

# NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C. 20594

## Safety Recommendation



**Date:** September 30, 1994

**In Reply Refer To:** M-94-31 through -38

Admiral Robert E. Kramek  
Commandant  
U.S. Coast Guard  
Washington, D.C. 20593-0001

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.<sup>1</sup> (When the towboat struck the bridge, the pilot, who was on the Big Bayou Canot, thought he was on the Mobile River.) 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.

Because all supervisory personnel were responding to the accident, toxicological samples from the MAUVILLA's crew were not collected and tested until about 10 hours after the accident. Because of the 10-hour lapse, the Safety Board cannot conclusively state whether alcohol was present in any of the MAUVILLA's crewmembers at the time of the accident. The Safety Board is concerned about the delay in obtaining samples from both the MAUVILLA crew and the surviving traincrew members, even though the testing took place within Federal timeliness standards in effect at the time, that is, "as soon as practicable." Alcohol at a blood

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

concentration level of 0.10 percent (the legal intoxication level in most States) is eliminated from the body in 6 to 7 hours. Although drugs and their metabolites are eliminated more slowly than alcohol, a 6- to 7-hour delay can also allow drug levels to fall below the testing thresholds established by law.

The Safety Board has long been concerned about drug testing inconsistencies among the transportation modes and about delays in obtaining toxicological samples after accidents. This accident underscores the need for the Coast Guard to develop improved procedures concerning postaccident sampling for toxicological testing. The Coast Guard, which regularly responds to marine accidents and attends to matters of postaccident testing, is fully aware of the law and therefore should provide guidance to employers. However, the Coast Guard has not provided its investigating officers with guidelines for informing marine employers about the law, for stressing the need for timeliness in testing crewmembers, and for assisting marine employers in accomplishing timely postaccident sampling.

In several previous accident investigations, the Safety Board has addressed the need for improved postaccident drug and alcohol testing procedures.<sup>2</sup> The Safety Board believes that the Coast Guard should provide guidelines to boarding officers who investigate marine accidents about informing marine employers of their responsibility to conduct toxicological testing as soon as practicable following a serious marine incident and about providing assistance when necessary (for example, supplying sampling kits and making arrangements for testing with local approved laboratories). This accident reinforces the need for such guidelines, and the Safety Board looks forward to prompt implementation of Safety Recommendation M-94-11, which calls on the Coast Guard to adopt them.<sup>3</sup>

Similarly, although blood and urine specimens were obtained from surviving train crewmembers in accordance with Federal timeliness standards then in effect, that is, "as soon as possible," the Safety Board regards the delay in testing as unjustified. Provisions of the Omnibus Transportation Employee Act of 1991 required that the Federal Aviation Administration, the Federal Highway Administration, the Federal Railroad Administration, and the Federal Transit Administration promulgate comprehensive alcohol use and detection programs. The new alcohol and drug testing regulations, published in the *Federal Register* on February 15, 1994, address for the first time the issue of timeliness. They require that postaccident testing be conducted "as soon as practicable" and set time limits within which testing for alcohol should be accomplished.

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<sup>2</sup>See, for example, Marine Accident Report--*Grounding of the United Kingdom Passenger Vessel RMS Queen Elizabeth 2 near Cattyhuak Island, Vineyard Sound, Massachusetts, August 7, 1992* (NTSB/MAR-93/01) and 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).

<sup>3</sup>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).

The marine industry was not included in the act because the Coast Guard already had regulations on alcohol use, including mandatory postaccident alcohol testing. The pipeline industry was excluded because, unlike other forms of public transportation, it does not transport people. The Research and Special Programs Administration, which regulates the pipeline industry, nonetheless implemented regulations similar to those of the other Department of Transportation (DOT) operating administrations. The Coast Guard did not, and its regulations pertaining to timeliness of postaccident toxicological testing do not conform with those of the other DOT operating administrations.

The Safety Board concludes that delays in obtaining samples from vessel crewmembers, which prevented definitive determination of whether alcohol was a factor in this accident, could continue to be a factor in marine accidents because Coast Guard regulations pertaining to timely postaccident toxicological testing do not conform with those of the other DOT operating administrations. The Safety Board believes that the Coast Guard should amend 46 CFR 4 and 16 to specify the time limits, not to exceed 8 hours, within which employers must conduct postaccident alcohol testing.

Although the operations of Warrior & Gulf Navigation (W&GN), which owned the MAUVILLA, complied with Coast Guard licensed operator manning regulations, the company did not ensure that the pilot of the MAUVILLA was adequately trained in the use of radar. Had the pilot been adequately trained to use radar, he should have recognized the juncture of the Big Bayou Canot and the Mobile River on the radarscope. When he inadvertently departed from his course, he should have been able to interpret his position on the radar and respond to the change in course appropriately. To locate a suitable place to secure their tows and wait for visibility to improve, towboat operators need to be trained in use of radar to navigate. The Safety Board found that W&GN did not provide the pilot with radar training beyond the rudimentary experience gained on the job (OJT).

Like the MAUVILLA's pilot, operators of uninspected towing vessels (OUTVs) typically learn to use radar through OJT. The knowledge imparted and skills learned through OJT vary, and a formal written examination is rarely given. The accident involving the MAUVILLA illustrates the shortcomings of such an approach to acquiring radar skills. Had the pilot received formal training in and been tested for radar skills, he should have been able to navigate his vessel properly without becoming lost. If the pilot had known how to navigate using radar, the MAUVILLA could have proceeded when the fog developed until the pilot was able to safely stop the tow. Operators need radar navigational skills because tows are not always in locations suitable for stopping when fog occurs. While the prudent course of action is to stop the tow until visibility improves, pilots must continue to operate until they find a safe place to stop.

Deck officers licensed to stand watch on radar-equipped, inspected vessels of 300 gross tons or more must successfully complete a Coast Guard-approved radar observer course to obtain their original license (have "radar observer" endorsed on the license with the date of completion) and must successfully complete a refresher course every 5 years thereafter. In the case of OUTVs, only those holding a license for ocean waters are required to have a radar observer

endorsement. As this accident demonstrates, radar observer training should be required of all OUTV licenseholders. Inland Navigation Rule 7(b), which applies to OUTVs, states: "Proper use shall be made of radar equipment if fitted and operational." Safe operation of a vessel includes proper use of radar, and only if a person successfully completes radar observer training at approved facilities can minimum proficiency in radar use be ensured.

The formal radar observer training currently available focuses on navigation of vessels offshore and in harbors. It emphasizes skills such as plotting of courses and collision avoidance maneuvers between vessels, which are useful on offshore waters and in harbors. This training is not directed at inland river navigation. The Coast Guard should develop radar observer course standards that, in addition to collision avoidance, teach navigation skills necessary for safe river operations. The Safety Board believes that current minimum licensing requirements are insufficient and that maritime safety would be enhanced by requiring that OUTVs be trained to use radar properly in a Coast Guard-approved radar observer course.

Title 46 CFR Parts 24 through 28 set forth equipment requirements for uninspected vessels. The regulations do not cover navigation equipment. Thus, the MAUVILLA, an uninspected towboat of less than 1,600 tons, was not required to be fitted with a radar, charts, or compass.

Like almost all uninspected towing vessels,<sup>4</sup> the MAUVILLA did have a radar, which is an important navigation aid widely used to detect the presence or movement of objects in a waterway. To require that radars be installed on uninspected towing vessels would be to regulate what is accepted practice and would not be an imposition on the industry, but it would prevent such vessels from operating legally unless their radar was in proper working order and would encourage operator reliance on radars. Operators trained in radar observation would be more likely to use radar and would know how to use it properly. They would also be less likely to become disoriented in fog. Proper use of radar by the MAUVILLA's pilot could have prevented this accident. The Safety Board concludes that all uninspected towing vessels, except those operating in very limited areas, should be required to have a radar installed. The Safety Board believes that the Coast Guard should require that towing vessels be equipped with radars and that towing vessel operators be trained in its use for navigation.

Graphic representations of the geographic features of a waterway, or charts, are another aid to safe navigation. Many river towboat operators carry their own charts, known as "bar books" or "bar charts," which are generally U.S. Army Corps of Engineers (USACE) waterway charts that have been annotated by the operators to assist them in navigating a waterway. On the night of the accident, the MAUVILLA had no charts on board, and the pilot did not have his personal set with him. W&GN's general manager testified that "charts are not required as standard operating equipment on Warrior & Gulf vessels or any other towboats or vessels under 1,600 gross tons." He said company "policy is to encourage our pilot trainees or anyone else

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<sup>4</sup>The most common exceptions are tugs and towboats that operate in limited confines such as fleeting areas or shipyards.

who wishes to use a chart to do so, if it will help them to familiarize themselves with the river system."

Had the pilot, mistakenly thinking he was on the river rather than the bayou, looked at a chart as he approached the Big Bayou Canot bridge, the chart alone would not have helped him. But if he had used a chart, in conjunction with radar, to track his progress as soon as visibility began to decrease, he could have avoided making a wrong turn into the bayou and thus prevented the accident. Most towboat operators who operate frequently over the same route become very familiar with that waterway. During clear visibility, especially in the daytime, they have no need to refer to charts and generally do not do so.

But when towboat operators are in unfamiliar waters or when visibility is low, whether due to fog, rain, sleet, snow or other cause, charts are important reference tools. Because visibility can deteriorate rapidly and with little notice, charts should be available in the pilothouse at all times. The Safety Board concludes that the Coast Guard should require that all uninspected towing vessels have charts on board appropriate for the vessels' route.

Recent advances in computer technology have made possible the development of digitized electronic charts that can be presented on a video screen. The National Oceanic and Atmospheric Administration (NOAA) is digitally scanning all of its charts, which number about 1,000, and expects to complete the project by the end of 1995. Beginning in fall 1994, NOAA, in cooperation with a commercial enterprise, will issue about 400 charts on floppy disks, which are expected to cost about the same as the paper charts. The USACE does not plan to digitize its river charts for distribution to users, but it has digitally scanned its St. Louis-to-New Orleans charts for internal use in survey and river maintenance operations. USACE charts for the Tombigbee River from Demopolis, Alabama, to the Tennessee River are also being digitized for internal use and should be completed next year.

The NAVSTAR Global Positioning System (GPS) provides a highly accurate<sup>5</sup> navigational aid that is available worldwide, and international organizations are cooperating to develop standards for GPS equipment and electronic charts. Navigating in rivers and restricted waters requires a more accurate system, and the differential GPS (DGPS) is being developed to meet this need.<sup>6</sup> DGPS land stations, which have broadcast ranges of up to 240 miles, broadcast corrections for use by GPS receivers. The station network for the U.S. east and south coasts is being tested and evaluated, and the entire network is scheduled to be operational by January 1996. The USACE, in cooperation with the Coast Guard, has built DGPS stations in St. Louis, Missouri; Memphis, Tennessee; and Vicksburg, Mississippi. The DGPS station network for the Mississippi River, which is also being tested and evaluated, is expected to be operational by June 1997. The Coast Guard plans to build 11 more DGPS stations in the Western Rivers area.

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<sup>5</sup>It can give positions accurate to 100 meters.

<sup>6</sup>Accuracy is in the 8- to 10-meter range, and greater accuracies are possible. Newer GPS receivers are of higher quality and yield greater accuracy, which is also a function of the vessel's closeness to the DGPS station.

Digital chart technology, coupled with GPS navigation technology, has made possible continuous electronic representation of navigational positions on computer. Mariners have long plotted their positions based on where they were rather than where they are. Electronic charting will give them continuous, real-time data, allowing them to monitor their positions by looking at the screen. The Safety Board welcomes these advances in technology, which should significantly improve navigation safety. If an electronic charting system and the DGPS had been available and installed on inland towing vessels such as the MAUVILLA, the accident at the Big Bayou Canot railroad bridge could have been avoided. The Safety Board believes that the Coast Guard and the USACE should promote the development and application of low-cost electronic charting navigation devices for inland rivers.

Emergency responders were delayed in identifying the location of the accident site because Big Bayou Canot bridge had no waterway mile marker or nameplate, thereby creating confusion and hindering marine response activities. When the captain of the MAUVILLA notified the Coast Guard Group Mobile that an accident had occurred, he was unable to identify the bridge; train 2's crew was unable to do so as well. Marine responders were uncertain which bridge was involved until about an hour after the accident. This confusion about the accident location would have been eliminated had the bridge borne a marking that response centers could recognize.

Not long after the accident at Mobile, another bridge striking occurred that posed a similar identification problem. At 9:55 a.m. on December 1, 1993, the towboat JENNIE DEHMER and its two-barge tow struck the Norfolk Southern Railroad bridge at mile 647.3, Tennessee River, in Knoxville, Tennessee, displacing the bridge pier 12 to 18 inches and the track 9 inches. The towboat operator on watch reported the accident at 10:00 a.m. to the Coast Guard Group Ohio Valley radio operator, giving the location as the Louisville and Nashville (L&N) Railroad bridge "just above the 647 point something or other [646.6], here in downtown Knoxville."

About 11:10 a.m., CSXT, which owns the L&N bridge, informed the Coast Guard that the bridge involved was in fact the Norfolk Southern Railroad bridge at mile 647.3. The dispatcher in Knoxville called about 11:45 a.m. to advise the Coast Guard that someone looking out his office window had seen the accident and immediately called Norfolk Southern Railroad, which was able to prevent a train about 4 miles from the damaged bridge from crossing it.

If bridges over waterways had some form of marking visible from both water and land, making identification simple and quick, confusion could be eliminated. Marking a bridge would help mariners and others readily identify it and advise emergency response personnel of the location, thereby facilitating notification of the bridge owner and proper authorities, who could control or stop bridge traffic. As the Mobile and Knoxville accidents demonstrate, prompt bridge identification is critical to ensure efficient movement of response forces to the accident scene and to halt land traffic about to transit damaged structures.

The Safety Board concludes that all bridges vulnerable to impact by commercial marine traffic should be required to have appropriate markings so that they can be identified promptly from land and water in the event of an accident or other emergency. The Safety Board believes that the Coast Guard should require such markings and periodically publish a list of them as part of a national bridge register. Such an inventory should be available to emergency response organizations and, following publication, should be included on navigation charts.

Therefore, the National Transportation Safety Board recommends that the U.S. Coast Guard:

Amend 46 CFR 4 and 16 to specify the time limits, not to exceed 8 hours, within which employers must conduct postaccident alcohol testing. (Class II, Priority Action) (M-94-31)

In consultation with the inland towing industry, develop radar training course curricula standards for river towboat operations that emphasize navigational use of radar on rivers and inland waters. (Class II, Priority Action) (M-94-32)

Upgrade licensing standards to require that persons licensed as Operators of Uninspected Towing Vessels hold valid river-inland waters radar observer certification if they stand navigation watch on radar-equipped towing vessels and to require that employers provide more specific evidence of training. (Class II, Priority Action) (M-94-33)

Require that all uninspected towing vessels carry appropriate navigational devices, including charts, in the wheelhouse. (Class II, Priority Action) (M-94-34)

Promote, in cooperation with the U.S. Army Corps of Engineers, the development and application of low-cost electronic charting navigation devices for inland rivers. (Class II, Priority Action) (M-94-35)

Require that radar be installed on board all uninspected towing vessels except those that operate within very limited areas. (Class II, Priority Action) (M-94-36)

Require that all bridges vulnerable to impact by commercial marine traffic bear unique, readily visible markings so that waterway and bridge users are better able to identify bridges involved in an accident when they report such accidents to emergency responders. (Class II, Priority Action) (M-94-37)

Periodically publish a list of bridge identification markings in a national register of bridges. (Class II, Priority Action) (M-94-38)

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; 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 M-94-31 through -38 in your reply. If you need additional information, you may call (202) 382-6860.

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

  
By: Jim Hall  
Acting Chairman