R-94-9
R-648A

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C. 20594

Safety Recommendation

Date: September 30, 1994

In Reply Refer To: R-94-9 and -10

Mr. Edwin L. Harper
President
Association of American Railroads
American Railroads Building
50 F Street, N.W.
Washington, D.C. 20001

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.

[1]For more information, read Railroad-Marine Accident Report–*Derailment of 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.

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 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.

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

---

[2]Highway-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).

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

risk assessment program for determining bridge vulnerability to vessel collision is needed and believes that the Department of Transportation (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 this report (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 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.

While the DOT is developing a national risk assessment methodology, the AAR and the ASLRA should independently initiate certain activities. They should immediately begin to collect data on vessel collisions with railroad bridges from their members. By doing so, the information needed to understand the bridge collision problem and to develop an effective national risk assessment program will be available to the DOT early in its methodology development process. Data on bridge-vessel collisions may also be helpful in identifying the types of bridges that should be included in the risk assessment, as well as those bridges that are especially vulnerable to collisions and thus require immediate protective action by the railroads, the Coast Guard, or other agencies. The Safety Board believes that the AAR and the ASLRA should immediately begin to collect such data from their members and, if appropriate, take steps to increase protection for bridges identified as vulnerable.

The railroad industry must also fully cooperate with the DOT to determine the appropriateness of each bridge protection system and the actual level of protection and risk reduction that each protective method provides. The interests of bridge safety are not served by the railroad industry standing by while the DOT devises a national bridge risk assessment

methodology. The Safety Board believes that the AAR and the ASLRA should cooperate with the DOT in developing a national risk assessment program for railroad bridges.

Therefore, the National Transportation Safety Board recommends that the Association of American Railroads:

> Immediately begin to collect data on vessel collisions with railroad bridges from your members and, if appropriate, take steps to increase protection for bridges identified as vulnerable. (Class II, Priority Action) (R-94-9)
>
> Cooperate with the U. S. Department of Transportation in developing a national risk assessment program for railroad bridges. (Class II, Priority Action) (R-94-10)

Also, the Safety Board issued Safety Recommendations I-94-3 through -6 to the U.S. Department of Transportation; 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; and R-94-11 and -12 to the American Short Line Railroad Association.

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 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 R-94-9 and -10 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