

Safety Tips

for Vehicle Modifiers to Tell and Show Their Clients, Family Members, and/or Caregivers before releasing personal vehicles that have been modified for use by passengers seated in wheelchairs secured by 4-point strap-type tiedown systems

SECURING THE WHEELCHAIR

- 1) If the client doesn't have a wheelchair that complies with the industry wheelchair transportation safety (WTS) safety standard, known as a WC19-wheelchair, tell them about these crashworthy wheelchairs that are designed for use as seats in motor vehicles with four easily accessible places for attaching hooks of tiedown straps, and encourage the client to purchase a WC19-wheelchair the next time they are in the market for a new wheelchair.

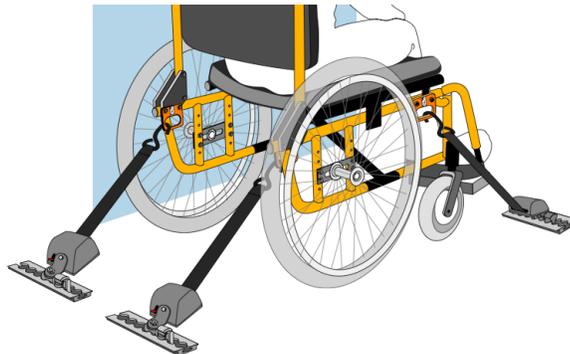


Illustration of a WC19 wheelchair secured by a four-point, strap-type tiedown

- 2) If the client does not have a WC19 wheelchair, help the client **identify and permanently mark** four easily accessible places (two in front and two in back) on the wheelchair frame for attaching hooks of tiedown straps.
- 3) For some non wheelchairs that do not comply with WC19 and that have frames with large cross sections, show the client how “securement loops” available from most wheelchair-tiedown manufacturers can be permanently attached to the wheelchair frame to provide easily accessible locations for attaching hooks of tiedown straps.

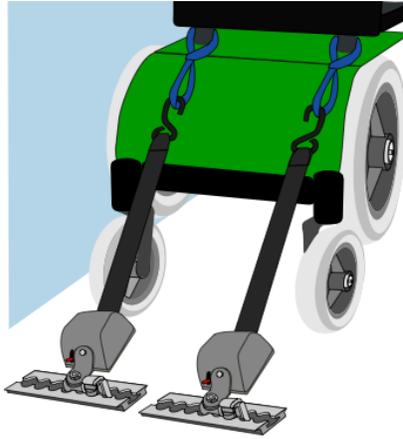


Illustration of securement loops attached to the back of a wheelchair frame to provide easily accessible places for attaching tiedown hooks

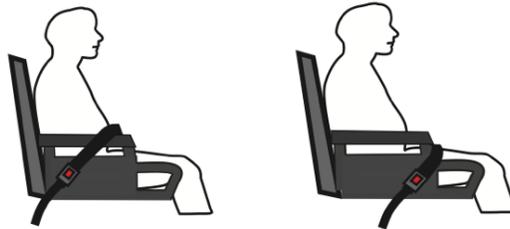
- 4) Demonstrate how the client's wheelchair can be effectively secured facing forward in the vehicle using all four tiedown straps, and
 - emphasize the importance of using all four tiedown straps to secure the wheelchair,
 - **warn the client never to attach tiedown straps and hooks to movable or detachable wheelchair components, such as arm supports and foot supports or wheels,**
 - demonstrate how to remove slack from tiedown straps and to make sure that all tensioning mechanisms, including retractor anchorages, are effectively locked, and
 - demonstrate how it should not be possible to cause any noticeable movement of a properly secured occupied wheelchair when manually pushing or pulling on the wheelchair in any direction.

PROPER USE OF SEAT BELTS

- 5) Inform the client that they should also use a crash-tested, three-point seat belt (a lap belt plus diagonal shoulder belt) with the lower end of the shoulder belt connected to the lap belt near the hip of the passenger seated in a wheelchair.
- 6) Encourage the client to use postural belts and supports attached to the wheelchair when traveling to help maintain a more upright seated posture.
- 7) **Warn the client not to rely on postural belts that are attached to their wheelchair for crash protection when traveling in their vehicle.**
- 8) Show the client how to position the seat belt, and particularly a vehicle-anchored lap belt, with their specific wheelchair so that the lap belt makes good contact with the

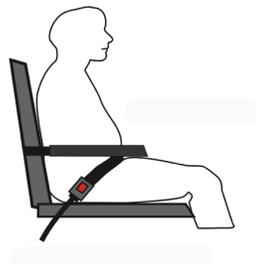
lower part of the pelvis and so that arm supports and other components don't interfere with good belt positioning.

- 9) **Warn the client that placing lap belts over or in front of arm supports will reduce the effectiveness of the seat belts in preventing serious injuries in a crash and can increase the risk of serious injury from occupant restraint forces from the lap belt.**



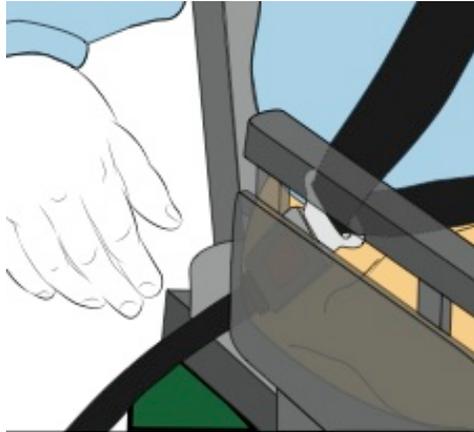
Improper positioning of a vehicle-anchored lap belt over (left) and in front of (right) wheelchair arm supports

- If the client has a **WC19 wheelchair** with a wheelchair-anchored crash-tested lap belt and you have installed a seat belt with a disconnecting shoulder belt, show the client how the lower end of the vehicle-anchored shoulder belt can be attached to the pin-bushing anchorage on the lap belt near the hip of the passenger on the side opposite to where the shoulder belt crosses over the passenger's shoulder.
- If the client has a wheelchair with arm supports that are attached to the wheelchair at or near the back-support posts such that they are open at the front and underneath (cantilevered arm supports), show the client how the lap belt can be placed and buckled under the arm supports so that it is in good contact with the lower pelvis.



Proper positioning of a vehicle-anchored lap belt low on the pelvis with wheelchair arm supports that attached to the wheelchair back-support posts

- If the client has a wheelchair with arm supports that are not open at the front but there are sufficiently large gaps between the arm supports and the wheelchair back support, show the client how the lap belt can be inserted into these gaps to achieve proper lap-belt positioning in good contact with the lower part of the pelvis.



Lap belt placed in gap between arm support and back to achieve proper positioning of the belt low on the pelvis

- If the client's wheelchair has arm supports that are attached to the wheelchair frame at the front so that it is not possible to slide the lap belt under the front of the arm supports, but the arm supports can be rotated up or sideways at the front, show the client how this feature can be used to help achieve proper positioning of the lap belt in good contact with the lower part of the pelvis.
- If the client's wheelchair requires "threading" of the anchorage ends of the lap belt through the opening between the seat and back support on each side of the passenger to achieve good lap belt positioning low on the pelvis, demonstrate how this is done by inserting the ends of the lap belt through the seat openings on each side of the passenger from the front.

NOTE: Seat belts provided by tiedown manufacturers often provide stiffened lap-belt webbing with small anchorage hardware that make it easier to thread the anchorage ends of the lap belt through openings between the wheelchair back and seat on both sides of the passenger. The anchorages are then manually connected to anchorage fittings on the vehicle floor behind the wheelchair.



Lap belt threaded into opening between the seat and back support to achieve proper positioning low on the pelvis

- 10) Show the client where to position the seat-belt buckle and the junction of the shoulder and lap belt such that:
 - the buckle is located against the passenger's body and not in contact with, or close to, rigid wheelchair components that could depress the buckle release button or contact and break the buckle assembly during a crash, and
 - the junction of the shoulder belt and lap belt is positioned near the passenger's hip on the side opposite to where the upper end of the shoulder-belt is attached to the vehicle or inserted through a D-shaped ring.

OTHER IMPORTANT POINTS

- 11) **Warn the client that they should never sew, pin, tie or otherwise modify the webbing of seatbelt systems.**
- 12) Provide the client with your contact information and tell the client that they should contact your company if they are having any problems with using the tiedown system, with proper positioning of the seat belt, or if the seat belt is not comfortable.
- 13) Give the client copies of the ***Ride Safe Brochure*** and the list of ***Safety Tips for Clients*** who ride as passengers in vehicles when seated in a wheelchair secured by a four-point, strap-type tiedowns. The Ride Safe brochure and further educational resources can be found here: wc-transportation-safety.umtri.umich.edu