OREGON State FACE Program
Fatality Assessment & Control Evaluation

Oregon Institute of Occupational Health Sciences • Oregon Health & Science University
3181 SW Sam Jackson Park Rd. L606 • Portland, OR 97239 • 503-494-3940

FATALITY INVESTIGATION REPORT

INCIDENT HIGHLIGHTS

DATE:
January 26, 2016

TIME:
4:07 p.m.

VICTIMS:
46-year-old male Crewman

INDUSTRY/NAICS CODE:
Commercial Fishing/114

EMPLOYER:
Commercial Crab Fishing

SAFETY & TRAINING:
Safety meetings & training were limited at this employer

SCENE:
Employees were returning from retrieving crab gear from another vessel that sank previously. They lost power while crossing the bar and waves capsized the vessel. The Captain and 1 crewmember survived.

EVENT TYPE:
Saltwater immersion drowning

Crab fishing vessel capsizes and one crew member drowns

REPORT#: 2016-07-1 **REPORT DATE:** June 2020

SUMMARY

On January 26, 2016, a commercial fishing vessel left a harbor on Oregon's coast with three crewmembers to retrieve crab pots left by another vessel and crew that had capsized and sank a week prior. The vessel's Captain proceeded out to sea, they collected the crabbing gear and returned to port that afternoon. While returning across the bar, in rough seas, there was a loud noise and the vessel lost power and maneuverability. A series of waves washed over the vessel. Upon losing power and steering, the Captain ordered the crewmembers to don immersion suits and abandon ship and notified the U.S. Coast Guard (USCG) by radio. The Captain donned a personal flotation device (PFD). The vessel was rolled by a wave onto its side throwing the crewmembers overboard. Shortly after, the Captain exited through a broken window, then off the bow. The USCG arrived approximately 20 minutes after the radio call. The Captain and one crewmember were recovered together; the second crewmember was found 10 minutes later. The second crewmember was face down in the water and unresponsive at that time. Resuscitation was attempted during transport, and continued at the hospital until he was declared deceased.

(Full report begins on p.5)

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CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- Mechanical failure while crossing the bar resulting in inability to steer and control the vessel.
- Failure to examine internal components after possible damage from prop entanglement with a net. External components were examined and found to be intact.
- Crossing the bar to retrieve lost crab fishing gear during adverse weather conditions.
- Failure to establish and follow maintenance and inspection intervals on critical components. The vessel had experienced 4 separate mechanical failures since its purchase, less than 2 years prior.
- Failure to secure the aft cabin door in heavy seas.
- Failure to request USCG escort for crossing the rough bar.

RECOMMENDATIONS

Oregon Fatality Assessment and Control Evaluation (OR-FACE) investigators concluded that to help prevent similar occurrences, employers should:

- Confirm major vessel damage is thoroughly inspected and repaired prior to sailing, especially prior to sailing in rough seas and inclement weather.
- Establish and follow maintenance and inspection intervals for critical components.
- Before deciding to fish and venture to sea, Captains must consider weather conditions and vessel suitability.
- If the decision is made to cross the bar in rough seas the Captain should request and obtain a USCG escort.
- Secure all potential water infiltration points in rough seas, including doors, windows, and hatch covers.
- Captains should work together to request regional safety training and encourage crewmembers to participate in available safety training.

(Recommendations section starts on p. 9)

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Oregon Fatality Assessment and Control Evaluation (FACE) Program

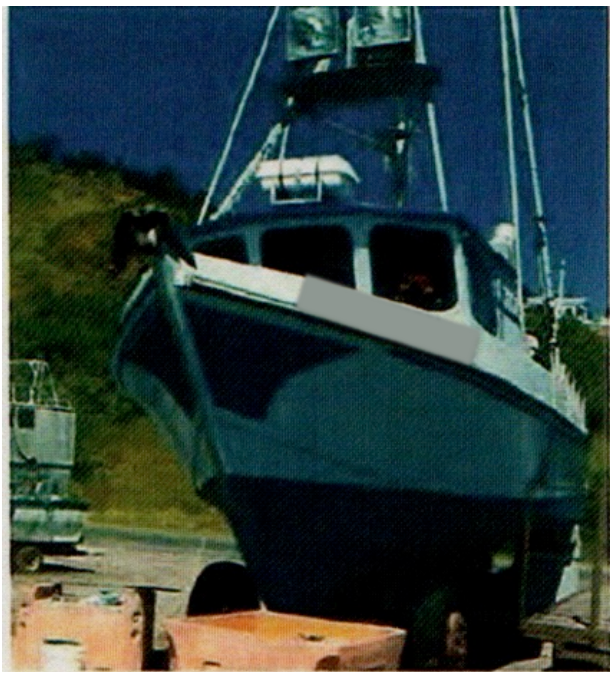
The Oregon Fatality Assessment and Control Evaluation (OR-FACE) Program is a project of the Oregon Institute of Occupational Health Sciences at Oregon Health & Science University (OHSU). OR-FACE is supported by a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH) (grant #U60OH008472) through the Occupational Public Health Program (OPHP) of the Public Health Division of the Oregon Health Authority. OR–FACE reports are for information, research, or occupational injury control only. Safety and health practices may have changed since the investigation was conducted and the report was completed. Persons needing regulatory compliance information should consult the appropriate regulatory agency.

OR-FACE supports the prioritization of safety interventions using a hierarchy of safety controls, where top priorities are hazard elimination or substitution, followed by engineering controls, administrative controls (including training and work practices), and personal protective equipment.

Oregon Institute of Occupational Health Sciences
OHSU

Google map of the port involved in the incident.

Photograph of a similarly-sized crab fishing vessel



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INTRODUCTION

On January 26, 2016, three crab fishermen (Captain and two crewmembers) were returning from retrieving crab pots left the week prior by a vessel that sank after setting them, while crossing the same bar off the coast of southern Oregon (see OR-FACE report 2016-06). This 42.3-foot steel hulled vessel experienced mechanical problems approximately 1 mile away from the harbor. It was raining and the seas were rough, with reported 6 to 8-foot swells on the north jetty and 10 to 12-foot swells on the south jetty and winds about 5 mph. As the Captain attempted to maneuver back to the bay, he heard a loud noise, and lost propulsion which meant maneuverability was also lost. He ordered the crewmembers to don immersion suits and called the US Coast Guard (USCG) to request immediate help. The Captain donned a PFD while in the cabin. While waiting for the USCG at the entrance to the bay, also known as the bar, several large waves hit the vessel. An estimated 16-foot-high wave/breaker struck the vessel, rolling it onto its side. The two crewmembers were thrown overboard as it rolled. The Captain exited through a broken window, entering the sea from the bow. The vessel flooded in part from the open aft cabin door, turned into the waves and quickly sank. The USCG arrived 20 minutes after the mayday call was received and found and retrieved the Captain and one crewmember. The second crewmember was found unresponsive and face down in the water approximately 10 minutes later. Resuscitation efforts were started and he was transported to the hospital by boat, then helicopter. At 10 p.m. he was pronounced dead due to trauma and drowning.

OR-FACE received the initial notification of the incident from its ongoing surveillance of programmed Google alerts. This investigation report is based on review of the US Coast Guard Marine Information for Safety and Law Enforcement (MISLE) Incident Investigation Report (2016) and NIOSH commercial fishing safety research and recommendations. A phone discussion was also completed 10/30/19 with Mr. Greg Merten, USCG Civilian Search And Rescue (SAR) Planner, Columbia River Division.

HISTORICAL BACKGROUND

The National Institute for Occupational Safety and Health (NIOSH) reports of commercial fishing fatalities from 2000 to 2009 and 2010 to 2014 both concluded that the Oregon Dungeness crab fishing occupation is one of the most hazardous nationally (NIOSH, 2010; 2017). This comparison includes deaths that occur in the Alaskan commercial fishing industry. Despite efforts to reduce these fatalities, a number of common hazards persist. According to the 2010 report, from 2000-2009, "…86 commercial fishing deaths occurred off the West Coast" (p. 2). It continued with, "The Dungeness crab fishery experienced the highest number of occupational deaths with 27 fatalities…Vessel disasters caused the most deaths among the Dungeness crab fisherman (78%)" (ibid, p. 2). Vessel disasters are particularly hazardous, as multiple crews are often at risk of injury or fatality per event. According to the 2017 NIOSH report covering 2010 to 2014, "the Dungeness crab fishery experienced the highest number of fatalities in the region, with eight crewmember deaths" (p. 3). The report stated, "Poor weather was reported to have contributed to five (38%) of the 12 fatal vessel disasters and six (11%) of the 57 non-fatal disasters" (ibid, p. 4). Drowning due to falls overboard was also listed as a cause of fatalities in both NIOSH reports.

INCIDENT BACKGROUND

Despite the inclement weather and rough seas, the Captain decided to proceed. There was a small craft advisory posted from the previous day through 4 pm the following day (National Oceanic and Atmospheric Administration, National Weather Service, 2016). When the Captain decided to return to port, the Captain did not request a USCG escort over the rough bar. A USCG escort can improve recovery chances for crewmembers if conditions put their vessel at-risk for a capsizing or man overboard event. There is no information about the bar conditions for January 27 nor if the Captain had looked at alternative dates for retrieving the crabbing gear.

In the USCG investigative report, the vessel "had a history of four separate marine casualties relating to equipment failure dating back to April 2014" when it had been purchased (MISLE Incident Investigation Report, 2016). A marine casualty refers to anything that might affect or impair the seaworthiness of the vessel. The report also found "the vessel's owner had not implemented an inspection schedule for tail-shafts, rudders, propellers and their components." Had this been done the failure may have been avoided.

The vessel had fouled the propeller (tangled on netting) several days earlier. A diver was able to remove the debris and assess the external damage. However, the interior coupling bolts were not inspected. Despite having gone to sea and returning after the fouling without incident, the USCG attributed the fouling and lack of internal inspection as a contributing factor as the parts failed in the heavy seas.

EMPLOYER

The Captain was in charge of the two crewmembers; he did not own the vessel. The Captain had operated the same vessel at least since 2014 based on public records and been engaged in crab fishing during those years, among other related fishing work. The vessel owner gave testimony after the incident that the boat was seaworthy and they were not aware of any issues with the vessel that could have contributed to it sinking.

WRITTEN SAFETY PROGRAMS and TRAINING

The USCG report did not mention the employers' policy of practicing monthly safety drills prior to the incident. In the employee interview there was no mention of practicing safety drills either.

WORKER INFORMATION

The decedent was a 46-year old male and had approximately 1 year of experience in the fishing industry; however, employment duration with the Captain was not reported. Similarly, there was no information regarding the second crewmember's experience. He did state in an interview this was not the first close call he'd had while crabbing. There was no mention regarding crew agreements in the Coast Guard's investigation report. Such crew agreements are considered a good safety practice, and a sample crew agreement posted by researchers at Oregon State University is available (Commercial Fishing Crew Member Agreement, n.d.).

VESSEL MAINTENANCE

According to the USCG MISLE report, "The vessel's owner had not implemented an inspection schedule for tail-shafts, rudders, propellers, and their components. Had these maintenance intervals or inspection timeframes been in place, potential problems with the component within the vessel's propulsion system may have been found and corrected prior to this casualty" (MISLE Incident Investigation Report, 2016). The report also stated that "The drive shaft and transmission on the vessel were misaligned. This put added stress on the coupling bolts. This together with the fouling of the propeller several days earlier led to the failure of the bolts in heavy weather conditions at the time of the incident" (ibid). They noted the coupling bolts were not inspected after the fouling and the fouling likely deformed the bolts.

INCIDENT SCENE

The port involved is an active commercial deep-water coastal harbor. The incident occurred as the vessel was coming back to the port after collecting crab pots in inclement weather. The United States Coast Guard Auxiliary considers vessels less than 65 feet to be "small" (United States Coast Guard Auxiliary, 2009), and a Small Craft Advisory that included this area had been issued by the National Weather Service on the day of the incident (National Oceanic and Atmospheric Administration, National Weather Service, 2016).

The vessel was crossing the "bar" which is where the deeper ocean waters and the shallower river waters meet. The change can result in additional significant wave and current effects, especially when the weather is severe as it was in this incident.

The USCG has published specific information for the various bar crossings along the Pacific Northwest (United States Coast Guard, 2020). Based on a Jan. 27, 2016 KVAL Eugene news report, "Coast Guard Officer Bryan Paplinski says this is one of the roughest winters he's ever seen on the Oregon coast."

WEATHER

Weather was considered to be a critical factor in the incident. The US Coast Guard report stated it was raining and the seas were rough, with reported 6 to 8-foot swells on the north jetty, 10 to 12-foot swells on the south jetty, and winds about 5 mph. Breakers were 16 feet high when they hit the vessel, rolling it and sinking it shortly afterward.

According to historical weather data (Weather Underground, 2019), the average outdoor temperature on January 26 at the port city was 54 degrees Fahrenheit (F) and 0.1 inches of rain fell. Average wind speed was reported as 5 mph that day.

INVESTIGATION

The USCG investigation reported that the vessel sank in part because the Captain decided to go to sea in inclement weather. National Institute of Occupational Safety and Health (NIOSH) researchers have identified

sailing in adverse weather conditions as a significant factor in a number of fatalities. The National Weather Service Small Craft Advisory "… means that winds and seas will create a potential hazard to smaller vessels and inexperienced mariners" (National Oceanic and Atmospheric Administration, National Weather Service, 2019). The National Weather Service notes "there is no precise definition of a small craft," but cautions that "Any vessel that may be adversely affected by Small Craft Advisory criteria should be considered a small craft. Other considerations include the experience of the vessel operator, and the type, overall size, and seaworthiness of the vessel" (ibid). The National Oceanic and Atmospheric Administration does separate vessels into different classes by length. (National Oceanic and Atmospheric Administration, 2015). This particular vessel was a class III (40 – 65 ft.).

As stated in the Historical Background section, reviews of Dungeness crab fishing fatalities identify vessel disasters as causing the majority of fatalities, often with more than one person killed in a single disastrous event. Weather is a recognized contributing factor to vessel disasters, either causing sinkings or knocking crewmembers overboard. Having watertight openings such as an aft door open while transiting across the bar was another potential contributing factor. With such openings closed, the vessels may stay afloat for a longer period of time and create more opportunity for actions leading to survival and/or rescue.

As stated in the Vessel Maintenance section, the vessel had been damaged when the propeller became entangled with a net. That was removed and the exterior inspected however the shaft and bolts holding it were not inspected for damage. The complete loss of propulsion left the vessel at the mercy of the winds and waves.

CAUSE OF DEATH

According to Oregon Vital Records data, the cause of death was determined to be saltwater immersion drowning for the recovered crewmember. It was unknown if he became unresponsive prior to or after drowning. News reports stated he sustained other injuries as well.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. OR-FACE investigators identified the following factors that may have contributed to this incident:

- Mechanical failure while crossing the bar resulting in inability to steer and control the vessel.
- Failure to examine internal components after possible damage from prop entanglement with a net. External components were examined and found to be intact.
- Crossing the bar to retrieve lost crab fishing gear during adverse weather conditions.
- Failure to establish and follow maintenance and inspection intervals on critical components. The vessel had experienced 4 separate mechanical failures since its purchase, less than 2 years prior.
- Failure to secure the aft cabin door in heavy seas.

- Failure to request U.S. Coast Guard escort for crossing the bar.

RECOMMENDATIONS/DISCUSSION

- ***Recommendation #1: Confirm major vessel damage is thoroughly inspected and repaired prior to sailing, especially prior to sailing in rough seas and inclement weather.***
  Discussion: If the Captain had inspected the internal components of the propeller after the fouling occurred, the weakened bolts might have been discovered and replaced. Alternatively, knowing the seas were rough, he may have postponed the trip to avoid crossing the bar in rough conditions. There is no information whether any testing efforts were made to confirm, after removing the fouled gear, that nothing else had been damaged and everything was operational and fully functional.

- ***Recommendation #2: Establish and follow maintenance and inspection intervals for critical components.***

  Discussion: If the owner had established and followed maintenance and inspection intervals for critical components, the Captain may have been inclined to correct the misaligned drive shaft and transmission and ensured a complete inspection after fouling the propeller (Recommendation #1). There had been four casualties from equipment failures prior to this, occurring in less than a two-year period.

- ***Recommendation #3: Before deciding to fish and venture to sea, Captains must consider weather conditions and vessel suitability.***

  Discussion: It is not known whether the Captain examined the weather forecast before making his decision to retrieve the gear on the particular day in question, or whether he deliberated with his crewmembers about his decision. On the day of the incident, the USCG reported the weather as “severe” and there was a small craft advisory that applied to the size of the Captain’s vessel and that extended through 4 pm the following day (National Oceanic and Atmospheric Administration, National Weather Service, 2016). According to Weather Underground’s history for this port, on the day after the incident there was no rain and winds were comparable though gusting with less intensity (Weather Underground, 2020). It may have been advisable to wait until better weather returned to the area.

- ***Recommendation #4: If the decision is made to cross the bar in rough seas, the Captain should request and obtain a Coast Guard escort for both departing and returning crossings.***

  Discussion: Having the Coast Guard on scene would improve the chances of recovery in the face of a capsizing or other disaster. Even with the radio mayday call, it took 20 minutes before Coast Guard search and rescue vessels arrived. With rough seas and harsh weather conditions, finding people floating in the sea is very difficult. It may also be so rough that a response is not possible, despite the Coast Guard’s best efforts. The presence or absence of an escort could factor into the decision to postpone the crossing until better conditions exist.

- ***Recommendation #5: Secure all potential water infiltration points in rough seas: doors, windows, hatch covers.***

Discussion: The aft cabin door was open while crossing the bar while returning. This allowed flooding of the vessel when the larger swells washed over the stern. This set the beam to the incoming swells and it rolled, contributing to the speed at which the vessel filled with water and sank. While at sea in heavy weather, doors, windows, and hatch covers should be closed.

- ***Recommendation #6: Captains should work together to request regional safety training and encourage crewmembers to participate in available safety training.***

Discussion: Prior to the start of the crabbing season Captains should work together to request regional safety training be provided in the local area. In addition to regular drilling, Captains can encourage crewmembers to take available safety training. For example, Clatsop Community College in Astoria, Oregon offers a range of Marine Safety and drill conductor classes. The College reports willingness to offer classes in off campus locations as needed, but it should be acknowledged, there would be a higher level of effort for fishermen in other parts of the state to arrange and access such training. Some additional commercial fishing safety classes are available through the Alaska Marine Safety Education Association (2016), and the Oregon Sea Grant (2020). The US Coast Guard coordinates with both entities to schedule and promote the trainings. Expanded training for crewmembers could further strengthen preparedness and safety climate on a Captain's vessel (see Oregon State University, 2020 for examples). By working with other Captains and vessel owners they can enhance the overall safety awareness and culture of area crewmembers. Everyone would benefit by having more qualified crewmembers able to work safely; two examples are reduced injuries, and hazards recognized and addressed before significant exposures occur.

GENERAL DISCUSSION

The characteristics of the incident described in this report are relatively common in vessel disasters based on reviews of prior incident reports (NIOSH 2010; NIOSH 2017). Although there have been some minor reductions in fatality rates in recent years, vessels in the Dungeness crab fishing industry continue to go to sea in hazardous weather, cross the bars without Coast Guard escorts, and allow employees to work on deck without PFDs.

The mechanical failure that contributed to the sinking was not the only factor, however the USCG voluntary inspection program may have helped ensure all components were sea worthy. Had the vessel shaft and rudder been inspected inside, after fouling with a net, any weakened or damaged bolts may have been found and replaced. The other vessel that sank prior to this one, also had experienced mechanical failure and that played a role in the decision to return to port in rough seas, without a USCG escort (see OR-FACE report 2016-06).

Newer low-profile PFDs are available that will only activate if submerged. To encourage PFD use, Captains could supply crewmembers with multiple PFD options and allow crewmembers to choose and wear a preferred type. But in all cases, Captains must be the driving force in requiring their use.

Monthly safety drills are required, but are often considered optional for many of the small commercial fishing vessels (less than 65 feet), yet they would benefit the most. Per the US Coast Guard requirements, drills must be conducted and instruction must be given to each individual on board the vessel at least once each month. Contingencies that must be covered in drills include:

- Abandoning the vessel
- Fighting a fire in different locations on the vessel
- Recovering an individual from the water (i.e., man overboard)
- Minimizing the effects of unintentional flooding
- Launching survival craft and recovering lifeboats
- Donning immersion suits and other wearable PFDs
- Making distress calls and using visual distress signals
- Activating the general alarm
- Reporting inoperative alarms, fire detection systems.

Northwest Dungeness crab fishing has been identified as a high-risk occupation. In 2015 a requirement went into effect for commercial fishing vessels that operate beyond 3 nautical miles of the baseline of U.S. territorial sea, and/or have more than 16 individuals on board (or are a fish tender vessel in the Aleutian trade; United States Coast Guard, 2014). Specifically, a current (unexpired) safety decal or a dockside safety examination was required by October 15, 2015. At each examination, vessels will be issued a safety decal that is valid for 2 years, and another dockside safety examination is required at least once every 5 years. Given the hazardous nature of the industry, it would be recommended best practice for commercial fishing vessels to obtain and keep current a valid safety decal every two years, even if not mandated to do so. It would also be best practice to stay in compliance with the mandatory dockside safety examination every 5 years.

There have been some voluntary pre-season safety examinations conducted by the Coast Guard in the industry. These could continue on an annual basis to promote safety and create ongoing educational opportunities. Captains and vessel owners should work together to request regional safety training in the local area. Education on safety and vessel stability could be part of these examinations. Other areas of emphasis in examinations, or educational outreach, that should be completed by everyone prior to going to sea include:

- Preventive vessel maintenance
- Weather forecasts and decision making
- Specific bar crossing hazards and procedures
- Water tight integrity training
- Regular training in the deployment and use of life boats

Education and outreach efforts could address the above factors, as well as the importance of ensuring monthly training in the use of immersion suits and PFDs. In the Northeastern region of the US, outreach efforts to lobstermen have included the deployment of “lifejacket vans” to make it easier for fishermen to access, try on, and afford PFDs (Northeast Center for Occupational Health and Safety 2019). Similar efforts,

tailored to regional needs of particular fishing fleets, would be a promising avenue to pursue. The option for requesting Coast Guard escorts both in and out of the bar should be widely publicized.

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INVESTIGATOR INFORMATION

Steve Eversmeyer, CIH, CSP, Contract Fatality Investigator/Outreach Specialist, OR-FACE Program conducted this investigation. The report was reviewed and received input from Ryan Olson, PhD, Director, OR-FACE

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