

SP20



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: July 21, 1986

In reply refer to: M-86-68 through -77

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Commandant
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Washington, D. C. 20593

Log: M-318
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About 1710, on December 12, 1985, the 382-foot-long U.S. passenger vessel *MISSISSIPPI QUEEN* and the U.S. towboat *CRIMSON GLORY* with its tow of 28 barges, approximately 1,150 feet in overall length, collided on the Mississippi River near Donaldsonville, Louisiana. The *MISSISSIPPI QUEEN* was holed and began to flood; however, the passenger vessel was grounded after the collision and all 405 passengers and crew were safely evacuated. The *CRIMSON GLORY* sustained minor damage and stood by to aid the *MISSISSIPPI QUEEN*. The estimated cost of repair to the two vessels was over \$7 million. ^{1/}

Title 46 CFR 78.10 prohibits passengers in the pilothouse while a vessel is underway. From at least 1445 on December 12 until the time of the accident, a passenger was present in the pilothouse of the *MISSISSIPPI QUEEN*. Furthermore, the master said that passenger tours of the pilothouse often were conducted while the *MISSISSIPPI QUEEN* was underway. The master testified that the passenger's presence in the pilothouse did not influence the decisions of the pilot on the day of the accident. However, the Safety Board believes that her presence in the pilothouse was a potential distraction to the pilot and the pilot-in-training. A passenger tour could result in a more significant distraction. Since the accident, passengers are no longer permitted in the vessel's pilothouse while the *MISSISSIPPI QUEEN* is underway.

Unlike the U. S. Coast Guard (USCG) regulations (46 CFR Subchapter H) under which the *MISSISSIPPI QUEEN* was certificated, 46 CFR Subchapter T for small passenger vessels does not contain any prohibition against passengers being in the pilothouse while underway. The presence of passengers in a pilothouse can be a significant distraction whether the vessel is subject to the USCG passenger regulations (46 CFR Subchapter H) or the small passenger regulations (46 CFR Subchapter T). The Safety Board recognizes that the regulations for small passenger vessels cover a wide range of vessel sizes and arrangements but, believes where practical, passengers also should be prohibited from the pilothouse of small passenger vessels while underway.

^{1/} For more detailed information, read Marine Accident Report—"Collision Between U.S. Passenger Vessel *MISSISSIPPI QUEEN* and U.S. Towboat *CRIMSON GLORY* in the Mississippi River near Donaldsonville, Louisiana, on December 12, 1985" (NTSB/MAR-86/09).

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Calculations performed by the USCG after the accident show that, although the MISSISSIPPI QUEEN could survive flooding of the lower machinery compartment, the additional flooding of the after crew staterooms would have led to the sinking of the vessel had it not been grounded. The after crew staterooms were flooding through the deck drains where check valves had been stuck in the open position from debris. The deck drains led to sumps which vented directly into the flooded lower machinery compartment. Although the drain system in the after crew stateroom compartment met USCG requirements, the system failed because the check valves were not properly maintained. The flooding of the staterooms also could have been prevented if the vents for the drain sumps had terminated above the main deck.

Title 46 CFR 170.110 requires that each trim and stability booklet contain sufficient information to enable the master to operate the vessel in accordance with USCG regulations. The regulations give general guidance as to the contents of the booklet, which must be approved by the USCG. The Safety Board believes that the information on flooding provided the master of the MISSISSIPPI QUEEN was difficult to understand and did not provide sufficient nor accurate information.

Although the MISSISSIPPI QUEEN's master had some knowledge of stability, the USCG did not require any knowledge of stability in order for him to obtain the license of master (inland waters) or first class pilot. Therefore, it was important that the MISSISSIPPI QUEEN's trim and stability booklet be written in clear and precise language appropriate to the vessel and its operation that could be readily understood by its master. Misinterpretation of the guidance regarding damage stability in the trim and stability booklet could have resulted in the loss of the vessel and many lives. The MISSISSIPPI QUEEN's trim and stability booklet should be rewritten to give clear and complete information regarding accidental flooding and general precautions to minimize progressive flooding. Title 46 CFR 170.110 addresses the contents of a trim and stability booklet but does not give any guidance on language or format.

On October 24, 1985, the USCG published a supplemental notice of proposed rulemaking (NPRM) at 50 FR 443316. These proposed regulations would require the applicant for a license of master of inland waters to pass an examination which includes knowledge of ship stability and damage control. On February 14, 1986, the Safety Board urged the USCG to adopt these ~~proposed~~ regulations because knowledge of stability is essential to the safe operation of a passenger vessel. The USCG proposes to publish an interim final rule by December 1986.

The MISSISSIPPI QUEEN receives passengers at various ports of call during the cruise. Because they board the vessel after the majority of passengers, these passengers are not given emergency procedures briefings and they do not participate in fire and boat drills. All passengers on the MISSISSIPPI QUEEN, at any given time when the vessel is underway, should have the benefit of a comprehensive and standardized emergency procedures orientation, including a visit to the assigned muster station. This could be accomplished for passengers, who embark after the fire and boat drills, when they report to the purser's office for stateroom assignments.

Crew familiarity with emergency-related responsibilities is not the same as being able to perform them proficiently. During the emergency, for example, one of the four liferafts was lost because the crew did not secure the liferaft properly to the vessel. The USCG should require that crews of passenger vessels receive appropriate and specific training, in the crewmember's emergency duties, including the actual use of necessary equipment, and demonstrate proficiency in the performance of those emergency duties.

Life preservers in use aboard vessels in lakes, bays and sounds, or river service are not required to be equipped with life preserver lights as required for vessels in other types of service. The potentially severe operating conditions in river service indicates the need for such devices. Darkness, rapid river currents, poor visibility, low water temperatures, and other environmental conditions similar to those encountered during the evacuation of the MISSISSIPPI QUEEN would hamper search and rescue operations and reduce the ability to locate victims in the water.

In the event of a serious accident or fire, hundreds of persons could potentially be forced to enter the water, a concern expressed during this accident by the master of the MISSISSIPPI QUEEN as he ordered all persons on board to don life preservers and the crew to launch the liferafts. Even if rescue vessels were available in the vicinity, as was the case in this accident, the rescue of large numbers of victims would require a lengthy period of time. Life preservers equipped with lights could expedite the rescue of victims helping to reduce the period of time needed to complete the rescue process.

The Safety Board addressed the issue of life preserver lights in four recommendations (M-69-53, M-70-2, M-71-4, and M-76-10) to the USCG between 1969 and 1976. In these recommendations, the Safety Board recommended that each life preserver, regardless of the type of service, be equipped with a battery-powered light. In 1979, the USCG adopted a requirement that vessels engaged in ocean, coastwise, or Great Lakes service, except ferries, be equipped with life preserver lights. Vessels engaged in other types of service were required to only equip their life preservers with retroreflective material, necessitating the use of spotlighting techniques to locate the victim in the water. The USCG stated that life preserver lights were not necessary for vessels in lakes, bays, or sounds, or river service because search and rescue units are generally within close range and survivors of an accident in these areas would, in all probability, not drift far from the scene before the arrival of help. The Safety Board classified the recommendations as "Closed—Acceptable Action." However, river current conditions at the time of the MISSISSIPPI QUEEN accident could have carried victims in the water over a mile away from the accident site within a 15-minute period, and the first USCG helicopter did not arrive on scene until 1850 or about 1 hour 40 minutes after the accident. The first USCG cutter did not arrive until 2115, over 4 hours after the accident. During hours of darkness or periods of reduced visibility as in rain or fog, life preserver lights would facilitate locating and recovering victims who might be carried from the accident site by river currents. This is the same rationale found in USCG regulations that require light-equipped ring buoys aboard vessels. The USCG requires that every life preserver carried aboard USCG vessels, including those operating on the Mississippi River, be equipped with life preserver lights. The protection offered to persons by life preservers equipped with life preserver lights should include all passenger vessels regardless of the type of service.

The MISSISSIPPI QUEEN was equipped with primary lifesaving equipment (inflatable liferafts), for 85 persons or slightly more than 13 percent of the 635 persons that were permitted to have been aboard. The USCG regulations and the Certificate of Inspection required that this type of equipment be available for only 10 percent of the persons aboard. Further investigation and review, including information provided by the USCG, revealed that the research history and rationale for the 10 percent are unknown. The USCG's lack of documented research history and rationale for these requirements precludes a meaningful assessment of the specific amounts of such equipment presently required by USCG regulations for the various services. The inability of the USCG to provide documented research or rationale to support the equipment requirements suggests that current requirements are arbitrary and, therefore, questions the validity of these requirements.

Although the MISSISSIPPI QUEEN's rescue boat was not used in the emergency, consideration of various conditions in which the MISSISSIPPI QUEEN operates indicates a need to improve its equipment. The rescue boat provides the primary means for rescue of a person who falls overboard after other rescue attempts have failed. The rescue boat, equipped only with oars, does not provide an effective means to reach rapidly a person in the water and it may not be possible for the MISSISSIPPI QUEEN to maneuver to accomplish the rescue. A nonswimmer or less-than-able person could drift from the vessel quickly in the river currents and, in times of reduced visibility, be difficult to locate. Additionally, heavy vessel traffic on the Mississippi River increases the potential for a vessel to strike a victim in the water before rescuers can reach him. A person carried into the proximity of a fleet of barges stopped on the river could be submerged by the current. Equipping the MISSISSIPPI QUEEN with a motorized rescue boat would greatly reduce the response time to retrieve a victim in the river and would improve the rescue capabilities of the vessel.

The value of a means of identifying and accounting for passengers and crew aboard any vessel in an accident becomes apparent during search and rescue operations. Accordingly, the availability of a list of the names of all persons on board, including nonrevenue adults and children, would facilitate search and rescue efforts. Such a list would provide to rescuers the identities of persons who had been located and those who were still missing, basic descriptive information, and a means by which to coordinate the accounting for persons scattered to assorted locations as a result of an emergency. The list should be reported or a copy of the list delivered to a place ashore before departure to assure the availability of the information.

In its report of the collision of the YANKEE and the HARBELL TAPPER in Rhode Island Sound on July 2, 1983, 2/ the Safety Board recommended that the USCG:

Require operators of all passenger vessels in coastwise, bays, sounds, or offshore service on extended routes to prepare an accurate list or count of embarked passengers, including nonrevenue adults and children, and to have the list or count reported or delivered to a place ashore prior to a vessel's departure. (M-84-28)

The USCG concurred with the recommendation and stated that revisions to Title 46 CFR would include implementing regulations regarding lists or counts on passenger vessels making an offshore trip. Revisions would require preparation of a crew and passenger list to be deposited at a suitable location ashore before departure. The Safety Board has classified Safety Recommendation M-84-28 as "Open--Acceptable Action."

Although in this accident the passenger and crew list was not used for search and rescue, it could have been useful in accounting for evacuees from the vessel, and the pending revisions to the regulations should include passenger vessels engaged in river service. Passenger ferries not operating on an extended route should be required to deposit only an accurate passenger count ashore before departure, including nonrevenue adults and children, because obtaining names of passengers would be too burdensome for the short duration of the voyage. All other passenger vessels should be required to provide the same accurate count and additionally a manifest listing passengers and crew aboard by name, including nonrevenue adults and children, to a place ashore before departure.

2/ Marine Accident Report--"Collision of the U.S. Passenger Vessel M/V YANKEE and, the Liberian Freighter M/V HARBELL TAPPER in the Rhode Island Sound July 2, 1983, (NTSB/MAR-84-05).

The various requirements in USCG Passenger Vessel Regulations concerning the use and maintenance of a ship's logbook aboard passenger vessels in river service are inconsistent. Subpart 78.17 requires that passenger vessels, including the MISSISSIPPI QUEEN, log equipment tests, equipment inspections, and emergency drills in the ship's official logbook. However, Subpart 78.37 exempts vessels engaged exclusively in trade on rivers of the United States from maintaining logbooks or records. The master of the MISSISSIPPI QUEEN, who kept a logbook aboard the vessel, stated that the keeping of a logbook is common practice on the Mississippi River and he believes it is prudent and useful. The USCG should resolve this conflict in the favor of requiring that all vessels, including vessels in river service, maintain logbooks, or records.

The master of the MISSISSIPPI QUEEN, after ordering that the general alarm be sounded to alert passengers and crew of an emergency condition, elected not to utilize the emergency loudspeaker system to notify passengers of the nature of the emergency or to broadcast instructions. The master based this decision on his belief that an announcement would generate panic among the passengers. The master ordered members of the crew to pass instructions to all aboard by word of mouth, which delayed the notification process. While this delay did not adversely affect passenger survivability in this case, passengers reported that they were concerned about not being informed of the nature of the emergency, and that they were confused and were not sure of what to do. Passengers asked other passengers what to do, sought out crewmembers for advice, or simply followed the example of other passengers they observed. Because they received conflicting instructions from the master, crewmembers moved groups of passengers to various locations aboard the ship before finally mustering them in the main lounge.

The lack of specific operational procedures requiring the use of the loudspeaker system in an emergency, especially in a dangerous and rapidly changing scenario, could contribute to the severity of the situation. Although the decision not to use the system may have been made to minimize passenger concern, the opposite effect was reported by some passengers.

The Safety Board previously addressed the need for emergency loudspeaker systems aboard passenger vessels following the collision of the M/V YANKEE and the M/V HARBELL TAPPER. 2/ The report concluded that the lack of a public address system on the YANKEE made it difficult for the master in the pilothouse to maintain contact with crew and to inform the passengers concerning the emergency. The Safety Board recommended that the USCG:

Require that passenger vessels with more than one deck have installed an adequate loudspeaker system suitable for announcing passenger advisories, instructions, and emergency alerts from the navigation bridge. (M-84-25)

The recommendation expresses the concern of the Safety Board as to the installation of emergency loudspeaker systems aboard passenger vessels. Requiring such a system is appropriate, but not using the system during an emergency defeats the purpose of the requirement. The use of such a system in an emergency situation should be a matter of operating company policy and procedure, and not discretionary.

The USCG concurred with the intent of the recommendation and initiated a regulatory project in response to it, citing the 1983 Amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, which advocates that all passenger vessels have an emergency loudspeaker system. A Notice of Proposed

Rulemaking is expected before the end of 1986. The Safety Board has classified Safety Recommendation M-84-25 as "Open—Acceptable Action" pending implementation of the regulation. As a result of this accident, the Safety Board reiterates Safety Recommendation M-84-25.

The stateroom placards in use aboard the MISSISSIPPI QUEEN provided instructions that were in conflict with the ship's drill procedures. The placards use the marine terms, "port" and "starboard," to describe the locations of emergency muster stations. This use of such language may not have been understood by passengers during the evacuation of the MISSISSIPPI QUEEN. Also, The MISSISSIPPI QUEEN's passenger staterooms placards illustrate a life preserver of a different configuration from those actually carried aboard the vessel.

Following its investigation of the YANKEE and the HARBELL TAPPER, the Safety Board also recommended that the USCG:

Require that all passenger vessels post conspicuously in passenger spaces passenger safety bills or equivalent instructions for emergencies, written in language understandable to nonmariners. (M-84-27)

The USCG concurred with the recommendation and initiated a regulatory project that would require passenger vessels to post instructions in nonmarine language. The Safety Board has classified Safety Recommendation M-84-27 as "Open—Acceptable Action," pending completion of the regulatory project. As a result of this accident, the Safety Board reiterates Safety Recommendation M-84-27.

The MISSISSIPPI QUEEN was equipped with primary lifesaving equipment (inflatable liferafts) for 85 persons or slightly more than 13 percent of the 635 persons that were permitted to have been aboard. The USCG regulations and the Certificate of Inspection required that this type of equipment be available for only 10 percent of the persons aboard. Further investigation and review, including information provided by the USCG, revealed that the research history and rationale for the 10 percent are unknown. The USCG's lack of documented research history and rationale for these requirements precludes a meaningful assessment of the specific amounts of such equipment presently required by USCG regulations for the various services. The inability of the USCG to provide documented research or rationale to support the equipment requirements suggests that current requirements are arbitrary and, therefore, questions the validity of these requirements.

As a result of its investigation of the collision of the YANKEE and the HARBELL TAPPER, the Safety Board also recommended that the USCG:

Reevaluate 46 CFR 75.10-20(a) to determine whether the primary lifesaving equipment required is adequate to safely support the entire crew and maximum embarked passengers in the water pending arrival of search and rescue assistance and amend the regulations, as necessary, to eliminate deficiencies in prescribed primary lifesaving equipment. (M-84-29)

The USCG responded and stated that the regulation should not be amended because, in summary, the accident environment did not pose the immediate threat of hypothermia. The Safety Board responded by pointing out that the USCG had failed to address the problem cited in the accident report. The hypothermia potential was not the primary

concern; the problem was that severely reduced visibility would have prevented rescue of passengers if they had been forced to enter the water. The USCG response to the recommendation was classified as "Open—Unacceptable Action."

The environmental conditions during the MISSISSIPPI QUEEN's emergency presented problems similar to those encountered by the YANKEE and HARBELL TAPPER, but also presented, in the words of the USCG Operations Center controller, the "very severe" threat of hypothermia. To counter the hypothermia danger, the USCG launched a massive search and rescue response.

The public must be confident that injuries or fatalities will not occur as the direct result of inadequate safety equipment requirements and the lack of lifesaving equipment. Primary lifesaving equipment requirements for all passenger vessels should accommodate all passengers of the vessel, unless research proves that a lesser requirement assures that no passengers will have to enter the water during an emergency. It would be difficult for any person and especially the older persons aboard the MISSISSIPPI QUEEN to swim or even walk ashore in the strong 4- to 6-mph river current and 52° water temperature.

As a result of its investigation of the grounding of the U.S. passenger vessel PILGRIM BELLE 3/ in Vineyard Sound, Massachusetts, on July 28, 1985, the Safety Board recommended that the USCG:

Require that all passenger vessels, except ferries on river routes making runs of 30 minutes or less, have primary lifesaving equipment that prevents immersion in the water for all passengers and crew. (Class II, Priority Action) (M-86-61)

As a result of this accident, the Safety Board reiterates Safety Recommendation M-86-61.

The majority of the life preservers aboard the MISSISSIPPI QUEEN were stowed in passenger and crew quarters located in the interior of the vessel. As practiced in emergency fire and boat drills and demonstrated during this actual emergency, passengers and crew had to return to their staterooms to obtain and don life preservers. The movement of large numbers of persons to and from their staterooms resulted in a funnel effect and led to crowding in the interior passageways of the MISSISSIPPI QUEEN, even though many of the passengers were already in their staterooms dressing for dinner. Had more passengers and crew been farther from their staterooms and had the nature of the emergency developed more rapidly, serious overcrowding and confusion in the ship's passageways probably would have occurred and would have worsened as passengers wearing bulky life preservers proceeded to exterior muster stations through narrow passageways. Such overcrowding and confusion would have decreased the potential for survivability of passengers and crew in the event of a rapid sinking or fire. A loss of lighting, even temporary in nature, and the automatic closing of fire doors in such an occurrence would further impede the movement of the vessel's passengers and crew to exterior muster stations.

The availability of life preservers to all passengers and crew of the MISSISSIPPI QUEEN and other passenger vessels is paramount to survival during a disaster. The elimination of a complicated procedure to facilitate the acquisition of life preservers by

3/ Marine Accident Report—"Grounding of the U.S. Passenger Vessel PILGRIM BELLE, at Sow and Pigs Reef, Vineyard Sound, Massachusetts, July 28, 1985," (NTSB/MAR-86/08).

passengers and crew would reduce potential confusion and panic and increase survivability. The first response of a passenger or crewmember in an emergency should be to move to an exterior area of the vessel rather than enter the interior of the ship to retrieve a life preserver. The movement of persons into the interior of the ship conflicts with the movement of others to the exterior areas and can create delays, generate panic, and jeopardize survivability in an emergency.

The stowage of life preservers at muster station locations at or near the exterior of the ship would improve access to life preservers by all persons aboard in emergency situations and permit life preservers to float free in case of a rapid sinking. Life preservers are in exterior locations on USCG cutters and buoy tenders for the same rationale. Availability of life preservers both in staterooms and at muster stations would provide optimum protection, but relocation of equipment currently in use would provide an acceptable safety margin.

As a result of its investigation of the grounding of the PILGRIM BELLE, the Safety Board recommended that the USCG:

Conduct research to determine the best location for stowing life preservers on all passenger vessels. In the interim, require that life preservers be stowed outside passenger and crew berthing rooms and closer to or at emergency stations. (Class II, Priority Action) (M-86-62)

As a result of its investigation of the December 12, 1985, accident, the National Transportation Safety Board reiterates Safety Recommendation M-84-25, M-84-27, and M-86-61 and -62, and recommends that the U.S. Coast Guard:

Require that the licensed operators of small passenger vessels exclude, whenever practical, passengers from the pilothouse and navigator's bridge while the vessel is underway. (Class II, Priority Action) (M-86-68)

Require that all vents on inspected vessels penetrating watertight bulkheads be extended above the weatherdeck. (Class II, Priority Action) (M-86-69)

Require that all stability information required to be aboard a vessel be written in clear and precise language that is appropriate to the vessel and its operation and is readily understood by its master or licensed operator. (Class II, Priority Action) (M-86-70)

Require that the applicant for a license as master of river steam or motor vessels be required to pass an examination on vessel stability. (Class II, Priority Action) (M-86-71)

Require that all passengers receive a comprehensive safety briefing by a crewmember soon after boarding a passenger vessel. (Class II, Priority Action) (M-86-72)

Require the comprehensive training of passenger vessel crews in emergency procedures that includes demonstrating proficiency in the use of emergency equipment. (Class II, Priority Action) (M-86-73)

Require that life preservers on all passenger vessels be equipped with lights. (Class II, Priority Action) (M-86-74)

Require that all passenger vessels which carry 50 or more passengers be equipped with at least one motorized rescue boat carried in a position for rapid launching. (Class II, Priority Action) (M-86-75)

Require that the master or licensed operator of all passenger vessels, except ferries on short routes, deposit an accurate passenger and crew manifest ashore before each sailing, and update the manifest during the voyage. Require the master of ferries on short routes to keep an accurate count of all persons aboard. (Class II, Priority Action) (M-86-76)

Require that the master or operator of passenger vessels in river service maintain logbooks or records as required for all other passenger vessels. (Class II, Priority Action) (M-86-77)

GOLDMAN, Acting Chairman, and BURNETT, LAUBER, and NALL, Members, concurred in these recommendations.

By: 
Patricia A. Goldman
Acting Chairman