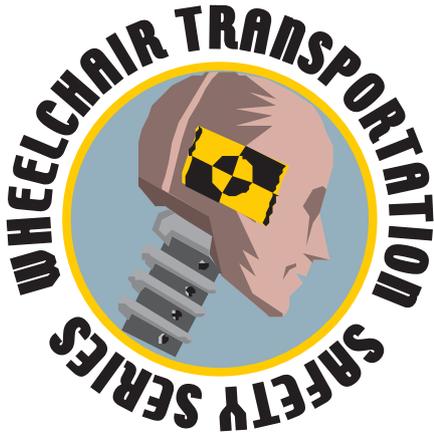


A UMTRI Research Technician  
readies a wheelchair for a  
securement point accessibility test.



# Getting The Right Wheelchair for Travel: A WC19-Compliant Wheelchair

This is EP's second installment in a six part series on Wheelchair Transportation Safety (WTS), produced in partnership with the University of Michigan Transportation Research Institute. Look for more informative articles on WTS appearing throughout 2007.

By Miriam A. Manary, Douglas A. Hobson, and Lawrence W. Schneider

## What is WC19 and why does it matter?

In the United States, motor vehicle crashes are the leading cause of death for children ages 3-18. Conventional occupant seatbelt systems, including child safety seats for younger children and vehicle seatbelts for older children, do much to reduce the risk of serious injury in the event of a collision event. However, children who must remain seated in their wheelchairs while traveling are often at a disadvantage in terms of crash safety.

The new voluntary wheelchair industry standard WC19 (short for Section 19 of the ANSI/RESNA\* wheelchair standards) works to close the safety gap by providing design

and performance criteria and test methods to assess whether a wheelchair can perform as a seat during a vehicle crash and work well with safety belt systems. The standard was developed by rehabilitation experts and safety engineers and is based on the same principles used to evaluate occupant protection and crashworthiness of vehicle seats and child safety seats. If you know someone who cannot transfer into a vehicle, a WC19-compliant wheelchair can help keep them safer on the road.

## What are the advantages to a WC19 wheelchair?

The numbers of WC19-compliant wheelchairs are growing and include many

product categories. There are WC19 wheelchairs for children and adults in both manual and power models. All offer some common benefits and features, which are listed below.

### 1. Reduced risk of injury for wheelchair riders involved in vehicle crashes

A WC19-compliant wheelchair is strong enough to provide effective support for the wheelchair rider in a wide range of crashes and emergency vehicle maneuvers. When the wheelchair can withstand crash loads, properly positioned seatbelts stay in place and apply any needed restraining force to the strongest areas of the body—the pelvis,

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\*American National Standards Institute/Rehabilitation Engineering and Assistive Technology Society of North America



The crash test just performed on this wheelchair with crash test dummy represents a seatbelt fit test where good fit was achieved.

### 3. Improved compatibility with proper use of seatbelts

As of May 2002, WC19-compliant wheelchairs must also provide the option of a wheelchair-mounted, crashworthy lap belt. Although many wheelchairs come with a belt meant for postural support, these are not designed to withstand impact loads or protect the rider during a crash. The WC19 lap belt has standardized connection hardware to allow it to be used with a vehicle-mounted shoulder belt and create a complete occupant protection system. Having the lap belt anchored to the wheelchair provides an opportunity for better fit of the belt low on the pelvis, reduces the problem of lap belts that have been soiled or damaged from contact with the vehicle floor, shortens the time it takes for attendants to apply seatbelts, and reduces the amount of interference with the rider's personal space.

For those who prefer to use a seatbelt that is entirely anchored to the vehicle, a WC19 wheelchair is test and rated to determine its compatibility with vehicle-anchored safety belts. Many non-compliant wheelchair designs do not easily allow for good lap/shoulder belt fit. For example, armrests and lateral supports can route vehicle-anchored lap belts away from the pelvis and on to the soft abdomen, potentially causing injury from seatbelt loading in a crash. By checking to make sure a wheelchair received an A or B rating, people in wheelchairs and their family members can help consumers and clinicians select products that allow for easier use and proper placement of vehicle-anchored seatbelts.

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shoulders, and chest. To comply with WC19, a wheelchair must perform well in a frontal crash test similar to the federal tests used to make sure vehicle seats, seatbelts, and child safety seats are crashworthy. The crash test simulates a frontal impact that is more severe than approximately 97 percent of frontal crashes. The frontal crash condition is the highest priority because it is the most common and deadly type of crash seen in the real world. In laboratory crash tests, a WC19 wheelchair must not fail, must provide a supportive seat for the crash dummy, and must remain well secured to the simulated vehicle platform.

### 2. Easier and faster wheelchair securement

Using a WC19 wheelchair makes it faster and easier to secure the wheelchair in a vehicle because the wheelchair has four, clearly marked and easy-to-reach securement points where tiedown hooks and straps are attached. To comply with the standard, these points must be marked by a hook symbol and be accessible for one-handed attachment of tiedown hooks in less than 10 seconds for each strap. To simulate the limited space conditions on a bus, these tests are conducted with the wheelchair in a walled space where the person securing the system can only access one side of the wheelchair. The standard prohibits wheelchair frames that require difficult routing of tiedown straps through the frame or that have sharp edges that could cut the strap during crash loading or degrade the tiedowns over time.

### How can I find out more?

There are several resources to help you learn more about WC19 and share the information with others. The wheelchair manufacturers should have the most up-to-date information about their wheelchairs that comply with the standard. A WC19 wheelchair will include special information in the presale literature and the owner's manual that outlines aspects of performance, best practice, and proper use as a seat in a motor vehicle. Additionally, there is a frequently updated website ([www.rercwts.org/WC19.html](http://www.rercwts.org/WC19.html)) that lists makes/models of wheelchairs that meet WC19. This website also includes helpful consumer information related to wheelchair transportation safety. The RideSafe brochure summarizes best practice for traveling while seated in a wheelchair and is available in hard-copy, on the website ([www.travelsafer.org](http://www.travelsafer.org)), and as a downloadable pdf.

The key to keeping people who ride in wheelchairs safer is education. WC19 is a voluntary standard and knowledgeable consumers, parents, caregivers, clinicians, and transportation providers need to ask for products that meet the standard. •

Miriam A. Manary is a Senior Engineering Research Associate in the Biosciences Division of the University of Michigan's Transportation Research Institute.

Douglas A. Hobson, PhD, is an Associate Professor Emeritus in the Department of Rehabilitation Science and Technology at the University of Pittsburgh.

Lawrence W. Schneider, PhD, is the Research Professor Head of the Biosciences Division of the University of Michigan Transportation Research Institute.

## Wheelchair Users Speak Out About Wheelchair Transportation Safety



"Riding in my chair is the most comfortable because my cushions and seatbelts are designed and contoured especially for me, plus, with brittle bones, the less I'm transferred the better. However, unless my wheelchair itself is securely fastened or in a place where it cannot move or tip, I'm not always 100% confident in it. There needs to be better technology for doing that."

—Priscilla D. Carlson, Park River, ND.  
Invacare Jaguar electric wheelchair user