H-168

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: April 5, 1979

Forwarded to:

Honorable Karl Bowers
Administrator
Federal Highway Administration
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

H-79-18 and -19

At 8:07 p.m. on Sunday, September 25, 1977, an empty tractor-semitrailer was traveling eastbound on I-70 in downtown St. Louis, Missouri, when the truckdriver lost control of his vehicle on wet concrete pavement. The tractor struck, broke, and overrode a concrete median barrier, vaulted into the westbound lanes, and collided with a westbound automobile. All three occupants in the automobile died; the truckdriver was injured slightly. 1/

The Safety Board concluded that the accident occurred when the truckdriver lost control of his vehicle between an on-ramp and exit ramp as a result of an evasive maneuver made in response to improper lane changes by an eastbound automobile driver. The driver lost control on a section of Portland cement concrete that was smooth and traffic-polished with ruts in the wheel paths ranging from 1/16- to 3/16-inch deep in all traffic lanes. The Missouri State Highway Commission (MSHC) reported a locked-wheel skid trailer coefficient of friction in the range of 0.25 to 0.30 for that section of roadway, based on tests that were made 25 months before the accident. The St. Louis Police Department reported that 84 accidents had occurred in the vicinity of this accident during calendar year 1977; 60 percent of these accidents occurred on wet pavement.

Although the Safety Board could not determine if the pavement surface directly contributed to the accident or whether improvements in wet pavement frictional quality would have prevented or reduced the severity of this accident, improved wet pavement frictional quality is known to prevent, or reduce the severity of, accidents on wet pavement. Improvements are normally made either when the measured coefficient of friction falls below a predetermined value or when wet weather accidents are a relatively high percentage of all accidents at a given location, or both.

1/ For more information read "Highway Accident Report -- Gateway Transportation, Inc., Tractor-Semitrailer and Automobile Collision, I-70, St. Louis, Missouri, September 25, 1977," (NTSB-HAR-79-3).

MSHC policy for correcting pavement surface is: "Major emphasis should be developed on wet weather high accident areas occurring on curves, intersections, etc. Any program to resurface existing pavements due to some 'magic' coefficient of friction value without high accidents would be seriously objectionable because of cost." 2/ The Pennsylvania Department of Transportation has had a firm policy since 1975 for correcting pavement surfaces with a coefficient of friction of 0.30 or less. For those locations with at least 35 percent of all accidents related to wet pavement, 3/ this Penn DOT policy states: "Immediate Corrective Action (must be placed on an approved program within one year of date of notification of test results). Corrective action must be completed within the next year following programming, but in no case shall be greater than two years after the date of notification of test results." This policy states that even at locations without significant wet-weather accident history, "Corrective work should be completed as soon as fiscally possible."

According to MSHC policy, there is no coefficient of friction value that would signal the need for corrective action, leaving the driving public unknowingly exposed to a potentially dangerous wet roadway when low values are detected. Accidents must occur in sufficient numbers before corrective measures are taken. This type of policy is contrary to the goals of accident prevention and severity reduction and should be replaced with a more progressive philosophy similar to that of Penn DOT.

There is also some evidence that either the MSHC is not consistently following its own pavement surface improvement policy or its resources for pavement improvement are extremely scarce. Even with a low wet coefficient of friction, a high general accident rate of 84 accidents in a year and a high wet pavement accident rate of 60 percent of all accidents, the MSHC has not improved or scheduled improvement of the pavement surface at this accident site. Therefore, efforts should be directed toward establishing whether: (1) The MSHC is consistently following its own policy, (2) a more progressive policy level is attainable within existing resources, and (3) additional resources are necessary to achieve a progressive policy at a level similar to that of other States. This accident site and other similar sites should be re-analyzed for possible corrective action upon or in conjunction with establishing a new pavement surface improvement policy.

2/ Missouri State Highway Commission Letter of January 27, 1978, to FHWA Docket No. 77-16 -- Skid Accident Reduction Program, Advance Notice of Proposed Rulemaking.

3/ State of Pennsylvania Department of Transportation Letter of February 15, 1978, to FHWA Docket No. 77-16 -- Skid Accident Reduction Program, Advance Notice of Proposed Rulemaking.

The impact speed and attack angle of the tractor-semitrailer probably did exceed the design limits of the "New Jersey" concrete median barrier and, therefore, contributed to the severity of this accident. However, there was some evidence that the design limits were not significantly exceeded and that minimal limitations in the "New Jersey" barrier design may have permitted the tractor-semitrailer to penetrate and vault the barrier. The tractor's left front tire scuff along the face of the barrier indicated that the climb angle of the tire began to level off and that the vehicle was beginning to be contained and redirected when the top of the barrier broke away at a contraction joint. The Safety Board understands that the FHWA is currently determining the feasibility of updating the design of concrete median barriers. However, there is no known program to develop design alternatives to improve the performance of concrete barrier systems already in place. Such a program is necessary to insure that locations with high accident rates or on hazardous materials routes can be updated.

As a result, the National Transportation Safety Board recommends that the Federal Highway Administration:

Determine what improvements should and can be made to insure a more progressive pavement surface improvement program by the Missouri State Highway Commission. (Class II, Priority Action) (H-79-18)

Establish a program to examine the feasibility of developing design alternatives to improve the performance of concrete barrier systems already in place. (Class II, Priority Action) (H-79-19)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and HOGUE, Members, concurred in the above recommendations.

By: James B. King
Chairman