

Log H-485



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

Date: March 3, 1987

In reply refer to: H-87-1 and -2

Mr. R. E. Stotzer, Jr.  
Engineer-Director  
Texas Department of Highways  
and Public Transportation  
Greer State Highway Building  
11th and Brazos  
Austin, Texas 78701

On July 20, 1985, a 45-passenger intercity type of church bus carrying 54 passengers en route to Lubbock, Texas, was traveling northbound in the right lane on U.S. Route 87, a four-lane, divided, rural highway, near Ackerly, Texas. It was raining lightly (sprinkling), the pavement was wet, and traffic was light. Two passenger cars carrying church members were following the bus. About 8:15 p.m., the bus skidded in a counterclockwise direction across the left lane, grassy median, and the two southbound lanes, and then it overturned onto its right side. Church members in the passenger cars stated that they were traveling between 60 and 62 mph when the bus began rocking side to side and appeared to make a U-turn across the travel lanes. Four bus passengers were ejected and killed; the busdriver and 37 passengers were injured. 1/

The Safety Board could not determine exactly what precipitated the initial loss of rear traction. However, the combination of high speed, the lack of adequate tread depth on the right rear tires, and the low and variant frictional quality of the road surface created a situation at the accident site similar to driving on ice. Any demand on the bus made by the driver, such as braking, turning, or even slowing by engine braking, could have precipitated the loss of rear traction.

Tests conducted by the Safety Board in conjunction with an accident at Luling, Texas, on November 16, 1980, 2/ indicate that the lateral traction generated by commercial tires on wet pavement is further reduced when the tire tread depth is below 4/32 inch. The right rear dual tires on the bus involved in the July 20 accident had a maximum tread depth of 2/32 inches. When the loss of rear traction began, the rear of the bus moved to the right in a counterclockwise direction. At 60 to 62 mph, the marginal right rear tires could not generate enough lateral traction to keep the rear of the bus from continuing to move in a counterclockwise direction until it eventually overturned onto its right side.

1/ For more detailed information, read Highway Accident/Incident Summary Reports--"Near Ackerly, Texas, July 20, 1985; Eureka Springs, Arkansas, September 13, 1985; and Bramwell, West Virginia, October 13, 1985" (NTSB/HAR-87/01/SUM).

2/ Highway Accident Report--"East Side Church of Christ Bus Skid and Overturn, U.S. Route 183, Near Luling, Texas, November 16, 1980" (NTSB-HAR-81-4).

Considering weather and surface conditions at the time of the accident, the Safety Board believes that the speed of the bus was too great for the highway conditions. As speed increases on wet pavement, available tire to pavement friction decreases. Because the tire-to-pavement friction coefficient is speed dependent, any reduction in the travel speed of the bus or increase in pavement friction would have improved the stability of the bus. Thus, the Safety Board concludes that the speed of the bus and the low and variant frictional quality of the road surface were causal factors in this accident.

The Safety Board has encouraged State agencies to adopt minimum criteria (skid numbers) below which corrective action in the form of signing and resurfacing would be initiated. <sup>3/</sup> However, the Federal Highway Administration (FHWA) and many States have been reluctant to establish a minimum skid number to initiate corrective action. Highway engineers familiar with skid testing generally agree that when the skid number for a surface is below 30, the pavement is becoming slippery and corrective action should be initiated.

The Safety Board investigated a wet pavement accident in November 1980, which involved a similar intercity-type bus traveling south on U.S. Route 183, a two-lane rural highway in south-central Texas. As the bus approached a curve and attempted to negotiate it to the left, the rear tires lost traction. The bus skidded across the opposing lane of traffic and onto the shoulder before it could be steered back onto the highway. As it crossed the highway again, the bus spun 180° and slid into a drainage ditch where it struck the side of the ditch and overturned onto its left side. Two passengers were killed, the busdriver and 35 passengers were injured.

Following the accident at Ackerly, the Safety Board contacted the State of Texas concerning its skid accident reduction program. The State indicated in a response letter dated November 20, 1985, that there are no uniform, statewide policies mandating skid resistance testing. The Texas Department of Highways and Public Transportation which is responsible for the State's road system operates through a series of 24 districts, each of which has access to skid testing equipment. Testing is the responsibility of district staff and practices vary among regions of the State depending upon a number of variables. There are no standardized, statewide policies for identifying wet pavement problem locations or improving the skid resistance at these locations. The State does not have a threshold skid number or a range of numbers used to indicate that pavement surfaces are in need of analysis for corrective treatment. The Texas Manual on Uniform Traffic Control Devices does contain criteria for posting "Slippery When Wet" signs. Safety Board investigators contacted officials of district No. 5, which encompasses the accident site, but they declined to discuss their program on skid resistance. The Safety Board believes that the State of Texas should develop a comprehensive skid accident reduction program which includes a maintenance policy for reducing potential problems associated with partial width resurfacing and differential friction.

<sup>3/</sup> Highway Safety Study--"Fatal Highway Accidents on Wet Pavement--The Magnitude, Location, and Characteristics" (NTSB-HSS-80-1).

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the Texas Department of Highways and Public Transportation:

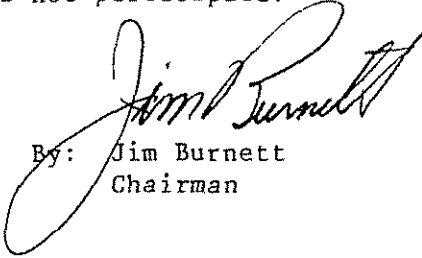
Conduct skid tests in all wheel paths in the area of the Ackerly accident site and take action to eliminate any adverse effects of differential friction on the road surface. (Class II, Priority Action) (H-87-1)

Develop a statewide comprehensive program for reducing skid accidents on low coefficient of friction roads. Include a design and maintenance policy for reducing potential problems associated with bleeding, partial width resurfacing, and differential friction. (Class III, Longer Term Action) (H-87-2)

Also, the Safety Board issued Safety Recommendation H-87-3 to Deliverance Tabernacle Church of God in Christ, Powerhouse Church of God, and Wayside Church of God in Christ.

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 recommendations in this letter. Please refer to Safety Recommendations H-87-1 and -2 in your reply.

BURNETT, Chairman, and LAUBER and NALL, Members, concurred in these recommendations. GOLDMAN, Vice Chairman, did not participate.

  
By: Jim Burnett  
Chairman

