

its proper lane of travel on the highway. Factors that contributed to that condition were: (1) The influence on the truckdriver of two oncoming vehicles, (2) the absence and deceptive placement of light-reflecting traffic control devices, (3) the absence of a solid centerline on the bridge and its approaches, (4) the narrow width of the bridge deck, and (5) the truckdriver's concern that braking would cause his vehicle to jackknife.

The collision between the vehicles resulted from the engagement of the truck-tractor with the bridge end-post and interrupted surface of the rail which caused that vehicle to jackknife across and block both traffic lanes of the highway.

Contributing to some of the fatalities and to the severity of many injuries in the bus were (1) the inadequate seat anchorage system and (2) the absence of an integrated occupant restraint system such as seatbelts and highback cushioned seats.

RECOMMENDATIONS

The National Transportation Safety Board recommends that:

1. The Federal Highway Administration:

- (a) Expedite development and implementation of a traffic-control system of positive guidance to assist drivers in remaining in the intended pathway at narrow highway structures. (Recommendation No. H-74-4)
- (b) Restate more precisely the definition of narrow bridges in the Manual on Uniform Traffic Control Devices and determine its adequacy and applicability. (A redefinition should be consistent with the intended use of any signing plan devised under recommendation 1(a) of this report.) (Recommendation No. H-74-5)
- (c) Require all States to bring approach guardrail sections at bridges on Federal-aid highways into compliance with the recommended installation described in

the FHWA's Handbook of Highway Safety Design and Operating Practices. (Recommendation No. H-74-6).

- (d) Expedite a program to improve, where feasible, substandard bridge-rail systems on existing bridges to increase resistance to pocketing or penetration by impacting vehicles of all classes and redirect those vehicles. Research, including crash testing, should also be expedited to develop criteria for mandatory standards for bridge-rail and guardrail designs for new bridge construction. (Recommendation No. H-74-7).
 - (e) Establish a program to identify and correct curb structures on existing bridges that create unnecessary hazards to the control of impacting vehicles. All new bridges should use railings that eliminate curbs. (Recommendation No. H-74-8).
 - (f) Develop a precise technical definition of crash cushions on the basis of minimum performance criteria. The factors defined should include not only classes of vehicles, but also velocities and angles of attack, so that standards can be established to require the most effective use of crash cushions on Federal-aid highways. Such standards would describe speeds and impact directions at which vehicle types will be adequately handled. (Recommendation No. H-74-9).
2. The National Highway Traffic Safety Administration:
- (a) Proceed with the Notice of Proposed Rulemaking (Docket 73-3 Notice 1), to provide for (1) increased strength of seat anchorages which more fully uses the abilities of structures to protect passengers and (2) more protection against gross seat deflection which can permit seats to be carried away. (Recommendation No. H-74-10).

(b) Identify types of bus seat anchorages which are substantially below the strengths obtainable by such simple changes as substituting a bolt for a sheet metal screw. If it is possible to

identify such buses by visual inspection, steps should be taken to inform owners of the possible change for local retrofit purposes. (Recommendation No. H-74-11).

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ WILLIAM R. HALEY
Member

Isabel A. Burgess, Member, was absent, and did not participate in the adoption of this report.

February 27, 1974