

PUBLIC HEALTH SERVICE/CDC/NIOSH/DSR
FACE-92-14
DATE: September 3, 1992

TO: Director, National Institute for Occupational Safety
and Health

FROM: Division of Safety Research, NIOSH

SUBJECT: Commercial Fisherman Presumed Drowned After Fishing
Vessel Capsized--Alaska

SUMMARY

A commercial fisherman (the victim) was missing and presumed drowned after the fishing vessel he was aboard capsized. The master/owner and two crewmen (one being the victim) were aboard the vessel on its way back to port after crabbing for a period of 9 days. In an effort to correct a 5-degree starboard (right) list, the victim pivoted the boom of the deck crane to port (left), resulting in a 20-degree port list. The initial list may have been attributed to a combination of stability, environmental/weather, and gear stowage conditions. Within 30 seconds the vessel was on its side, and later completely capsized. The victim was last seen when he told the skipper that he had his immersion suit in hand. His immersion suit was found on shore, out of the bag, a few days later. NIOSH investigators determined that, in order to prevent future similar occurrences, masters or individuals in charge of commercial fishing vessels should:

o1) ensure that their vessels comply with applicable U.S. Coast Guard (USCG) stability requirements and 2) be aware of the factors that can lead to the deterioration of inherent stability and the measures that can be employed to maintain or restore stability

oensure that persons on board are properly trained in the donning of immersion suits

oensure that on-board emergency instruction drills and safety orientation are conducted as required

oensure that their vessels have appropriate lifesaving equipment, that each item is properly maintained and stowed, and that each item is readily accessible at all times

oensure that immersion suits have an appropriate personal flotation device (PFD) light properly attached.

INTRODUCTION

On February 3, 1992, a 30-year-old commercial fisherman (the victim) was lost at sea and is presumed drowned after the vessel on which he was crabbing capsized. On February 4, 1992, the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research, Alaska Activity learned via a newspaper article that the victim was missing and presumed drowned. On February 10, 1992, two safety specialists from the Alaska Activity traveled to the port nearest the incident site, and conducted an investigation. The safety specialists reviewed the incident with the master/owner of the vessel, the USCG, and the local police and state troopers assigned to the case.

The victim had been self-employed as a commercial fisherman (share-holding crewman who receives a share of the catch) aboard the 43-foot fishing vessel for 3 years and had fished commercially for more than 6 years. The diesel-powered vessel had a fiberglass hull, weighed 27 tons, and was built in 1980. It was carrying 50 crab pots, each measuring 4 feet by 4 feet by 1 foot and weighing 150 pounds. The pots were stacked five high and evenly distributed on the deck of the vessel. The vessel's master/owner, who had been a commercial fisherman for 12 years, conducted safety drills at the beginning of each season and occasionally throughout the year during the less busy periods. The other crewman, age 30, was on his first trip with this crew.

INVESTIGATION

The crew had been fishing for tanner crabs for 9 days prior to the incident. At approximately 7:25 p.m. on the day of the incident, the fishing vessel was coming around a point 18 miles from the fishing port with 8- to 10-foot following seas, 25-knot west by southwest (W/SW) winds, snow squalls, limited visibility, and a temperature of 22 degrees Fahrenheit (F). At the time of the incident, there were approximately 150 gallons of fuel on board in the vessel's 760-gallon-capacity fuel tank. The vessel was experiencing a 5-degree starboard list. The cause of the list has not been determined, but might have been attributed to a combination of stability, environmental/weather, and gear stowage conditions. An upper cabin had been added which raised the vessel's center of gravity and provided more wind surface area. The upper cabin had possibly been built off-center and may have blocked water from flowing off the deck. Other contributing factors may have been the accumulation of ice from freezing spray on the crab pots, blockage of scuppers (deck drains) by loose gear or ice which prevented water from draining

from the deck, and the strong wind.

The owner thought the list was due to the 25-knot W/SW (port) wind; however, when the vessel turned the point so that the wind was blowing against the stern, the vessel did not correct itself. The owner then asked the victim to check the crab tank through the 18-inch-square top hatch to see if the crabs were unevenly distributed due to a possible leak in the tank.

After noting that the live-well tank water level was topped off or completely full of water, the victim pivoted the boom of the deck crane from starboard to port in an attempt to correct the list. This action over-corrected the vessel's 5-degree starboard list and resulted in a 20-degree port list. The list worsened rapidly, and within 30 seconds the vessel was resting on its side.

The owner immediately kicked the life raft off the vessel and pulled the painter line—the emergency inflation line—which should have inflated the raft. The line, however was not attached to the vessel, and the owner recalled that the raft wasn't fully deployed and may have had a hole in it. Within a few seconds the vessel's deck lights shorted out. The victim told the owner that he had his immersion suit in hand, although he was not wearing it. An immersion suit is an encapsulating, insulating, waterproof garment used to provide buoyancy and thermal protection in water 59 degrees F or below. This was the last time the owner saw or heard the victim.

The other crewman asked the owner where the immersion suits were kept on the upper deck. The owner told him to break through the wheelhouse window and grab them from under the chart table. After radioing a partial "Mayday" signal and stating their position, the owner and crewman partially donned their immersion suits and jumped into the water. They did manage to turn the Emergency Position Indicating Radio Beacon (EPIRB) on before the vessel capsized.

The crewman got his immersion suit completely zipped, but could not get his hood on. The owner could not find the gloves located in pockets on each sleeve of his suit. He was unable to pull his hood on or get his suit completely zipped because his hands were numb due to the 34-degree F water.

Fearing that they might be injured by the fishing gear mounted on the bobbing vessel, the two men concentrated on moving away from it. They managed to get about 100 yards away; however, they were unable to find the life raft because it was floating unattached on the opposite side of the vessel. The crewman remained alert during the 1½ hours in the frigid water and was

able to support the semi-conscious owner until rescued.

The USCG, Village Police Safety Officers, and many nearby villagers, heard the "Mayday" signal and began searching for the survivors of the capsized vessel. The PFD strobe lights on the owner's and crewman's immersion suits helped rescuers target their exact location and enable timely recovery. They were taken to a nearby health clinic and then transferred via air transport to the nearest hospital where they were treated for hypothermia and released. The missing crewman has not been found.

CAUSE OF DEATH

The exact cause of death is unknown. The victim is presumed to have drowned.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Masters or individuals in charge of commercial fishing vessels should: 1) ensure that their vessels comply with applicable USCG stability requirements and 2) be aware of the factors that can lead to the deterioration of inherent stability and the measures that can be employed to maintain or restore stability.

Discussion: The cause of the initial list has not been determined. However, the USCG discovered that the owner had added an upper cabin to his vessel which raised the vessel's center of gravity. It also provided more wind surface area and blocked water from flowing off the deck. Other possible contributing factors included the accumulation of ice from freezing spray on the crab pots, the blockage of scuppers by loose gear or ice which prevented water from draining off the deck, and the strong wind.

It is imperative that vessel owners obtain the services of qualified vessel stability specialists before making modifications that might change the vessel's stability. The vessel stability must then be recalculated by a marine surveyor or marine architect.

According to the Code of Federal Regulations (46 CFR Part 28), approximately 70 percent of deaths involving commercial fishing industry vessels are related to vessel stability. An examination of USCG search-and-rescue and casualty data for the years 1982 to 1987 (National Research Council, 1991) show that stability-related casualty rates are independent of vessel length or vessel hull material. The data also show that

stability-related casualties are independent of the geographic area of operation.

Subpart E of the 46 CFR Part 28 dealing with stability applies to all vessels more than 79 feet long which were built after the effective date of the regulations (December 31, 1989). This vessel was only 42 feet long; however, the appropriate recommendations should also be considered by owners of smaller vessels. A Supplemental Notice of Proposed Rulemaking (SNPRM) is under development which will address the stability criteria applicable to commercial fishing vessels which are less than 79 feet in length.

Further information on vessel stability is available from the North Pacific Fishing Vessel Owners Association (NPFVOA). There are courses, books, and videotapes available through NPFVOA on the subject of vessel stability. The NPFVOA address is:

1800 West Emerson
Suite 101
Fishermen's Terminal
Seattle, WA 98119
(206) 283-3383

Recommendation #2: Masters or individuals in charge of commercial fishing vessels should ensure that persons on board are properly trained in the donning of immersion suits.

Discussion: Each individual employed on a commercial fishing vessel that operates in cold water (59 degrees F or below) should receive instruction in donning each type of immersion suit stowed for their vessel in the event of an emergency. This should be accomplished in the drills mentioned in Recommendation #3.

The owner did not know the gloves on his immersion suit were located on the sleeves because he had not practiced donning this type of immersion suit. Therefore, he could not put on the gloves to insulate his hands from the cold water. There were five immersion suits on board, four of one type, and one—the skipper's—of another type. The owner and crew had only practiced donning the first type of suit. If the owner had been familiar with the suit he donned, he would have known where the gloves were located, which would have insulated his hands from the cold water. (A helpful hint for donning suits in a hurry is to store two plastic bags with the immersion suit so that the wearer can pull them over boots to facilitate sliding the feet smoothly into the suit.) Also, 46 CFR 28.265 (d) (3) requires that illustrated instructions on the method for donning the suits be provided.

The Alaska Marine Safety Education Association (AMSEA) Marine Safety Instructor Training Manual lists the procedures for properly donning an immersion suit.

Recommendation #3: Masters or individuals in charge of commercial fishing vessels should ensure that on-board emergency instruction drills and safety orientations are conducted as required.

Discussion: The Code of Federal Regulations (46 CFR Part 28.270) states: The master or individual in charge of a vessel is required to ensure that drills are conducted at least once each month. Drill instruction may be combined with the following minimum contingencies:

o abandoning the vessel

o fighting a fire in different locations on board the vessel

o recovering an individual from the water

o minimizing the affects of unintentional flooding

o launching survival craft and recovering life boats and rescue boats

o donning immersion suits and other wearable PFDs

o donning a fireman's outfit and a self contained breathing apparatus, if the vessel is so equipped

o making a distress call

o sounding the general alarm

o reporting inoperative alarm systems and fire detection systems.

Although these requirements apply to documented vessels that go beyond the boundary line or have more than 16 people aboard, they are appropriate for all commercial fishing vessels. The vessel involved in this incident was not documented.

Each vessel must have emergency instructions posted in conspicuous locations accessible to the crew. On a vessel which operates with less than four individuals, as in this case, the emergency instructions may be kept readily available as an alternative to posting [46 CFR 28.265 (a) (c)].

Each vessel should have a list of emergency assignments so that all persons on board can participate in the drills. An example of this list can be seen in the AMSEA Marine Safety Instructor Training Manual. Individuals should be aware of their assignments at all times.

According to the AMSEA Marine Safety Instructor Training Manual, drills should address the following at a minimum:

- oDrills should be realistic and spontaneous.

- oCrew members should have as much hands-on experience with the equipment as is practical.

- oFamiliarity with equipment should be stressed.

- oDrills should be progressive, starting slow to build skill and speed.

- oCrews should build teamwork and cross-train in case an individual member is absent or injured.

- oDrills should be positive and never used as punishment.

- oA debriefing session and evaluation among persons on board should immediately follow each drill to discuss ways to improve performance.

The manual has an example of a chart to keep track of monthly drills. It is suggested that a copy of the chart be kept on board and at home for proof of drills.

The owner conducted emergency drills at the beginning of each season and during "slow times" throughout the year. However, a review of the event indicates that the crew members were not familiar with the procedures of donning an immersion suit in an emergency. This suggests that the crew had not been adequately drilled in emergency procedures.

Orienting all newcomers, not just new crew members, is critical to the safety of the vessel and persons on board. Masters should ensure that a safety orientation is given to each individual on board who has not received it and has not participated in the drills. The safety orientation must explain the emergency instructions [46CFR 28.270 (e)]. The AMSEA manual has an example script one might follow when orienting a newcomer.

Recommendation #4: Masters or individuals in charge of commercial fishing vessels should ensure that their vessels have appropriate lifesaving equipment, that each item is properly

maintained and stowed, and that each item is readily accessible at all times.

Discussion: Masters/operators should include immersion suit/PFD stowage location, donning, and use as part of a vessel safety orientation and required drills. Persons on board must have immediate access to immersion suits so that they do not have to search for them during a vessel emergency. In this incident, the victim did not know where the immersion suits were stowed. More than one immersion suit per individual, stowed on board in different locations, may be necessary to satisfy the requirement for the accessibility of the suits at all times on most commercial fishing vessels.

A life raft should be repacked annually by a USCG certified facility that has a manufacturer's certificate for the brand of life raft being repacked [46 CFR 28.120]. In this incident, the life raft had not been repacked within the previous year, it did not fully inflate, and its light was not functional, possibly due to dead batteries.

Owners should be responsible for regular safety inspections. Conducting regular safety inspections helps ensure that established vessel safety procedures are being followed. Additionally, regular on-vessel safety inspections clearly demonstrate that the master is committed to preventing commercial fishing injuries and fatalities.

The Code of Federal Regulations (46 CFR Part 28.140) states:

(a) The master or individual in charge of a vessel must ensure that each item of life saving equipment be in good working order ready for immediate use, and readily accessible before the vessel leaves port and at all times when the vessel is operated.

(b) Except for an inflatable life raft or an inflatable buoyant apparatus less than two years of age, each item of life saving equipment including unapproved equipment, must be maintained, inspected and logged in accordance with:

- o 46CFR Table 28.140
- o the servicing procedure
- o the manufacturer's guidelines.

(c) An inflatable life raft or inflatable buoyant apparatus must be serviced at a facility approved by the USCG. In addition, the facility should have a certificate from the manufacturer of the raft they are repacking.

Recommendation #5: Masters or individuals in charge of commercial fishing vessels should ensure that immersion suits have an appropriate PFD light properly attached.

Discussion: It is important to note that the PFD strobe lights that were attached to the survivors' immersion suits helped save their lives by catching the attention of the rescuers very quickly, allowing them to pinpoint the exact location of the survivors in the darkness. All immersion suits and PFDs on all oceangoing vessels, commercial and recreational, are required to have a USCG-approved PFD strobe light (Coast Guard approval series 161.012).

REFERENCES

Commercial fishing industry vessel regulations. 46 CFR Part 28. Federal Register 56:157, pp. 40364-40416 (Aug 14) 1991.

National Research Council [1991]. The commercial fishing safety record. Chapter 3. Fishing vessel safety: blue print for a national program. Washington, D.C.: National Academy Press, pp. 38-72.

Alaska Marine Safety Education Association [1992]. Marine safety instructor training manual [unpublished]. P.O. Box 2592, Sitka, AK 99835. (907) 747-3287.

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Fatal Accident Circumstances and Epidemiology (FACE) Project

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatal Accident Circumstances and Epidemiology (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. The goal of these evaluations is to prevent fatal work injuries in the future by studying the working environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

States participating in this study: Alaska, Georgia, Indiana, Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia.

Additional information regarding this report is available from:

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