

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: April 1, 1985

Forwarded to:

Admiral James S. Gracey
Commandant
U.S. Coast Guard
Washington, D.C. 20593

SAFETY RECOMMENDATION(S)

M-85-18 through -24

About 0015 c.s.t. on April 26, 1984, a tow consisting of 12 barges laden with grain, was being pushed ahead by the U.S. towboat ERIN MARIE, when it collided with a pier of the Poplar Street Bridge, which crosses the Upper Mississippi River between St. Louis, Missouri, and East St. Louis, Illinois. The tow, which was proceeding downriver during high water conditions, was arranged three barges wide and four barges long with the towboat pushing at the center aftermost barge. The hulls of the forward two of the four barges on the starboard side were ruptured when the tow struck the bridge pier. These two barges, in addition to the forward two center and forward two portside barges broke loose from the tow as a group of six barges. The two aftermost barges on the starboard side also separated and floated free down stream. Only four barges remained attached to the ERIN MARIE. One of the two forward starboard barges sank and its cargo was damaged; three barges were punctured and two other barges sustained minor damage. 1/

The barges which had broken free from the tow floated down river, striking a fleet of 23 barges, breaking them from their mooring and causing them to float free down river. The barges in turn struck other fleeted barges and shoreside facilities. More than 150 barges and vessels were broken free of their moorings and cast adrift in the river. The total damage to barges, cargo, fleeting areas, and barge loading facilities was estimated at \$3,000,000. There were no injuries to persons.

The relief operator maneuvered the tow under the Merchants Railroad Bridge, mile 183.2, and the McKinley Highway and Railroad Bridge, mile 182.5, without experiencing any navigational problems. The operator remained in the wheelhouse until the tow was between the two bridges and then went below to his room. The vessel then passed slightly to the right of the green lights of the main span of the Veterans Memorial Bridge, mile 180.2, (slightly right of the center of the river's channel) and then the relief operator steered to the right to point the starboard row of barges under the right daymark on

1/ For more detailed information, read Marine Accident Report--"Ramming of the Poplar Street Bridge by the Towboat M/V ERIN MARIE and Its Twelve - Barge Tow, St. Louis, Missouri, April 26, 1984" (NTSB/MAR-85/2).

the Eads Highway and Railroad Bridge, mile 180.0, in a maneuver to compensate for a right to left crosscurrent and thereby place the towing vessel near the center of the highest point of the arch on the Eads Bridge. The towboat passed about 10 feet to the left of center of the arch. With the river level gage in St. Louis at 33.3 feet, there was 55.3 feet of vertical clearance at the center of the arch and 40.5 feet of vertical clearance for 150 feet to the left and right of center. The ERIN MARIE had an estimated maximum height above water of 36 feet. The relief operator stated that he was busy maneuvering through the Eads Bridge trying to avoid the arch and to compensate for the crosscurrent which was setting the tow to the left, from the Missouri to the Illinois side of the river, on the downstream side of the bridge. As the tow cleared the bridge, the relief operator steered the tow to the right to point it toward what he thought was the right descending pier of the main navigation span of the Poplar Street Bridge, mile 179.2. However, the operator had misidentified the green light on the Illinois span of the Poplar Street Bridge as that on the main span and was steering instead toward the left descending pier of the main navigation span. There was only 0.8 mile between the bridges, or slightly more than four lengths of the tow. About two tow lengths from the Poplar Street Bridge, the relief operator realized that something was wrong with the tow's position because he did not feel the current setting his tow to the left as expected. The tow travelled one more tow length before the relief operator determined that he was heading for the Illinois span and not the main navigation span in the center of the river. He then attempted to steer the tow to the left toward the left descending pier of the Illinois span. He stated that at that moment he had a better opportunity to avoid the bridge pier between the two spans rather than try to maneuver the tow to the right for the main span. As he steered to the left, he told the deckhand, who was standing by in the wheelhouse, to call the operator. The operator arrived in the wheelhouse to when the tow was about 300 feet above the left descending pier of the main span and took over navigation of the tow from the relief operator. The relief operator told the operator that the tow was out of shape and that he had steered on the wrong bridge lights. The operator told the relief operator to contact via radio the Eagle Marine Service's office (at mile 177.4, UMR), a 24-hour-a-day harbor fleeting service, to tell them that the ERIN MARIE was going to hit the bridge and to request that they send towboats to the bridge. When contacted, the fleeting service responded that it had no towboats immediately available. The operator continued the left turn until the starboard head of the barge had cleared the left descending pier of the main navigation span and then applied right rudder in an attempt to swing the stern of the tow away from the pier. The maneuver was not successful, and the starboard side of the tow about 100 feet aft of the bow of the first barge struck the left side of the left descending pier of the main span. This occurred about 0015 on April 26.

When the tow struck the pier, the force of the impact ruptured the hulls of the forward two barges on the starboard side. These two barges and the two forward center and two forward portside barges broke loose from the tow and floated free as a unit passing down river through the Illinois span. The two remaining starboard side barges also broke loose from the tow and together floated down river through the main or center span. Four barges, the after two center and the after two portside barges, remained secured to the ERIN MARIE. The barges that broke away from the tow collided with barges moored in fleeting areas and at docks downstream from the Poplar Street Bridge causing a chain reaction as floated and docked barges were in turn broken away from their moorings. The breakaway barges collided with the Monsanto Chemical Company barge facility (mile 178.0, LDB, UMR); the Pillsbury Company barge loading facility (mile 177.6, LDB); the Corps of Engineers Service Base Dock (mile 176.6, RDB); and various other floated barges. An estimated 150 barges and other vessels were set adrift by the domino effect of the breakaway barges from the ERIN MARIE tow.

The relief operator's testimony indicated that he was not well experienced about navigating a large tow through the St. Louis area at night during flood water conditions. He was not familiar with the strength of the crosscurrent at the Eads Bridge during flood water; thus, he was unable to orient correctly his tow during the approach to the bridge in order to compensate for the crosscurrent. When the tow cleared the Eads Bridge, the relief operator did not look for the three white lights over the green light which marked the center of the main span of the Poplar Street Bridge. He expected them to be extinguished as he had misunderstood a Notice to Mariners broadcast the evening before which reported that the three downstream white lights were extinguished (in fact, there are no white lights at this location). He decided to head for the green light that he did see on the assumption that the white lights were still extinguished. However, the green light marked the center of the side span. Had the relief operator possessed adequate local knowledge, he would have been aware of two important factors: (1) because of the crosscurrent, the tow would be headed toward the Illinois-side span as it passed through the center span of the Eads Bridge, and (2) it would be essential to direct the head of the tow to the right after clearing the Eads Bridge because of the curvature of the river and the effects of the crosscurrent. The Safety Board believes that operators piloting a large tow through the St. Louis area should be required to have sufficient local knowledge to be able to use aids to navigation effectively and facilitate maneuvering through the numerous closely spaced bridges; for that matter, the operator must have local knowledge of all other areas along his route which are particularly difficult to navigate.

In the preamble to the publication of the uninspected towing vessel operator license regulation the Coast Guard stated that they would develop a system to collect casualty information to analyze towboat accidents in order to evaluate the towing operator license regulations continually to insure that the licensees had the proper qualifications. The issuance of a license to operate throughout the Western Rivers, without requiring that the applicant be examined on his local knowledge, even as to areas known to be difficult to navigate or to have a high rate of accidents, does not provide an adequate safeguard to prevent accidents similar to this one. The consequences of this accident could have been much more severe if the barges had been carrying dangerous chemicals or petroleum products instead of grain. After having had over 11 years of experience in the issuance of towing operator licenses and in the investigation of pertinent accidents, the Coast Guard should now review its accident data on towing vessels and in light of it evaluate the qualifications needed by towboat operators on the Western Rivers. The Coast Guard's requirements for issuing towboat licenses (experience and knowledge) should be revised accordingly. An applicant for an operator's license should be required to pass an examination that includes questions on local knowledge within the geographic area for which he seeks endorsement. The testing for local knowledge for an operators license endorsed for the Western Rivers would not need to be as rigorous as for a license as first class pilot. For the Western Rivers, it would be sufficient if the applicant were tested on a limited number of high hazard or major accident areas, such as St. Louis Harbor, and certain bends, bridges, and other areas where traffic, current, or other conditions are known to adversely affect the safety of navigation. The Coast Guard should identify such areas of the Western Rivers and require that an applicant for a license as an operator of uninspected towing vessels be examined for local knowledge of any of these areas to be covered by the license as to provide evidence of successful completion of simulator exercises for these areas upon each renewal of a license, as is the current practice for rules of the road exercises.

Title 33, CFR Part 118 describes the requirements for lights on bridges. The regulations requires that the lower white light shall not be placed more than 15 feet nor less than 10 feet above the green light and that the other white lights shall be between 7

and 15 feet above the light below it. The regulations at section 118.100 authorize the Coast Guard District Commander to modify this spacing as local conditions warrant. The Poplar Street Bridge had the following light separations authorized in its approval of a lighting plan in 1963 as follows: 9 feet from the green light to the first white light, 6 feet between the bottom and middle white light, and 7 feet between the middle and top white light. The white lights were lighted on the Poplar Street Bridge but may have been obscured due to background lights or due to not being separated to the maximum spacing as allowed in the regulations.

The Coast Guard Notice to Mariners broadcasts at 1648 and 1715, on April 25 reported among other things that the three downstream midchannel white lights were extinguished. The relief operator stated that he misunderstood the broadcast and believed that the white lights were out so that he did not expect to see them above the green lights on the upstream main span. He did not make any effort to contact the Coast Guard or harbor boats after coming on watch to confirm the status of the lights. The relief operator stated the background lights in the downtown area and below the bridges interfered with his ability to recognize navigation lights; especially distracting were the Pillsbury dock lights at 177.6, LDB. The impact of such lights on navigation through St. Louis Harbor should be studied, and, if found to be distracting, appropriate corrective measures taken.

The relief operator's understanding of the Broadcast Notice to Mariners should have alerted him that there could be difficulties in locating the main navigation span and that he would have to use other cues to distinguish between the similarly lighted spans of the Poplar Street Bridge. He later determined it to be the left pier of the main span. The relief operator testified that he was sure that he was heading for the green light for the main span. However, he did not make any efforts to confirm this belief. He should have made a concentrated effort to look for the green light in adjacent spans, used the towboat's radar, used landmarks which would help fix his position in the river, or used the searchlights to thoroughly scan the bridge to identify the bridge spans and piers. If the Illinois span's green light had been extinguished, he most certainly would have taken these steps. The relief operator did not make any effort nor did he locate any other bridge navigation lights until the tow was more than midway between the bridges. When he saw the main span's three white lights over the green light, he put the rudders to the left to avoid hitting the left pier of the main span head on and called the operator for assistance.

The consequences of the ramming of the bridge pier did not escalate into a major accident until the tow's breakaway barges drifted into barges flected along the river bank and caused other barges to breakaway. Even though there was about \$3 million damage to barges and shoreside facilities, there were no injuries. It was fortuitous for the St. Louis area that the tow or the flected barges did not contain dangerous chemicals or highly flammable petroleum cargoes. Had they, the result may have been catastrophic to this densely populated and heavily trafficked area. The barges and other vessels being set adrift could have caused more damage had it not been for the two lineboats and numerous fleet boats in the area which quickly responded to Coast Guard requests for assistance. One lineboat was waiting for a tow and the other had just passed through St. Louis with a southbound tow. The one waiting for a tow protected a 48-barge fleet by pushing breakaway barges away from the fleet and into the channel. The other lineboat tied off its tow, proceeded to catch a 28-barge fleet, and then assisted in rounding up barges until the emergency was over. The flected barges should be able to withstand a certain amount of impact without massive breakaways. If standby fleet boats had been required for the fleets, they might have prevented their fleet breakaways by pushing runaway barges away from the fleet and onto the bank. There are no regulations applicable to flected barges on any waters of the United States except for one regulated navigation area between mile

88 and 127 on the Lower Mississippi River near New Orleans, Louisiana. These regulations are found at 33 CFR 165.803 and contain requirements for moorings, specifying the responsibilities of the person in charge, inspection, recordkeeping, and surveillance requirements. They also contain requirements to establish procedures for securing breakaways and procedures to be followed during high water.

As a result of its investigation of the 38 barge breakaway on the Arkansas River, 2/ the Safety Board issued Safety Recommendation M-83-56 on August 16, 1983, recommending that the USCG:

Promulgate regulations similar to the regulations contained in 33 CFR 128.801 [relocated to 33 CFR 165.803] to be applicable to barge fleets moored in all portions of the inland waters of the United States.

The Safety Board agreed with the Coast Guard that a universal set of barge fleeing regulations for all inland waters of the United States may not be necessary and that a barge breakaway problem is best handled at the local level through the establishment of a regulated navigation area. Therefore, the Safety Board has classified Safety Recommendation M-83-56 "Open—Acceptable Alternate Action."

This accident, however, again gives credence to the need for designating St. Louis Harbor as a RNA and for developing regulations for fleeing similar to those found in 33 CFR 165.803.

As a result of its investigation of the M/V CITY OF GREENVILLE accident, 3/ the Safety Board issued Safety Recommendation M-83-93 on February 6, 1984, recommending that the USCG:

Identify critical areas of the Western Rivers which are difficult to navigate due to unusual current conditions, sharp bends, navigation clearance restrictions, or similar circumstances, and require applicants for licenses as operators of uninspected towing vessels to take an examination regarding local knowledge of these areas.

On May 18, 1984, the USCG replied:

"The Coast Guard concurs with the intent of this recommendation. We are, however, concerned that limiting the operator of uninspected towing vessels (OUTV) license to areas of a river corresponding to local knowledge might be contrary to Congressional intent associated with the Towing Vessel Operator Licensing Act, (P.L. 92-339). We note that the present license examinations reflect only a slight modification from the preliminary proposals which were presented at Congressional hearing on the subject and that House Report No. 92-125, 92nd Congress (1971) stated in part that the 'Committee endorses the concept reflected in the draft regulations submitted as meeting the intent of the Committee to insure that the proper qualification of an individual seeking a license as required by this bill.' We have initiated a review of our casualty

2/ Marine Accident Report--"Breakaway of 38 Barges, Arkansas River, December 4, 1982" (NTSB-MAR-83-05).

3/ Marine Accident Report--"Ramming of the Poplar Street Bridge by the Towboat M/V CITY OF GREENVILLE and Its Four-Barge Tow St. Louis, Missouri, April 2, 1983" (NTSB-MAR-83/10).

information to identify critical areas of the Western Rivers as recommended by the Safety Board. Additionally, we will place this as an agenda item for consideration by the Towing Safety Advisory Committee (TSAC). We will correspond with you further on this recommendation."

The Safety Board continues to believe that demonstrating local knowledge of certain difficult to navigate areas is critical to marine safety on the Western Rivers but has concluded as a result of this accident that a somewhat broader approach is necessary than was recommended in M-83-93. Accordingly, the recommendation has been classified "Closed--Superseded" and a new recommendation will be issued.

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

When the ongoing study to identify critical areas of the Western Rivers which are difficult to navigate is completed, analyze the cause of the accidents in these areas as well as in areas that have a higher-than-average accident rate or recurrent major accidents to determine which accidents resulted from personnel error or operator unfamiliarity with an area. Utilize this data to develop examination or exercise questions on local knowledge of these areas. (Class II, Priority Action) (M-85-18)

Require future applicants for an original or renewal license as operator of uninspected towing vessels who intend to operate in critical areas which are difficult to navigate, or have a higher-than-average accident rate, or where there are recurrent major accidents, to pass a written examination or exercise, a simulator training course at a Coast Guard approved school, or a simulator exercise at a Coast Guard licensing center, regarding local knowledge of these areas before the license is issued. (Class II, Priority Action) (M-85-19)

Conduct a field test using a bridge with characteristics such as the Poplar Street Bridge in St. Louis Harbor to study the applicability and identifiability of alternative bridge main span light displays, such as electroluminescence, laser, strobe and moire lights. (Class III, Longer Term Action) (M-85-20)

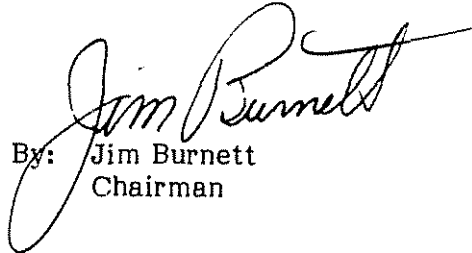
In cooperation with the State of Missouri, study the desirability of extinguishing the downbound green light in the Illinois span of the Poplar Street Bridge during high water when the span customarily is not used by downbound lineboats. (Class II, Priority Action) (M-85-21)

In cooperation with the State of Missouri, determine the optimum separation for easy identification of the vertical white lights, located over the green light on the main navigation span of the Poplar Street Bridge and, if necessary, modify the spacing. (Class II, Priority Action) (M-85-22)

Conduct a comprehensive review of shore lighting in St. Louis Harbor to determine which lights adversely affect identification of bridge span navigation lights and take action to minimize the effect of the shore lights that interfere with bridge light identification. (Class II, Priority Action) (M-85-23)

Designate St. Louis Harbor as a regulated navigation area and promulgate regulations similar to the regulations contained in 33 CFR 165.803. (Class II, Priority Action) (M-85-24)

BURNETT, Chairman, GOLDMAN, Vice Chairman and BURSLEY, Member, concurred in this recommendation.


By: Jim Burnett
Chairman