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The Development and Efficacy of Safety Training for Commercial Fishermen

Jerry Dzugan, MsEd

ABSTRACT. Commercial fishing is still the most dangerous occupation in the United States. Efforts to have more stringent safety regulations in this industry beginning in the 1960s, culminated in the Commercial Fishing Vessel Safety Act of 1988. The purpose of this paper is to provide a short history of the development of safety training in the United States and the current training infrastructure. This paper will also review studies available regarding the effectiveness of safety training in reducing fatalities among fishermen. The lack of familiarity and practice with marine survival equipment such as life rafts, immersion suits, and emergency-locating beacons has been noted in National Transportation Safety Board and US Coast Guard casualty reports as a contributing factor in fatalities. These reports have demonstrated the importance of not just having survival equipment onboard, but training in how to use it effectively in an emergency. There is evidence that safety training has made a measurable impact in surviving an emergency at sea and that recent training (within 5 years) is most effective in saving lives. More recently, studies have been completed to understand how skills may diminish over time since initial training.

KEYWORDS. AMSEA, commercial fishing, safety, training

INTRODUCTION

Commercial fishing is one of the world's oldest professions. It is also one of the most unique. In no other industry do the workers toil in such a tight space, amongst such complicated machinery and systems while working on a pitching and rolling deck, while exposed to the abuses of storms, waves, and freezing temperatures, and are unable to leave the worksite for days or weeks at a time.

Due to the inherent risks of such a "hunter and gatherer" occupation, the coldness of the water, the great distance from help and rescue, and many other factors, fishermen suffer from a high fatality rate when compared to other high-risk occupations. In 2008 the fatality rate for fishermen in the

United States was 128.9/100,000 full-time equivalents (FTEs).¹ However, despite the high present rate, the risks used to be much higher.

In 1971, the Coast Guard conducted a cost-benefit analysis of a fishing safety program. However, despite the fact that the report concluded that it would prevent 72% of fatalities, it also found that the industry could not sustain such a program without causing financial hardship.²

In 1977, the United States expanded its Exclusive Economic Zone (EEZ) out to 200 miles. This pushed foreign fishing vessels outside 200 miles when formerly they could commercially fish to within three miles of the US Coast. This "Americanization" of waters out to 200 miles resulted in overcapitalization and inexperienced crew and vessel owners rushing

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in to cash in on a resource that was now available just to US fishermen. At the same time, the Coast Guard, which regulates US vessels, had no regulations on safety in commercial fishing that went beyond recreational boating regulations, and safety oversight was minimal.

During the early days of Americanization from 1981 to 1984, there was an average of 25.8 fatalities a year in Alaska commercial fishing. This was a fatality rate of 320/100,000. This compares to a rate of 15/100,000 for all other industries in Alaska during the same period.³

HISTORY OF SAFETY TRAINING

By the early 1980s, the negative safety consequences of this “race to fish” was already in evidence, especially in the rich fishing grounds off Alaska. When the fishing vessels *Americus* and *Altair* were lost with 14 lives in Alaska in 1983, the negative impacts were felt throughout the marine insurance industry.⁴ This resulted in insurance premium increases. It also became harder to get insurance for commercial fishing and other vessels.

In reaction to these and other losses in Alaska, individuals from several agencies such as the Coast Guard and Alaska Sea Grant/Marine Advisory Program (MAP) started traveling to rural fishing ports to teach marine safety in fishing ports in Alaska. However, there was no standardized curriculum and no network of instructors or other resources to sustain this effort. By 1985, individuals from other agencies joined in this effort and organized the Alaska Marine Safety Education Association (AMSEA). This was a grassroots effort started by individuals within agencies who saw a need to educate and train commercial fishermen. With scarce resources to do this work, collaboration was a necessity.

The founding agencies of AMSEA were the Coast Guard, Sea Grant/MAP, Emergency Medical Services, State Troopers, and others. The most immediate objectives of this group were to create a standardized hands-on performance skill-based training curriculum, conduct train-the-trainer courses so that fishing ports

would have locally based marine safety instructors, and supply these instructors with marine safety equipment such as life rafts and immersion suits for training.

In 1986, the Coast Guard reacted to these losses by announcing a voluntary fishing vessel safety program.⁴ This program encouraged more safety equipment onboard vessels as well as training in the use and maintenance of this equipment. It was hoped that insurance underwriters would recognize the value of safety training by reducing insurance premiums, but this did not occur.

Some fishermen bought survival gear, even though it was not required. But with no formal safety training, fishermen did not always use this equipment to its best efficiency.⁵ Simple things such as learning how to turn on an emergency beacon or failure to properly size or maintain an immersion suit were often cited in casualty reports⁶ as the cause of fatalities.

By 1985, the National Ocean and Atmospheric Administration (NOAA) and others provided funds to start up regional safety training programs for commercial fishermen. In Alaska, AMSEA was funded to train trainers in fishing ports. In the Northwest, funding allowed the Vessel Safety Training program to start within the North Pacific Fishing Vessel Owners Association (NPFVOA), and the Vessel Safety Manual was developed. In the Gulf of Mexico, Sea Grant within Texas A&M University started training and developed a vessel safety manual for their area. In the Northeast, the University of Rhode Island, McMillan Offshore Survival Training, and the New Jersey Marine Science Consortium also started safety training programs for fishermen.

These programs taught fishermen how to use survival equipment such as life rafts, immersion suits, emergency radios, and other equipment in case of an emergency at sea. The training emphasizes hands on experience with survival equipment in the water, fighting small fires, and conducting emergency drills on fishing vessels. Although most of the programs bring safety training directly to fishermen, AMSEA is the only organization that conducts train-the-trainer workshops so that far flung fishing communities can have their own port-based instructors.

These early programs trained hundreds of people. However, because it was a voluntary program, it tended to draw fishermen who already had a "safety conscience" and may not have been at the highest risk. Nonetheless, anecdotal stories by survivors told of the value of the training they had received in helping save their lives. Some of the most successful training programs such as AMSEA and NPFVOA have survived to the time of this writing despite the ending of funding by NOAA many years ago. These programs have trained thousands of fishermen. Other Drill Conductor training efforts on the East Coast and Gulf of Mexico have also been successful.

Due to continued losses in commercial fishing, Congress passed the Commercial Fishing Industry Vessel Safety Act (CFIVSA), which was signed into law (46 CFR Part 28) in late 1988.⁷ This Act gave authority to the USCG to develop basic lifesaving regulations for commercial fishing vessels. In addition it created the Commercial Fishing Industry Vessel Safety Advisory Committee (CFIVSAC).

From 1989 through 1991, the CFIVSAC gave recommendations to the Coast Guard to further develop and detail the regulations. The Act significantly raised the amount and types of survival equipment required to be on commercial fishing vessels. In addition, it led to limited training requirements. The Act stated that certain fishing vessels would be required to have regulations for the installation, maintenance, and use of survival equipment. This wording provided the legal basis that allowed required safety training to be part of the final regulation.

On March 22, 1990, the Seattle-based fish trawler Aleutian Enterprise capsized and sank with the loss of nine lives. This loss encouraged the Coast Guard to use the authority given to it in the CFIVSA to require monthly emergency drills on fishing vessels. The emergency drills required the entire crew to practice using survival equipment and emergency procedures in what to do in case of a man overboard, fire, flooding, or abandon ship situation. It also required the person leading the drills to take formal training to become an Emergency Drill Conductor. The Drill Conductor is the person who would be formally trained in leading

Emergency drills on a fishing vessel. The Coast Guard allowed 3 years, September 1991 to September 1994, for thousands of Drill Conductors to be trained.

A national curriculum was needed to train Emergency Drill Conductors. The US Marine Safety Association (USMSA) drew heavily from the AMSEA Marine Safety Instructor-Trainer (MSIT) manual for the development of this curriculum. The MSIT manual is an instructor curriculum that had been developed under the previous voluntary safety training initiative. Thus the training of thousands of fishermen that had taken place under the voluntary training regime greatly aided in the development of training curriculum, materials and instructors for the required training regime.

CURRENT STATUS OF SAFETY TRAINING

Most of the safety training in commercial fishing today is supported by grants and contracts from the Coast Guard, National Institute for Occupational Safety and Health (NIOSH), course fees, and a number of other locally raised sources. There is no single source of funding to support all of the training that is required or desired.

The training requirement was not without difficulties in terms of enforcement. First, the Drill Conductor was not required to be a member of the crew or onboard the vessel. This makes it difficult to enforce the training regulation during a random at sea Coast Guard enforcement boarding. It also does not give the crew the benefit during an emergency of having the person with the most emergency safety training, the Drill Conductor, onboard to more effectively deal with the problem.

Secondly, the Drill Conductor requirement was not equally enforced around the nation due to the unequal availability of safety training infrastructure. Alaska, the Pacific Northwest, the Gulf of Mexico, and to a lesser extent, the Northeast have Drill Conductor training workshops available. Thousands of fishermen were trained before the deadline of September 1994. However, the Southeast and Southwestern parts

of the nation had no, or very little, training available. The Coast Guard was thus reluctant to enforce these parts of the regulation when training was unavailable in these regions.

As a result of the lack of trainers in parts of the nation, and the fact that AMSEA had the only Marine Safety Instructor-Training (MSIT) available, by the early 1990s, AMSEA was asked to deliver this training to other parts of the nation to help build training infrastructure. AMSEA brought MSIT workshops to many parts of the nation such as Maine, Virginia, New Jersey, Florida, Texas, Washington, and Oregon. As a result of these efforts, more Drill Conductor training is now available in the United States, although without additional funding, it is likely that underserved areas will continue to exist.

An important boost to the enforcement of training has been due to the National Marine Fisheries Service (NMFS) fishery observer training program. By the early 1990s, some fisheries were required to have these fish observers onboard to monitor catch and provide data to help manage fisheries. These Observers are not members of the crew, yet are at risk in case of an emergency at sea. NMFS requires vessels that carry Observers to have a Dockside Safety Exam sticker. This sticker is given to the vessel when qualified Coast Guard personnel examine a vessel and find it in compliance with the fishing vessel safety regulations. If the vessel is required to conduct monthly emergency drills, then the owner must verify they have a Drill Conductor to lead the monthly drill. This has caused many fishing vessel owners to take the training themselves, since they cannot fish without an Observer onboard. The incidence of fisheries that are required to have an Observer onboard is growing, and thus it can be expected that this will continue to be a lever for enforcement.

At this time, it is estimated that 25,000 Drill Conductors have been trained for what is estimated to be more than 30,000 fishing vessels that are required to have monthly drills and for another 80,000 vessels that may voluntarily wish to conduct emergency drills with qualified Drill Conductors.⁸ Most of these trained Drill Conductors are found in Alaska and the Pacific

Northwest. Many other fishermen have taken part in other types of safety training around the country, even though the training did not result in a Drill Conductor certificate.

SAFETY TRAINING EFFICACY RESEARCH DATA

Trainers and newspaper accounts provide anecdotal reports from survivors of how the skill-based training they received in a Drill Conductor course helped them survive an emergency at sea. AMSEA has a database of Drill Conductors it has trained. If these trainees have subsequently been involved with an emergency at sea, interviews are conducted with them. As a result, we can document that at least 50 AMSEA trained Drill Conductors have stated that the training helped them survive their emergency. In addition, it should be noted that the knowledge and skills of a Drill Conductor would also not just help themselves, but that of their crew, which most frequently is composed of three to six other fishermen. Although the total number of such saves would be hard to estimate—and probably would be underestimated—it can be reasonably assumed that in the past 20 years, several hundred lives have been saved by this training on all coasts of the United States.

Another figure that is impossible to document is the number of emergencies that have been prevented as a result of what was learned in training. During Drill Conductor workshops, fishermen get experience using survival equipment such as cold water immersion suits, life rafts, and radio equipment. They also experience conducting an emergency drill on a vessel and thus learn the procedures needed in an emergency. After the course, numerous fishermen have been observed purchasing additional safety equipment and taking specific preventive measures as a result of what they learned during the training.

In an effort to better quantify the effectiveness of training, in 1995 a study was conducted to compare the survival rate of all AMSEA trained Drill Conductors and compare it to fishing fatalities in the previous four years. A four-box table

was developed using the number of deaths, number of survivors, and whether or not they were AMSEA trained. The Fisher exact two-tailed test was used to determine the probability that the difference in survivability was random. It was found that of the 114 deaths commercial fishing in Alaska from 1991 through 1994, none was an AMSEA trained Drill Conductor ($p = .034$). Of the 227 identified survivors, 10 were AMSEA trained Drill Conductors.⁹ This study was the first time a statistical approach had been taken to quantify the effectiveness of safety training in preventing fatalities.

Research in Alaska comparing victims of vessel losses to those who survived, also examined the effect of safety training. The study found that survivors were 1.5 (95% confidence interval CI 0.9, 2.4) times more likely to have had safety training from either AMSEA or NPFVOA.¹⁰

To study the need for refresher training, AMSEA has recently worked with the University of Washington, Pacific Northwest Agriculture Safety and Health (PNASH) center, to examine the retention rate of skills acquired in the Drill Conductor workshop. There is no refresher training required of Drill Conductors by the Coast Guard. Coupled with this is the fact that some Drill Conductors were trained almost 20 years ago. Further, there is evidence that only 29% of fishing vessel crews are being given the opportunity to practice emergency drills.¹¹

Phase I of an unpublished AMSEA/PNASH study demonstrated that there was a "significant difference" between the 100% baseline scores in those not previously Drill Conductor trained one month from baseline training ($85.9\% \pm 11.6$ [SD]) and 3 months from baseline (86.6 ± 10.1 [SD]). These both had p values of $<.001$. This demonstrates that there is a significant loss of skills in just one month. This skills loss, however, remains essentially unchanged out to 3 months.

In addition, there was a significant difference in previously trained fishermen who overall had a mean score of 70.5 compared to a baseline of 100. This demonstrates that fishermen had an

even greater loss of skills several years out from initial training. This fact, along with a question that asked about the frequency of monthly drills actually conducted (6.3% in the previously trained group and 6.5% in the trained group), implies that the lack of drills not being conducted on a regular basis contributes to the decay of skills.

The Phase II part of this study looked at the decay of skills out from 18 to 24 months of initial training. It was found that the skills retention scores dropped even further to a mean of 76%. Thus, there was another 10% to 11% drop in skills performance over time. It was also significant that less than 7% of this study group reported conducting emergency monthly drills as required. Thus, onboard "refresher" training that might be reinforced during monthly drills was not taking place as intended by the Coast Guard regulations.

CONCLUSION

Safety training has demonstrated its effectiveness in reducing fatalities. As of this writing in 2010, there is a Coast Guard proposed rulemaking in the process that would further positively affect safety training. The rulemaking, if it becomes law, would require that the Drill Conductor be a member of the crew. This would have two advantages. One, it would make the law more enforceable, since an at sea random boarding could easily determine if a certified Drill Conductor was onboard. Secondly, in case of an emergency at sea, the entire crew would benefit by having the person with the emergency response training onboard the vessel. The proposed rule would also require periodic refresher training for Drill Conductors.

Until safety training is more institutionalized by regulations and universally available, training in commercial fishing will be difficult to enforce and will suffer from poor skills retention. In addition, the protective nature of this training will remain unavailable in many parts of our nation's coastline without the building of additional infrastructure.

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