



## Safety Issues for Vehicles Adapted for Use by Persons with Disabilities

The number of persons with disabilities reporting participation in employment, recreational, and other activities steadily has increased since passage of the Americans with Disabilities Act (ADA) of 1990. In 1995, the Census Bureau estimated that 26.1 percent, or 3.7 million of those persons between the ages of 21 and 64 with severe disabilities were employed. In addition, it estimated that 25.9 percent of the 2.3 million long-term users of mobility equipment (e.g., wheelchairs, canes, walkers, crutches) in this age group are employed...almost 600,000 persons.

Many persons with disabilities need specific types of modifications or adaptive equipment added to their motor vehicles to meet their transportation needs, and the number persons using adapted vehicles has also increased. The 1990 National Health Interview Survey (NHIS-D) estimated 299,000 adaptive equipment users, while the 1994 and 1995 NHIS-D estimated 510,000<sup>1</sup>, an increase of 211,000 users over a five-year period.

In terms of the number of vehicles modified for persons with disabilities, in December of 1997, the National Highway Traffic Safety Administration (NHTSA) estimated the number of modified vehicles at 383,000.<sup>2</sup> The number of vehicles with adaptive equipment is expected to continue to increase as the U.S. population ages and as access to employment, travel, and recreation continues to improve for persons with disabilities, as a result of the ADA. To guide agency research in this area, in 1997 NHTSA began soliciting information on potential safety issues for users of adapted vehicles via its Internet site at <http://www.nhtsa.dot.gov/cars/rules/adaptive>. This site includes a NHTSA web questionnaire on

Automotive Safety Issues for Persons with Disabilities. Data collected from May 30, 1997 through March 9, 1998 were summarized and published in a NHTSA Research Note entitled, *Safety Issues for Vehicles Adapted for Use by Persons with Disabilities*, dated April 1998. This June 2002 Research Note provides updated information through May 31, 2002. NHTSA's web site invites users (drivers and passengers) of vehicles with adaptive equipment to complete a brief on-line questionnaire on the type of vehicle, the specific equipment or modifications, and user opinions about the safety of the modified vehicle. Because the responses are obtained by inviting respondents to participate rather than by random sample of the universe of users, results may not be representative of the total population of adapted vehicle users. The data, however, do provide NHTSA with insight into potential safety issues for adapted vehicles.

Between May of 1997 and May of 2002, a total of 305 visitors to the NHTSA web site completed the questionnaire. The majority (214 respondents, or 71 percent) were drivers of adapted vehicles. Fifty-one respondents (17 percent) were passengers, and 35 respondents (12 percent) were both.

The most frequently reported types of adapted vehicles were passenger cars (35 percent), vans (29 percent), and minivans (24 percent). Other types of vehicles accounted for the remaining 12 percent of adapted vehicle types used (see Table 1).

**Table 1. Type of Modified Vehicle**

Vehicle type	Percent of Total	N*
Passenger car	35	101
Van	29	83
Minivan	24	70
Pickup	5	14
Sports Utility Vehicle	4	13
Heavy truck/motor home	3	9

\*N= Number of respondents

<sup>1</sup> National Center for Health Statistics (1998), NHIS-D Phases 1 and 2, 1994 and 1995. Machine readable data file and documentation, CD-ROM Series 10, No. 8A and 10A.

<sup>2</sup> National Highway Traffic Safety Administration's "Research Note" (December 1997), *Estimating the Number of Vehicles Adapted for Use by Persons with Disabilities*.



Respondents were asked to identify modifications or adaptations presently in use in their vehicles from a list of 25 specific vehicle modification categories. The choices ranged from modifications for the purposes of accommodating wheelchair users (e.g., securement, ramp, raised roof, hoist or carrier, lift) to vehicle control adaptations (e.g., power assist hand control, joystick, electronic gas/brake, steering control devices). Respondents could select as many choices as applicable from the list.

The five most frequently reported modifications to adapted vehicles include hand controls, wheelchair securement, automatic door openers, steering control devices, and lifts (see Table 2).

**Table 2. Types of Modifications/Adaptations**

Type of Modification	Percent of Total	N*
Hand controls	55	152
Wheelchair securement	36	100
Automatic door opener	33	92
Steering control device	32	87
Lift	31	85
Dropped floor	26	72
Modified safety belts	20	55
Power seat base	18	49
Ramp	17	48
Modified switch/touch pads	14	40
Wheelchair/scooter hoists	14	40
Can be driven from wheelchair	13	37
Raised roof	11	29
Low effort steering	10	27
Low effort braking	9	26
Remote ignition	9	25
Zero-effort steering	6	17
Electronic gas/brake	6	16
Left foot accelerator	6	16
Remaining modifications were selected by less than 5% of respondents		

\*N= Number of respondents

Sixty-eight respondents described other types of adaptive equipment they have had installed on their vehicles. The most frequently mentioned additions were headrests for control of headlights, wipers, etc. (8), some form of hand controls (6), seatbelt extenders (4), and pedal extenders (4).

Respondents were also asked to rate their feelings about the safety of their adapted vehicle by responding to the question, “How do you feel about the safety of your automotive equipment or modified vehicle?” Respondents used a scale of 0 (Don’t feel safe) to 5 (Feel very safe) to answer the question.

The majority of respondents (73 percent) rated their safety level as a 4 or 5, indicating that they feel safe or very safe with their modified vehicles (see Table 3). Of the three most frequently modified types of vehicles, respondents using passenger cars are more likely to report feeling safe or very safe (85 percent), compared to those using minivans (67 percent) or vans (62 percent).

**Table 3. Rating Safety of Modified Vehicles**

Safety Rating	Percent of Total	N*
0 – Don’t feel safe	5	15
1	5	16
2	7	22
3	10	30
4	42	127
5 – Feel very safe	31	92

\*N=Number of respondents

Respondents were given an opportunity to provide details about their safety rating. One hundred and seven respondents offered additional remarks. Twenty-nine of those remarks reiterated that respondents feel safe in their adapted vehicle. The most frequently mentioned concerns addressed in the remaining comments dealt with wheelchair equipment (22), hand controls (11), and airbags (8, 3 of which were related to driver height).

On behalf of NHTSA, BTS plans to update this Research Note periodically, based on website visitors’ responses to the *Automotive Safety Issues for Persons with Disabilities* questionnaire, to evaluate patterns and emerging trends in personal vehicle adaptations and modifications.

Questions about the website may be directed to Gayle Dalrymple at NHTSA (202-366-5559). Questions about the data analysis and this Research Note may be directed to June Taylor Jones at BTS (202-366-4743).

