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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: October 13, 1977

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Forwarded to:

Honorable William M. Cox  
Administrator  
Federal Highway Administration  
400 7th Street, S.W.  
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

H-77-11 through 15

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On May 21, 1976, a charter bus carrying 52 persons struck and mounted a section of the bridge rail system on the Marina Vista offramp of I-680, near Martinez, California. The bus rolled off the top of the curved bridge rail, fell 21 feet onto the ground below and landed on its roof. The roof structure collapsed to the windowsill line and all of the occupants were trapped in the bus. Twenty-nine persons were killed and the rest sustained injuries ranging from minor to serious. The bus was owned and operated by the Student Transportation Lines, Inc., of Carmichael and Marysville, California. The bus was chartered by the Yuba City High School choir for a trip to Orinda, California. <sup>1/</sup>

The National Transportation Safety Board's investigation found that a badly deteriorated air compressor drivebelt on the bus had failed before the crash. As a result of the belt failure, air was not replaced in the airbrake system as it was used. The system's air pressure dropped to the point where the service brakes were unable to decelerate the bus on the curved ramp.

The investigation further revealed that the curvature of the ramp did not meet the minimum standards of the 1957 specifications of the American Association of State Highway Officials.

The Safety Board concludes that the design of the ramp's bridge railing system enhanced the ability of the bus to climb the parapet. Inadequate bridge railing systems have been a factor in many accidents investigated by the Safety Board. The Safety Board has previously recommended that the Federal Highway Administration establish mandatory performance standards for bridge barrier rails and that these standards be supported by vehicle crashtesting.

<sup>1/</sup> For more detailed information on this accident read: "Highway Accident Report - Student Transportation Lines, Inc., Charter Bus Climbing of Bridge Rail and Overturn Near Martinez, California, May 21, 1976."  
(NTSB-HAR-77-2)

Based on available evidence, the effect on this accident of the design and placement of traffic control devices cannot be determined. The location of signing on the exit ramp suggests that earlier information to the driver on the severity of the ramp geometrics might have resulted in an earlier brake application. This should have alerted the driver to the ineffectiveness of his service brake system early enough to permit him to continue ahead on the main roadway and coast to a stop, or to use other braking capability available to him.

Therefore, the National Transportation Safety Board recommends that the Federal Highway Administration:

Prepare and issue an advisory document citing the proper techniques for inspecting air compressor drivebelts. The bulletin should be disseminated widely throughout the commercial motor carrier industries and to all agencies charged with the regulation of intrastate motor carrier safety. (Class II, Priority Followup) (H-77-11)

Develop bridge railing designs that will meet performance standards to be established by FHWA for various classes of vehicles and that will be sufficient in number to meet the various State requirements with regard to climatic and other physical conditions that affect the operation and maintenance of a roadway system. Such bridge barrier railing designs should be available to States that do not desire to develop their own designs in accordance with mandatory performance standards issued by FHWA. (Class II - Priority Followup) (H-77-12).

Investigate through dynamic crashtesting and analytical procedures the effects of various geometric configurations and adjacent roadway surfaces on the performance of traffic barrier rail systems. The investigation should also consider how maintenance practices or the lack of maintenance affects the performance of the barrier rail systems. (Class II - Priority Followup) (H-77-13)

In cooperation with the States, establish priority guidelines for improving, through modification or retrofit, the performance of existing traffic barrier rail systems at bridges. Consideration should be given in the priority guidelines to the potential for multi-fatality accidents involving high occupancy vehicles such as buses. (Class II - Priority Followup) (H-77-14)

In cooperation with the States, determine if the current design and placement of guide, directional, advisory, and warning signs, and other necessary traffic control devices on highway exit ramps are adequate to provide a driver with understandable and performance-related information necessary

for the selection and safe negotiation of the desired ramp. The results of the investigation should be used to improve the criteria contained in the Manual on Uniform Traffic Control Devices. (Class II - Priority Followup) (H-77-15)

BAILEY, Acting Chairman, McADAMS, HOGUE, and HALEY, Members, concurred in the above recommendations.

A handwritten signature in cursive script that reads "Kay Bailey".

By: Kay Bailey  
Acting Chairman

