

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

Log M-213

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Forwarded to:

Admiral James S. Gracey
Commandant
U.S. Coast Guard
Washington, D. C. 20593

SAFETY RECOMMENDATION(S)

M-83-50 through -52

About 0415 on February 12, 1983, the U.S. bulk carrier MARINE ELECTRIC capsized and sank during a storm in the Atlantic Ocean about 30 nautical miles east of Chincoteague, Virginia. Thirty-four persons were on board. Three persons survived the accident and the bodies of 24 persons were recovered. The remaining seven persons are missing and presumed dead. The MARINE ELECTRIC currently is resting on the bottom of the ocean in two pieces in about 120 feet of water; its estimated value was \$12 million. A joint National Transportation Safety Board/U.S. Coast Guard investigation of this accident is still in progress.

When the MARINE ELECTRIC capsized, the sea temperature was 39° F and the air temperature was 29° F. The winds were 30 to 35 knots and the seas were 13 to 18 feet. The reports of the Virginia Department of Health Medical Examiner and the Maryland Department of Post Mortem Examiner indicate that 20 of the 24 persons whose bodies were recovered died of hypothermia--the loss of body heat to the water. The other four persons drowned. The following chart contained in the Coast Guard regulations (33 CFR 181.705) shows the effects of hypothermia:

Water Temperature	Exhaustion or Unconsciousness	Expected Time of Survival
(° F)	(Time)	(Time)
32.5	Under 15 min.	Under 15 to 45 min.
32.5 to 40	15 to 30 min.	30 to 90 min.
40 to 50	30 to 60 min.	1 to 3 h
50 to 60	1 to 2 h	1 to 6 h
60 to 70	2 to 7 h	2 to 40 h
70 to 80	3 to 12 h	3 h to indefinite
Over 80	Indefinite	Indefinite

At 0251, on February 12, the master of the MARINE ELECTRIC contacted the Coast Guard Station at Ocean City, Maryland, on VHF-FM radiotelephone channel 16 1/and stated, "I'm going down by the head, I seem to be taking on water forward." After giving the MARINE ELECTRIC's position and the type of vessel, the master said, "I am mustering my crew at the lifeboats and trying to get my lifeboats out."

About 0300, the master of the MARINE ELECTRIC ordered that the off-watch crew be awakened. The crew donned lifejackets and mustered near the lifeboats, and the port and starboard lifeboats were made ready for launching. About 0350, after the MARINE ELECTRIC developed a 5° list to starboard, the master told the chief mate to swing out the lifeboats. About 0410, when the starboard list increased to about 10°, the master ordered the engines stopped, the engine room evacuated, and the ship abandoned. At 0414, the master notified the Coast Guard via VHF-FM radiotelephone that "we are abandoning right now," but before the lifeboats could be launched, the MARINE ELECTRIC suddenly capsized, throwing the crew into the cold, rough seas.

The Coast Guard rescue coordination center in Portsmouth, Virginia, had been notified of the MARINE ELECTRIC's distress call at 0310, and at 0318, Coast Guard Air Station Elizabeth City had been directed to launch its ready helicopter. The helicopter departed at 0413 and arrived on scene about 0520. After rescuing only three survivors--the chief mate, the 8 to 12 third mate, 2/ and an able seaman (AB)--the helicopter departed the scene at 0700 for Salisbury, Maryland.

The 8 to 12 third mate said that after he was thrown from the MARINE ELECTRIC, he swam to a lifering where five other crewmembers were hanging on. He testified as follows:

And I don't know when I started to notice that people weren't on the lifering. I noticed that [the ordinary seaman] wasn't there at one time. And then I turned around and the day man wasn't there. Right after there [sic], I called out to [the 12 to 4 third mate], and I asked him how he was doing. He responded that he was okay, that he was cold, he was okay.

I don't know how long [I] was on the lifering before I noticed that the only one there was the chief engineer and the radio operator. The radio operator kept saying he was cold, and he was stiffening up. He kept saying, "I'm cold. I'm cold. Help me."

At that point, I noticed that the chief -- the chief, when we went into the water, had his spotlight, and he had been shining it up into the air all this time. I noticed that he wasn't shining it anymore. I thought he might have lost it. So I whacked him on the back of his lifejacket, and there was no response from the chief. And as I hit him, his flashlight floated away from him, and I was able to grab that, and use that as my signal.

Again, I never looked at my watch in the water because I was afraid that I would lose my grip on the ring. So I wasn't concerned with the time element. I kept talking to [the radio operator]. [He] was the last one on the ring with me.

1/ Channel 16 is an international distress and safety channel.

2/ These designations refer to the watch stood by the individuals. The 8 to 12 third mate stood the 0800 to 1200 and 2000 to 2400 watch on the bridge.

The helicopters arrived, and it seemed like I could see them passing over me two or three times before they spotted us. When they lowered the basket, I turned to tell [the radio operator] that the basket was here, and [he] wasn't on the lifering anymore. It was just myself.

That's when they lowered the basket into the water, and I was able to get in.

The AB said that after he was thrown from the MARINE ELECTRIC, he inflated an unopened liferaft floating in the water by putting his feet on the canister and pulling on the inflation line. After he entered the liferaft, four other crewmembers swam to the liferaft, including the second mate. After unsuccessfully attempting to pull the crewmembers into the liferaft, the second mate told the AB to put over the liferaft ladder, which the AB found at the opposite end of the liferaft. The four crewmembers in the water moved to the other end, using the lifeline around the outside of the liferaft. The AB testified as follows:

What the ladder consisted of was, I guess what we call a cargo net. We went over there, and again one of the guys, he grabbed ahold of that, and the other two guys had the life line on one side, and the second mate came around the other side, and I was trying to get the second mate in, and even with him, with that ladder, we couldn't get it in. He couldn't grab on top. The ladder was flush against the raft, the top of there, and you couldn't reach down and get your hands into anything. I even tried to -- I squashed the net up a little bit, and they had a little flap there. I tried to put his hand into there so he could hold onto that and I grabbed something else. And we tried for a long time to get him in. I told him to get a foot hold, see if he could get a foot hold on the ladder. He said he couldn't do it, there wasn't one, or whatever. And so he was really coherent. I was trying to get him in first because he was the most coherent, and he could help me get the other guys in.

Finally we tried every way we could, and I was pulling. Of course, we was all freezing. You know, our hands aren't all that good. It was cold.

And then he put his legs up there, tried to get in that way, and after awhile I had him up to his knees. His knees were on top of the raft and his head was in the water down that way, and I was losing him. That way he was falling asleep and drifting off.

* * * *

So, after I couldn't get them in, and they all -- the second mate, he was the first one to drift away. I guess he was struggling. And then after that I went to try to look for something; kept on looking for something to help them with, and then they all started drifting away one by one.

* * * *

And then I was in the raft. So I just sat back and turned off my dollar and twenty-nine cent flashlight and just waited until I heard the helicopters come, and that's the only noise I heard, you know, after I lost these four guys.

The chief mate testified that he swam to and climbed into the port lifeboat, which had flooded with water up to the bottom of the thwarts. He said that the air temperature was "freezing cold" and that the seas washed over the lifeboat. He also said that several times he yelled "lifeboat here, come here, lifeboat here," but he received no response.

Both inflatable covered liferafts aboard the MARINE ELECTRIC were Coast Guard-approved liferafts which are required to have a boarding ladder, or the equivalent, and hand holds, or the equivalent, on each side of each entrance to aid in boarding. Although the Safety Board cannot determine why the AB did not find the ladders of the liferaft at both ends, it believes that one or more of the persons in the water might have been saved if the location of the liferaft's boarding ladders had been clearly marked and they had been easier to rig. While the AB was looking for the boarding ladders and trying to rig the one he found, the persons in the cold water were becoming progressively weaker. The Safety Board believes also that even though the AB in the raft and the four persons in the water were probably feeling the early effects of hypothermia, the second mate and the others in the water might have been able to enter the liferaft if the hand grabs on the ladder had not flattened against the liferaft with the weight of a person on the ladder, or if there had been a ramp fitted on the outside of the liferaft for persons in the water to climb onto. Therefore, the Safety Board believes that the Coast Guard should require that the means of boarding new and existing Coast Guard-approved liferafts from the water be improved.

Several experimental studies 3/ have shown that the use of exposure suits, which provide proper thermal protection, can extend an individual's survival time in cold water by several hours. Coast Guard regulations (46 CFR 94.41) currently require each vessel operating on the Great Lakes to carry an exposure suit which provides thermal protection for each person on board.

On September 22, 1978, as a result of its investigation of the sinking of the CHESTER A. POLING 4/ with the loss of one person, the Safety Board recommended that the Coast Guard:

Require that exposure suits be provided for each crewmember on vessels that routinely operate in areas of cold air or sea temperature.
(M-78-65)

On May 19, 1980, the Coast Guard replied that it concurred in the recommendation but that it did not intend to require oceangoing vessels equipped with enclosed lifeboats to have exposure suits.

3/ Harnett, R. M.; O'Brien, E. M.; Sias, F. R.; and Pruitt, J. R., (1979) "Experimental Evaluations of Selected Immersion Hypothermia Protection Equipment," U.S. Coast Guard Report No. CG-D-79-79, October 12, 1979; Hayward, J. S.; Lisson, P. A.; Collis, M. L.; and Eckeson, J. D., (1978) "Survival Suits for Accidental Immersion in Cold Water: Design-Concepts and their Protection Performance," University of Victoria, January 1978.

4/ For more detailed information, read Marine Accident Report—"Sinking of the M/V CHESTER A. POLING, Near Cape Ann, Massachusetts, January 10, 1977" (NTSB-MAR-78-7).

On July 8, 1982, as a result of its investigation of the capsizing and sinking of the OCEAN RANGER ^{5/} with the loss of all 84 persons on board, the Safety Board recommended that the Coast Guard:

Require that all U.S. mobile offshore drilling units that operate in waters where hypothermia can greatly reduce an individual's survival time carry an exposure suit for each person on board, similar to that required by 46 CFR 94.41-5(c). (M-82-35)

On February 3, 1983, the Coast Guard published a notice of proposed rulemaking in the Federal Register (Vol. 48, No. 24, page 4837) that would require U.S. flag oceangoing and coastwise tank vessels, cargo and miscellaneous vessels, mobile offshore drilling units and oceanographic vessels, be equipped with exposure suits for all persons on board. This would include industrial persons on mobile offshore drilling units, such as the OCEAN RANGER, and scientific personnel on oceanographic vessels, recognizing the fact that although industrial persons and scientific personnel are not part of the crew, they are employed on board the vessel and should be provided with exposure suits. However, the requirements would not apply to vessels with totally enclosed lifeboats, except for mobile offshore drilling units, or to any vessel operating in waters between 35° north latitude and 35° south latitude or on the outer continental shelf of the United States in the Atlantic Ocean south of 38° north latitude. The Coast Guard stated that the temperatures in these waters are usually above 60° F and generally do not fall below 57° F. At the time the MARINE ELECTRIC capsized and sank, it was located south of 38° north latitude on the outer continental shelf of the United States and the water temperature was about 39° F. Therefore, the Safety Board believes that the Coast Guard should reevaluate its temperature analysis to insure that cold water areas are correctly identified and that vessels operating in such waters are required to be equipped with exposure suits.

Both the OCEAN RANGER and the MARINE ELECTRIC accidents demonstrate that exposure suits should be required even if a vessel is equipped with enclosed lifeboats. The OCEAN RANGER was equipped with enclosed lifeboats, but many persons on board entered the water before rescue boats arrived on the scene and others entered the water when one of the enclosed lifeboats capsized. Before anyone could enter the open lifeboats on the MARINE ELECTRIC, the ship suddenly capsized, throwing the persons on board into the cold water. Even if the MARINE ELECTRIC had been equipped with enclosed lifeboats, the crew still would have been thrown into the cold water because they never got into the lifeboats. Therefore, whether a vessel is equipped with open or enclosed lifeboats, it should be provided with exposure suits for the crew if it operates in cold waters.

The proposed Coast Guard regulations do not address inspected passenger vessels. (The provision to permit the substitution of exposure suits for life preservers or other personal flotation devices on uninspected vessels presumably would reach vessels carrying less than six passengers.) The Safety Board believes that the crews of passenger vessels also should be provided with exposure suits so that they can provide assistance to passengers in the water in an emergency before succumbing to the effects of hypothermia themselves.

^{5/} For more detailed information, read Marine Accident Report—"Capsizing and Sinking of the U.S. Mobile Offshore Drilling Unit OCEAN RANGER off the East Coast of Canada, 166 Nautical Miles East of St. John's, Newfoundland, on February 15, 1982" (NTSB-MAR-83-2).

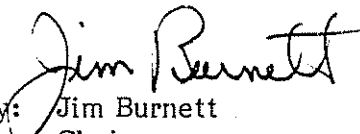
Therefore, the National Transportation Safety Board recommends that the U.S. Coast Guard:

Conduct a design study to determine the adequacy of existing boarding systems of U.S. Coast Guard-approved inflatable liferafts regarding the marking of the location and ease of rigging of boarding ladders or equivalent, and the ability of persons in the water, including those wearing exposure suits, to use the boarding ladder and hand holds or equivalent, and require design changes encompassing both new and existing liferafts found to have inadequate boarding systems. (Class II, Priority Action) (M-83-50)

Reevaluate the water temperature analysis underlying the Coast Guard's proposal to exempt vessels operating between 35° north latitude and 35° south latitude and on the U.S. outer continental shelf in the Atlantic Ocean south of 38° north latitude from being required to carry exposure suits, and modify the proposal as appropriate to limit the exemption to those areas where the water is above 60° F throughout the year. (Class II, Priority Action) (M-83-51)

Require that exposure suits be provided for each crewmember, scientific personnel, or industrial person on tank vessels, passenger vessels, cargo and miscellaneous vessels, mobile offshore drilling units, offshore supply vessels, small passenger vessels, and oceanographic vessels that operate in areas where the water temperature is below 60° F. (Class II, Priority Action) (M-83-52)

BURNETT, Chairman, GOLDMAN, Vice Chairman, McADAMS, BURSLEY, and ENGEN, Members, concurred in these recommendations.


By: Jim Burnett
Chairman