H-81 AI-4

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: August 3, 1981

Forwarded to:
Honorable Raymond A. Peck
Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

H-81-33 through H-81-36

About 7:25 a.m., central standard time, on November 16, 1980, an intercity-type bus was traveling south on U.S. Route 183, a two-lane rural highway in south-central Texas. It was raining and the pavement was wet. As the bus approached and attempted to negotiate a curve to the left, the rear tires of the bus lost traction. The bus skidded across the opposing traffic lane 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 bus passengers were killed, and the busdriver and 35 passengers were injured. 1/

The bus was owned by a church in Austin, Texas, and was registered as a private bus. Therefore, it was subject only to State of Texas motor vehicle regulations. The bus front tires had adequate continuous tread groove depth while all four bus rear tires were worn to or below the top of the fillets at some part of the tire or across the entire tire. As a result, the tread groove patterns were no longer continuous and a "slotted" tread pattern developed. This slotted tread pattern developed before the tires were worn to the tread wear indicators, which were designed below the fillets and whose purpose, according to NHTSA's Federal Motor Vehicle Safety Standard No. 119 is to "enable a person inspecting the tire to determine visually whether the tire has worn to a tread depth of one-sixteenth (or 2/32) of an inch."

U.S. Route 183 was a two-lane, two-way asphalt concrete highway. The accident occurred at a shallow 2° curve to the left and in a rural area that had a posted speed limit of 55 mph. The pavement at the accident site was deteriorated at the time of the accident, with lateral cracks visible about every 10 to 15 feet and several patches. Contour and rutting bar measurements of the pavement surface revealed a number of points where water could accumulate or drainage would be slow.

1/ For more detailed information, read: "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).

After the accident, the Texas Department of Highways and Public Transportation (DOT) performed sand patch tests and locked-wheel skid trailer tests at the accident site. The sand patch tests indicated that the pavement surface texture depth in the traffic lanes was considerably reduced, when compared to tests made on similar new pavement surfaces, and texture depth was predominantly below acceptable or minimum levels that have been recommended by research. High speed trailer tests indicated that tire-to-pavement frictional quality for passenger car-type tires was significantly degraded at wet pavement speeds near the posted speed limit. High speed tests on a machine that simulated the wet pavement surface at the accident site indicated an even greater loss of tire-to-pavement frictional quality when the bus tires were tested. Bus tire-to-pavement frictional values were obtained during wet pavement braking tests that were equivalent to attempting to stop or slow a vehicle on ice, even when a bus front tire with more than adequate tread depth was tested.

Wet pavement cornering tests indicated that the worn bus rear tires had a much lower capability to resist sliding sideways during a turn than the front tires. The pavement and tire tests and the physical evidence found at the accident scene indicated that it was possible for the bus rear tires to have lost traction while the busdriver was simply attempting to negotiate the curve at or near the posted speed limit. The Safety Board has concluded that the low wet cornering capability of the marginal yet "legal" bus rear tires and the low frictional quality of the wet pavement combined to cause the accident. Physical evidence and test data also indicated that any small reduction in traveling speed or improvement in tire or pavement condition may have prevented this accident.

The Safety Board examined current State of Texas and Federal programs, policies, and standards to determine their effectiveness in reducing wet weather accidents of this type. Such measures could assist by (1) reducing high speed operation in wet weather, (2) providing adequate performance standards for the design of tires, (3) prohibiting the use of marginal or inadequate tires, (4) providing objective methods to detect pavement with low wet frictional quality, (5) providing objective methods to more consistently warn the public of pavement segments with low wet frictional quality, and (6) providing objective methods to determine when pavements with low wet frictional quality should be repaired. However, the Safety Board found that neither Texas nor Federal agencies have adopted standards able to assist in preventing this type of accident. The Safety Board was able to identify standards and policies used by the State of Pennsylvania regarding pavement evaluation that could theoretically assist in preventing this type of accident, but these standards need further evaluation.

Federal Motor Vehicle Safety Standard (FMVSS) No. 119 for new commercial vehicle tires is apparently not specific enough to prohibit tire designs that are similar to the design of the bus rear tires that were involved in this accident. These designs place supporting fillets above the tread wear indicators, and noncontinuous tread grooves are produced when the tire is worn to the fillets and before the tire is worn to the tread wear indicators. As this investigation illustrated, this design practice defeats the function of the tread wear indicator in indicating when a tire has worn beyond the point of maximum safe use with respect to tread depth. The NHTSA should revise Standard No. 119 so that it effectively guards against design practices that render safety devices ineffective.

The State of Texas vehicle inspection criteria contain pass/fail guidelines regarding tire cuts, tire tread depth, and tread wear indicators. The bus had passed Texas inspection about 11 months before the accident and had to be inspected again within 2 weeks after the accident to remain in service. If the bus had been inspected on the day of the accident, there is some question as to whether the rear outer tires of the bus would have passed Texas inspection guidelines for cuts. However, because of limits in Standard

No. 119 and Texas regulations, the bus rear tires probably would have passed Texas guidelines for tread groove depths, even though they were worn below continuous tire tread groove depths and less than 2/32 inch of any tread pattern remained in areas of three of the four rear tires.

It was noted that the lack of appropriate inspection guidelines is not confined to Texas. Although not applicable to the bus involved in this accident, Federal Motor Carrier Safety Regulations for inspecting vehicles that operate interstate with similar tires do not contain appropriate guidelines for rejecting tires worn to the fillets and below continuous tire tread groove depths. The NHTSA has responsibility for developing and seeking the adoption of model State motor vehicle inspection guidelines. The Safety Board believes that the NHTSA should examine all recommended and existing inspection guidelines for commercial vehicle tires and develop and seek the establishment of appropriate guidelines for the rejection of tires before they are worn to noncontinuous tread groove depths.

Although recommended by the Safety Board in 1971, there is still no specific national policy that would establish a minimum skid number or range of skid numbers that would require the correction of pavement surfaces that produce hazardous stopping conditions for tires with more than adequate tread depth, the condition of the pavement at the accident site. That type of policy, in combination with an appropriate tire policy, should eliminate tire-to-pavement frictional quality that is equivalent to attempting to slow or stop a vehicle equipped with adequate tread depth tires on ice, a condition that existed in this accident. In 1976, the Safety Board recommended that the NHTSA establish minimum frictional quality standards for commercial vehicle tires so that tire frictional quality can be maintained at some minimum level and not compromise minimum pavement standards. Although the NHTSA concurred with this recommendation, no rulemaking activity has been initiated to date.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the National Highway Traffic Safety Administration:

> Accelerate its activity to establish rulemaking action for minimum frictional quality standards for commercial vehicle tires. (Class II, Priority Action) (H-81-33)
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> Advise State Motor Vehicle Inspection agencies of the problems associated with operating vehicles equipped with tires worn to noncontinuous tread groove depths. (Class II, Priority Action) (H-81-34)
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> Issue model inspection criteria to prohibit the use of tires worn to noncontinuous tread groove depths. (Class II, Priority Action) (H-81-35)
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> Reevaluate its Federal Motor Vehicle Safety Standard No. 119 to eliminate tire designs that produce noncontinuous tread grooves before the tire is worn to the tread wear indicators. (Class II, Priority Action) (H-81-36)

DRIVER, Vice Chairman, and McADAMS, GOLDMAN, and BURSLEY, Members, concurred in these recommendations. KING, Chairman, did not participate.

By: James B. King
Chairman