



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** October 11, 2002

**In reply refer to:** I-02-05

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U.S. Department of Transportation  
Room 3103, K-1  
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The National Transportation Safety Board relies on many external databases when performing accident investigations, safety studies, and special investigations. Most of these databases are sponsored and operated by the modal administrations of the U.S. Department of Transportation (DOT). The Safety Board's ability to study important safety issues is often affected by poor data quality. The Board studied transportation safety databases to evaluate data quality issues and encourage improvements in this area. The effort had four specific objectives: (a) highlight the value and potential uses of transportation safety data; (b) describe some accident and incident databases commonly used by the Board; (c) summarize past Board recommendations involving transportation data; and (d) evaluate Bureau of Transportation Statistics (BTS) efforts to establish data quality standards, identify information gaps, and ensure compatibility among the safety data systems maintained by the DOT.<sup>1</sup>

In reviewing BTS efforts to establish data quality standards, identify information gaps, and ensure compatibility between DOT safety data systems, the Safety Board recognizes a number of important BTS accomplishments. The BTS has drafted standards for data collection and analysis, and these standards are being refined as BTS staff gain experience during audits of existing DOT databases. The agency has published several reports identifying DOT safety data gaps, including *Information Needs to Support State and Local Transportation Decision Making*, published in 1997, and *Transportation Statistics Beyond ISTEA: Critical Gaps and Strategic Responses*, published in 1998. The BTS has identified additional gaps through its Safety Data Initiative and Data Gaps projects, which began in 1999 and 2001, respectively. In short, the BTS has led safety data improvement efforts in recent years, and the Safety Board commends the DOT's efforts in this area.

The Safety Board has issued a variety of recommendations seeking the improvement of transportation safety data. An analysis of past recommendations revealed that roughly 30 percent of the Board's data recommendations addressed the collection or use of exposure data in some way. These measures are needed to calculate broad safety indicators (for example, fatality

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<sup>1</sup> National Transportation Safety Board, *Transportation Safety Databases*, Safety Report NTSB/SR-02/02 (Washington, DC: NTSB, 2002).

rates), risks for operational categories (for example, vehicle type comparisons), and to evaluate safety interventions (for example, seat belt use).

Broad indicators of transportation activity, such as vehicle miles, vehicle departures, hours of operation, or passenger miles, are available in all modes of transportation. These measures are commonly used to calculate accident and injury rates by qualifying how often a risk event had the chance to occur. Most activity measures are derived by estimation methods that vary by mode. For example, a vehicle census or an operator survey may be used to develop transportation activity estimates. Depending on the estimation method used, different activity measures will have varying levels of precision.

Although the Safety Board recognizes that broad indicators of transportation activity are well documented, activity measures specific to operational segments within a mode of transportation are less likely to be available. Activity measures for specific segments of transportation are necessary for safety comparisons between groups, such as comparing the safety of different models of vehicles or comparing operators with different levels of training. They are also useful for determining the effectiveness of safety interventions, particularly those designed to target specific operators, equipment, or conditions.

There are many examples of exposure data limitations that restrict the transportation community's ability to assess risk. In aviation, for example, the flight hour activity for air carrier nonrevenue flights are not reported, activity of air tour operators is based on survey responses from a small fraction of aircraft owners, and no reliable estimates of general aviation departures are available. Activity data are sparse for recreational boating, with only one national survey conducted in the last 10 years. Data describing activity at the Nation's highway-rail crossings are lacking. The U.S. Census Bureau conducts the Vehicle Inventory and Use Survey that estimates miles traveled, but that data cannot support comparisons of certain types of interstate versus intrastate operations. Estimates of active pipeline mileage are available, through the Federal Energy Regulatory Commission, for only some varieties of pipelines that carry potentially hazardous petroleum products. The collection of more detailed exposure data would support improved safety surveillance, making it possible to normalize accident trends within each sector and to monitor overall risk.

Many existing exposure data collection programs are insufficient to support the analysis of risk factors for transportation accidents because they lack adequate detail. For example, general aviation exposure data are expressed in terms of annual flight hours by aircraft category and region, but the Federal Aviation Administration (FAA) does not collect data describing the characteristics of active pilots, flight conditions, or specific models of aircraft flown. In the highway mode, the Federal Highway Administration (FHWA) collects highway exposure data including annual vehicles miles traveled, but the data do not describe driver characteristics, driving conditions, or specific vehicle models. In the marine mode, DOT databases provide no information on passenger or cargo movement via commercial vessels, and surveys of recreational boat use are conducted at infrequent, irregular intervals and therefore do not collect standard information over time. The Federal Railroad Administration (FRA) requires railroads to submit exposure data including train miles, freight train miles, and passenger train miles, but the FRA does not collect exposure data describing train or highway vehicle activity at highway-rail crossings despite the fact that hundreds more people die at grade crossings than die as train

passengers. The Federal Transit Administration (FTA) collects transit exposure data including passenger miles traveled, vehicle miles traveled, vehicle hours, and unlinked passenger trips, but FTA exposure data contain little or no information about the population of transit users. Without detailed information about the people and vehicles involved in transportation activities, and the conditions under which such activities take place, it is difficult to assess the degree to which various factors may influence the likelihood and severity of transportation accidents. This circumstance lessens the usefulness of the relatively detailed data collected for transportation accidents as a tool for monitoring and improving transportation safety.

The BTS addressed exposure data issues as part of the Safety Data Initiative through its project 3, *Common Denominators for Safety Measures*. The term for that project's "common denominators" refers to the relationship between accident measures and representative exposure data that are used to assess transportation risks. The BTS report concluded that exposure data collection could be made more consistent across the modes, and recommended the collection of information such as trip length, trip time, number of vehicle occupants, and hours of duty for most modes. The BTS has also been developing its Omnibus Survey and its American Travel Survey to collect better data on household travel activity. These surveys may facilitate better analysis of risk factors for the most common forms of travel, such as personal highway vehicle travel. However, these surveys are not as useful for qualifying travel for specific types of vehicles or for specific purposes, such as commercial trucks. The Safety Board believes that the DOT's exposure data collection programs can be improved and expanded to better support the monitoring of accident risk for specific transportation sectors, to support the detailed analysis of risk factors, and to evaluate the effectiveness of strategies for preventing transportation accidents.

Any programmatic effort to improve exposure data collection and make it more relevant for safety data analysis will require the participation and expertise of the operating administrations of the DOT. It will also require consideration of the statistical methods to appropriately use the data. Congress made the BTS responsible for issuing data collection guidelines and implementing a comprehensive long-term data collection program. It is therefore logical that the BTS would be the appropriate agency to lead any DOT-wide effort to improve exposure data. The Safety Board concludes that the BTS should develop a long-term program to improve the collection of data describing exposure to transportation risk in the United States. Within each mode, representative exposure data should be maintained for distinct transportation sectors, industry segments, or travel purposes because these differences relate to unique operational and/or regulatory characteristics. These data should be collected in such a fashion that they are useful for (a) the normalization of accident data on at least an annual basis; (b) the analysis of risk factors involving people, vehicles, and environments; and (c) the evaluation of safety improvement strategies implemented at the State or national level.

Therefore, the National Transportation Safety Board recommends that the Bureau of Transportation Statistics:

Develop a long-term program to improve the collection of data describing exposure to transportation risk in the United States. Within each mode, representative exposure data should be maintained for distinct transportation sectors, industry segments, and travel purposes. (I-02-05)

Please refer to Safety Recommendation I-2-05 in your reply. If you need additional information, you may call (202) 314-6177.

Chairman BLAKEY, Vice Chairman CARMODY, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.<sup>2</sup>

*Original Signed*

By: Carol J. Carmody  
Acting Chairman

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<sup>2</sup> At the time the report was adopted, on September 11, 2002, Marion C. Blakey was Chairman of the National Transportation Safety Board.