



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

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In reply refer to: M-11-23 through -27

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The NTSB has long been concerned about the high rate of vessel losses and fatalities in the U.S. commercial fishing industry. In the United States, deaths averaged 158 per 100,000 commercial fishing workers from 1992 to 2008, compared with an average of 4 fatalities per 100,000 workers in all occupations nationwide.¹ The Bureau of Labor Statistics ranked commercial fishing the most dangerous occupation in the United States for 2007, 2008, 2009, and 2010.²

To focus attention on safety issues in this industry, the NTSB convened a public forum on fishing vessel safety on October 13–14, 2010, at its headquarters in Washington, DC.³ The forum was structured as a series of six topical panels, each consisting of experts who represented a diverse mix of industry perspectives and provided comments, data, and recommendations addressing the following topics:

- Identification of safety problems within the commercial fishing industry
- Vessel issues related to safety
- Lifesaving equipment
- Safety training for commercial fishermen
- Fisheries management impacts on safety
- Perspectives of fishermen on safety

¹ *Morbidity and Mortality Weekly Report, Commercial Fishing Deaths—United States, 2000–2009* (Atlanta, GA: Centers for Disease Control and Prevention, July 16, 2010), vol. 59, no. 27, pp. 842–845.

² (a) U.S. Department of Labor (DOL), Bureau of Labor Statistics (BLS), “National Census of Fatal Occupational Injuries in 2007,” press release, August 20, 2008. (b) DOL, BLS, “National Census of Fatal Occupational Injuries in 2008,” press release, August 20, 2009. (c) DOL, BLS, “National Census of Fatal Occupational Injuries in 2009 (Preliminary Results),” press release, August 19, 2010. (d) DOL, BLS, “National Census of Fatal Occupational Injuries in 2010 (Preliminary Results),” press release, August 25, 2011.

³ Background documents and transcripts from the 2010 NTSB Fishing Vessel Safety Forum are available online at <http://www.nts.gov/news/events/2010/fishing_vessel/index.html>, accessed September 22, 2011.

Safety issues that emerged during forum discussions as most significant in reducing the unacceptable rate of vessel losses and fatalities included the following:

- Vessel stability, subdivision, and watertight integrity for vessels 79 feet or less in length
- Crew knowledge and ability to apply stability principles while operating a vessel
- Requirements for flotation aids
- Requirements for personnel retrieval gear
- Training and competence in responding to emergencies and deploying survival equipment

This letter presents recommendations to address these safety issues.

Historical background on fishing vessel safety regulations

Congress first addressed fishing vessel safety 23 years ago through the Commercial Fishing Industry Vessel Safety Act of 1988⁴ (1988 Act), which authorized the U.S. Coast Guard to prescribe vessel safety regulations in two areas:

- Lifesaving and firefighting equipment and
- Operating stability of certain classes of vessels

In 1991, the Coast Guard published rules addressing the 1988 Act, including setting standards for operating stability for vessels over 79 feet in length. At the same time, the Coast Guard indicated that standards for smaller vessels would be published separately in a subsequent rulemaking. The Coast Guard has not yet published these regulations.

With passage of the Coast Guard Authorization Act of 2010, the Coast Guard can now develop regulations for training individuals in charge of operating commercial fishing vessels and for examining fishing vessels while dockside to ensure compliance with applicable regulations.^{5,6}

Stability, subdivision, and watertight integrity

Stability refers to the tendency of a ship to remain upright. Subdivision involves the location of watertight bulkheads to confine flooding and maintain upright stability in case of damage. The watertight integrity of the subdivisions and hull must ensure no openings allow flooding into the hull or across compartments. These issues have been a longstanding concern of the NTSB and remain critical to fishing vessel safety, as highlighted in two recent accidents:

Katmai, 2008. The sinking of the *Katmai* in 2008 was found to involve both loss of watertight integrity and lack of training in stability. The NTSB determined that the probable

⁴ Public Law 100-424.

⁵ Public Law 111-281, signed by the President in October 2010.

⁶ Despite the requirement for dockside examinations, commercial fishing industry vessels are not subject to the requirements for inspected vessels and remain classified as “uninspected.”

cause of this accident was the loss of the vessel's watertight integrity because watertight doors from the main deck to the processing space and the lazarette were left open by the crew at a time when the vessel was overloaded and navigating in severe weather, which allowed water to enter the vessel resulting in progressive flooding and sinking. The NTSB investigation revealed that the vessel master had no training in stability and ultimately loaded a quantity of fish weighing twice as much as addressed in the vessel's stability report and that the extra load contributed to loss of the vessel.⁷

Lady Mary, 2009. The NTSB investigation of the sinking of the *Lady Mary* revealed that numerous vessel modifications had been undertaken by the vessel owners without consultation with a naval architect to assess the overall impact of the modifications on stability. These actions showed a lack of understanding of the importance stability plays in a safe fishing operation and the importance of watertight integrity, particularly in severe weather. The NTSB determined that the probable cause of the sinking of the *Lady Mary* was flooding originating in the lazarette through an access hatch left open during rough weather, contrary to safe shipboard practice.⁸

At the NTSB Fishing Vessel Safety Forum, keynote speaker Rear Admiral Kevin Cook, director of prevention policy, said, "Almost half of the vessel losses are initiated by flooding and instability." An industry panelist and fishing vessel owner estimated that "80 percent of the boats I'm working on don't have watertight bulkheads."

Vessel stability is often affected by repeated modification of fishing vessels. Commercial fishing industry vessels may remain in service for many years, and in some cases, regulations prohibit the replacement of vessels, thus forcing owners to modify their vessels to stay in business. Changes in fisheries, fishing equipment, and crew needs all may dictate repeated modification. An NTSB forum participant commented, "Major conversions are maybe not as dangerous as the multiple small changes." Numerous small modifications can increase risk from unintended weight gain and rise in vessel center of gravity, which can contribute to loss of stability.

Thus, in addition to a vessel's initial condition, periodic reassessment of a vessel's stability is needed to evaluate these potentially adverse effects. The NTSB considers stability standards for both newly constructed and existing vessels to be a matter of highest priority to reduce vessel losses and resultant fatalities.

After reviewing 16 years of vessel accidents, the Coast Guard reported in 2008 that vessels smaller than 79 feet long are lost at a higher rate than larger vessels and that the majority of vessel losses are due to flooding, sinking, and capsizing.⁹ The NTSB believes that the Coast Guard has been remiss in not issuing the stability regulations for vessels 79 feet or less in

⁷ *Sinking of the Fishing Vessel Katmai, Bering Sea, 120 miles west of Adak, Aleutian Islands, Alaska, October 21–22, 2008*, forthcoming (Washington, DC: National Transportation Safety Board, 2011), available on the NTSB website at <<http://www.nts.gov/>>.

⁸ *Sinking of the Lady Mary, Atlantic Ocean, 65 Miles Southeast of Cape May, New Jersey, March 24, 2009*, NTSB/MAB-11/01 (National Transportation Safety Board, Washington, DC, 2011), available on the NTSB website at <<http://www.nts.gov/>>.

⁹ *Analysis of Fishing Vessel Casualties: A Review of Lost Fishing Vessels 1992-2007* (Washington, DC: U.S. Coast Guard, 2008).

length as promised in 1991. Therefore, the NTSB recommends that the Coast Guard establish standards for new and existing commercial fishing industry vessels of 79 feet or less in length that (1) address intact stability, subdivision, and watertight integrity and (2) include periodic reassessment of the vessels' stability and watertight integrity.

Stability training and competence

Although the 1988 Act required regulations for the operating stability of certain classes of vessels, it did not require workers in the fishing industry to demonstrate the necessary skills, knowledge, and experience to understand the stability information provided to the master and the risks of improper loading or loss of watertight integrity. During the NTSB forum, a panelist stated, "It doesn't matter what the naval architect does or the Coast Guard does; it boils down to the importance of the crew on board being able to use the information and having it make sense to them."

Provisions of the 2010 Coast Guard Authorization Act include requiring the Coast Guard to develop regulations for training individuals in charge of operating commercial fishing vessels further than 3 miles from the coastline.¹⁰ Such training must address seamanship, stability, collision prevention, navigation, fire fighting and prevention, damage control, personal survival, emergency medical care, emergency drills, and weather. The Coast Guard has not indicated how it will develop these training regulations or provided a timeframe for finalizing them. Several training institutions currently offer stability training, and model stability courses have been designed for the fishing industry, including online instruction developed by the Coast Guard and this training should be required separate from the remainder of the requirements for individuals in charge.

As the NTSB found in the recent investigations mentioned above, stability information for the master is ineffective without comprehension of stability principles and competence in applying them. In the sinking of the *Katmai*, with the loss of seven persons, the master did not demonstrate understanding of the implications of open watertight doors in severe weather or the hazards of loading excess fish and disregarding the stability information provided. In the sinking of the *Lady Mary*, with the loss of six persons, the NTSB found that the owners made structural modifications to the vessel without consulting a naval architect or assessing stability and that the crew did not realize the importance of maintaining watertight integrity during severe weather.

During the NTSB forum, a fisherman and fishing vessel owner who provided onboard crewmember training observed:

Fishing vessels 79 feet or more in length not required to have a load line must have stability instructions, but nothing is required as far as training on those instructions or stability principles or information in general. And stability is the initiating cause for about 20 percent of vessel losses. Better knowledge and understanding of the conditions that adversely affect stability could reduce this number. Stability training is needed on smaller vessels as well.

¹⁰ 46 U.S.C. 4502(g)(1).

Broad recognition among forum participants of the importance of training in stability and watertight integrity was noteworthy. The NTSB believes that an understanding of stability principles by those responsible for decisions affecting vessel loading and operation, as demonstrated in the *Katmai* and *Lady Mary* accidents, would reduce the rate of vessel losses. The NTSB therefore recommends that the Coast Guard require all owners, masters, and chief engineers of commercial fishing industry vessels to receive training and demonstrate competency in vessel stability, watertight integrity, subdivision, and use of vessel stability information regardless of plans for implementing the other training provisions of the 2010 Coast Guard Authorization Act.

Flotation aids

Falls overboard represent a significant safety issue in the commercial fishing industry. During an NTSB forum panel discussion, Dr. Jennifer Lincoln, an injury epidemiologist with the National Institute for Occupational Safety and Health (NIOSH) and an international expert in safety in the commercial fishing industry, commented, “About 30 percent of these fatalities occurred when a person fell overboard. None of those people were wearing a personal flotation device when they died.”

In the last decade, a new generation of flotation aids for commercial fishermen has been developed.¹¹ A NIOSH pilot program in Alaska asked fishermen to voluntarily wear one of several of the new generation flotation aids while on deck and report their reactions. The results of the study were presented at a 2009 trade show and were addressed at NTSB’s Fishing Vessel Safety Forum. In general, most of these fishermen had been unfamiliar with the many options for flotation aids. They expressed acceptance, and most felt they could find an appropriate flotation aid that did not hinder normal operations and they were willing to wear.^{12,13}

During the forum, Dr. Lincoln further pointed out that wearing a flotation aid on deck is also effective during sudden capsizing, such as the case of the *Double Eagle* while crossing the Tillamook River bar on October 3, 2010.¹⁴ The two crewmembers were wearing flotation aids, which facilitated their survival while in the water until they were rescued.

The NTSB believes that flotation aids can extend the time available for rescue following a fall overboard or capsizing. Therefore the NTSB recommends that the Coast Guard require each person on the deck of a commercial fishing industry vessel to wear a flotation aid at all times.

¹¹ “Man Overboard Prevention and Recovery,” National Institute for Occupational Safety and Health Safety Video, April 26, 2011 <<http://www.youtube.com/watch?v=YT17QGVd4jc>> (accessed September 2, 2011).

¹² L. Welch, “Seeking a PFD Fishermen Will Actually Wear,” *Anchorage Daily News*, posted April 10, 2009 <<http://community.adn.com/node/140451>> (accessed August 8, 2011).

¹³ Pacific Marine Expo 2009, November 19–21, 2009, Seattle, WA <<http://www.tvworldwide.com/events/pme/091119/default.cfm?id=11787&type=flv&test=0&live=0>> (accessed August 8, 2011).

¹⁴ (a) U.S. Coast Guard, “News Release: Coast Guard rescues 2 after vessel capsizes crossing Tillamook Bar, press release, October 3, 2010 <<http://www.d13publicaffairs.com/go/doc/21/913135/>> (accessed August 12, 2011).

(b) U.S. Coast Guard, Visual Information Gallery, “101003-G-0000X-TillamookBarRescue” <http://cgvi.uscg.mil/media/main.php?g2_itemId=1016283> (accessed August 12, 2011).

Retrieval equipment and recovery systems

Even when wearing a flotation device, fishermen who fall overboard may have only minutes before they are incapacitated by hypothermia. Therefore, equipment to retrieve one who has fallen overboard can reduce fatalities by providing assistance in recovering persons more rapidly. The commercial industry is developing and refining equipment to improve retrieval of personnel lost overboard, and a wide variety of such equipment is available for differing vessel and fishery types. Further, as pointed out at the NTSB forum, the International Maritime Organization has worked to develop standards for recovery equipment for low freeboard vessels, such as the Rescue Cage, which can be deployed in 20 seconds to retrieve a hypothermic or unconscious person.¹⁵ As with any safety equipment, practice in its use is necessary, and mandatory drills should be required for any rescue equipment.

The NTSB believes that these advances in the development of recovery equipment further enhance the speed of retrieval and therefore survivability of those who have fallen overboard. Therefore, the NTSB recommends that the Coast Guard require owners of commercial fishing industry vessels to (1) install fall overboard recovery devices appropriate for the vessel, (2) periodically ensure the functionality of such equipment, and (3) regularly conduct drills in which crewmembers demonstrate their competence in the use of such devices.

Safety training

As stated by a Coast Guard representative at the NTSB forum,

Crews must be able to act instinctively in an emergency, and the best way to accomplish this is through training and practice. But any requirements for safety training have been quite limited. One of the recurring safety recommendations coming out of fishing vessel casualty investigations is the need for required crew training on safety and survival awareness and skills associated with that. There are numerous success stories of training programs where survivors of a casualty attribute their living through the ordeal to a safety awareness or survival training course they had taken. ...

Since 1991, there have been requirements for someone on the vessel to be certified in first aid and CPR and each individual on the vessel to participate in monthly drills and instruction on board for at least the ten emergency contingencies listed in the regulations. The drills and instruction must be conducted by a trained drill conductor. That's not a lot.

These are the only training requirements for those in the commercial fishing industry.

Current regulations require the master to provide instruction and conduct monthly drills in which equipment is used as if there were an actual emergency. Despite on-board drills and training, many fishermen lack adequate safety competencies. Many masters themselves are insufficiently aware of proper training or emergency procedures, and required on-board drills and instruction are not always performed.

¹⁵ "Man Overboard Rescue and Recovery," northeast1 (North East Scotland on Video), North Tonight 1 broadcast, uploaded November 3, 2007 <<http://www.youtube.com/watch?v=7h9EzSIPRnA>> (accessed September 2, 2011).

An important safety procedure is the issuance of an effective Mayday call from a ship in distress. The loss of the *Katmai* and the *Lady Mary* illustrate cases in which such calls were not made. While both vessel masters, who were responsible for training the remainder of the crew, made Mayday calls shortly before abandoning their vessels, in both cases the calls were not complete enough for assistance to be provided. While merchant mariners worldwide are required to demonstrate understanding and competency in safety procedures and in the use of safety equipment, commercial fishermen operate with no such obligation in the United States.

The NTSB believes that the training gap between merchant mariners and those serving aboard commercial fishing industry vessels should be narrowed.¹⁶ A panel member at the NTSB forum stated that, in his experience, fishermen want training opportunities: “Each time we did the demonstrations ... just me walking the docks, getting people, we had over 100 people volunteer, just come down and do the safety demonstrations. These guys want to know how to survive.”

The NTSB is concerned that many crewmembers are not experienced in the use of safety equipment despite Coast Guard regulations requiring monthly on-board drills, which is the only training requirement for crewmembers. On December 20, 2004, five of six crewmembers of the 75-foot scallop vessel *Northern Edge* died when their boat sank off of Nantucket in 30-degree weather with winds gusting to 45 miles an hour. This was the deadliest fishing incident off New England in nearly 15 years. The only survivor from the sudden capsizing was a fisherman who had been trained in survival techniques. Anecdotal evidence and testimony from NTSB forum participants suggest that such shore-based training has significantly enhanced crewmembers’ ability to survive vessel losses, improved crewmember safety awareness and prevention efforts, and improved the safety culture within the region.

The NTSB therefore recommends that the Coast Guard require all crewmembers to provide certification of completion of safety training before getting under way on commercial fishing industry vessels, such training to include both prevention of and proper response to emergency situations as well as actual use of emergency equipment.

Recommendations

Therefore, the National Transportation Safety Board makes the following safety recommendations to the U.S. Coast Guard:

Establish standards for new and existing commercial fishing industry vessels of 79 feet or less in length that (1) address intact stability, subdivision, and watertight integrity and (2) include periodic reassessment of the vessels’ stability and watertight integrity. (M-11-23)

Require all owners, masters, and chief engineers of commercial fishing industry vessels to receive training and demonstrate competency in vessel stability, watertight integrity, subdivision, and use of vessel stability information regardless of plans for implementing the other training provisions of the 2010 Coast Guard Authorization Act. (M-11-24)

¹⁶ The Coast Guard requires credentials for masters and chief engineers working on uninspected commercial fishing vessels over 200 gross tons, which comprise a small portion of the commercial fishing industry.

Require each person on the deck of a commercial fishing industry vessel to wear a flotation aid at all times. (M-11-25)

Require owners of commercial fishing industry vessels to (1) install fall overboard recovery devices appropriate for the vessel, (2) periodically ensure the functionality of such equipment, and (3) regularly conduct drills in which crewmembers demonstrate their competence in the use of such devices. (M-11-26)

Require all crewmembers to provide certification of completion of safety training before getting under way on commercial fishing industry vessels, such training to include both prevention of and proper response to emergency situations as well as actual use of emergency equipment. (M-11-27)

In response to the recommendations in this letter, please refer to Safety Recommendations M-11-23 through -27. 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 this recommendation.

[Original Signed]

By: Deborah A.P. Hersman
Chairman