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EDITORIAL

Using Land-Based Simulation to Perform Crew Overboard Recovery Training and Research

Commercial fishing is hazardous work in an unpredictable and unforgiving environment. Television shows like "The Deadliest Catch" are appropriately named; however, they fail to capture how proper training can positively impact survival outcomes. In 2022, the farming, fishing and forestry occupations had the highest fatality rate of all occupational groups at 23.5 fatalities per 100,000 full time equivalent workers compared to 3.7 for all workers.[1] In commercial fishing, falls overboard are a leading cause of fatalities among United States fishermen, second only to vessel disasters.[2] Falls overboard claimed 204 lives between 2000–2016 with the highest number of fatalities occurring in the Gulf of Mexico shrimp fishery ($N = 34$, 16.7%).[2]

Due to these alarming statistics, researchers in Texas and Louisiana, funded by the United States Coast Guard (USCG) and the National Institute for Occupational Safety and Health (NIOSH), conducted a project to address crew overboard (COB) recovery through data collection and hands-on drills training. The survey data provided insights into the crew members' experience with crew overboard recovery and assessed attitudes, beliefs, and intentions toward using COB recovery methods.[3] A successful COB recovery process includes multiple steps. Simply stated, the COB wears a personal floatation device (PFD) to improve visibility and survivability. Crew members maintain visual contact with COB, mark their location, and notify the skipper, crew, and nearby vessels. The captain navigates the vessel back to the victim. The captain and crew members then deploy a rescue device and employ a mechanical advantage to reboard the crew member.[4] These steps may be disrupted if the COB is not wearing a PFD, the fall is unwitnessed, or if the captain is the victim. Figure 1 depicts this process or COB "chain of survival" with emphasis on the deployment of a rescue device and the application of a mechanical hoisting advantage. Recovery skills can be learned. This editorial focuses on the benefits of drills training to achieve the final two steps in the recovery process: deploy a rescue device (in this case, a recovery sling) and successfully bring a COB back aboard the vessel.

Drills training is common practice for commercial fishermen. The USCG requires workers to participate in training and drills for numerous survival skills. Required training topics listed in the Code of Federal Regulations (CFR), USCG, Department of Homeland Security section 199.180 include donning personal protective equipment, mustering, boarding, launching, and clearing the survival craft, among others. The regulations also specify that drills must be practical, realistic, and held regularly.[5] Although research on commercial fishing safety training effectiveness is sparse, the need for repetition of hands-on learning to support skills retention is reiterated in the literature.[6,7] The USCG and outside companies use simulations to conduct training programs to meet the federal requirements. The USCG Damage Control trainer provides fishermen practical training in eight unique leak scenarios. Independent suppliers demonstrate how to deploy life rafts from their storage cases into the water and the research team has used fire extinguisher simulations to give fishermen realistic practice with fighting fires. Similarly, cardiopulmonary resuscitation training (using simulations with manikins to demonstrate/practice skills) is recommended for at least one crew member. While conducting these training simulations aboard a dockside "squared away" vessel is ideal, special circumstances may force instructors to find alternative options on land.

In 2019, the research team began planning logistics for data collection and training. The plan was to hold the trainings aboard commercial fishing vessels in three ports in the Gulf of Mexico.

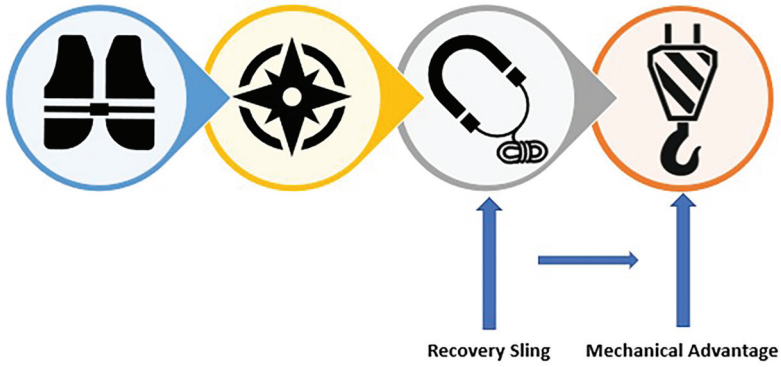

Figure 1. Crew overboard chain of survival.

The research team would deploy a water rescue manikin strapped into a recovery sling into the water. Pairs of fishermen would then practice using a mechanical advantage already available on the vessel (winch) to pull the manikin toward the vessel, lift it up, and recover it back aboard the deck safely. When it came time to deploy the survey and training program in early 2020, the world paused as it faced a pandemic. With travel restrictions and social distancing, researchers were forced to revise their plans.

Through collaboration with the USCG, Texas Sea Grant, Texas AgriLife Extension, Louisiana State University Ag Center, and Southeastern Louisiana University, the research team designed an alternative land-based simulation for COB recovery training. The new design allowed for training to be held inside a building with tall ceilings or in an open outside area. Although not optimal for recreating vessel and weather conditions, moving the training to the land allowed the team to reach a larger group of fishermen, while maintaining social distancing.

The simulation design was portable, simple, and cost-effective. A deer cleaning tripod (stand used by hunters for cleaning and processing deer) with a winch was used in place of an onboard mechanical advantage. A 79×40 inch safety barrier was positioned beside the tripod to act as vessel railing. A recovery sling with a rope was attached to the winch and pulled away from the tripod approximately 10 feet. Finally, the recovery sling was positioned under the arms and around the torso of a manikin. Refer to Figure 2.

Figure 2. Crew overboard recovery land-based simulation.

To prepare trainers across the Texas/Louisiana border, a video was produced to demonstrate simulation procedures for one-fisherman and two-fishermen recovery. The video was shared with partners through a private YouTube link. Louisiana partners were allowed to travel to Texas to observe a COB training and transport the simulation equipment back to Louisiana to replicate the training with commercial fishermen in Abbeville.

Data collected at the time of training and 12–18 months post-training revealed that although the attitudes and beliefs of commercial fishermen in the Gulf of Mexico can be favorably influenced toward using a COB recovery device, their confidence and intention to use a rescue sling waned over time. This finding supported the use of simulations to familiarize commercial fishing workers with COB recovery techniques and underscored the need to regularly perform drills training to maintain confidence and intention to act.[3]

Although performing the drills training aboard a commercial fishing vessel as originally planned would have provided a more realistic simulation, the land-based simulation allowed the research team to reach the intended audience and describe key elements of the recovery process while observing the safety precautions in place during the COVID-19 pandemic. The research team was able to train partners across state lines to use the equipment, which helped to ensure training was delivered consistently across all three sites. Fishermen also gained confidence in deploying a rescue sling using a mechanical advantage. Finally, the elements of the land-based simulation were affordable, durable, and portable, making it a viable option for repeated trainings and replication in other ports. In the post-pandemic environment, future trainings could be held aboard vessel as originally envisioned and survey results could be compared to the land-based simulation responses. If training was replicated on land, the experience could be improved with the use of a weighted manikin rather than one designed for water rescue. In conclusion, land-based simulations can be used as training tools for commercial fishing safety; however, trainings that mimic real world situations are ideal. Whether held on land or aboard vessel, all trainings need to be repeated on a regular basis to maintain skills proficiency and confidence.

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