U.S. Department of Transportation

**Bureau of Transportation Statistics**

# Research Note

**March 2004**

## Update on Safety Issues for Vehicles Adapted for Use by People with Disabilities

**Background**: Following passage of the Americans with Disabilities Act (ADA) in 1990, the number of disabled persons reporting participation in employment, recreational, and other activities has steadily increased. In 2000, the Census Bureau estimated that roughly 25 percent of the 51 million Americans with disabilities between the ages of 16 and 74 were employed. In addition, in 1995 Census 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 were employed—almost 600,000 individuals.

Many people with disabilities need specific types of modifications or adaptive equipment added to their motor vehicles to meet their transportation needs. As the technology has improved in quality and availability, the number of 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,[1] an increase of 211,000 users over a five-year period.

In December of 1997, the National Highway Traffic Safety Administration (NHTSA) estimated the number of vehicles modified for those with disabilities to be 383,000.[2] 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 augment agency research in this area, in 1997 NHTSA began soliciting information on potential safety issues for users of adapted vehicles via its Internet site.[3] This site included a NHTSA web questionnaire on Automotive Safety Issues for Persons with Disabilities. Data collected from May 1997 through May 2002 were summarized and published in a NHTSA Research Note entitled, *Safety Issues for Vehicles Adapted for Use by Persons with Disabilities*, dated June 2002. This Research Note provides updated information through November 2003.

NHTSA's web site invited users (drivers and passengers) of vehicles with adaptive equipment to complete a brief on-line questionnaire on the type of vehicle they used, the specific equipment or modifications they made, and user opinions about the safety of the modified vehicle. Because the responses are obtained by inviting respondents to participate rather than by a random sample of the universe of users, results may not be representative of the total population of adapted vehicle users. The total of 398 respondents who completed the questionnaire between May 1997 and November 2003 is also small by survey standards. The results, however, do provide NHTSA with insight into potential safety issues for adapted vehicles.

**Findings**: The majority (293 or 74 percent) of respondents over the six year period from 1997 to 2003 were drivers of adapted vehicles. Sixty respondents (15 percent) were passengers, and 41 respondents (10 percent) were both. The most frequently adapted vehicles (see Table 1) were cars (33 percent), vans (28 percent) and minivans (24 percent).

Respondents were asked to rate their perceived level of safety when using their adapted vehicle. Ratings ranged from 0 ("Do not feel safe") to 5 ("Feel Very Safe"). More than eight out of ten (85 percent) drivers of adapted cars rated their perceived safety as a 4 or 5 on the safety scale, compared to 60 percent

[1] 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.

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

[3] http://www.nhtsa.dot.gov/cars/rules/adaptive

of van users, and 71 percent of minivan users. Three out of four (75%) users of other types of vehicles (e.g. pickup trucks, sport utility vehicles (SUVs), and heavy trucks) rated their perceived safety as a 4 or 5 on the safety scale.

**Table 1**
**Modified Vehicle Types and Vehicle Safety Ratings**

| Vehicle Type | Percent of Total | Count | Safety Rating of 4/5 |
|---|---|---|---|
| Car | 33% | 130 | 85% |
| Van | 28% | 110 | 60% |
| Minivan | 24% | 97 | 71% |
| Other Types | 15% | 60 | 75% |
| Pickup | 6% | 26 | |
| SUV | 6% | 23 | |
| Truck | 2% | 7 | |
| Other | 1% | 4 | |

Respondents were asked to identify what types of modifications or adaptations they had made to their vehicles. They were given a list of 25 specific vehicle modification categories and could select as many as were applicable to their vehicle. The choices, listed in Table 2, ranged from modifications for the purposes of accommodating wheelchair users to vehicle control adaptations.

The five most frequently reported modifications to adapted vehicles included hand controls, wheelchair securement, steering control devices, automatic door openers, and lifts and the percentages of these respondents who rated their vehicles as a 4 or 5 on the safety scale ranged from 62 percent for lifts to 80 percent for hand controls.

The three modifications with the highest percent of respondents selecting a 4 or 5 on the safety scale were left foot accelerator (85%), remote ignitions (80%), and hand controls (80%). The modification with the lowest percent of respondents selecting a 4 or 5 was horizontal steering (56%).

**Table 2**
**Types of Modifications and Vehicle Safety Ratings**

| Type of Modification | Percent of Total | Count | Safety Rating of 4/5 |
|---|---|---|---|
| Hand control | 50% | 200 | 80% |
| Wheelchair securement | 32% | 127 | 63% |
| Steering control device | 30% | 119 | 79% |
| Automatic door opener | 29% | 114 | 66% |
| Lift | 27% | 106 | 62% |
| Dropped floor | 23% | 90 | 64% |
| Modified safety belts | 18% | 73 | 70% |
| Power seat base | 16% | 63 | 73% |
| Ramp | 15% | 59 | 61% |
| Wheelchair or scooter hoist | 14% | 57 | 63% |
| Modified switches, touch pads | 13% | 52 | 69% |
| Drive from wheelchair | 12% | 46 | 63% |
| Low effort steering | 10% | 40 | 75% |
| Raised roof | 10% | 39 | 72% |
| Low effort braking | 9% | 34 | 62% |
| Remote ignition | 8% | 30 | 80% |
| Zero effort steering | 7% | 28 | 71% |
| Left foot accelerator | 7% | 27 | 85% |
| Electronic gas, brake | 6% | 22 | 64% |
| Reduced diameter steering | 5% | 20 | 75% |
| Joystick/other steering system | 4% | 16 | 75% |
| Zero effort braking | 4% | 14 | 71% |
| Horizontal steering | 2% | 9 | 56% |
| Power assist hand control | 2% | 9 | 78% |
| Foot steering | 1% | 2 | 100% |
| Other equipment | 16% | 63 | 75% |

Overall, the majority of respondents (73%) rated their safety level as a 4 or 5, indicating that they feel safe or very safe with their modified vehicles.

Respondents were given an opportunity to provide details about their safety rating. The most frequently mentioned concerns dealt with malfunctions or flaws of the modified equipment or vehicle (35), wheelchair equipment (14), and airbags (10).

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