

Log H-416

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:

Mr. Mark G. Goode
Engineer-Director
Texas State Department of Highways and
Public Transportation
P.O. Box 5055
Austin, Texas 78763

SAFETY RECOMMENDATION(S)

H-84-64 and -65

About 5:15 a.m. on November 30, 1983, a Trailways Lines, Inc., intercity bus traveling in the right lane of southbound U.S. 59 about 5 miles north of Livingston, Texas, struck the rear of an unloaded tractor-flatbed semitrailer operated by E. A. Holder, Inc. The bus then veered across the left southbound lane, crashed through a bridge guardrail, and vaulted to a creekbank 26 feet below the bridge deck. It was dark, the weather was cloudy, and there was no roadside lighting. The pavement of the four-lane, divided highway was dry. The truck had turned right onto southbound U.S. 59 about 927 feet before the accident site and according to postaccident tests had accelerated to about 42 mph when it was struck in the rear by the southbound bus. Six of the 11 bus passengers were killed; 5 bus passengers and the busdriver sustained moderate to severe injuries during the accident. The truckdriver later reported that he was injured. 1/

U.S. 59 at the accident site is a four-lane, north/south, divided highway with two 12-foot-wide lanes in each direction separated by a 55-foot-wide median. The highway has 10-foot-wide right shoulders and 3-foot-wide median shoulders. The posted speed limit is 55 mph. The roadway is a slight downgrade for southbound vehicles approaching the accident site. The average daily traffic volume is 13,000 vehicles; about 25 percent of this traffic is large trucks or buses. The southbound lanes of U.S. 59 between the intersection with Loop 116 and the bridge where the bus left the roadway were constructed in 1942. Future construction plans for this section of highway include the addition of 6 inches to the thickness of the pavement surface in late 1985.

U.S. 59 in the southbound direction is relatively straight about 1,500 feet before the intersection with Loop 116. The length of the shoulder acceleration lane for this intersection as indicated by markings on the pavement is 345 feet. The original design plans indicated that a 575-foot-long marked acceleration lane was to be constructed. The guidelines of the American Association of State Highway and Transportation Officials (AASHTO) recommend an acceleration lane length of 900 feet, which is based on passenger vehicle performance. Trucks and buses generally require much longer distances to accelerate to highway speeds.

1/ For more detailed information read Highway Accident Report—"Trailways Lines, Inc., Bus/E.A. Holder, Inc., Truck, Rear End Collision and Bus Run-Off-Bridge, U.S. Route 59, near Livingston, Texas, November 30, 1983" (NTSB/HAR-84/04).

Although the length of the acceleration lane on the shoulder as indicated by pavement markings was 345 feet, a Texas Statute, Article 6701d, Section 54a, permits driving on an improved shoulder under certain circumstances. The statute states, in part:

Operation of a vehicle on improved shoulder. (a) a driver may operate a vehicle on an improved shoulder to the right of the main traveled portion of the roadway as long as necessary and when the operation may be done in safety only under the following circumstances. . . (2) to accelerate prior to entering the main traveled lane of traffic.

AASHTO guidelines state that there is a need to provide for overrun at the end of an acceleration lane; "At the far end (of the shoulder acceleration lane) there should be no barrier such as a curb between lane and shoulder which would make it difficult for a driver to continue on the shoulder if the opening in through traffic does not materialize." 2/

Acceleration tests indicated that the truck was traveling about 25 mph at the end of the acceleration lane from Loop 116 to U.S. 59 and that about 10 to 12 seconds would have elapsed as the truck traveled from the end of the acceleration lane to the point of impact. With no other vehicles between the bus and the truck after the truck entered the right lane, the busdriver probably would have had a clear view of the truck for at least 10 seconds before impact. Even in the darkness, the taillights of the truck, which tests indicated were illuminated at the time, should have been visible to the busdriver for the 1/2-mile, relatively straight section of U.S. 59 leading to the accident site.

The 345-foot-long marked acceleration lane used by the truck was 230 feet shorter than specified by the original road design and 555 feet shorter than the 900 feet recommended by AASHTO guidelines. Since the impact occurred after the front of the truck had traveled about 927 feet from the intersection, the truck probably would have been operating in the right lane even if the marked length of the acceleration lane had met the AASHTO guidelines. The truckdriver was permitted by Texas law to continue driving past the marked end of the acceleration lane on the improved shoulder to accelerate to traffic speed. However, if the acceleration lane had been marked as being 900 feet long as recommended by AASHTO guidelines, the truckdriver might not have driven onto the highway when he did, and as a result he would have had at least an additional 10 seconds in the marked shoulder acceleration lane to see the approaching bus in his left side mirror and gauge the rate of closure of the bus before and while turning into the highway lane.

The first tire marks attributed to the accident were found in the right southbound lane about 880 feet south of the intersection of U.S. 59 and Loop 116, and 170 feet before the area where the bus crashed through the bridge guardrail. South of these tire marks, another tire mark extended from the left passing lane to the edge of the bridge deck at a 21-degree angle to the centerline of the roadway.

The 200 feet of guardrail approaching the bridge consisted of W-beam guardrail mounted on wooden posts. The bridge guardrail consisted of W-beam guardrail mounted on concrete posts, which were spaced 6 1/4 feet apart and which were an integral part of the bridge deck. The bridge guardrail was 40 years old. It was not designed to redirect vehicles of the bus' size and speed. The W-beam bridge guardrail was flattened and the concrete posts were sheared off in the area that was struck by the bus. After crashing through the bridge guardrail, the bus was airborne for a horizontal distance of 106 feet as it dropped to the creekbank 26 feet below the bridge deck.

2/ "A Policy on Geometric Design of Rural Highways," AASHTO, 1965.

From January 1980 to September 1983, 12 accidents occurred within 0.2 mile of the intersection with Loop 116. Only three of these accidents involved a southbound vehicle. In two of the three accidents, a southbound vehicle struck another vehicle that was crossing the southbound lanes at the intersection. In the third accident, a southbound vehicle ran off the road and overturned in the median. No accidents occurred that were similar to this bus and truck accident.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the Texas State Department of Highways and Public Transportation:

As part of any major pavement improvement project, provide, wherever feasible, for the lengthening of marked acceleration and deceleration lanes that do not meet recommended design standards of the American Association of State Highway and Transportation Officials. (Class III, Long-Term Action) (H-84-64)

As part of any major pavement improvement project, provide wherever feasible for the installation of advanced barrier systems on and approaching bridges in the State of Texas. (Class III, Longer-Term Action) (H-84-65)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . . to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY and GROSE, Members, concurred in these recommendations.


By: Jim Burnett
Chairman

