

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: May 11, 1976

Forwarded to:

Honorable William T. Coleman, Jr.
Secretary
Department of Transportation
Washington, D. C. 20590

SAFETY RECOMMENDATION(S)

H-76-11 through H-76-15

About 9:25 p.m. on February 23, 1975, an automobile struck a vital structural member of the Yadkin River Bridge near Siloam, North Carolina. The collision occurred in heavy fog. After the impact, the bridge collapsed and both the automobile and the bridge fell into the river. Six more vehicles vaulted into the collapse zone within a 17-minute period. Four persons were killed and 16 were injured.^{1/}

The National Transportation Safety Board determines that the probable cause of the bridge collapse was the penetration of the timber railing by the vehicle and its subsequent impact with and crushing of a vital structural member of the bridge truss. The timber railing was not adequate to sustain impact at posted speeds.

The investigation indicated that the bridge truss did not experience any abnormal movements that would have contributed to the driver's loss of control. No reason for the driver's loss of control could be determined.

The structural member struck by the vehicle had been damaged previously by an overheight load. The damage caused by the vehicle impact was sufficient to have caused collapse even if there had been no earlier damage. However, the investigation did show that the earlier damage had reduced the load-carrying capacity of the bridge from the posted 7 tons to 2.2 tons. The earlier damage to the member was identified and recorded by the State bridge inspection team when the bridge was routinely inspected in December, 1974, but no evaluation of the potential effects of the damage had been made. Damage to the truss' portal bracing from overheight loads were first recorded in the 1972 bridge inspection, but no specific reference was made to the member that was struck by the vehicle in this accident.

^{1/}The Board's full report on this accident will be forthcoming.

The number of critically deficient bridges in the United States is very large when compared to the funds required to replace them. Although national standards exist for the inspection inventorying of bridges on the Federal-aid system, no such requirements exist for non-Federal-aid bridges, which account for more than half of all bridges. As a result, the magnitude of the bridge safety problem is not defined adequately and many bridges may have undetected reduced strength. The Federal Highway Administration estimates that at the current level of funding, it will take 80 years to replace the 32,000 currently deficient bridges on the Federal-aid system alone.

The cost to replace all the critically deficient bridges on the roadways represents a substantial financial burden. It is not reasonable to expect that all such deficient bridges will be replaced quickly. Consequently, it is important to identify, by thorough inspection, the degree of any hazard that may exist at each bridge in order to identify those which are most in need of remedial measures or preventive actions. Such measures and actions could include closing a bridge; posting for reduced safe load limits; improving traffic controls and roadway delineation; improving bridge railings and approach traffic barriers; adding failure warning systems; increasing skid numbers of bridge and approach road surfaces above currently recommended minimums; and making other minor-to-moderate structural changes that could extend the life of the structure, or prevent a catastrophic collapse.

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

1. Develop and publish, as a part of the FHWA research program, guidelines for the structural retrofit of bridge railings on existing bridge structures to protect vital structural members from impact by vehicles. (H-76-11) (Class II, Priority Followup)
2. Include under the National Bridge Inspection Standards and under Highway Safety Program Standard No. 12, "Highway Design, Construction and Maintenance," a requirement that bridge inspection reports be analyzed and evaluated within a specified time period, and that any changes in load limits be posted promptly. (H-76-12) (Class II, Priority Followup)
3. Include under Highway Safety Program Standard 12, "Highway Design, Construction and Maintenance," a requirement that all bridges on public roadways be inspected for safety under the same criteria established for bridges on the Federal-aid system under the National Bridge Inspection Standard. (H-76-13) (Class II, Priority Followup)

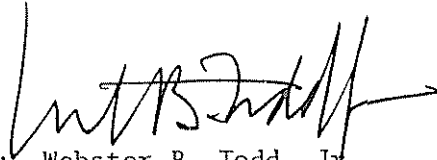
4. Institute a program in cooperation with the States which provides for the investigation, by multidisciplinary accident investigation teams, of the following:

- a. All bridge collapses on public roadways,
- b. Accidents involving vehicles that have struck traffic barrier railings on bridges and damaged structural members vital to the bridge's stability.

The number of such investigations should be sufficient to identify the characteristics of individual traffic barrier railings and to identify how such characteristics affect the severity of accidents. (H-76-14) (Class II, Priority Followup)

5. In cooperation with the States, perform a sufficient quantity of skid tests on timber roadway surfaces to establish if such surfaces can normally meet the recommended skid number values contained under Highway Safety Program Standard 12, "Highway Design, Construction and Maintenance." (H-76-15) (Class II, Priority Followup)

TODD, Chairman, McADAMS, BURGESS, HALEY, and HOGUE, Members, concurred in the above recommendations.


By: Webster B. Todd, Jr.
Chairman

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