



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Log H-595E
SP-1

Date: August 5, 1998

In reply refer to: H-98-25

Mr. Charles H. Thompson
Secretary
Wisconsin Department of Transportation
Post Office Box 7910
Madison, Wisconsin 53707-7910

About 5:52 a.m. on February 12, 1997, a doubles truck with empty trailers, operated by Consolidated Freightways, Inc., that was traveling northbound on U.S. Route 41, a four-lane divided limited access highway, near Slinger, Wisconsin, lost control and crossed over the 50-foot depressed median into the southbound lanes. A flatbed truck loaded with lumber, operated by McFaul Transport, Inc., that was traveling southbound on U.S. Route 41 collided with the doubles truck, lost control, and crossed over the median into the northbound lanes. A northbound passenger van with nine adult occupants struck and underrode the right front side of the flatbed truck at the landing gear. A refrigerator truck loaded with produce, operated by Glandt/Dahlke, Inc., that was also traveling northbound, struck the right rear side of the flatbed truck. Although it had snowed from about 8 p.m. to 3 a.m. the night before, it was clear at the time of the accident. Other motorists and the emergency responders to the accident scene reported icy patches in the roadway. Eight of the nine van occupants suffered fatal injuries, and the remaining occupant suffered serious injuries. Two of the three commercial truckdrivers were treated for minor injuries and released; the third refused treatment.¹

The icy roadway conditions were a factor in this accident. Consequently, the National Transportation Safety Board examined the snow and ice removal procedures followed by the Washington County, Wisconsin, maintenance personnel. The personnel on duty prior to the accident indicated that the accident area had received two applications of salt and wetting agent. The application rate was above the required State contract level and within the ranges used by other northern States. Therefore, the Safety Board concluded that, although Washington County more than fulfilled the criteria in the WisDOT snow and ice removal contract, its countermeasures did not prevent ice from forming on the roadway.

¹For further information, read Highway Accident Report—*Multiple Vehicle Crossover Accident, Slinger, Wisconsin, February 12, 1997* (NTSB/HAR-98/01).

The Safety Board found several possible explanations as to why these countermeasures were ineffective. The lack of natural windbreaks (evergreen trees and shrubs) exposed the roadway surface to winds, which may have reduced the effectiveness of the salt and wetting solutions. Traffic could have blown the salt and wetting agent off the roadway before they had a chance to melt the ice. The temperature had dropped to around 15°F, a temperature point at which the salt and wetting agent become less effective, and abrasives were not applied to provide traction.

Conventional winter maintenance operations involve deicing techniques, that is, sending plows and trucks loaded with salt and other materials to clear the roadways after a storm has begun. The principle of anti-icing is to inhibit the bond between the pavement and packed snow and ice by applying a chemical that lowers the freezing point of water. The Strategic Highway Research Program (SHRP) undertook a project² to examine five of the available types of chemical brines commonly used in anti-icing: sodium chloride, calcium chloride, magnesium chloride, calcium magnesium acetate, and potassium acetate. Chemical applications were made before a storm, early in the course of a storm, or during a storm, as plows created bare or nearly bare pavement. The chemical could be applied to the roadway to prevent frost or black ice if road surface temperatures were expected to drop below freezing. Sections of roadway could be selected for different anti-icing treatments based on such variables as traffic flow or pavement type. Through this project, the SHRP found that an anti-icing strategy coupled with a road weather information service could reduce winter maintenance costs, improve travel conditions, and help protect the environment.

Subsequently, the Federal Highway Administration and the States conducted a field test to evaluate the anti-icing technologies tested and reviewed in the SHRP project. The field test included a two-winter experimental anti-icing evaluation and analysis of the experimental data. The recently issued report³ of this evaluation concluded that well-timed initial chemical applications can prevent or mitigate reductions in friction, as well as support the anti-icing objective of preventing a strong bond from developing (between the ice and the pavement). Based on these findings, the Safety Board concluded that new adverse weather countermeasures and anti-icing technologies have been shown to be effective, are readily available, and should be aggressively adopted by Wisconsin and other States.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Wisconsin Department of Transportation:

Review your policies for snow and ice removal and 1) accelerate the use of new anti-icing technologies, 2) consider the use of abrasives when temperatures drop

²Blackburn, R. R.; McGrane, E. J.; Chappelow, C. C.; Harwood, D. W.; and Fleege, E. J.; *Development of Anti-Icing Technology*, Report No. SHRP-H-385, National Research Council, Washington, D.C., 1994.

³Ketcham, S. A.; Minsk, L. D.; and Danyluk, L. S.; *Test and Evaluation Project No. 28 Anti-icing Technology, Field Evaluation Report*, FHWA-RD-97-132, March 1998.

below 15°F, and 3) take corrective action in open areas where wind could hinder the application and effectiveness of the salt and wetting solutions. (H-98-25)

Also, the Safety Board issued Safety Recommendations H-98-8 through -13 to the Federal Highway Administration; H-98-14 through -17 to the National Highway Traffic Safety Administration; H-98-18 to the National Association of Governors' Highway Safety Representatives; H-98-19 through -23 to the American Trucking Associations, the International Brotherhood of Teamsters, and the Motor Freight Carrier Association; H-98-24 to the American Association of State Highway and Transportation Officials; and H-98-26 to the Independent Truckers and Drivers Association, the National Private Truck Council, and the Owner-Operators Independent Drivers Association, Inc.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation H-98-25 in your reply. If you need additional information, you may call (202) 314-6484.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By:



Jim Hall
Chairman