



National Transportation Safety Board

Washington, DC 20594

Safety Recommendation

Date: February 3, 2011

In reply refer to: M-10-4 through -6
M-05-6 (Reiteration)

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On Wednesday, July 2, 2008, about 1215 eastern daylight time, the 187-foot-long passenger and car ferry *M/V Block Island* collided with the 140-foot-long U.S. Coast Guard cutter *Morro Bay* in reduced visibility on Block Island Sound, about 4 nautical miles south of Point Judith, Rhode Island. The ferry, carrying 294 passengers, eight crewmembers, two concession stand employees, and one off-duty employee, had departed Point Judith about 25 minutes earlier and was traveling south, headed for Old Harbor on the eastern side of Block Island, Rhode Island. The cutter, carrying 21 personnel, had departed Naval Station Newport, Rhode Island, about 1015 and was traveling west, headed for Coast Guard Station New London, Connecticut. As the vessels approached the accident site, the visibility decreased due to fog. At the time of the collision, the crew on the *Morro Bay* estimated the visibility at about 500 yards.

As a result of the accident, the *Block Island* ferry sustained about \$45,000 in damage and the *Morro Bay* about \$15,000. Two passengers were treated for minor injuries and released that same day.

The National Transportation Safety Board (NTSB) determined that the probable cause of the collision between the ferry *Block Island* and the Coast Guard cutter *Morro Bay* was the failure of the bridge watch officers on both vessels to monitor their radars, sufficiently assess traffic, and compensate for limited visibility. Contributing to the accident was the failure of the bridge watch officers on both vessels to maintain a proper lookout and to sound appropriate fog signals.

Safety issues identified in this investigation included failure to follow “rules of the road”¹ in reduced visibility, ineffective use of the radars on board both vessels, and lack of safety management systems and voyage data recorders (VDR) on U.S. passenger ferries.

¹ Navigation Rules and Regulations: International Navigational Rules Act of 1977 (Public Law [P.L.] 95-75, 91 Stat. 308, or 33 *United States Code* [U.S.C.] 1601-1608), and the Inland Navigation Rules Act of 1980 (P.L. 96-591, 94 Stat. 3415, 33 U.S.C. 2001-2038). The accident site was under the authority of the International Navigational Rules Act of 1977.

Loudhailer Use for Sound Signaling Purposes

In a June 2010 letter of proposed findings to the NTSB, the Coast Guard stated that the *Morro Bay* bridge team should not have used the onboard Ray 430 loudhailer to sound fog signals because the loudhailer did not produce a minimum of 130 decibels required by navigation rules and therefore was not an authorized sound signaling device. Instead, the cutter's whistle—which NTSB investigators tested following the accident and found to be in working order—should have been used. NTSB investigators followed up with the Coast Guard and learned that the previous commanding officer on the *Morro Bay* had authorized the loudhailer's installation a couple of years before the accident, in part for sounding the bell signal when anchored in fog. Over time, a habit developed of exclusively using the loudhailer to sound fog signals; in fact, the Coast Guard stated that no one in the current *Morro Bay* crew recalled using the whistle for sound signaling purposes. The NTSB therefore concludes that the *Morro Bay* sounded fog signals on a device that did not meet auditory standards of international navigation rules, and consequently, the signals sounded by the *Morro Bay* leading up to the collision were not technically appropriate or sufficient. The current *Morro Bay* commanding officer has since prohibited the use of the loudhailer as the cutter's sound signaling device. However, it is unclear how many other Coast Guard crews may be using a loudhailer, as opposed to the whistle, for sound signaling purposes. Therefore, the prohibition should apply to all Coast Guard vessels.

Voyage Data Recorders

Neither the *Morro Bay* nor the *Block Island* had VDRs. The NTSB has advocated the carriage of VDRs on ships in U.S. waters since 1976 when it made its first recommendation on this subject.

In the Coast Guard and Maritime Transportation Act of 2006, enacted in the wake of the October 15, 2003, collision of the Staten Island ferry *Andrew J. Barberi* with a maintenance pier at the Staten Island ferry terminal, New York,² Congress directed the Coast Guard to study the use of VDRs on ferries. Based on the findings in its report,³ particularly the significant costs associated with the use of VDRs, the Coast Guard recommended against requiring the use of VDRs or simplified voyage data recorders (S-VDRs) on ferries.

In its report to Congress, the Coast Guard made three recommendations:

- Require the ferries covered in the report to capture the type of information recorded by a VDR.
- Review electronic chart systems and automatic identification system (AIS) equipment to determine how they can be used or modified to capture the relevant information.

² *Allision of Staten Island Ferry Andrew J. Barberi, St. George, Staten Island, New York, October 15, 2003*, Marine Accident Report NTSB/MAR-05/01 (Washington, DC: National Transportation Safety Board, 2005).

³ *Report to Congress on Use of Voyage Data Recorders on Ferries* (Washington, DC: U.S. Department of Homeland Security, U.S. Coast Guard, March 26, 2008).

- Develop a performance standard that provides vessel owners and operators the flexibility to determine the best equipment to meet that standard considering other regulatory requirements.

In January 2010, the NTSB inquired with the Coast Guard about the status of the three recommendations. The Coast Guard responded, in part, that it believed that electronic charting (whether an electronic chart system or an electronic chart display and information system [ECDIS]) integrated with AIS and other navigation equipment could capture most of the information recommended in the VDR report. To that end, the Coast Guard stated that it was drafting new regulations for U.S. vessels that carry 50 or more passengers to have AIS and electronic chart systems. In addition, the Coast Guard reported that it was working with the international standards community to develop a new international standard (International Electrotechnical Committee [IEC] 62376) that could be used to determine which type of electronic chart system would capture most of the information recommended in the report. The Coast Guard anticipated that the standard would be finalized in 2011.

As noted in the Coast Guard's VDR report, some electronic chart systems are able to record navigational data, such as position, course, and route planning data. For those electronic chart systems designed to meet recognized industry performance standards, certain navigational data must be recorded for a period of at least 12 hours. The two recognized performance standards for electronic chart systems⁴ specify the same recording requirements: that is, that the electronic chart system must keep a record of the ship's actual track at 1-minute intervals and that, at a minimum, the record shall include the ship's positions, corresponding times, courses, and speeds.⁵ The standards specify that the electronic chart system shall prevent the record from being manipulated or changed and preserve it from being over-written, but they do not require it to be in a standard (nonproprietary) format, nor retrievable by standard interface connections.⁶ In addition, in contrast to the performance standards for VDRs and S-VDRs, the electronic chart system standards do not require the recording of radar imagery, bridge audio, or certain other ship-specific data specified in the VDR/S-VDR performance standards. The VDR/S-VDR performance standards specify the recording of parametric data, such as own ship's position, course and speed at 1-second intervals, radar images at 15-second intervals, and bridge audio continuously. International performance standards for VDRs are currently undergoing revision at International Maritime Organization (IMO), and it is anticipated that the revised standards will significantly improve the capabilities of recording equipment installed on new vessels. Among the improvements being considered are

⁴ The requirement for recording of certain navigational data by electronic chart systems is specified in performance standards promulgated by two standards agencies, the Radio Technical Commission for Maritime Services (RTCM) and the IEC. The performance standards are the "RTCM Standard 1090014 for Electronic Chart Systems," published in 2008, and IEC Standard 62376 "Electronic chart systems, operational and performance requirements, methods of testing and required test results" (draft version, final version anticipated in 2011).

⁵ In addition, the performance standards specify that electronic chart systems shall keep a separate voyage record of the ship's actual track at intervals not exceeding 4 hours, with a minimum record duration of 3 months.

⁶ In contrast, the International Maritime Organization (IMO) performance standards for VDRs and S-VDRs, as amended by Resolution MSC.214(81), specify that VDRs should provide a standard interface (e.g. USB, Ethernet, FireWire) for downloading stored data and that the data either be in standard (nonproprietary) format or have software available to investigators for converting the data into open industry standard formats.

longer recording time; recording of additional data, such as both radars images and electronic chart system/ECDIS data; and improved audio quality.⁷

The safety value of recorded electronic data has been definitively demonstrated in all modes of transportation. Witness statements are important in understanding the circumstances of an accident, but they are sometimes contradictory and less conclusive than electronic data, especially high-quality audio recordings of events before an accident. Contrary to the comments made by some operators of small passenger vessels in response to the Coast Guard's 2008 VDR report, analysis of recorded electronic data can result in the identification and correction of safety deficiencies in vessel operations, which can help prevent accidents. A number of countries around the world have recognized the potentially severe consequences of accidents on passenger vessels and have taken action to mandate the carriage of VDRs on their domestic vessels.⁸ For example, in 2007, Transport Canada commissioned a cost/benefit analysis⁹ in support of its work on a new regulatory requirement for VDRs on domestic Canadian vessels not covered by the International Convention for the Safety of Life at Sea (SOLAS). The analysis noted, among other things, the likely financial burden on small vessel operators of installing VDRs and the added technical difficulty and expense of installing VDRs on existing vessels. The analysis also noted that the cost and difficulty of installing VDRs on new vessels were insignificant. The analysis concluded that "the potential for benefits to outweigh the costs is greatest for passenger vessels because of the number of passengers carried and the potential to save lives." New Canadian regulations requiring the installation of VDRs on certain domestic vessels are expected to be published in May 2011, as part of the "Canada Shipping Act 2001."

The Coast Guard acknowledged the value of recorder information in its 2008 VDR report and made a recommendation that certain ferry vessels be required to "capture the types of information recorded by a VDR." However, the Coast Guard's expectation that the current rulemaking for AIS and electronic chart system carriage requirements will encompass the recording of an adequate level of data is unrealistic. To be most useful to accident investigators, the recorded electronic data should be in a standard, nonproprietary format and contain specific information recorded with adequate quality. In these respects, the performance standards for electronic chart systems are inadequate. For example, the standards allow for parametric data (own ship's positions, and corresponding times, courses, and speeds) to be recorded at 1-minute intervals, which is far less than the VDR standard's data rate of 1-second intervals. In addition, the electronic chart system performance standards do not require the recording of bridge audio or radar images, a serious

⁷ Work on revisions to VDR performance standards began in 2009 and is being undertaken by the IMO Safety of Navigation Sub-Committee under a 3-year work item.

⁸ "Feasibility Study on the Potential Application of VDRs and [safety management systems] to U.S. Domestic Commercial Vessels," Alexander A. J. van der Zee, 2009. The study is available at NTSB's public docket. The countries surveyed were Australia, Canada, China, Finland, Germany, Mexico, New Zealand, South Africa, and the United Kingdom.

⁹ The Canadian regulatory project was undertaken in response to the Transportation Safety Board of Canada (TSB) recommendation to Transport Canada to "extend the requirement for the carriage of VDRs/S-VDRs to large passenger vessels over 500 gross tonnage and all other commercial vessels on an equivalent basis to those trading internationally." The recommendation resulted from TSB's investigation of the 2006 grounding and sinking of the passenger ferry vessel *Queen of the North*. Transport Canada has indicated its agreement with the general intent of the recommendation and commissioned a study to conduct a cost-benefit analysis of potential regulatory requirements for VDRs and S-VDRs for Canadian non-SOLAS vessels. Information obtained from TSB's website <http://www.wapps2.tc.gc.ca/saf-sec-sur/4/rqs_query/ed_md.aspx?lang=en&N=2000000005> (accessed March 19, 2010).

limitation to accident investigation. As noted in the Coast Guard's VDR report, some makers of electronic chart systems are developing the capability to record bridge audio, but, because of the additional cost involved, it will likely be an optional feature that few vessel operators will incorporate in their electronic chart system equipment unless required by the Coast Guard. In addition, the quality of the audio recording will be unpredictable because it would not be designed to meet a recognized performance standard, such as the existing VDR performance standard for audio recordings. Finally, the format of the data in electronic chart system recordings, unlike those of VDR recordings, is not required to be in a standard, nonproprietary format, and it is likely that manufacturer-specific software and hardware will be needed to analyze them, greatly complicating the work of accident investigators. The NTSB therefore concludes that electronic chart systems and AIS do not provide the data recording capability of VDRs and do not capture the level of detail required to identify causes of accidents. As noted in the Canadian cost/benefit analysis, installing VDRs on vessels at the initial design stage poses little technical difficulty and moderate additional cost. The NTSB concludes that installing VDRs would enhance safety on new ferry vessels.

Installing VDRs or S-VDRs on existing ferry vessels will likely be technically challenging on older vessels because it may not reasonably be possible to capture the designated data on these vessels. The IMO anticipated this technical difficulty and developed an alternative standard for older vessels. This standard allows for exemptions from the requirement to record certain data if it can be shown that it would be infeasible to do so. The NTSB concludes that flexible application of the VDR standard to existing ferry vessels would alleviate the burden of compliance for those vessels where it can be shown that recording the full data set is not feasible.

Safety Management Systems

Also as a result of the 2003 *Andrew J. Barberi* accident, the NTSB issued Safety Recommendation M-05-6 to the Coast Guard:

Seek legislative authority to require all U.S.-flag ferry operators to implement safety management systems, and once obtained, require all U.S.-flag ferry operators to do so.

In May 2005, the Coast Guard indicated initial concurrence with the recommendation. In July 2007, the Coast Guard submitted a legislative change proposal to amend 46 U.S.C. 3202(a) to cover U.S. flag ferries carrying more than 399 passengers and operating on domestic voyages and, thus, require such vessels to implement safety management systems pursuant to 33 CFR Part 96. The Coast Guard's section-by-section analysis stated that 399 passengers "is the universe of ferry vessels where the NTSB and the Coast Guard believe safety management systems will be most effective." In an August 2009 response, the NTSB clarified to the Coast Guard that the NTSB advocates safety management systems on all U.S. ferries, not just those carrying more than 399 passengers. Because the Coast Guard had only sought legislative authority to require safety management systems on ferries with 399 or more passengers—as opposed to all ferries, as recommended—Safety Recommendation M-05-6 was classified "Open—Unacceptable Action" in August 2009. The Coast Guard's proposed legislation failed to pass before the end of the 110th congressional session.

In October 2010, House bill H.R. 3619 (the Coast Guard Authorization Act of 2010) was enacted into law (P.L. 111-281). The law amends 46 U.S.C. Section 3202 to require safety

management systems for passenger vessels, including ferry vessels. The applicability of the safety management system regulation would be determined by the Coast Guard, based on vessel characteristics, methods of operation, nature of service, and, for ferries, the size of the ferry system.

Despite the large carrying capacity of individual ferry vessels, such as the *Block Island* with potentially over 1,000 persons on board, only organizations that operate internationally or that have voluntarily adopted the approach operate under safety management systems in the United States. Given the thousands of passengers who ride ferries on U.S. waterways, the NTSB continues to be concerned that the absence of a requirement to implement safety management systems could result in the type of safety-deficient operations found both on the *Block Island* and in the 2003 accident involving the *Andrew J. Barberi* ferry. Although some U.S. domestic ferry systems have voluntarily adopted a safety management system, the NTSB concludes that safety management systems on all passenger ferries would enhance the likelihood that operators will maintain the high standards of safety that the Coast Guard requires of U.S. oceangoing vessels operating from the United States. Based in part on Safety Recommendation M-05-6, the NTSB in February 2010 added "Require Safety Management Systems for Domestic Vessels" to its Most Wanted List of Transportation Safety Improvements directed at Federal agencies.

In summary, as a result of the *Morro Bay/Block Island* accident investigation, the NTSB makes the following new safety recommendations to the U.S. Coast Guard:

Determine whether your vessels are inappropriately using loudhailers for sound signaling, and ensure that all Coast Guard vessels use only sound signaling devices that meet auditory standards of international navigation rules. (M-10-4)

Require installation of voyage data recorders that meet the international performance standard on new ferry vessels. (M-10-5)

Require installation of voyage data recorders on ferry vessels built before the enactment of voyage data recorder carriage requirements that will record, at a minimum, the same video, audio, and parametric data specified in the International Maritime Organization's performance standard for simplified voyage data recorders. (M-10-6)

Also as a result of this accident investigation, the NTSB reiterates Safety Recommendation M-05-6 previously issued to the U.S. Coast Guard:

Seek legislative authority to require all U.S.-flag ferry operators to implement safety management systems, and once obtained, require all U.S.-flag ferry operators to do so. (M-05-6)

In addition, the NTSB issued one safety recommendation to Interstate Navigation Co. as a result of this investigation.

In response to the recommendations in this letter, please refer to Safety Recommendations M-10-4 through -6, and M-05-6. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for

instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Chairman HERSMAN, Vice Chairman HART, and Members SUMWALT, ROSEKIND, and WEENER concurred in these recommendations. Member Rosekind filed a concurring statement, which is attached to the report, regarding the *Block Island's* lifesaving equipment.

[Original Signed]

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Chairman