

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: February 14, 1978

Forwarded to:

Admiral Owen W. Siler
Commandant
U.S. Coast Guard
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

M-78-1 and -2

This is in further regard to the accident involving the SS MARINE FLORIDIAN collision with the Benjamin Harrison Bridge near Hopewell, Virginia, on February 24, 1977. During the preliminary stages of the investigation, the Safety Board submitted seven recommendations to you by our safety recommendation letter dated August 4, 1977.

The investigation of the accident has now been completed and our accident report has been adopted. 1/ As a result of our analysis of all the evidence in this case, we believe additional safety actions are necessary.

The Safety Board recommended in a previous report regarding an accident in which a vessel collided with a bridge 2/ that "oceangoing vessels should be aligned with any bridge opening before the vessels reach a point equal to the ship's stopping distance." The USCG response stated that would not be possible in circumstances where there is a bend in the channel under or near a bridge opening. The Safety Board believes that at least an approach at less than full speed under ideal circumstances should be required. Certainly, a vessel approaching a narrow bridge opening should proceed with caution, at a speed no greater than the minimum necessary for adequate control in the circumstances, and should be aligned with the opening as early as possible. In this case, the vessel could have been aligned safely at a distance of 1,000

1/ "Marine Accident Report--U.S. Tankship SS MARINE FLORIDIAN Collision with Benjamin Harrison Bridge, Hopewell, Virginia, February 24, 1977," (NTSB-MAR-78-1)

2/ "Marine Casualty Report -- SS AFRICAN NEPTUNE Collision with the Sidney Lanier Bridge at Brunswick, Georgia on November 7, 1972, with Loss of Life," (Report No. USCG/NTSB-MAR-74-4, released July 22, 1974, Recommendations No. M-74-14 and M-74-18).

yards from the bridge at little expense of time and with small additional maneuvering effort.

Alignment at an early time alone would not assure that a vessel would pass safely through a bridge opening since headings are not static, and almost continuous rudder actions are necessary to maintain a reasonably steady course, even under ideal circumstances. However, alignment early in the final approach would allow time for the vessel's heading to be stabilized within a narrow range and for minor heading adjustments to be made with minimum rudder angles through the latter part of the approach.

The International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) were adopted by international convention and became effective on July 15, 1977. Rule 6 of those regulations provides that a vessel "shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions." It further provides that several factors must be taken into account in determining a safe speed. "Stopping distance and turning ability in the prevailing circumstances," and "the proximity of navigational hazards," are among these factors.

The lack of precise evidence regarding time, speed, and distance in this case made it impossible to determine conclusively the exact combination of events that contributed to the collision. In two previous reports 2/ 3/, the Safety Board proposed the installation of equipment on ocean-going tankships and container ships to record certain information automatically. Such equipment is well within the state of the art, and it could be designed to record with a common time base a number of operational functions, such as rudder orders entered at the helm, actual rudder angle, shaft rpm, engine telegraph orders entered from the wheelhouse, bow thruster direction and rpm, headings, rate of turn, relative wind direction and speed, barometric pressure, ambient air temperature, steering gear hydraulic pressure, and other operational data. In addition to the data recording equipment, an audio recorder could be installed in the pilothouse to record, on a common time base, conversations, and radio transmissions and whistle signals sent and received.

Large commercial aircraft are required by International Civil Aviation Organization (ICAO) convention to have flight data recorders (FDR) and cockpit voice recorders (CVR). Large U.S. commercial aircraft are required by the Federal air regulations (14 CFR 121.359) to have CVR equipment which

3/ "Marine Casualty Report -- SS C.V. SEAWITCH - SS ESSO BRUSSELS (Belgium), Collision and fire in New York Harbor, June 2, 1973, with Loss of Life," (Report No. USCG/NTSB-MAR-75-6, released 2 March 1976, Recommendation M-76-8).

operates continuously and retains the latest 30 minutes of audio recordings. The FDR equipment is required (14 CFR 121.343) to operate continuously and have a capacity for 25 hours of recorded data for 19 different parameters. More sophisticated equipment is commercially available and some air carriers record data for many additional parameters.

The Safety Board does not suggest that an airplane accident is directly comparable to a ship accident, or that this type equipment should be required to be retrofitted on all existing ships. We do believe that a formal study should be made to determine the extent this technology has favorable application to shipboard operations on newer vessels. The study could determine a pertinent array of standard operational factors which should be recorded and the practical and economical aspects which would make the installation of such equipment beneficial to operations and to safety.

The array of data to be recorded could be established in conjunction with domestic and international management and labor interests who might find the retention of the data to be to their advantage. Many operational data are commonly recorded manually in time-consuming, routine shipboard procedures. The recording of data automatically could prove to be a labor-saving feature in addition to improving the reliability and accuracy of the data. We believe management would find some form of standard equipment to be economically viable for ship operation purposes, and merely an expansion of the decisions they have already made to install data recorders and monitoring display equipment now found in many newer automated vessels. A common standard would probably assist industry to avoid the proliferation of dissimilar equipments which record a diverse variety of data. If appropriate, correct data were available, the causes of accidents could be determined more conclusively, and resources expended for corrective measures would be applied to accurately identified problem areas which in turn would assist the economics of safety.

Your response to our recommendation M-76-8 stated that the cost of such equipment was not justified for safety purposes, and that, unlike aircraft accidents, all the eyewitnesses are seldom killed in vessel casualties. The investigation of this accident disclosed again the same problems in determining the chain of events with enough accuracy to be conclusive. Eyewitnesses are rarely able to provide the precise information needed to determine accurately the chain of events involved in an accident.

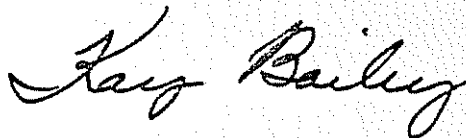
The Maritime Administration response to our recommendation M-74-18 indicated that data and audio recording equipment was being included in the development of an Intergrated Conning System, and that the acquisition of data appeared to pose no technical problems.

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

Expedite the submission of the legislative proposal and urge Congress to enact legislation, or authorize the Coast Guard to undertake rulemaking, to establish in the navigation rules for inland waters a requirement for vessels to proceed at a safe speed identical to the requirement established by Rule 6 of the newly adopted international convention for vessels on the high seas which became effective on July 15, 1977. (Class II, Priority Action) (M-78-1)

Conduct a formal study in coordination with the Federal Maritime Administration and the shipping industry to determine a standard array of operational and audio data that should be recorded automatically with a view to establishing a requirement for the installation and operation of suitable equipment in U.S. vessels over 1,600 gross tons built after 1965, and to submitting an initiative to Inter-Governmental Maritime Consultative Organization (IMCO) for the adoption of a similar international requirement. (Class III, Long Term Action) (M-78-2)

BAILEY, Acting Chairman, McADAMS, HOGUE, and KING, Members concurred in the above recommendations.



By: Kay Bailey
Acting Chairman