



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Ray H-268

Date: February 5, 1986

In reply refer to: H-85-59

Mr. William R. Roberson, Jr.
Secretary of Transportation
Department of Transportation
Highway Building
Raleigh, North Carolina 27611

About 12:20 p.m. on March 13, 1985, an Ashe County School District schoolbus, driven by a 17-year-old student driver and carrying 22 students ages 16 and 17, was traveling up an 8-percent grade on eastbound State Route 88 near Jefferson, North Carolina, when it went off the right edge of the road in a left curve and crossed the grassy shoulder. The 1980 schoolbus then rolled one revolution to the right and down a steep embankment and came to rest 24 feet below the road surface against two trees. There was no fuel leakage or fire. It was daylight, the weather was clear, and the two-lane roadway was dry. One student was seriously injured, one sustained moderate injuries, and the other 20 had minor injuries; the schoolbus driver was not injured. None of the bus occupants were ejected from the schoolbus. ^{1/}

The physical evidence (i.e., the tire tracks made by the bus) indicates that the bus driver held the steering wheel straight rather than turning to the left as the road curved left. Then the bus driver inadvertently drove onto the right shoulder and was unable to regain control while on the shoulder. Because of the instability of the bus due to the steepness of the embankment adjacent to the shoulder and the predominant passenger loading on the right, the bus rolled to the right. There was no corrective maneuvering that could have been performed to regain control after the schoolbus was on the embankment. Consequently, the continuing efforts of the schoolbus driver to steer the bus back onto the roadway were futile.

The maximum speed at which this particular bus could climb the 8-percent grade was calculated to be 22.8 mph in second gear. This speed is close to the speed of two buses subsequently observed climbing the hill. It was calculated that the speed at overturn was less than 5.6 mph. However, it was also calculated that the bus rolled laterally due to gravity at a speed of about 10 to 12 mph, struck the trees, accelerated again due to gravity, and landed at a speed of 15.5 mph. There was no evidence to indicate that the driver braked the bus prior to overturn.

^{1/} For more detailed information, read Highway Accident Report--"Schoolbus Rollover, State Route 88, near Jefferson, North Carolina, March 13, 1985" (NTSB/HAR-85/05).

There was no barrier on the right side of the roadway to redirect errant vehicles away from the steep embankment. The 1977 "Guide for Selecting, Locating, and Designing Traffic Barriers," which is published by the American Association of State Highway and Transportation Officials (AASHTO), characterizes the following criteria for barriers:

Height and slope of the embankment are the basic factors in determining barrier need for a fill section (an embankment that slopes downward). Warranting criteria for fill sections are shown in Figure III-A-1. The criteria are based on studies of the relative severity of encroachments on embankments versus roadside barriers. Embankments with slope and height combinations below the curve do not warrant protection. Obstacles on the slope may, however, warrant protection. Embankments with slope and height combinations above the curve warrant protection.

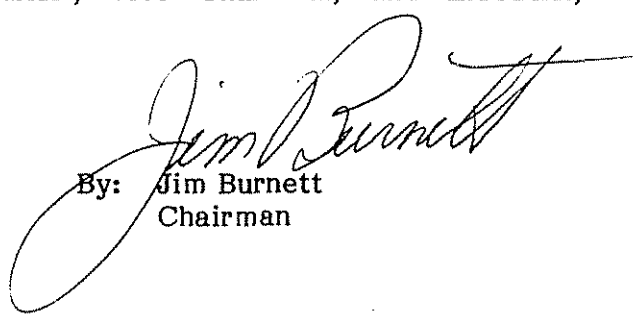
The Safety Board believes that because the schoolbus was traveling at such a slow speed at the point of overturn, a guardrail would have retained and either stopped or redirected the schoolbus before it rolled over. The Safety Board realizes that the hilly topography in the accident area is such that the installation of a guardrail or other barrier system at all locations where the height/slope criteria are met is not feasible. This location had no previous accident record that should have alerted highway officials to the need for a barrier. Because this rollover accident could have been prevented and because seven or more schoolbuses travel this route round trip per day, the Safety Board believes that a guardrail is warranted at the accident site.

Therefore, as a result of its investigation of this accident, the National Transportation Safety Board recommends that the North Carolina Department of Transportation:

Install a guardrail on North Carolina State Route 88 from 0.35 to 0.65 mile west of Jefferson, North Carolina, where warranted, based on the fill height and embankment slope criteria stated in the American Association of State Highway and Transportation Officials' "Guide for Selecting, Locating, and Designing Traffic Barriers." (Class II, Priority Action) (H-85-59)

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 actions taken as a result of its safety recommendations and 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-85-59 in your reply.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, Member, concurred in this recommendation.


By: Jim Burnett
Chairman