



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 4, 2011

In reply refer to: H-11-34 and -35

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The National Transportation Safety Board (NTSB) is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendations in this letter. The NTSB is vitally interested in these recommendations because they are designed to prevent accidents and save lives.

These recommendations address the need to improve the data describing cross-median crashes and the need for state seat belt laws to address 15-passenger vans. The recommendations are derived from the NTSB's investigation of a highway accident that occurred near Munfordville, Kentucky, on March 26, 2010, when a truck-tractor semitrailer traveling south on Interstate 65 (I-65) crossed the median and entered the northbound lanes, where it was struck by a 15-passenger van. As a result of the accident and subsequent truck fire, the truck driver, the van driver, and nine van passengers died. Two child passengers in the van, who were using child restraints, sustained minor injuries.¹ As a result of this investigation, the NTSB has issued 15 safety recommendations, 2 of which are addressed to the Governors Highway Safety Association (GHSA). The recommendations are consistent with the evidence we found and the analysis we performed. Information supporting these recommendations is discussed below. The NTSB would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendations.

¹ For additional information, see *Truck-Tractor Semitrailer Median Crossover Collision With 15-Passenger Van, Munfordville, Kentucky, March 26, 2010*, Highway Accident Report NTSB/HAR-11/02 (Washington, DC: National Transportation Safety Board, 2011), which is available on the NTSB website at <<http://www.nts.gov/>>.

The National Transportation Safety Board determined that the probable cause of this accident was the truck driver's failure to maintain control of the truck-tractor combination vehicle because he was distracted by use of his cellular telephone. Contributing to the severity of the accident were a median barrier that was not designed to safely contain or redirect the heavy vehicle and the lack of adequate guidance to the states in the form of high-performance median barrier warrants.

Cross-Median Crashes

There is no official, broadly accepted definition of the term "cross-median crash," and the absence of such a definition has implications for understanding the accident history of any particular segment of highway. In addition, existing definitions of this term are not always clear and comprehensive. The following definition, taken from a recent Federal Highway Administration (FHWA)/Texas report,² may illustrate the point:

For the purposes of this project, the research team developed the following definition of a cross median crash: 'A crash where a vehicle departs from its traveled way to the left, traverses the median separation between the highway's directional lanes, and collides with a vehicle traveling in the opposite direction.'

The absence of a standard definition leaves many accident situations in doubt with regard to characterizing them as cross-median crashes. Questionable examples include the following: vehicles departing the roadway, crossing the median, and colliding with a tree; vehicles crossing the median and, while not hitting another vehicle, causing another vehicle to lose control; and vehicles prevented from crossing because they were contained by a median barrier. Moreover, because of this lack of a clear and comprehensive definition, Fatality Analysis Reporting System (FARS) data,³ which rely on sequence-of-event coding, have difficulty characterizing an accident as a cross-median crash. Currently, there is no specified code in FARS to identify cross-median crashes; instead, the terminology "Motor Vehicle In-Transport on Different Roadway" is used, and this code may also include a vehicle falling from a bridge overpass onto a different road.⁴ FARS data are crucial to understanding the extent of the cross-median crash problem and to developing solutions to address it—and no alternative comprehensive data sources are available in this area. The NTSB concluded that NHTSA data concerning cross-median crashes would be improved by a standard definition describing what constitutes a "cross-median crash."

² S. Cooner and others, *The Development of Guidelines for Cable Median Barrier Systems in Texas*, Report FHWA/TX-10/0-5609-2 (College Station, Texas: Texas Transportation Institute and the Federal Highway Administration, February 2009), p. 2-1.

³ FARS is a census of fatal accidents on U.S. public roads in which at least one person died within 30 days following the crash. The National Highway Traffic Safety Administration (NHTSA), an agency of the U.S. Department of Transportation, maintains the FARS. FARS data are obtained from police reports, driver records, vehicle records, and death certificates.

⁴ The terminology "Motor Vehicle In-Transport on Different Roadway" differs from "Motor Vehicle In-Transport on Same Roadway" in that it applies when the motor vehicle in transport leaves one roadway, enters a different roadway, and then has a collision with a motor vehicle in transport on that roadway. For example, the coding "Motor Vehicle In-Transport on Different Roadway" is used when one motor vehicle in transport travels across the median of a divided highway, enters oncoming traffic, and is struck, or when a motor vehicle in transport traveling on an overpass falls from the overpass to the roadway below and strikes or is struck by a motor vehicle moving on that roadway. This code is only used for the motor vehicle crossing over onto the other traffic way.

Following its investigation of an accident that occurred in 1997 in Slinger, Wisconsin,⁵ the NTSB issued Safety Recommendation H-98-13 to the FHWA, asking it to revise the coding in the guidelines for the *Model Minimum Uniform Crash Criteria* to facilitate identification of cross-median crash events. That recommendation was “Closed—Acceptable Action” in February 1999, based on the FHWA’s explanation of a combination of coding parameters (sequence-of-event coding and trafficway descriptions) that could be used to identify cross-median crashes.⁶ The NTSB’s difficulty in distinguishing cross-median crashes in FARS data analyses for this report illustrates the analytical complexity associated with trying to identify one of the most serious accident types. State transportation agencies regularly conduct cross-median crash analyses in support of barrier application decisions and, depending on how they use the FARS data, their results vary.

In light of the need for better accident analysis in this area, the NTSB recommends that NHTSA and GHSA work together to add a standard definition for “cross-median crash” and a data element for cross-median crash accidents to the *Model Minimum Uniform Crash Criteria*. Adding “crossed median” to each of the three attributes of crash data element C6—*First Harmful Event* could be an appropriate approach because those attributes (noncollision; collision with person, motor vehicle, or nonfixed object; and collision with fixed object) add meaning to further characterize the outcome of the median crossing. Providing a more direct characterization of cross-median crashes in the vehicle data element V20—*Sequence of Events* offers another possible solution.

Seat Belts on 15-Passenger Vans

All 15 seat positions in the Munfordville accident van were equipped with either lap belts or lap/shoulder belts. Of the 12 van occupants, only 4 were using safety restraints: a 4-month-old infant in a rearward-facing convertible child restraint in the second bench row directly behind the driver, an adult female occupant in the second row center seat position next to the infant, and two children, ages 3 and 5, in forward-facing child restraints in the left and center seat positions in the third bench row. Because of the severity and location of the intrusion into the interior, the 4-month-old infant and the adult seated in the second row sustained fatal head injuries. The two surviving children were not in the intrusion area and were strapped into child restraints held by seat belts, which kept them secure. The seats remained attached to the vehicle, and the children were harnessed by the child restraints throughout the accident sequence. The NTSB concluded that the two children who survived the accident did so because of the protection provided by their child restraint systems.

The remaining eight van occupants were unrestrained. For the two unrestrained occupants in the first row, intrusion into the occupant space was the primary cause of the fatal injuries. The six remaining unrestrained occupants were thrown from their seating compartments. When the van came to final rest, the unrestrained adult occupant who had been in the back (fifth) row and the two unrestrained adult occupants who had been in the fourth row seated in the left and center

⁵ *Multiple Vehicle Crossover Accident, Slinger, Wisconsin, February 12, 1997*, Highway Accident Report NTSB/HAR-98/01 (Washington, DC: National Transportation Safety Board, 1998).

⁶ No coding change to the *Model Minimum Uniform Crash Criteria* was associated with the FHWA explanation.

seat positions were all found located behind the right front bucket seat. The two unrestrained adult occupants who were seated in the right-side seat positions in the third and fourth rows were fully ejected from the van. The unrestrained occupant of the right front passenger seat in the first row was also partially ejected. The NTSB cannot determine whether the use of occupant restraints would have prevented the fatalities of all the unrestrained occupants, especially those in the area of intrusion, but restraint use would have prevented ejections and occupants' motion out of their seating locations. In addition, restraint use might have allowed the occupants to "ride down" the collision as the vehicle decelerated throughout the accident sequence. The NTSB concluded that had all the occupants of the 15-passenger van been restrained, some injuries might have been mitigated and the likelihood of ejections would have been reduced.

Seat belt use rates among occupants of 15-passenger vans involved in fatal accidents are significantly lower than those associated with occupants of other passenger vehicles. During the 5-year period from 2003 to 2007, about 67 percent of all occupants of 15-passenger vans that rolled over, resulting in fatal accidents, were unrestrained.⁷ Occupants who were killed were four times as likely to be unrestrained as restrained.⁸

The Commonwealth of Kentucky's occupant protection restraint law, Kentucky Revised Statute 189.125—*Requirements of use of seat belts, child restraint systems, and child booster seats*, limits its definition of motor vehicles covered by the law to those vehicles designed to carry 10 or fewer passengers. Such a narrow definition does not cover 15-passenger vans and similar vehicles that need seat restraints at least as much as smaller vehicles do. The NTSB concluded that the Kentucky seat belt statute is too restrictive in its definition of "vehicle" and does not afford safety benefits to occupants of 15-passenger vans. The NTSB recommended that the Commonwealth of Kentucky revise its seat belt law so that it applies to all vehicles designed to carry 15 or fewer passengers.

Treating 15-passenger vans as buses for the purposes of safety standards has created a gap in the application of state primary seat belt laws to larger passenger vehicles. However, determining the extent of that gap from state to state is difficult. Many safety organizations track state seat belt laws according to age, seating location, and fines,⁹ but determining each state's treatment of 15-passenger vans is far from straightforward. Some states qualify the definition of "passenger vehicle" based on number of passengers (Virginia); some states qualify applicable vehicles by weight (Connecticut); and some states exempt buses or school buses (Hawaii). Few states specifically identify a requirement for seat belt use in 15-passenger vans (Texas). NHTSA

⁷ By comparison, for the same period, 55 percent of passenger vehicle occupants in fatal crashes were unrestrained. See *Traffic Safety Facts Research Note*, "Fatalities to Occupants of 15-Passenger Vans, 1997–2006," DOT HS 810 947 (Washington, DC: National Highway Traffic Safety Administration, May 2008).

⁸ For the 5-year period 2003–2007, out of the 1,367 occupants involved in such accidents, 212 of those killed were unrestrained and 716 of those surviving were unrestrained (68 percent unrestrained). See *Traffic Safety Facts Research Note*, "Fatalities to Occupants of 15-Passenger Vans, 2003–2007," DOT HS 811 143 (Washington, DC: National Highway Traffic Safety Administration, May 2009).

⁹ For example, see the following websites <www.ghsa.org/html/stateinfo/laws/seatbelt_laws.html>, <www.iihs.org/laws/safetybeltuse.aspx>, and <<http://www-nrd.nhtsa.dot.gov/Pubs/811378.pdf>>, all accessed July 20, 2011.

regularly publishes the *Summary of Vehicle Occupant Protection Laws*,¹⁰ which provides some information on the applicability of state seat belt laws to 15-passenger vans and indicates that gaps in coverage can and do exist. The nature and composition of the summary make it difficult to identify which states' seat belt laws apply to 15-passenger vans on a case-by-case basis. The NTSB concluded that, based on NHTSA's 2011 *Summary of Vehicle Occupant Protection Laws*, states other than Kentucky also may not require restraint use in 15-passenger vans. Therefore, to make certain that all states are aware of the possible consequences of failing to ensure that their seat belt laws apply to 15-passenger vans, the NTSB recommends that GHSA inform its members of the circumstances of this accident, emphasizing that most of the van occupants who died in the accident were not restrained by seat belts and that, like Kentucky, other states may have seat belt laws that do not cover 15-passenger vans and similar vehicles.

As a result of the investigation, the National Transportation Safety Board makes the following safety recommendations to the Governors Highway Safety Association:

Work with the National Highway Traffic Safety Administration to add a standard definition for "cross-median crash" and a data element for cross-median crash accidents to the *Model Minimum Uniform Crash Criteria*. (H-11-34)

Inform your members of the circumstances of this accident, emphasizing that most of the van occupants who died in the accident were not restrained by seat belts and that, like Kentucky, other states may have seat belt laws that do not include 15-passenger vans and similar vehicles. (H-11-35)

The NTSB also issued safety recommendations to the Federal Highway Administration, the Federal Motor Carrier Safety Administration, the National Highway Traffic Safety Administration, the 50 states and the District of Columbia, the Commonwealth of Kentucky, and the American Association of State Highway and Transportation Officials.

In response to the recommendations in this letter, please refer to Safety Recommendations H-11-34 and -35. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

¹⁰ For the current (9th) edition, see <<http://www.nhtsa.gov/staticfiles/nti/pdf/811458.pdf>>, accessed July 25, 2011 (DOT HS 811 458).

Chairman HERSMAN, Vice Chairman HART, and Members SUMWALT, ROSEKIND, and WEENER concurred in these recommendations.

[Original Signed]

By: Deborah A.P. Hersman
Chairman