

Log H-576
Adopted 6-7-94

Accident # DC-A-93-M 020

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C. 20594

Safety Recommendation



Date: JUN 30 1994

In Reply Refer To: H-94-8

Honorable Rodney E. Slater
Administrator
Federal Highway Administration
Washington, D.C. 20590

About 3:30 p.m. CDT on May 28, 1993, the towboat CHRIS, pushing the empty hopper barge DM 3021, collided with a support pier of the eastern span of the Judge William Seeber Bridge in New Orleans, Louisiana. The Judge William Seeber Bridge, known locally as the Claiborne Avenue bridge, carries Highway Route 39 over the New Orleans Inner Harbor Navigation Canal, known locally as the Industrial Canal. The impact severed the pier, causing two approach spans (about 145 feet of bridge deck) and a two-column bent to collapse onto the barge and into the shallow waters of the canal. Two automobiles carrying three people fell with the four-lane bridge deck, resulting in one death and serious injuries to two other people. As a result of the accident, the canal was closed to navigation traffic for 2 days and the bridge was closed to vehicle traffic for 2 months.¹

The Claiborne Avenue bridge was opened by the Louisiana Department of Transportation and Development (LADOTD) in 1957. It is 2,418 feet long and has multiple simply supported approach spans. It has a 360-foot steel-truss vertical-lift span, which is supported by two towers on concrete piers. The east tower pier is protected by a pair of corrugated-sheet pile caissons, one at the north end and one at the south end. Both tower piers have timber fendering.

¹For more detailed information, read Highway Accident Report--*US Towboat CHRIS Collision with the Judge William Seeber Bridge, New Orleans, Louisiana, May 28, 1993* (NTSB/HAR-94/03).

The Safety Board determined that the Claiborne Avenue bridge did not fail as a result of any structural problem. The bridge was designed in accordance with AASHTO specifications for combinations of live load, dead load, and lateral loads from wind and stream velocity. The Safety Board concludes that the Claiborne Avenue bridge was vulnerable to vessel collisions because the approach piers were inadequately protected and that the design of the structure, including simply supported spans and the lack of redundancy in the substructure, made it vulnerable to collapse.

Safety Board investigators found indications of previous impact damage to the north caisson and to the timber-fendering system of the Claiborne Avenue bridge. They also noted the lack of effective protection for the bridge's approach piers. During the November 1992 inspection, State bridge inspectors had an opportunity to recognize the greatly increased accessibility of waterborne traffic to the bridge as a result of Saucer Marine's departure a month earlier. For more than 30 years, the facilities of this marine repair firm had protected, intentionally or unintentionally, the bridge's eastern approach spans from traffic transiting the canal. Saucer Marine, as its lease with the Dock Board required, also provided convenient, no-cost mooring for tows awaiting lockage. In fact, the U.S. Army Corps of Engineers (USACE) based its policy of bringing vessels up between the bridges to wait for lockage on the availability of this mooring. However, when Saucer Marine went out of business in October 1992 and removed its equipment and spud-barge wharf, USACE continued to direct vessels to this area, and the Dock Board continued to charge for mooring at its own wharves. As a result, operators began pushing their vessels into the bank vacated by Saucer Marine. Less than 7 months after Saucer's departure, the CHRIS tow struck the north column of bent 21.

The LADOTD inspection policy and procedures did not identify the vulnerability of the Claiborne Avenue bridge to vessel collision and subsequent collapse. The bridge maintenance engineer testified that the Claiborne Avenue bridge inspection report "that we have on file...is adequate based on the written guidance and training that the inspectors have..." He stated that the LADOTD uses such inspection criteria as the AASHTO 1983 *Manual for the Maintenance Inspection of Bridges* and the Department of Transportation's *Bridge Inspector's Training Manual - 1990*. These manuals, which most States use as reference materials, do not specify that inspectors should examine the bridge and the area or waterway around it to assess conditions contributing to the vulnerability of the bridge to vessel collision.

The Safety Board concludes that although earlier bridge inspections disclosed evidence of previous vessel collisions, the vulnerability of the bents supporting the eastern approach spans and the importance of the condition of the pier protection were not recognized in the inspection review process. Furthermore, although several agencies were involved in the safety of the Claiborne Avenue bridge and vessel navigation in the Industrial Canal, the accident still occurred. These agencies failed to consider, either independently or collectively, the bridge's vulnerability to vessel collision and possible collapse.

The problem of highway bridge vulnerability to vessel collision and subsequent collapse that the Safety Board identified in this accident is not limited to Louisiana. The problem exists nationwide and is compounded not only by the different types and the number of bridge structures but also by the amount of marine traffic plying the waterways of the United States. In the inland waterway system, about 15 percent of the nation's total freight volume is moved by about 5,300 towboats pushing more than 31,000 barges. Moreover, barges and tows have increased in size; a larger tow or barge poses a greater threat to bridges because it has less maneuverability, especially near bends or turns in channels, and because it has a greater impact force. During the 12-year period 1980-1991, the Coast Guard received notifications of 773 reportable² tow collisions with bridges or bridge fendering systems.

The Safety Board concludes that ongoing risk assessment is necessary to protect existing bridges from extreme events and changing conditions; no formal, comprehensive, or effective risk-assessment program existed in Louisiana at the time of this accident. Such a program for the Industrial Canal could have determined that changed conditions had made the Claiborne Avenue bridge vulnerable to vessel collisions and that the bridge would be unable to withstand the lateral loads generated by collisions. The FHWA has emphasized specific areas of bridge vulnerability to extreme events--scour, seismic, etc. It was also instrumental in developing the 1991 AASHTO Guide, which stresses vessel collisions with *new* highway bridges. However, little emphasis has been given to addressing the vulnerability of *existing* bridges to vessel collisions.

As a result of its investigation of the Evergreen, Alabama, accident on May 19, 1993,³ the Safety Board issued to the Federal Highway Administration on May 4, 1994, Safety Recommendations H-94-5 and -6 regarding the vulnerability of bridges to high-speed heavy-vehicle collisions. The status of these recommendations is "Open--Await Response." In light of the recent vessel collision accidents, the Safety Board believes that AASHTO and the FHWA should also ensure that bridge management system *guidelines include information on evaluating* which bridges are vulnerable to collision and collapse from vessel impact. Therefore, the Safety Board recommends that the Federal Highway Administration:

In cooperation with the American Association of State Highway Transportation Officials, broaden the application of risk-assessment and management programs to existing highway bridges. Such programs should include, among other things, a formal assessment of the vulnerability of bridges to vessel collision and collapse. (Class II, Priority Action) (H-94-8)

²Since 1979, the Coast Guard has required that any collision resulting in \$25,000 or more damage to the vessel and/or the bridge be reported.

³ Highway Accident Report--*Tractor-Semitrailer Collision with Bridge Columns on Interstate 65 near Evergreen, Alabama, on May 19, 1993* (NTSB/HAR-94/02).

The Safety Board also issued Safety Recommendations M-94-10 and -11 to the U.S. Coast Guard, M-94-12 to the U.S. Army Corps of Engineers, M-94-13 to the Louisiana Department of Transportation and Development, H-94-9 to the American Association of State Highway and Transportation Officials, and M-94-14 to the Board of Commissioners of the City of New Orleans. If you need additional information, you may call (202) 382-6850.

Acting Chairman HALL and Members LAUBER, HAMMERSCHMIDT, and VOGT concurred in these recommendations.


By: Jim Hall
Acting Chairman