelchair

The wheelchair securement device should secure a wheelchair when it is properly positioned. The securement device should be (1) activated by

a mechanism of the securement device when contacted by a wheelchair and released by either passenger or second party action, and/or (2) conveniently engaged and released by a person familiar with the operation of the securement device.

2.2.2 Time for Securement

The securement should be able to be engaged or released by a person familiar with the use of the securement device in no more than ---(*)--- minutes.

(*) To be completed by Procuring Agency.

Rationale: The securement system might be mechanical devices, belts, or a combination of the two. Existing securement devices can be activated in the positioning process (e.g., certain clamp devices), require assistance in engaging and releasing (e.g., lock-pin devices), or are combination systems requiring both (e.g. a combination clamp and belt system).

In Section 2.2.1 the first activation process may require involvement by more than a wheelchair passenger in the process while the second process will require second party involvement.

In discussing the securement process, the Advisory Panel debated the role of the driver. For paratransit services the driver should be involved in the securement process and verify securement. For fixed route operations, opinions varied. Some members considered that the driver should be involved in the securement process and verify securement. Others considered the driver role to be passive. Proper securement would be left to the passenger. The role of the driver is a local operating policy decision; and the specification allows an optional driver role. As noted above, a device that can be "conveniently engaged and released by a person familiar with the operation of the securement device" may require driver or a third party familiar with the securement device operation.

The time of securement is a specification that is to be completed by the local operator based on the characteristics of the service being provided. For fixed route service, the Advisory Panel considered the securement engaging or release process should take a minimum amount of time. Less than 1 minute and less than 2 minutes were both discussed. In no case should the time exceed 5 minutes. For paratransit service no consensus could be reached on a desirable time. The time of securement is dependent on the type of device used, operating conditions, and the type of wheelchair being secured. When using this specification the operator may wish to designate the wheelchair types to be secured within the specified time or establish an upper time limit.

2.3 Wheelchair Restraint Requirements

2.3.1 Force To Be Restrained

2.3.1.1 The wheelchair securement system used on vehicles with GVWRs of 30,000 pounds or above should be designed to withstand a force in a forward longitudinal direction of up to 2,000 pounds per tiedown leg or clamping mechanism and a minimum of 4,000 pounds total for each wheelchair.

2.3.1.2 The wheelchair securement system used on vehicles with GVWRs of up to 30,000 pounds should restrain up to 2,500 pounds per tiedown leg or clamping mechanism and a minimum of 5,000 pounds total for each wheelchair.

Rationale: Crash tests have shown the following:

(a) Small school buses crashed at 30 mph experienced peak decelerations of 21-25g's
(b) Large school buses crashed at 21 mph experienced peak decelerations of 12-15g's
(c) Transit buses crashed at 21 mph experienced peak decelerations of 8-10g's.

The force values given in this guideline section were selected by the Advisory Panel on the basis of the test data and recognition that paratransit vehicles are small relative to standard transit buses and can be expected to operate at a higher average speed.

The requirement of lower wheelchair restraining forces for vehicles with GVWRs of 30,000 pounds or more is based on recognition that virtually all advanced design transit bases over 30 feet in length have GVWRs over 30,000 pounds. The higher wheelchair restraining forces were considered appropriate to all vehicles with lower GVWRs.

2.3.2 Attachment to Vehicle

2.3.2.1 On vehicles with a rated GVWRs of 30,000 pounds or more,the attachments to the vehicle should restrain a force in the forward longitudinal direction of up to 2,000 pounds per attachment point and a minimum of 4,000 pounds total for wheelchair securement system.

2.3.2.2 On vehicles with GVWRs of less than 30,000 pounds, the attachments to the vehicle should restrain a force in the forward longitudinal direction up to 2,500 pounds per attachment point and a minimum of 5,000 pounds total for the wheelchair securement system.

Rationale: The force to be restrained by the attachment to the vehicle is designated the same as the force to be restrained by the wheelchair securement system (Section 2.3.1) in order to ensure overall integrity in the system.

2.3.3 Nominal Movement in Normal Operations

Each securement location within a vehicle should be designed to limit movement of an occupied wheelchair when the vehicle is in normal operation and should meet the requirements of Section 4.1.2.

Rationale: Limiting wheelchair movement during normal operation provides a more comfortable ride for the wheelchair passenger and reduces the risk of a moving wheelchair injuring another passenger. Note that nominal movement will most likely require self-locking securement for belts and prohibit the use of inertial securement on belts.

3.0 OCCUPANT BELT REQUIREMENTS (Optional)

3.1 Occupant Belts

Separate from the wheelchair securement system, an occupant securement system consisting of (1) a lap belt or (2) a lap and shoulder belt should be provided. The lap belt should be a minimum of 86 inches in length. For lap and shoulder belt combination, the shoulder belt should be a minimum 86 inches in length and the second belt should be a minimum 43 inches in length. The occupant belt system should comply with Section 2.1.4.

Rationale: The question of occupant securement generated divergent opinions among the Advisory Panel. Occupant securement is not required on public transportation vehicles. Some thought that no special consideration should be made for those in wheelchairs. Yet, the Southern California Rapid Transit District has documented that wheelchair patrons have an accident rate over 350 times greater than ambulatory passengers.

As described earlier in the rationale of Section 2.3.1, the forces present in a crash vary by type of vehicle. Operators of small vehicles generally favored occupant securement. Belt systems are often used in paratransit operations; and occupant securement belts would not add significantly to the time of boarding. Given the divergence, the Advisory Panel considered occupant securement a local issue and made this section optional.

Differences of opinion also existed in terms of only a lap belt or a lap and shoulder belt combination. Again, the differences partially related to vehicle size. On larger transit buses, finding attachment points for shoulder belts is difficult. On smaller vehicles, especially vans, the problem of attachment is not considered as difficult.

Although self-locking securement for belts for wheelchairs may result from the nominal movement requirements, inertial locking systems should be acceptable for passenger use. Such belts could allow passenger movement in a wheelchair. The 86-inch length is currently in use in the industry. Longer lengths have caused both procurement and certification problems.

3.2 Force to be Restrained

The occupant securement system and anchorages should comply with FMVSS 209 and FMVSS 210, respectively.

Rationale: Both the belt assembly and anchorage should be designed and tested to FMVSS. These standards for seat belts are accepted in the automotive industry. Since FMVSS is to be met, no additional test procedures are described in Section 4.0.

4.0 TESTING, CERTIFICATION, AND WARRANTIES

4.1 Design Tests

The tests defined in Section 4.1 should be performed on a representative production unit of the securement device model procured under this specification. The securement device should meet the requirements given in Section 2.0 when attached to a fixture that simulates a bus installation. Only one representative production unit is required to be tested for certification.

4.1.1 Wheelchair Securement Device and Attachment Restraint Test

Once engaged the securement device and attachment to the vehicle should not fail when the device is subjected to the loads described in Sections 2.3.1 and 2.3.2 for 10 seconds under the following conditions:

(1) For clamps and similar systems:
The force is applied at the height at which the securement device is mounted or attached to a wheelchair.
(2) For belt systems:
The force is applied horizontally at the end of the belt when belts are in conformance with the manufacturer's recommended installation and securement procedures.

Permanent deformation or rupture of the restraint or anchorage is not considered a failure if the required force is sustained for 10 seconds.

Rationale: This test is designed based on the requirements of Sections 2.3.1 and 2.3.2, and concurrently tests both restraint and the attachment to the vehicle. It recognizes the difference between the

clamp and belt systems. The clamp systems will be tested at their height of mounting or when the clamp is adjustable at the height of attachment to a wheelchair (usually 10 inches to 18 inches above the floor). The belt systems will be tested when belts are in conformance with the manufacturer's recommended installation and securement procedures. The definition of failure used in this guideline is similar to that used in FMVSS 210.

Note that the language in Section 4.1 does not mean that a manufacturer must perform these tests for each procurement. Once a securement device model and vehicle model combination have been tested, the design test applies to all procurements of this combination of models.

4.1.2 Nominal Movement Test

The contractor should test the ability of the securement device to maintain nominal movement. One or more of the following wheelchairs should be used in this test:

- a standard manual wheelchair (e.g., an Everest and Jennings Traveller model or equivalent)
- a standard powered wheelchair (e.g., an Invacare Power Rolls Arrow Model 4M929E or equivalent)
- a modular powered wheelchair (e.g., a Fortress Scientific 655 or equivalent).

When the wheelchair is loaded with a restrained weight of 110 and 250 pounds, it should not move more than 4 inches in any direction at any point of contact with the floor when the vehicle is being operated under the following conditions:

(a) Full throttle acceleration on dry pavement from a standstill to 25 mph with the vehicle at its curb weight plus one occupied wheelchair.
(b) Maximum braking from 22 mph to a standstill on dry pavement with the vehicle at its curb weight plus one occupied wheelchair.
(c) Driving both clockwise and counterclockwise with the outer front wheel around one of the following:

  (i) 50 ft diameter circle at a minimum steady speed of 12 mph
  (ii) 75 ft diameter circle at a minimum steady speed of 14 mph
  (iii) 100 ft diameter circle at a minimum steady speed of 16 mph.

Use of the securement device during normal bus operation should not cause damage to the wheelchair being transported.

Rationale: This section is adapted from the Canadian Standards Association. The 4-inch movement was recommended by the Advisory Panel, which considered the CSA 3/8-inch standard too restrictive, especially with regard to clamp systems. The vehicle circular operating tests all generate 0.35 to 0.39 gs of lateral force. The circle to be operated will depend on the size and manueverability of the vehicle.

4.1.3 Visual Inspection

At the conclusion of the tests described in Section 4.1.2, the securement device and components for attachment to the vehicle should show no condition of fracture, wear that would exceed manufacturer's tolerances, perceptible impairment, or other deterioration.

Rationale: The tests in Section 4.1.2 involve loads well below those applied in Section 4.1.1 and these tests should not reduce the capacity of the system to restrain loads.

4.1.4 Certification

The contractor should provide written certification of compliance of the tests in Section 4.1.

Rationale: Section 4.1.4 is standard practice in design testing.

4.2 Acceptance Tests (Optional)

The contractor should submit for approval to the Procuring Agency a test plan to demonstrate that the securement devices purchased by this procurement meet the requirements in Section 2.0. The Procuring Agency may witness any or all of these acceptance tests. A mutually agreed upon notification time prior to the conduct of a test should be made between the two parties. The test results should be recorded, witnessed (i.e., signed), and submitted to the Procuring Agency as proof of meeting the acceptance criteria of the approved test plan.

Rationale: Acceptance tests are standard industry practice in vehicle procurement. It is anticipated that acceptance testing will primarily concern the requirements of Sections 2.2 and 2.3.2. For small procurements the Procuring Agency could choose to accept test data from other procurements of the same vehicle and securement device. For this reason the acceptance test requirement is optional based on the size of the procurement.

4.3 Warranty

A statement of warranty should be provided with each securement device assuring the quality of materials and workmanship of the product for at least one (1) year from the date of delivery to the final consumer.

Rationale: When securing accessible equipment, the above is standard practice in the industry.

THE MAINTENANCE, TRAINING, AND SERVICE GUIDELINES THAT FOLLOW ARE ADAPTED FROM WHITE BOOK SPECIFICATIONS. IF WHEELCHAIR SECUREMENT DEVICES ARE PROCURED AS A PART OF A VEHICLE SPECIFICATION, THESE SECTIONS MAY NOT BE REQUIRED.

5.0 MAINTENANCE, TRAINING, AND SERVICE

5.1 Documents

The contractor should provide ---(*)--- current maintenance manual(s), ---(*)--- current parts manual(s), and ---(*)--- operator's manual(s) or ---(*)--- combination manuals thereof as part of this contract. The contractor should keep maintenance manuals available for a period of 3 years after the date of acceptance of the securement device procured under this contract.

(*) Procuring Agency to fill in pertinent information.

5.2 Maintenance and Inspection

Scheduled maintenance or inspection tasks as specified by the contractor should require a skill level of 3M or less. Scheduled maintenance tasks should be related and should be grouped in maximum bus mileage or time intervals.

5.3 Replacement Parts

The contractor should guarantee the availability of replacement parts for securement devices procured under this contract for at least the useful life of the securement device. Spare parts should be interchangeable with the original equipment and should be manufactured in accordance with the quality assurance provisions of this contract.

5.4 Training (Optional)

The contractor should have at least one qualified instructor who should be available at the Procuring Agency's property for ---(*)---calendar days between the hours of ---(*)--- and ---(*)--- after acceptance of the first securement device. Instructor(s) should conduct classes and advise the

personnel of the Procuring Agency on the proper operation and maintenance of the securement device. The contractor should also provide visual and other teaching aids for use by the Procuring Agency's own training staff.

(*) Procuring Agency to fill in pertinent information.

Rationale: For small procurements this type of training would be expensive and excessive. This section is, therefore, optional. For small procurements the contractor should be requested to provide brief instructions on securement device use at the time of vehicle delivery, and to be available for consultation on an as-needed basis.

COMMENTS SHEET

These guideline specifications are an industry document developed by professionals familiar with accessible transportation. The document is considered to be an important step in the evolution of accessible transportation. However, it is not the final step. It is anticipated that operational experiences and technology advancements will indicate areas where these guidelines can be improved. Your comments and suggested changes are solicited. Please use this comments sheet to forward your comments to:

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Comments: (When referring to specific sections of the guideline specifications, please identify the section number and title.)