

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: October 31, 1977

Forwarded to:

Mr. Jack Kinstlinger
Executive Director
State Department of Highways
4201 East Arkansas Avenue
Denver, Colorado 80222

SAFETY RECOMMENDATION(S)

H-77-23 and 24

About 4:45 a.m., on October 16, 1976, a station wagon traveling west on Interstate 70 near Byers, Colorado, ran off the left side of the roadway, at an angle of 5 degrees, 303 feet east of a bridge structure onto a relatively flat median. In leaving the roadway, the vehicle missed the 100-foot tangent section of the bridge approach guardrail. The vehicle traveled 310 feet in back of the guardrail on the median to the top of a sloped embankment wall between twin bridge structures. The vehicle then vaulted into the air for a distance of 62 feet before hitting the opposite embankment. After impact, the vehicle moved 20 feet up the embankment before sliding back to the toe of the slope. A fire ensued and completely destroyed the vehicle. Nine of the 10 occupants were either killed on impact or died as a result of their injuries and the fire.

During the 5-year period preceding September 1, 1976, four similar accidents occurred at this location, resulting in three deaths. Including this accident, 12 people have died in less than 5 years as a result of errant vehicles entering the median, driving behind the guardrail, and plunging over the embankment between these twin bridges.

The bridge approach guardrail was extended from 25 feet to 100 feet by State maintenance forces during July, 1975. While this extension was an improvement over the 25-foot section, it did not conform with the State's 1968 standard M-606-AB for guardrails at bridge approaches. This standard calls for 200 feet of guardrail of which 50 feet is tangent, 75 feet is flared, and 75 feet is curved to an anchorage beyond the centerline of the median. Calculations have shown that if the 1968 standard had been followed, the vehicle in this accident would have been intercepted by the guardrail and deflected back onto the main roadway. The severity of the accident would have been reduced significantly.

On August 15, 1976, the State of Colorado published a report titled "Elephant Trap Accidents on Colorado Interstate Highways" as a supplement to its 1973 study "Motor Vehicle Traffic Accidents at Bridges." The supplemental report, covering the 4 1/2-year period from January 1970 to July 1974, found that of 217 twin bridge structures studied, 41 or 19 percent had experienced 1 or more such accidents for a total of 57 accidents, 25 fatalities, 59 injuries, and an estimated \$2 million property damage.

Colorado's 1968 standard M-606-AB does not conform to either the Federal Highway Administration (FHWA) 1/ or the American Association of State Highway and Transportation Officials (AASHTO) 2/ guidelines. These guidelines provide for a longer tangent and more gradual curve, a decrease in the striking angle of errant vehicles, and less severe interception and deflection. However, the FHWA and AASHTO guidelines had not yet been established at the time the guardrail systems were installed at these bridges.

The State of Colorado was aware as early as August 15, 1974, that the bridge approach guardrail systems on the State's interstate highways did not conform with the State's own 1968 standard. They were also aware of the hazards created by these nonconforming barriers and of the costly results in lives, injuries, and property damage. Yet prior to the Byers accident, the State of Colorado did not act to plan and implement the updating of its standard, much less the removal of the hazards to motorists. If the State had done nothing more than shield the openings between the twin bridge structures to prevent errant vehicles from plunging to the roadway below, at least the severity of this accident might have been reduced significantly.

Updating standards, disseminating revised standards, and modifying existing barrier systems is costly. However, the cost can be justified by the elimination of deaths, personal injury, and property damage resulting from accidents. Interstate construction funds can be used for these types of safety improvements.

Since the nine-fatality accident at Byers, the Colorado Department of Highways has acted to inform maintenance personnel of the current FHWA and AASHTO guardrail standard; has assigned a committee to re-examine the State's 1968 guardrail standard; and has developed a program to shield the openings between twin bridge structures on State highways as financing becomes available. The committee's recommendations have been developed for consideration at the FHWA division and regional levels.

1/ Report No. FHWA RD-76-503 Volumes I and II "Guide for Selecting, Locating, and Designing Traffic Barriers," February 1976. Final Report.

2/ "Guide for Selecting, Locating, and Designing Traffic Barriers," 1977, American Association of State Highway and Transportation Officials.

Therefore, the National Transportation Safety Board recommends that the Colorado State Department of Highways in cooperation with the Federal Highway Administration:

Expedite the review of State guardrail standards and the implementation of recommended changes. (Class II, Priority Followup) (H-77-23)

Make the necessary commitment of Federal or State funds for shielding the openings between twin bridge structures on the State's interstate system. (Class II, Priority Followup) (H-77-24)

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

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

By: Kay Bailey
Acting Chairman

