

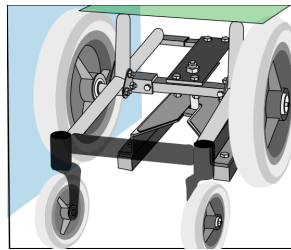
Safety Tips for Wheelchair Accessible Personally Licensed Vehicle Providers

Attention: Vehicle conversion companies and modifiers

Transportation safety tips for modifying a personally licensed vehicle for use by a Wheelchair-Seated Passenger using a Docking-Type Securement System.

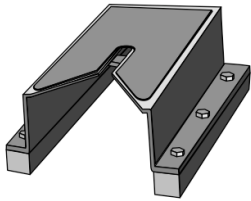
Always follow the National Mobility Equipment Dealers Association (NMEDA) guidelines to ensure that adaptive vehicle equipment is installed and vehicle modifications are completed according to the highest level of industry standards and best practices. Below are key points included in the NMEDA guidelines and as well as additional tips to improve transportation safety for people who travel in a vehicle while seated in a wheelchair. For more information, refer to the Ride Safe Brochure found here: wc-transportation-safety.umtri.umich.edu.

- 1) Install a docking securement system (i.e. EZ-Lock, Dock’N’Lock, Q’Straint QLK, or Permolock) that meets all applicable requirements of RESNA WC18 or ISO 10542-1. These systems will be labeled either with the target symbol below or with the words ‘Conforms with ISO 10542-1:2012’.



- Always use a system that has been designed and tested for use with the client’s specific wheelchair model. It is important to check with the securement device or wheelchair manufacturer to make sure that the client’s wheelchair has been successfully crash tested for use with the docking system.
- Follow the securement system manufacturer’s instructions during installation, using all fasteners, backing plates, etc. as indicated and/or supplied by the manufacturer.
- Docking securement systems shall not be attached to any movable or detachable vehicle components. Also, the add-on wheelchair docking adaptor hardware shall not be attached to any movable or detachable wheelchair components.
- Position the docking device on the vehicle floor so that the client’s shoulders are forward of the upper shoulder belt anchor point on the vehicle sidewall.
- Ensure that there is an audible or visible signal to the wheelchair occupant that assures that the wheelchair is fully engaged in the device and secured.
- A front stabilizing bracket should be installed to prevent wheelchair rotation to the left and right during travel, and to reduce forward and backward pitching of the wheelchair in frontal crashes.

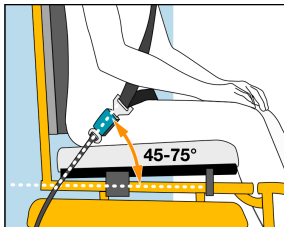
- It is best to locate the securement bolt toward the rear of the wheelchair frame, rather than near the center. This will also help to reduce downward pitching of the wheelchair and seating system, which can lead to an increased risk of abdomen injury from the lap belt riding up onto the abdomen in frontal crashes (also known as lap-belt submarining).



- When possible, mount the docking device so that it is spaced up off of the vehicle floor and mount the docking device drop bolt on the underside of the wheelchair as high as possible to prevent the bolt from catching on thresholds and other raised ground surfaces during everyday wheelchair use.

- After installing the securement system, the wheelchair should be properly positioned and tested for motion. The wheelchair should not be able to move more than ½ inch in any direction while the vehicle is maneuvering under normal conditions.

2) It is best to use the original vehicle lap and shoulder seatbelts as the primary restraint for the occupant. Removal of the vehicle seat from the wheelchair station will usually require that an aftermarket component with a compatible seatbelt buckle receptacle be used to complete the lap/shoulder belt system.



- The aftermarket component with the buckle receptacle attached should be anchored to the vehicle floor near the inboard side of the wheelchair so that a forward lap belt angle of 45 to 75 degrees to the horizontal is achieved when the lap belt is positioned properly on the client's lower pelvis and upper thighs.

- It is best for the buckle receptacle to be located above the vehicle floor by a stiff cable stalk or other structure so that the client or their caregiver can reach it easily for seatbelt buckling or so that the lap portion of a pre-buckled seatbelt can be easily positioned over the client's thighs when they move forward into the wheelchair station.
- The seatbelt buckle receptacle should be placed against the client's body near their hip and should not be in contact with or close to rigid wheelchair components that could contact the buckle release button or cause failure of the buckle cover during impact loading in a crash.

3) If an aftermarket lap and/or shoulder belt must be added to the vehicle to restrain the passenger (i.e., the original vehicle equipment will not work), use equipment that has been crash tested to RESNA WC18 or ISO 10542-1, and that has a permanent label indicating compliance with either of both of these voluntary industry standards.

- The lap belt ends should be anchored to the vehicle floor near the sides of the wheelchair so that a forward lap belt angle of 45 to 75 degrees to the horizontal is achieved when the lap belt is positioned properly on the client's lower pelvis and upper thighs.
- The seatbelt buckle receptacle should be placed against the client's body near their hip and should not be in contact with or close to rigid wheelchair components that could contact the buckle release button or cause failure of the buckle cover during impact loading in a crash.

4) Do not sew, pin, tie or otherwise modify the webbing of the original vehicle or aftermarket seatbelt systems.

5) If the client has armrests that are closed at the front:

- Recommend that the client retrofit their wheelchair with armrests that are open at the front (e.g. cantilevered from the back support) when possible. This will allow a lap belt to slide under the armrest and into contact with lower pelvis and upper thighs so that it fits snugly around the hips.



- If a retrofit is not possible, recommend that they pivot the armrests backward or sideways out of the way or have their caregiver thread the lap belt through the gap between the armrest and the wheelchair back support so that the lap belt will contact them low on the pelvis near the thighs.
- Avoid placing the seatbelt over top of the armrests because this positions the lap belt up too high and on the client's belly. Also avoid placing the seatbelt around the front of the armrest structure creating a gap between the client's pelvis and the seatbelt. Risk of injury in a crash is much higher with the poor seatbelt fit created by these seatbelt paths.

6) The shoulder-belt portion of the three-point belt should cross over the middle of the left shoulder and diagonally across the center of the chest. The D-ring guide of the vehicle seatbelt or the upper anchor point of the aftermarket shoulder belt will ideally be positioned above and behind the top of the client's shoulder so that the belt webbing makes good contact with the shoulder and chest while traveling.



7) Inform the client that postural supports of any kind (belts, padded bars, lateral trunk supports, etc.) are helpful for maintaining a more upright seated posture. This can improve the positioning and effectiveness of belt restraints and can help the client maintain their balance when entering and exiting vehicles or during vehicle maneuvering. But, clients seated in wheelchairs must always use a crashworthy lap and shoulder belt restraint as the primary occupant-protection system during travel.



8) Encourage the client to use their wheelchair headrest. If they have one or if a vehicle-mounted headrest is to be installed, recommend that it be positioned so that it extends higher than the user's ears and is less than 2 inches from the back of the head to help reduce the risk of neck injuries during rear-end crashes.

9) Passenger airbags should remain activated.

10) When possible, cover or fill vehicle seat floor pockets in the wheelchair station to make maneuvering easier for the client.