



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** MAY 29 2009

**In reply refer to:** H-09-8

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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 organizations to take action on the safety recommendation in this letter. The NTSB is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses developing criteria to better assess the risks of rural road travel by large buses. The recommendation is derived from the NTSB's investigation of the January 6, 2008, motorcoach rollover near Mexican Hat, Utah,<sup>1</sup> and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the NTSB has issued seven safety recommendations, one of which is addressed to both the American Association of State Highway and Transportation Officials (AASHTO) and the National Association of State Emergency Medical Services Officials. Information supporting the recommendation 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 recommendation.

On January 6, 2008, about 3:15 p.m. mountain standard time, a 2007 Motor Coach Industries 56-passenger motorcoach with a driver and 52 passengers on board departed Telluride, Colorado, en route to Phoenix, Arizona, as part of a 17-motorcoach charter. The motorcoach passengers were returning from a 3-day ski trip. The normal route from Telluride to Phoenix

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<sup>1</sup> For more information, see *Motorcoach Rollover Near Mexican Hat, Utah, January 6, 2008*, Highway Accident Report NTSB/HAR-09/01 (Washington, DC: NTSB, 2009), which is available on the NTSB's website at <<http://www.nts.gov/publictn/2009/HAR0901.pdf>>.

along Colorado State Route 145 was closed due to snow, and the lead driver planned an alternate route that included U.S. Route 163/191 through Utah.

About 8:02 p.m., the motorcoach was traveling southbound, descending a 5.6-percent grade leading to a curve to the left, 1,800 feet north of milepost 29 on U.S. Route 163. The weather was cloudy, and the roadway was dry at the time of the accident. After entering the curve, the motorcoach departed the right side of the roadway at a shallow angle, striking the guardrail with the right-rear wheel and lower coach body about 61 feet before the end of the guardrail. The motorcoach traveled approximately 350 feet along the foreslope (portion of roadside sloping away from the roadway), with the right tires off the roadway. The back tires lost traction as the foreslope transitioned into the drainage ditch.

The motorcoach rotated in a counterclockwise direction as it descended an embankment. The motorcoach overturned, struck several rocks in a drainage ditch bed at the bottom of the embankment, and came to rest on its wheels. During the 360-degree rollover sequence, the roof of the motorcoach separated from the body, and 50 of the 53 occupants were ejected. As a result of this accident, 9 passengers were fatally injured, and 43 passengers and the driver received injuries ranging from minor to serious.

The National Transportation Safety Board determined that the probable cause of this accident was the driver's diminished alertness due to inadequate sleep resulting from a combination of head congestion, problems acclimating to high altitude, and his sporadic use of his continuous positive airway pressure sleeping device during the accident trip. The driver's state of fatigue affected his awareness of his vehicle's excessive speed and lane position on a downhill mountain grade of a rural secondary road. Contributing to the accident's severity was the lack of an adequate motorcoach occupant protection system, primarily due to the National Highway Traffic Safety Administration's delay in developing and promulgating standards to enhance the protection of motorcoach passengers.

The potential severity of tour and charter bus accidents, such as the one that occurred in Mexican Hat, Utah, greatly concerns the NTSB. A tour or charter bus accident can be a mass casualty event that challenges rural emergency medical service (EMS) operations. In the Mexican Hat accident, spotty cellular telephone coverage and long travel distances over remote areas significantly delayed accident notification and response: the accident took 36 minutes to report; the first emergency response unit arrived almost an hour after the accident occurred; and the injured were transported from the scene for more than 4 hours following the accident.

During the course of this accident investigation, NTSB staff analyzed fatal accidents involving buses and found that rural road travel risk extends to tour and charter buses.<sup>2</sup> The

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<sup>2</sup> This analysis, which is presented in appendix B of the accident report, is based on two data reports prepared in support of the Mexican Hat, Utah, accident investigation: *Large Bus Accidents and Injuries in Rural and Urban Areas, 2000–2006*, May 29, 2008, and *Addendum 1—Large Bus Accidents and Injuries in Rural and Urban Areas, 2000–2007*, December 31, 2008. Both the data report and data report addendum are available in the accident docket (HWY-08-MH-012). In addition, the NTSB conducted a study entitled *Study of Rural Travel Risk Factors for Large Buses: Fatal Accidents, Emergency Response, and Highway Safety Improvement*, which is also included in the Mexican Hat accident docket.

analysis determined that the risk of a fatal accident and subsequent injury to charter and tour bus occupants is greater in rural areas than in urban areas and that this pattern is consistent with the overall pattern in rural fatal accidents.<sup>3</sup>

The Mexican Hat accident route, U.S. 163, highlights one of the difficulties in defining rural roads. Mexican Hat is located in San Juan County, the largest county in Utah, covering 7,933 square miles, making it larger than several eastern States. It is also sparsely populated, with fewer than two people per square mile. Although the average daily traffic (ADT) count along the accident route is quite low at 650 vehicles per day, the route connects several major tourist locations<sup>4</sup> that experience elevated levels of seasonal traffic, particularly commercial tours. ADT counts do not distinguish vehicle type and, because they represent an average, can disguise peaks in seasonal traffic.

The importance of rural road travel risk was underscored in the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation, which involves a set-aside allocation for high-risk rural roads that States can use to fund Highway Safety Improvement Program (HSIP) projects.<sup>5</sup> Underlying a State's development of an HSIP project is the SAFETEA-LU requirement to incorporate a risk-based, data-driven, analytical approach to highway safety. This requirement is based on traditional approaches to risk assessment using accident frequency and accident severity. The analysis must include, at a minimum, use of crash data to identify hazardous locations and roadway elements, criteria for establishing the severity of locations, priorities for corrective action based on data analysis, and a data-driven means for evaluating the effectiveness of HSIP projects.

Vehicle miles traveled (VMT) and ADT provide the standard measures of highway activity in the assessment of accident risk and, when used to calculate accident rates, are the basis for identifying road segments and locations that meet high-risk criteria. States collect VMT data and are required to use such data to assess risk in the development of an HSIP project, but the detail is typically insufficient to determine the routes and travel characteristics of charter and tour buses. This circumstance is especially true in States such as Utah, where travel between population centers and recreation areas may include long distances through remote areas.<sup>6</sup>

Finally, the "ruralness" of a road differs substantially from one area of the country to another. The Federal Highway Administration (FHWA) functionally classifies roads using a population census definition. In that classification, an urban road is defined as any road or street within the boundaries of an urban area with a population of 5,000 or more, and a rural road is

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<sup>3</sup> In fatal accidents involving charter/tour buses, the proportion of fatally injured occupants was substantially higher in rural accidents than in urban accidents. See table B-4 of the accident report for more details.

<sup>4</sup> In the vicinity are the Valley of the Gods, Four Corners Monument, Arches National Park, Lake Powell, Mesa Verde National Park, Bryce Canyon National Park, Zion National Park, and Grand Canyon-Parashant National Monument.

<sup>5</sup> Title 23 *United States Code* (U.S.C.) Section 148 was established by Section 1401 of SAFETEA-LU, which implemented HSIP projects effective October 2005. Title 23 U.S.C. Section 148 establishes suballocations (set-asides) for two specific purposes: highway-rail grade crossings and high-risk rural roads.

<sup>6</sup> Industry estimates are available, but they, too, contain aggregate data and insufficient detail to support detailed analyses of charter and tour bus routes and travel patterns. Furthermore, the source of the industry estimates and the validity of the methods used to obtain the data cannot be adequately verified.

any road not classified as urban. This classification based on population reasonably assumes that traffic volume in urban areas will be greater than in rural areas. However, it does not consider factors such as use or travel patterns or traffic corridors, nor does it adequately characterize the extent of long-distance travel in remote areas.

Although the NTSB supports data-driven decision-making for HSIP projects, programmatic measures that rely primarily on fatal accidents and aggregated activity data (such as VMT and ADT) cannot adequately characterize the accident risk of rural travel, especially in rural areas that may experience relatively high volumes of charter or tour bus traffic. Further, analysis based solely on fatal accidents and fatalities results in a focus on infrequent, worst-case scenarios. Fatal accidents typically account for less than 1 percent of the total number of accidents in any one year. In addition, an analysis that considers only fatalities cannot adequately account for accidents that produce a large number of nonfatally injured, such as motorcoach accidents, and the subsequent demands placed on emergency response systems.

Accurate accident risk assessment can be used to target roads and road segments in remote areas such as Mexican Hat for special consideration. Moreover, an accurate assessment of all nonfatal injury accidents is necessary to evaluate EMS capabilities in rural areas. The accident data for rural accidents involving charter or tour buses, where almost all of the transported injured are bus occupants, show that these types of accidents can place substantial demands on rural EMS. The NTSB concludes that the lack of adequate data on large bus travel in rural areas—especially data related to charter and tour bus activity, travel patterns, and routes—severely limits a State’s ability to assess rural road travel and hazardous locations, especially in remote areas where a tour or charter bus accident can result in large numbers of injured.

HSIP projects have historically focused on highway design features and infrastructure characteristics. This accident and the analysis of rural fatal accidents involving charter and tour buses indicate that the risks of rural road travel are not limited to highway design features but may also be associated with the consequences of a mass casualty event. A recent U.S. Government Accountability Office (GAO) report<sup>7</sup> found that the FHWA’s emphasis on HSIP infrastructure projects may not allow States to allocate Federal safety dollars to their highest priority safety improvements and specifically referred to EMS projects. The report concluded that Congressional action should be taken to modify the HSIP project’s flexible funding provisions so that States can more freely direct funds to EMS and other such projects.

The NTSB therefore recommends that AASHTO and the National Association of State Emergency Medical Services Officials work with the FHWA to develop and implement criteria based on traffic patterns, passenger volume, and bus types that can be used to assess the risks of rural travel by large buses. The NTSB further recommends that the FHWA use these criteria as part of the SAFETEA-LU requirement to identify and select HSIP projects. The criteria should allow assessment of both fatal and nonfatal accidents involving large buses in all types of service and use, travel routes, travel activity and travel characteristics of these buses, and the potential problems for EMS in rural communities.

<sup>7</sup> U.S. Government Accountability Office, *Highway Safety Improvement Program: Further Efforts Needed to Address Data Limitations and Better Align Funding with States’ Top Safety Priorities*, GAO-09-35 (Washington, DC: GAO, 2008), pp. 5, 7, 14, and 31–33.

As a result of its investigation, the National Transportation Safety Board makes the following recommendation to the American Association of State Highway and Transportation Officials and the National Association of State Emergency Medical Services Officials:

Work with the Federal Highway Administration to develop and implement criteria based on traffic patterns, passenger volume, and bus types that can be used to assess the risks of rural travel by large buses. (H-09-8)

The NTSB also issued recommendations to the Federal Interagency Committee on Emergency Medical Services, the Utah Bureau of Emergency Medical Services, the FHWA, the American Bus Association, the United Motorcoach Association, and Arrow Stage Lines and reiterated one previously issued recommendation to the Federal Motor Carrier Safety Administration.

In response to the recommendation in this letter, please refer to Safety Recommendation H-09-8. 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](mailto:correspondence@ntsb.gov). If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our Tumbleweed 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).

Acting Chairman ROSENKER and Members HERSMAN, HIGGINS, and SUMWALT concurred in this recommendation. Member HIGGINS filed a concurring statement, which is attached to the highway accident report.



By: Mark V. Rosenker  
Acting Chairman