

Wheelchair Transportation Safety

For nearly 2 million Americans, wheelchairs are more than just a place to sit. These assistive devices provide mobility, a means of inclusion, recreation and social involvement, and access to paid or volunteer work.

This informative series will have high value for readers who use their wheelchairs as seats when they travel.

When traveling beyond the neighborhood, the best practice is to transfer from the wheelchair into a vehicle seat. However, this is not always possible or practical. Most wheelchair users appreciate chair-friendly transportation when getting out into the community.

Using a wheelchair as a seat in personally owned modified vans, paratransit vehicles, fixed-route public transit buses, or urban light rail reduces the effort and makes transportation possible for people who cannot transfer. However, anyone who travels seated in a wheelchair needs extra information to ensure the highest level of personal safety when traveling. This is because wheelchairs were not originally designed for use as vehicle seats.

Typical seats in cars and vans have been crash-tested to very high standards. Seats are bolted to the floor and designed to protect the occupants. Crash-tested seat belts for the chest and pelvis are required. Manufacturers even include air bags on the front and side to protect passengers.

Equivalent passenger protection is available for

wheelchair-seated passengers. Chairs must be secured to the floor using crash-tested securement straps or docking stations. Wheelchair-seated passengers must be kept safe in their seats with vehicle-mounted, occupant safety belts. Crash-tested wheelchairs now available are stronger and make these securement and occupant protection systems even easier to use.

Why Crash-test Wheelchairs?

After development by engineers, automotive products are typically crash-tested according to standards established by the National Highway Traffic Safety Administration (NHTSA). Crash tests measure the results of a 30-mph change in velocity and a 20g load on

crash-test dummies to imitate forces in the worst 5% of all motor-vehicle accidents. Many people are familiar with images of crash-test dummies—some of which have even become TV stars. In order to create equal protection for wheelchair-seated passengers, the same crash severity is used in wheelchair transportation safety standards.

Most crash-testing of wheelchairs in the U.S. occurs in Ann Arbor at the University of Michigan Transportation Research Institute (UMTRI). This facility is equipped with a Sled Lab that is used for crash tests on all types of wheelchairs and wheelchair seating systems, as well as wheelchair tie-downs and occupant-restraint systems.

Carefully taken, high-speed videos capture the crash-test action. After the test is completed, engineers analyze the photos and video. They also evaluate the impact's effect on the wheelchair, its parts, and, of course, on the crash-test dummy.

All aspects of conducting a crash test and performance expectations for wheelchair transportation safety products are described in voluntary national and international standards. These have been developed just to protect wheelchair-seated passengers.

The Safety Series

Future Mobility and More columns will report, in depth, on important aspects of

wheelchair transportation safety. This informative series will have high value for readers who use their wheelchairs as seats when they travel.

You can look forward to articles about the following topics:

- Obtaining WC19-compliant wheelchairs
- Riding in a public bus while seated in a wheelchair
- Riding in a personal van while seated in a wheelchair
- Driving a personal van while seated in a wheelchair
- The future of wheelchair transportation safety

Engineers, product designers, researchers, and therapists will write the articles. These contributors work on a federally supported research project called the Rehabilitation Engineering Research Center on Wheelchair Transportation Safety (RERC WTS). The Center is based at UMTRI with additional team members at the University of Colorado-Denver, the University of Louisville, and the University of Pittsburgh.

If you are curious and want to get a jump on learning more, visit the project's Web site, www.ercwts.org. Then check out the ride-safe brochure at www.travelersafer.org.

Contributor: Mary Ellen Buning, PhD, OTR, ATP.

Editor's note: For related information, see "Riding Safely," the feature article on p. 18. Dr. Buning is an occu-

pational therapist with many years' experience helping people choose wheelchairs that fit their life activities and personal goals. She believes wheelchair transportation safety is an important feature to ask about when selecting a new wheelchair.

Hand Controls in a Ring

The National Mobility Equipment Dealers Association (NMEDA) conference held in Phoenix in February included an expo that offered much information about

According to company CEO Martine Kempf, the standard mechanical hand controls used in the U.S. have remained basically the same since the 1950s. She claims they can, after years of driving, lead to an increase in shoulder instability. This results in a greater need for power chairs and reduced-effort steering and braking.

In addition, driving with only one hand on the steering wheel is less safe, Kempf says, and hand controls' metal rods in the knee area force installers to make the airbag there inoperative. Sometimes the steering-wheel airbag is



Kempf Inc. hopes to revolutionize the world of hand controls by installing its Digital Accelerator Ring in cars owned by American drivers with disabilities.



products and services for drivers with disabilities. One of these products was the Digital Accelerator Ring from Kempf Inc., a Silicon Valley, Calif., company.

also inactivated because of a steering knob.

"In France," Kempf explains, "the situation is very different. Most people without use of their legs drive

using an accelerator ring on the steering wheel and a main hand brake built inside the dashboard. It enables them to drive with both hands on the steering wheel, giving them the same comfort and safety as any other driver. All airbags remain functional, and no metal parts are added in the knee area."

Kempf moved to California from France 22 years ago. As a student she invented a speech-recognition system for surgical microscopes used in operating rooms. She believed she would have more opportunities to start her own business in the U.S. Her father, Jean-Pierre Kempf, who contracted polio at age 2,

invented the Accelerator Ring in 1954 to adapt his car.

After Jean-Pierre's death in 2002, Martine traveled to France every month to restart his company, adapting cars for drivers with disabilities. Today the business is thriving, adapting more than 1,000 cars per year. Its products are recommended by many European car manufacturers, including Volkswagen and Ford.

Kempf recently opened a facility in Tampa to perform installations.

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