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# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** July 23, 1998

**In reply refer to:** M-98-103 through -116

Admiral James M. Loy  
Commandant  
U.S. Coast Guard  
2100 2<sup>nd</sup> Street, S.W.  
Washington, D.C. 20593-0001

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On Friday afternoon, January 19, 1996, the U.S. tug *Scandia* had an engine room fire while towing the unmanned U.S. tank barge *North Cape*, 4.5 miles off Point Judith, Rhode Island. All six crewmembers abandoned the *Scandia* amid 10-foot waves and 25-knot winds; however, no one was injured. The crew was unsuccessful in its attempts to release the anchor of the barge, which ran aground and spilled 828,000 gallons of home heating oil, causing the largest pollution incident in Rhode Island's history, an incident that led to the closing of local fisheries.<sup>1</sup> (The Eklof Marine Corporation, or EMC, was the company that operated the vessels.)

The National Transportation Safety Board determines that the probable cause of the fire damage aboard the tug *Scandia* and the subsequent grounding of and pollution from the barge *North Cape* was the EMC's inadequate oversight of maintenance and operations aboard those vessels, which permitted a fire of unknown origin to become catastrophic and eliminated any realistic possibility of arresting the subsequent drift and grounding of the barge. Contributing to the accident was the lack of adequate U.S. Coast Guard and industry standards addressing towing vessel safety.

After reviewing the *Scandia*'s discrepancy reports, interviewing EMC operations department personnel responsible for the oversight of vessel maintenance, and evaluating the implementation of the EMC's vessel inspection program (VIP), the Safety Board determined that the EMC's management oversight of vessel maintenance was poor, which resulted in reducing the safety of its vessels.

The International Maritime Organization adopted the International Safety Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code) in 1993. The

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<sup>1</sup>For more information, read Marine Accident Report—*Fire Aboard the Tug Scandia and the Subsequent Grounding of the Tug and the Tankbarge North Cape on Moonstone Beach, South Kingston, Rhode Island, on January 19, 1996* (NTSB/MAR-98/03).

ISM Code provides important guidance to shipping companies for exercising oversight of the operation and maintenance of oil tankers in international trade. However, no comparable guidance applies to tug-barges involved in domestic oil transportation. Therefore, the Safety Board believes that the Coast Guard and the American Waterways Operators, Inc., (AWO) should cooperate to develop and implement an effective safety management code to ensure adequate management oversight of the maintenance and operation of vessels involved in oil transportation by barges.

The Safety Board analyzed the captain's vessel operations in light of the predicted weather and the actual on-scene weather and found that although a winter storm was rapidly approaching, the captain continued to proceed into the open seas of the "Race," thus reducing his margin of safety for avoiding the storm. (After leaving Long Island Sound, vessels proceed through the Race, which serves as a gateway to the next sound--Block Island Sound. Vessels are exposed to high southerly winds, waves, and ocean swells while in the Race because it does not have any islands to provide protective land cover.) Further, the captain did not reassess his decision to continue his voyage beyond the sheltered waters of Long Island Sound to the Race, and neither he nor the EMC had any plan to consider alternatives in case the vessel was endangered by the storm.

The weather also played a key role in the grounding of and pollution from the *North Cape*. (After the Coast Guard had rescued the *Scandia's* crewmembers and taken them to the station, the Coast Guard coxswain and some of the *Scandia's* crewmembers returned to the *North Cape* to try to release its anchor.) The crewmen who boarded the barge to release its anchor discovered that the waves had increased to between 20 and 30 feet and were washing over the barge, making it impossible to release the anchor without risking severe injury. Had the weather not turned so severe, they may have been able to release the anchor.

The Safety Board's investigation shows that the EMC had no procedures that would enable the crew to assess weather-related voyage risks or require the captain to obtain updated weather information or require the captain to consult the EMC's shoreside management about the risk of continuing the voyage under the prevailing weather conditions.

Although the EMC left all weather-related decisions entirely to the captain, the Safety Board points out that current maritime safety management practices, such as those embodied in the ISM Code, emphasize that responsibility for vessel safety cannot be limited to ship captains but must be shared by the upper levels of the company's shoreside management. Therefore, the Safety Board believes that the Coast Guard should require towing vessel companies to develop and implement procedures whereby management officials communicate with ship captains at sea in times of potential or actual emergencies and during safety-critical periods of a voyage.

In response to the Coast Guard Authorization Act of 1996, the Coast Guard issued a notice of proposed rulemaking (NPRM) in October 1997 to improve towing-vessel and tank barge safety in a variety of areas. The Coast Guard's NPRM solicited public comments on voyage planning, and the Safety Board's recommendations, based on the findings of this accident investigation, are particularly relevant to the Coast Guard's request. They highlight the importance of voyage planning to the safety of tug-barge operations.

The *Scandia* accident shows that EMC's inadequate oversight of vessel operations resulted in the *Scandia*'s lack of preparedness to encounter the predicted bad weather and contributed to the accident. For example, if the EMC had had a checklist to ensure that the loose equipment and material aboard the *Scandia* were secured in heavy weather, to ensure that flammable materials were not stored in the engineroom, and to ensure that the *North Cape* was adequately equipped for the anticipated weather, the crew might have thought through the process of preparing for heavy weather and taking the necessary precautions, thus significantly improving the safety of operations.

The Safety Board, therefore, concludes that because the EMC did not have adequate voyage planning procedures to ensure that adequate weather information and operational precautions were considered in its decisionmaking, the risk reduction measures that could have been taken before the voyage began were not taken. Therefore, the Safety Board believes that the Coast Guard, in conjunction with the towing vessel industry, should develop and implement requirements for voyage planning standards and checklists for towing vessel companies to ensure that adequate risk reduction measures are taken before starting a voyage, including an assessment of weather risks, of the adequacy of the vessel's equipment, and of operational precautions.

In its NPRM, the Coast Guard proposed the use of an emergency barge retrieval system as an acceptable method by which a tug can recover its barge if the towline breaks. If the towline between a tug and its barge breaks, the tug can use an emergency barge retrieval system to retrieve its barge, but only if the tug, itself, is operational. In this accident, however, even if the *Scandia* had had a retrieval system, the vessel could not have used the system because the vessel was completely disabled by the fire. The same consequence would also result if a tug were to suffer other casualties, such as flooding, sinking, capsizing in heavy seas, or grounding. In such situations, a tug that has a retrieval system and is dispatched from another location is needed to retrieve the drifting barge.

While a number of tugs set out to assist the *North Cape* and were prevented by the weather from arriving on scene in time, the tugs were not strategically located when they started their journey to assist and were selected by chance. No organized system ensured that the tugs were strategically located so they could reach the accident scene in time or that the tugs were powerful enough or possessed the proper equipment to provide the assistance necessary. There was also no assurance that their crewmembers were trained to handle emergency retrieval operations without seriously endangering themselves and their tugs. A tug of opportunity system or an alternative system, therefore, may be necessary to complement the proposed retrieval system. (A tug of opportunity system is an organized system for diverting a tug, which may be towing or escorting another vessel or idling, to arrest a drifting oil barge or vessel. Under this system, information regarding the capabilities and locations of suitable tugs is monitored so that in an emergency the proper resources can be immediately dispatched to help. In addition, the system ensures that the tug is appropriate for the condition of the sea and for the size of the vessel to be helped.)

In this accident there was a 4 ½-hour period, from the start of the fire to the grounding of the barge, within which the barge could have been retrieved. The Safety Board concludes that the

use of a tug assistance system in conjunction with a barge retrieval system would have significantly improved the chance of arresting the drift of the *North Cape* and preventing its grounding. Therefore, the Safety Board believes that the Coast Guard and the towing industry should institute a pilot project in the northeastern United States to evaluate the benefits of using an organized tug-assistance system to complement the proposed barge retrieval system or, if appropriate, develop and implement an alternative system to ensure barge retrieval if a tug becomes incapable of performing that function.

The *North Cape* had a 6,000-pound bow anchor. On the day of the accident, it was temporarily held in place on the bow anchor sled by a wire rope sling and shackle attached to an A-frame just behind the sled. The temporary arrangement was used while the windlass and its brake--which normally secured the anchor--were being repaired ashore. An appropriately designed and installed anchoring system may have reduced the possibility of grounding and pollution.

The captain had probably long been aware of the oncoming storm and could have chosen to wait out the storm by dropping anchor in a harbor of safe refuge in Long Island Sound. However, the lack of a windlass would have deterred him because there is no easy way to retrieve an anchor without a windlass, and he would have lost the anchor--a valuable piece of equipment. This fact may explain why the captain never considered this option.

It is difficult to say with certainty whether the drifting *North Cape* could have been completely stopped before running aground even if the anchor and windlass had been properly installed and operable. The ability of an anchor to stop a vessel depends on various unknown factors, such as the holding power of the sea bottom compared to the magnitude of the drag forces exerted on the barge by the seas and wind. While an anchor is often ineffective in stopping a self-propelled vessel within a limited distance when the vessel is traveling at speed, the *North Cape* was drifting slowly, and there was a considerable distance for the anchor to take hold on the bottom before the barge grounded. Having an anchor drag along the bottom would have slowed the barge down and may have stopped it before it reached shore, thus giving the assist tugs much more time to reach it. The Safety Board therefore concludes that an operable anchor may have reduced the chance of the barge grounding.

Anchors are routinely used to hold (to "anchor") a vessel in a waterway and are safety devices. Just as Coast Guard regulations require anchors on manned barges to enhance their safety, so would anchors increase the safety of unmanned barges. The Coast Guard, however, does not require an unmanned barge to have an anchor because the Coast Guard recognizes that normally there is no one on an unmanned barge to release the anchor.

Nevertheless, the *North Cape* was not unique in having an anchor and windlass because many owners equip their unmanned barges with an anchor and windlass for operational convenience. On such a barge, a crewman jumps from the tug to the barge. While the jump is usually safe under routine conditions, in rough seas or unfavorable conditions, the probability of injuries and deaths can be unacceptably high. In this accident, the lives of two tug crewmen were seriously endangered by the turbulent seas when they jumped aboard the *North Cape* to release the anchor. Even if the anchor and windlass had been properly installed, the Safety Board would

have considered the risk to the crewmen's lives to be just as excessive. The Board's determination is supported by Coast Guard accident statistics, which show that slips and falls overboard are the largest cause of deaths and injuries in the towing industry.

The Safety Board thinks that such risk reduction strategies as remotely operated quick releases for barge anchors should be considered as a way of avoiding the risks associated with transferring people to an unmanned barge. The Safety Board concludes that when a tug is disabled, modern devices, such as radio-frequency transmitters, that are suitably located on the tug may be effective in releasing the barge's anchor by remote control and that the use of such transmitters does not involve imposing risks on the crew. A remotely operated mechanism can be designed to operate independently of the tug's primary power systems so that the device is not dependent on the tug's ability to propel or steer itself. A remote device can be activated quickly even if a tug has lost propulsion or steering, is involved in a fire, or is sinking.

In its NPRM, the Coast Guard invited readers to propose technological solutions to the problem of arresting drifting barges that are better than the existing techniques, which are often hazardous to the crews. The Safety Board, therefore, believes that the Coast Guard, in conjunction with the towing vessel industry, should develop modern remote anchor release devices for barges in emergencies that do not expose crewmen to unnecessary risk, and require their utilization. Further, the Safety Board believes that the AWO should encourage its members to work with the Coast Guard to develop a means of releasing anchors on unmanned towed barges by remote control from the towing vessel.

The safety of the Nation's fleet, about 30,000 barges, and its personnel and cargo, as well as the safety of the marine environment, depends to a large extent on the fire safety of the vessels that tow the barges. The fact has been consistently demonstrated by accident statistics for towing vessels, which show that fires are the second largest cause of towing vessel accidents. The statistics also show that almost all fires occur in the engine room, where ignition sources, such as hot operating machinery and electrical equipment, are close to flammable fuels and oils and to the combustible materials used in the vessel's construction. The *Scandia* fire demonstrates how rapidly a fire on a tug can get out of control and cause a second accident involving a barge in its tow. The second accident caused large-scale pollution that significantly damaged the environment and drew public attention to this accident. The Safety Board determines that the chances of preventing pollution from towed oil barges would be greatly enhanced if Coast Guard regulations adequately addressed the fire safety of towing vessels.

Despite the fact that the *Scandia* had firefighting equipment, such as the semi-portable fire extinguishing system and the fire pump, that exceeded the Coast Guard requirements, the crew could not reach the equipment during the emergency. The intensity of the smoke and heat prevented the crewmembers from entering the fidley, and they could not reach the controls for the semi-portable extinguisher, which were only a few feet inside the fidley door. Consequently, the equipment was ineffective in fighting the fire.

To use the semi-portable system, crewmembers would have had to enter the fidley and move close to the fire so that they could manually unreel the hose and direct its nozzle toward the base of the fire. To enter the fidley, however, the crew would have had to wear firemen's outfits

and self-contained breathing apparatus (SCBA). Firemen's outfits and SCBAs would also have significantly increased the effectiveness of the portable extinguishers, as the crewmen would have been able to get the extinguishers closer to the fire.

The Safety Board concludes that the *Scandia* accident demonstrates the need for SCBAs and firesuits on towing vessels. Therefore, the Safety Board believes that the Coast Guard should require SCBAs and firesuits aboard all towing vessels, as well as training in their use.

The crew would have been safer if the *Scandia* had had a fixed firefighting system in the engineroom that could be remotely operated from outside the engineroom. Crewmembers would not have been subject to the physical risks involved in entering a fire- and smoke-filled fidley, and the firefighting would have been more effective.

The Safety Board supports the NPRM in proposing the requiring of fixed fire extinguishing systems in the enginerooms of new tugs but notes that the NPRM does not require fixed fire extinguishing systems aboard existing tugs. Also, the NPRM would not require tugs such as the *Scandia* to have firefighting equipment beyond what is already aboard the vessel, which the crew could not operate in this accident because the equipment controls were located in areas made inaccessible by the fire. The Safety Board concludes that the NPRM proposes a lower level of safety for existing tugs than for new tugs and would not make existing tugs any safer from the kind of fire that the *Scandia* experienced in this accident. The Safety Board, therefore, believes that the Coast Guard should require approved fixed firefighting systems in the enginerooms of existing towing vessels.

Although the *Scandia* had a fire pump, it could only be operated from the lower engineroom. The crewmembers could not reach the lower engineroom because they could not even enter the smoke-filled fidley. (They needed to go down the stairway in the fidley to the lower engineroom, engage the clutch, and start the pump.) The Safety Board concludes that because the *Scandia*'s fire pump could not be started from outside the engineroom, it could not be used for fighting this fire. Therefore, the Safety Board believes that the Coast Guard should implement the requirement in its NPRM that fire pumps on towing vessels also be operable from outside the engineroom.

Neither the chief engineer, who led the firefighting, nor any other crewman was aware that the emergency remote shut-offs for the engineroom ventilation fans were just outside the fidley's aft door. The fans continued to supply the fire with fresh air, causing the fire to grow and spread rapidly. None of the crewmen activated the remote fuel pump or fuel valve shut-offs to the engineroom, which were also outside the aft door of the fidley.

Basic marine firefighting requires that all ventilation and fuel supply to the engineroom be shut off in the event of an engineroom fire. Although the chief engineer had completed a Coast-Guard-approved basic firefighting course, his statements to Safety Board investigators and his actions during the emergency show that he was not familiar with the location of the *Scandia*'s emergency shut-offs.

Although the crewmembers told Safety Board investigators that they had participated in emergency drills, they showed a lack of familiarity with the *Scandia's* emergency firefighting systems. None of the crew had participated in engine room firefighting drills on the *Scandia*, and none had been assigned specific duties in the event of a fire emergency. The chief engineer was the only crewman who said he knew how to operate the *Scandia's* fire pump.

The Safety Board supports the proposals in the NPRM about requiring muster lists, drills on using SCBAs and fireman's outfits, and safety orientations that will familiarize crewmembers with their vessel before they sail. The Safety Board believes that the Coast Guard should incorporate these proposals in its regulations.

The Safety Board notes that it will be up to the vessel owners to comply with the regulations and that, for uninspected vessels, the Coast Guard intends to rely on spot checks rather than on an inspection program. Therefore, the Safety Board believes that the Coast Guard should require vessel owners to keep detailed, signed logs of all on-board drills to assist the Coast Guard in its spot checks.

Because oil spill statistics from 1992 to 1996 show that oil barges spilled eight times more oil than tank ships, the Safety Board questions whether the Coast Guard's safety regulations for tug-barge systems are adequate when compared to those for tank vessels. A comparison of some of the fire safety regulations that are relevant to the *Scandia* accident shows that tank ships are subject to significantly higher safety regulations than tug-barge systems, although both carry similar cargoes. Regulatory differences in fire safety, as well as in other areas, such as vessel inspection and equipment redundancies, may explain why the pollution from tug-barges is so much greater than that from tank ships.

If risks for tug-barge systems and tankers had been assessed with equal rigor, then the resulting regulations would probably have been comparable and would have provided an equivalent level of safety against pollution. Even though a regional risk assessment team conducted a risk assessment, based on which the Coast Guard issued the NPRM for improving tug-barge safety, the Board's investigation of this accident uncovered significant issues that were not addressed by the NPRM; thus, the proposed regulations may not be effective in reducing pollution. Even if the NPRM were adopted, it would not significantly reduce the overall regulatory discrepancy between tank vessels and tug-barges in many areas of safety, because the NPRM focuses only on safety issues relating to the *Scandia* accident. The Safety Board concludes that the large difference in the oil pollution data for the two vessel types quite likely results from the discrepancy in risk mitigation regulations that apply to them.

The Coast Guard has both the authority and the responsibility to direct a comprehensive risk assessment to mitigate the effects of marine accidents on the public and the environment. The Safety Board therefore believes that the Coast Guard should conduct a comprehensive risk assessment to develop risk mitigation regulations for tug-barge systems that provide a level of safety against marine pollution equivalent to that provided by regulations for tankers.

The Coast Guard rescue boat crew left the station in a 41-foot UTB. As a result, the crew lost 20 minutes in reaching the accident scene because the sea was unsafe for the UTB, forcing the SAR crew to return for a 44-foot MLB.

The delay did not prevent the Coast Guard from rescuing the *Scandia's* crew. However, the delay allowed the fire to progress and caused a more dangerous situation to develop for the crewmembers while they waited for the Coast Guard to arrive. The delay also forced the SAR crew to conduct a more difficult in-the-water rescue because the wheelhouse windows on the tug had "exploded" by then, forcing the tug crew to enter the water. If the SAR crew had initially deployed in the MLB, the crew would have arrived 20 minutes sooner than it did, and the coxswain would have been able to conduct a direct vessel-to-vessel transfer of the tug crew as he had earlier envisioned. As a result of the rescue, the rescue swimmer became hypothermic and the MLB returned to the station to get him medical treatment. The coxswain later returned to the barge with some of the tug crewmembers who boarded the barge and tried to drop its anchor. With an out-of-the-water transfer, the swimmer would not have suffered from hypothermia, and the crew of the *Scandia* would have been exposed to less risk. The sea would not have been as dangerous as it was when the tug crewmembers eventually did board the barge. The sea had become so dangerous that the coxswain was unable to retrieve one of the tug crewmen from the barge. Consequently helicopter crewmembers had to risk their lives to rescue the tug crewman stranded on the barge.

The coxswain explained that he initially selected the UTB instead of the MLB because the UTB was significantly faster and more maneuverable and offered greater protection from the weather. The coxswain's points are valid, but he did not recognize that the wind and sea were too severe for a UTB until he was some distance out to sea.

The coxswain made the decision to use a UTB instead of an MLB. According to the Coast Guard's SAR plan, the selection of the boat is the responsibility of the officer-in-charge (OIC) at the boat station. Because the OIC was not present at the time of the accident, it became the officer-on-duty's (OD's) responsibility. However, the OD did not give the coxswain any guidance about the type of boat to use.

Although the coxswain had seen a weather report posted at the station earlier that morning, he did not check a more recent weather report at the station. Instead, he based his knowledge of the weather on what he could readily see from the station windows. When the coxswain launched, the duty watchstander did not supply the latest weather update.

In the Safety Board's opinion, the Coast Guard's procedures for deploying the proper boat were adequate. However, the Coast Guard station personnel did not adequately follow the procedures. For instance, the OD did not give the coxswain the necessary guidance for selecting the boat, and the coxswain failed to check the latest weather information.

The Safety Board concludes that the OD and the coxswain did not consider the weather and sea conditions sufficiently in selecting the rescue boat, and the result was a 20-minute delay in arriving on scene. The Safety Board believes that Coast Guard stations should conduct a



mandatory pre-deployment briefing for all SAR missions to ensure that the on-scene weather and sea conditions are assessed accurately so that the proper rescue boat is selected.

Coast Guard procedures prescribing the use of hypothermia protective clothing specify that in cold-water areas, a surface swimmer should don either a wet suit or a dry suit and a safety harness en route to the scene of the accident if the coxswain or boat crew has prior knowledge that someone must be rescued from the water. The coxswain is responsible for selecting the swimmer from the boat crew. During the initial response to the *Scandia*, the coxswain did not tell the swimmer to outfit himself because the coxswain did not anticipate that a rescue from the water would be necessary. As a result, when the swimmer entered the water, he was wearing only anti-exposure coveralls, which were inadequate to protect him from hypothermia.

In the Safety Board's opinion, it is likely that someone, either a Coast Guardsman or a civilian, will fall into the water during any small-boat rescue operation in rough seas. Therefore, the need for a swimmer to enter the water should always be anticipated under such conditions. Since it is extremely difficult to remove anti-exposure coveralls and don a dry or wet suit on a rolling and pitching small boat in rough seas, a pre-designated swimmer should don appropriate thermal protective garments before the boat leaves the station in cold-water areas. The Safety Board concludes that had the swimmer been properly attired, he probably would not have become hypothermic. The Safety Board, therefore, believes that the Coast Guard should establish and implement procedures to require a pre-designated swimmer to don suitable thermal protective clothing before launching a small boat on a SAR mission in cold water.

The Safety Board analyzed the group commander's decision to send a Coast Guard crew, along with two *Scandia* crewmen, to the *North Cape* to drop its anchor. This decision required an analysis of the potential risks of injury or death to the Coast Guard and civilian personnel, an assessment of the risk of loss of or damage to Coast Guard resources, and a judgment about the probability of success. Of particular concern to the Board was the group commander's decision to place civilian lives at risk to conduct this dangerous mission. The Safety Board concludes that although the coxswain, the Coast Guard boat crew, and the tug crew volunteers made an heroic attempt to prevent an oil spill, the decision to allow them to do so was ill-conceived and not justified.

The Coast Guard Air Station Cape Cod had informed the group commander that the air station would not provide a helicopter to deliver anyone to the barge because aviation risk assessment criteria specify that SAR personnel should only be placed at risk if human lives are in danger. When the group commander proceeded with the salvage mission, he did not tell the air station.

While the group commander thought he had assessed the risks fully before he ordered the attempt to drop the barge anchor, in the Safety Board's view he had not. He did not fully recognize the severity of the sea and weather conditions or anticipate that another life-threatening rescue would be necessitated as a result of the dangers encountered by the salvage crew. Such an assessment has been identified in previous Safety Board investigations.

As a result of its investigation of the 1991 capsizing and sinking of the U.S. commercial fishing vessel *Sea King*,<sup>2</sup> the Safety Board issued Safety Recommendation M-92-54 to the Coast Guard:

Incorporate into the training of SAR personnel procedures to ensure the gathering and dissemination of pertinent information by all appropriate SAR personnel to facilitate a thorough assessment of the potential risks to persons involved in a SAR mission.

As the result of the investigation of three 1993 accidents<sup>3</sup> involving Coast Guard SAR responses that proved unsuccessful because of the inadequacy of the risk assessments, the Safety Board issued Safety Recommendation M-94-7 to the Coast Guard:

Provide risk assessment training to all Coast Guard personnel directly involved in SAR missions.

On November 21, 1994, the Coast Guard Commandant stated:

I concur with these recommendations. The Coast Guard has taken action to add risk assessment training for SAR personnel at appropriate levels in the operational chain of command, and full implementation is expected by May of 1995.

The Commandant's response further indicated that, as a result of the Board's recommendations, risk assessment training had been included in training courses for small-boat coxswains, for pilots and aircrews, for small-boat station commanders, for cutter commanders and executive officers, for operations-center watchstanders, and for group and station commanding officers and executive officers. As a result of the Commandant's response, Safety Recommendations M-92-54 and M-94-7 were classified "Closed--Acceptable Action."

While the Safety Board is gratified that the Coast Guard has incorporated risk assessment training in the training for all levels of SAR activity, from small-boat coxswain to group commander, training in and of itself does not ensure that proper risk assessments will be made in all cases. To be truly effective, training must be reinforced by pertinent operational guidelines. According to the pilot of a rescue helicopter, the operations officer at the air station declined to provide helicopter assistance for the salvage mission after consulting personnel from the Group. The request was denied because the formal risk assessment guidelines, which are in the Coast Guard Commandant's Instruction 3710, *Air Operations Manual*, prohibit the placing of a Coast Guard helicopter and air crew at grave risk for any operation, such as a salvage mission, that is

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<sup>2</sup>For more information, read Marine Accident Report -- *Capsizing and Sinking of the U.S. Fishing Vessel Sea King Near Astoria, Oregon, January 11, 1991* (NTSB/MAR-92/05).

<sup>3</sup>For more information, read Marine Accident Brief Reports--*Grounding of the U.S. Sailing Pleasure Craft Rite of Passage, Isle of Palms, South Carolina, August 4, 1993* (DCA-93-MM-023); *Sinking of the U.S. Pleasure Craft Big Abalone, Coos Bay, Oregon, August 20, 1993* (DCA-93-MM-029); and *Sinking of the U.S. Tug Duke Luedtke, in Lake Erie, near Cleveland, Ohio, September 21, 1993* (DCA-93-MM-030).

not a life-threatening emergency. (The risk of losing the aircraft or the air crew is considered a grave risk.)

The group commander did not have any comparable published formal risk assessment guidelines to follow in making his assessment of the risks presented by the salvage operation. In the Board's opinion, it is just as necessary to provide guidelines for placing Coast Guard surface craft and surface personnel at "grave risk" as it is to provide such guidelines for aircraft and aviation personnel. The guidelines should clearly explain the procedures for conducting risk assessments and analyses that are necessary before conducting SAR and salvage missions, for identifying grave risk to surface craft and personnel, and for obtaining concurrence and approval from the respective district commands. In particular, the guidelines should emphasize the need to protect civilian lives from unnecessary "grave risks." The Safety Board concludes that developing and implementing risk assessment guidelines for the deployment of surface SAR units that are similar to those for the deployment of aircraft would enhance the quality of risk assessments by Coast Guard operational commanders. The Safety Board, therefore, believes that the Coast Guard should develop and implement risk assessment guidelines for the deployment of surface SAR units that are similar to those published in Coast Guard Commandant's Instruction 3710.

As a result of its investigation of this accident, the National Transportation Safety Board makes the following safety recommendations to the U.S. Coast Guard:

*Conduct a comprehensive risk assessment to develop risk mitigation regulations for tug-barge systems that provide a level of safety against marine pollution equivalent to that provided by regulations for tankers. (M-98-103)*

*In conjunction with the towing vessel industry, develop and implement an effective safety management code to ensure adequate management oversight of the maintenance and operation of vessels involved in oil transportation by barges. (M-98-104)*

*Require towing vessel companies to develop and implement procedures whereby management officials communicate with ship captains at sea in times of potential or actual emergencies and during safety-critical periods of a voyage. (M-98-105)*

*In conjunction with the towing vessel industry, develop and implement requirements for voyage planning standards and checklists for towing vessel companies to ensure that adequate risk reduction measures are taken before starting a voyage, including an assessment of weather risks, of the adequacy of the vessel's equipment, and of operational precautions. (M-98-106)*

*In conjunction with the towing vessel industry in the northeastern United States, institute a pilot project to evaluate the benefits of using an organized tug-assistance system to complement the proposed barge retrieval system or, if appropriate, develop and implement an alternative system to ensure barge retrieval if a tug becomes incapable of performing that function. (M-98-107)*

In conjunction with the towing vessel industry, develop modern remote anchor release devices for barges in emergencies that do not expose crewmen to unnecessary risk, and require their utilization. (M-98-108)

Require self-contained breathing apparatus and firesuits aboard all towing vessels, as well as training in their use. (M-98-109)

Require approved fixed firefighting systems in the enginerooms of existing towing vessels. (M-98-110)

Require that fire pumps on towing vessels also be operable from outside the engineroom. (M-98-111)

Require that towing vessels have muster lists, drills on the use of self-contained breathing apparatus and fireman's outfits, and safety orientations to familiarize crewmembers with their vessel before sailing. (M-98-112)

Require vessel owners to keep detailed, signed logs of all on-board drills to assist the Coast Guard in its spot checks. (M-98-113)

Require Coast Guard station search and rescue personnel to conduct a mandatory pre-deployment briefing for all search and rescue missions to ensure that the on-scene weather and sea conditions are assessed accurately so that the proper rescue boat is selected. (M-98-114)

Establish and implement procedures to require a pre-designated swimmer to don suitable thermal protective clothing before launching in a small boat on a search and rescue mission in cold water. (M-98-115)

Develop and implement risk assessment guidelines for the deployment of surface search and rescue units similar to the guidelines published in Coast Guard Commandant's Instruction 3710. (M-98-116)

Also, the Safety Board issued Safety Recommendations M-98-117 through -119 to Eklof Marine Corporation and M-98-120 through -122 to the American Waterways Operators, Inc.

Please refer to Safety Recommendations M-98-103 through -116 in your reply. If you need additional information, you may call (202) 314-6450.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:

  
Jim Hall  
Chairman