

LOG I-103

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C. 20594

Safety Recommendation



Date: September 30, 1994

In Reply Refer To: I-94-3 through -6

Honorable Federico Peña
Secretary
U.S. Department of Transportation
Washington, D.C. 20591

On September 22, 1993, about 2:45 a.m., barges that were being pushed by the towboat MAUVILLA in dense fog struck and displaced the Big Bayou Canot railroad bridge near Mobile, Alabama.¹ About 2:53 a.m., National Railroad Passenger Corporation (Amtrak) train 2, the Sunset Limited, en route from Los Angeles, California, to Miami, Florida, with 220 persons on board, struck the displaced bridge and derailed. The three locomotive units, the baggage and dormitory cars, and two of the six passenger cars fell into the water. The fuel tanks on the locomotive units ruptured, and the locomotive units and the baggage and dormitory cars caught fire. Forty-two passengers and 5 crewmembers were killed; 103 passengers were injured. The towboat's four crewmembers were not injured.

While bridge strikes are fairly common, comprehensive tracking of their occurrence and systematic evaluation of bridge vulnerability to vessel collision are lacking. Ensuring that appropriate protective measures are provided for bridges such as the one over the Big Bayou Canot is an issue that requires a coordinated national effort. This accident emphasizes the need for such an undertaking to avoid similar mishaps. Subsequent actions taken to protect the Big Bayou Canot railroad bridge, however laudable, may not be sufficient to prevent a similar incident, and the degree to which thousands of other bridges are at risk is unknown.

¹For more information, read Railroad-Marine Accident Report--*Derailed Amtrak Train No. 2 on the CSXT Big Bayou Canot Bridge Near Mobile, Alabama, September 22, 1993* (NTSB/RAR-94/01).

Determining which protective method or combination of methods is appropriate depends on the vulnerability of each structure and thus should be preceded by a comprehensive risk analysis, which will make possible a rank ordering of bridges in need of protection. The accident in Mobile occurred only a few months after another serious vessel collision and bridge collapse that the Safety Board investigated.² These incidents underscore the urgent need to develop a comprehensive risk assessment methodology for bridges and to ensure that it is uniformly applied to all bridges in the United States.

The term "risk," according to a previous Safety Board study, refers to the probability of an event occurring and the consequences of the occurrence.³ Risk assessment is the process by which risks are identified, quantified, qualified, analyzed, and presented; it combines these variables into a single measure of risk, thereby allowing a comparison and ranking of the factors being analyzed. Risk management uses the results of this analysis to reduce risk to an "acceptable level" and can be applied to any bridge in the Nation, including the one that spans the Big Bayou Canot. The operational factors for each bridge in the United States are unique and should determine the type of protection provided for each structure.

Protection from vessel collision can be provided in several ways. New bridges can be built with large vertical and horizontal clearances. In the case of existing bridges that cannot be moved or replaced, other measures are available to minimize risk. They include changes to the channel or aids to navigation such as signs, buoys, retroreflective material on the structure, bridge lighting, radar reflectors, radar beacons (RACONS),⁴ and fog signals.⁵ Islands, caissons, dolphins, and fenders are also means of affording protection. Manually activated traffic control devices, alignment or movement detection systems, and clear bridge identification to facilitate the notification process are all measures that can reduce loss of life or property in the event of an accident. The Safety Board believes that the Department of Transportation (DOT) should consider the use of RACONS, radar reflectors, and other devices to make bridges more identifiable on radar.

Bridges for which the chance of a catastrophic accident is highest should receive the greatest protection. A railroad bridge that carries numerous passenger trains, hazardous material loads, or both across a waterway merits more attention than a bridge over the same waterway

²Highway-Marine Accident Report--*Collision of the U.S. Towboat CHRIS and Tow with the Judge William Seeber Bridge, New Orleans, Louisiana, May 28, 1993* (NTSB/HAR-94/03).

³Special Study--*Protection of Transportation Facilities Against Earthquakes* (NTSB/STS-72/01).

⁴When triggered by a vessel's radar signal, RACONS transmit a coded reply display on the vessel's radarscope and provide the approximate range and bearing to the beacon.

⁵As provided at 33 CFR 118, Coast Guard District Commanders can require such items for bridges. Often they are not required, especially on bridges in the advance approval category, until the maritime industry, having experienced problems with a structure, requests a change in existing protective measures from the Coast Guard. Until an accident occurs, whatever protective measures are in place are considered adequate.

that does not. Similarly, a bridge that spans a waterway with traffic of 200 barges a day is at greater risk than one that spans a waterway carrying 5 barges a day. The location of a bridge is another consideration.

Several factors, including the volume of railroad traffic, numbers of passenger and hazardous material trains, proximity to commercial navigation channels, and volume of marine traffic, should be considered when assessing the vulnerability of railroad bridges to collisions from marine vessels. Only when the vulnerability of a bridge has been adequately assessed can an informed decision be made on the appropriate type of protection. The assessment method should allow vulnerability to vessel collision among bridges to be compared so that priorities for protective measures can be assigned.

Highway bridges are also at risk from vessel collisions, as the collapse of the Judge William Seeber Bridge in New Orleans, Louisiana, on May 28, 1993, demonstrated (see footnote 2). The Safety Board discussed the factors that must be considered in conducting a risk assessment of highway bridges in its report on that accident. Among those factors are daily vehicle traffic over the bridge and the structure's importance to the local economy.

No single entity is responsible for the safety of the Nation's bridges. Federal, State, and local governments, as well as private industry, share that responsibility, and such fragmentation of authority often leads to a piecemeal, uneven approach to bridge safety. What's more, bridge safety involves several transportation modes, including marine, railroad, and highway; and several Federal agencies, including the Coast Guard, the Federal Railroad Administration (FRA), the Federal Highway Administration (FHWA), and the U.S. Army Corps of Engineers, have a role in oversight of these modes. The Safety Board concludes that development of a national risk assessment program for determining bridge vulnerability to vessel collision is needed and believes that the DOT modal agencies should develop one. The Safety Board further concludes that the transportation regulatory agencies need a standard methodology for determining the vulnerability of the Nation's highway and railroad bridges to collisions from marine vessels, for formulating a ranking system to identify those bridges at greatest risk, and for providing guidance on the effectiveness and appropriateness of protective measures.

The Safety Board believes that the DOT should convene an intermodal task force for this purpose. At a minimum, the methodology should address the highway bridge factors discussed in the Safety Board's report on the collapse of the Judge Seeber Bridge and the railroad bridge factors discussed in the report about this accident (see footnotes 1 and 2). It should include a ranking system that will identify bridges at greatest risk so that protective measures can be prioritized. In addition, it should provide guidance on the effectiveness and appropriateness of protective measures such as warning signs, lighting, navigation markers, alignment detectors, pier protection, dolphins, caissons, and radar beacons.

As the DOT agency that regulates the railroad industry, the FRA should maintain close contact with all railroad companies and with the Association of American Railroads (AAR) and the American Short Line Railroad Association (ASLRA), which represent the owners of the

majority of the Nation's railroad bridges. The FRA should work with the AAR and the ASLRA on matters pertaining to railroad bridge safety. The Safety Board believes that in the absence of a single entity charged with oversight of all U.S. bridges, the FRA is the appropriate agency to assume responsibility for railroad bridge safety and should require that all railroad bridges be included in a national risk assessment program that employs the comprehensive risk assessment methodology developed by the DOT.

The Safety Board also believes that the Nation's highway bridges should be included in this process. Since no single entity has oversight of all U.S. bridges, the FHWA is the appropriate agency to assume responsibility for highway bridge safety and should require that all highway bridges be included in a national risk assessment program that employs the methodology developed by the DOT.

Neither alcohol nor illicit drug use appears to have been a factor in this accident. Safety Board tests on samples taken from the MAUVILLA's captain, however, revealed the presence of norpropoxyphene, caffeine, nicotine, cotinine, ibuprofen, and acetaminophen. Norpropoxyphene is the metabolite of propoxyphene, a mild narcotic analgesic drug found in Darvon, a prescription drug for the alleviation of pain. The captain stated that he took Darvocet N 100, as necessary, for pain from an old shoulder injury. Possible side effects of Darvocet include dizziness and drowsiness.

Although the captain was not on watch at the time of the accident, the Safety Board is concerned about the possible effects of medication on performance. Unsupervised use of medication, both prescribed and over-the-counter, by operators in the transportation industry has been an issue in previous accidents.⁶ Operators may not understand the potential dangers of many medications, including their effect on performance, and therefore may use them inappropriately. Consequently, the Safety Board concludes that companies such as the one that owned the MAUVILLA should establish procedures that encourage towboat operators to inform management when they are taking medication, determine whether such medication may affect their performance of duties, and arrange for a qualified relief, if necessary.

Considering previous experiences with medication use by transportation industry employees and the events in this accident, the Safety Board concludes that the industry needs to develop intensive educational programs for employees that stress the relationship between medication and possible effects on fitness-for-duty status. The Safety Board believes that the Secretary of Transportation should require that each modal operating administration issue notices, bulletins, circulars, or other documents that stress the need for transportation industry employees to report any use of over-the-counter or prescription medication so that a determination can be made concerning the effect of such medication on the employees' fitness for duty.

⁶See, for example, Marine Accident Report—*Grounding of the Panamanian-Flag Passenger Cas ferry M/V REGINA, Mona Island, Puerto Rico, February 15, 1985* (NTSB/MAR-86/02) and Railroad Accident Report—*Derailed Amtrak Train 87, Silver Meteor, in Palatka, Florida, December 17, 1991* (NTSB/RAR-93/02/SUM).

Therefore, the National Transportation Safety Board recommends that the Department of Transportation:

Convene an intermodal task force that includes the Coast Guard, the Federal Railroad Administration, the Federal Highway Administration, and the U.S. Army Corps of Engineers to develop a standard methodology for determining the vulnerability of the Nation's highway and railroad bridges to collisions from marine vessels, to formulate a ranking system for identifying bridges at greatest risk, and to provide guidance on the effectiveness and appropriateness of protective measures. (Class II, Priority Action) (I-94-3)

Require that the Federal Railroad Administration and the Federal Highway Administration, for their respective modes, use the methodology developed by the intermodal task force to carry out a national risk assessment program for the Nation's railroad and highway bridges. (Class II, Priority Action) (I-94-4)

Require the modal operating administrations to develop and disseminate bulletins, notices, circulars, and other documents that call attention to the need for an employee reporting procedure concerning use of medication (over-the-counter and prescription) while on duty and that urge the transportation industry to develop and implement informational and educational programs related to this subject. (Class II, Priority Action) (I-94-5)

Consider the use of RACONS, radar reflectors, and other devices to make bridges more identifiable on radar. (Class II, Priority Action) (I-94-6)

Also, the Safety Board issued Safety Recommendations I-94-7 and M-94-30 to the U.S. Army Corps of Engineers; M-94-31 through -38 to the U.S. Coast Guard; R-94-6 through -8 to the National Railroad Passenger Corporation (Amtrak); I-94-8 to the Federal Emergency Management Agency; M-94-39 through -41 to The American Waterways Operators, Inc.; M-94-42 through -45 to the Warrior & Gulf Navigation Company; R-94-9 and -10 to the Association of American Railroads; and R-94-11 and -12 to the American Short Line Railroad Association.

The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations I-94-3 through -6 in your reply. If you need additional information, you may call (202) 382-6840.

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



By: Jim Hall
Acting Chairman