

Log 11-378

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

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Forwarded to:

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SAFETY RECOMMENDATION(S)

H-83-67

On February 24, 1983, an empty dump truck, traveling north on State Route 96, a two-lane rural highway near Willow Creek, California, suddenly veered left across the centerline and collided head-on with a southbound schoolbus. The schoolbus was carrying 36 high school students; 30 students sustained varying degrees of injury, and 1 was fatally injured. The schoolbus driver survived the collision with serious injuries. The truckdriver, who was ejected from the truck's cab, was killed on impact. 1/

Except for the driver, none of the schoolbus occupants was restrained. The dump truck struck the schoolbus on the left front side and penetrated rearward into the driver's seat area and the passenger compartment on the left side. One of the passengers seated on the right side was ejected; another passenger seated on the right side was partially ejected.

The schoolbus was manufactured in 1972, before the enactment of Federal Motor Vehicle Safety Standard (FMVSS) 222, Schoolbus Seating and Crash Protection, for schoolbus occupant protection. The manufacturer thus was not required to equip the schoolbus with seatbelts, and because of the bus' size (greater than 10,000 gross vehicle weight ratio (GVWR)), the schoolbus would still be exempt today from the seatbelt requirement specified in FMVSS 222. The wooden floor and tubular steel seats within the schoolbus were not designed to accommodate occupant restraints and would have had to have been substantially upgraded to do so. If stronger seats and a more rigid floor structure had been installed, the internal crush dynamics of the school bus in this accident probably would have been different. Thus, an accurate assessment of the effectiveness of seatbelts could not be made.

1/ For more detailed information, read Highway Accident Report—"Collision of Humbolt County Dump Truck and Klamath-Trinity Unified District Schoolbus, State Route 96 near Willow Creek, California, February 25, 1983" (NTSB/HAR-83/05).

In this accident, at least 18 passengers sustained AIS level 1 (minor) and 2 (moderate) injuries to the head and facial area. Blood transfers were noted on the exposed metal seatbacks and seatframes. Several passengers who were interviewed stated that they were thrown forward over the seats in front of them.

If seats approved under FMVSS 222 had been installed in the accident schoolbus, they might have mitigated some of the minor to moderate injuries. Seats approved under FMVSS 222 are designed to absorb energy through controlled yielding, and are covered with padding to reduce occupant injuries associated with direct contact with exposed seatframes and metallic seatback covers. In a 1980 study conducted for the National Highway Traffic Safety Administration (NHTSA) to evaluate the effectiveness of FMVSS 222, 2/ it was determined that the requirements of FMVSS 222 are probably very effective in reducing minor to moderate injuries, which are the most severe injury levels experienced in the vast majority of schoolbus accidents. The standard's requirements probably would be less effective in reducing more severe injuries, as may occur in the few violent schoolbus accidents that produce fatalities. The requirements are thought to have only limited effectiveness in the extremely small number of very violent accidents involving, for example, rollovers or collisions with trains. In these types of crashes where there is usually substantial crushing of the schoolbus body into the occupant compartment, passengers are thrown into contact with each other or with broken glass, the walls, the roof, or other interior components.

It is not likely that the installation of seats approved under FMVSS 222 would have mitigated any of the serious injuries in this accident. The schoolbus body passenger compartment was intruded during impact. The entire frontal section of the schoolbus was pushed rearward during impact. Most of the seriously injured passengers were seated in the front-row seats and were thrown into the rearward moving front interior structure during the impact sequence. Two passengers seated in the right front seat were ejected; they sustained moderate to severe injuries. One other passenger seated in the left front seat sustained fatal injuries.

Although transit-type buses are not widely used for schoolbus purposes throughout the country, three western States have schoolbus fleets which include a significant number of transit-type schoolbuses. Because transit-type schoolbuses have a service life which is twice as long as the conventional schoolbus, 3/ it is not unusual that they undergo refurbishment, including refurbishment of the interior components. The service life of conventional schoolbuses is relatively short and retrofit with updated seats and interiors probably would not be cost effective. Although the cost estimates for replacement of prestandard 4/ seats and barriers would not justify a wholesale retrofit of these buses, the use of poststandard seats should be considered for transit-type schoolbuses when refurbishment includes replacement of existing seats. Thus, the Safety Board urges those States 5/ to consider retrofitting their prestandard transit-type schoolbuses with FMVSS 222 seats and restraining barriers, if the schoolbus interior is refurbished at any time during its service life.

2/ Statistical Evaluation of the Effectiveness of FMVSS 222: Schoolbus Seating and Crash Protection, Center for the Environment and Man, Inc., October 1980.

3/ The service life for a schoolbus is estimated to be 10 years for a conventional schoolbus and 20 years for a transit-type schoolbus.

4/ "Prestandard" refers to those seats and barriers manufactured before FMVSS 222 became effective. "Poststandard" refers to those seats and barriers manufactured after FMVSS 222 became effective.

5/ The States of California and Washington offer incentives to their respective school districts to recondition or refurbish existing schoolbuses within their fleet in lieu of replacement cost.

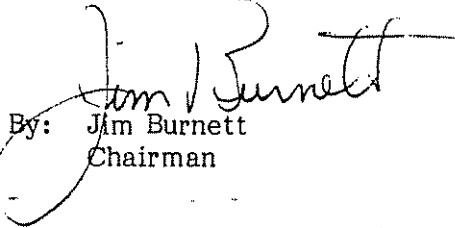
The Safety Board contacted the schoolbus manufacturer to determine if the model of bus involved in this accident could be retrofitted with poststandard approved seats. A representative of the schoolbus manufacturer stated that he was aware of one California school district which had purchased poststandard approved seats and installed them into a prestandard schoolbus similar to the accident vehicle.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the California State Department of Education and the Washington State Board of Education:

Initiate a program to retrofit (except where the design makes retrofitting economically prohibitive) all transit-type schoolbuses within your fleet that are not equipped with Federal Motor Vehicle Safety Standard (FMVSS) 222 approved seats with FMVSS 222 approved seat and restraining barriers if these schoolbuses are refurbished during their normal service life. (Class II, Priority Action) (H-83-67)

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" (P.L. 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations, and the Board would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter.

BURNETT, Chairman, GOLDMAN, Vice Chairman, McADAMS, BURSLEY, and ENGEN, Members, concurred in this recommendation.

  
By: Jim Burnett  
Chairman

