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Commercial Fishing Safety Training
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ABBREVIATIONS

AMSEA- Alaska Marine Safety Education Association

APRO- Alaska Pacific Regional Office (NIOSH)

CFSAC- Commercial Fishing Safety Advisory Committee (U.S. Coast Guard)

DC- Drill Conductor

Fishermen- All the fishermen referred to in this report are commercial fishermen or women.

Fishing vessels- All the fishing vessels in this report are commercial fishing vessels.

FTE- Full Time Equivalent position

MSIT- Marine Safety Instructor Training

NAS- National Academy of Sciences

NOAA- National Oceanic & Atmospheric Administration

NORA- National Occupational Research Agenda

NTSB- National Transportation Safety Board

PI- Project Investigator

PNASH- Pacific Northwest Agriculture Safety & Health

USCG- United States Coast Guard

ABSTRACT

For many years the U.S. Department of Labor has noted commercial fishing as having the highest fatality rate of any occupation in the U.S. Before 1988 when fishing vessel safety regulations were passed, Alaska had over 40 fatalities a year at times, the highest number of fatalities of any region in the U.S.

The Fishing Vessel Safety Act of 1988 (the Safety Act) required many fishing vessels to conduct monthly emergency drills led by a trained Drill Conductor (DC). The non-profit Alaska Marine Safety Education Association (AMSEA), had been conducting Marine Safety Instructor Training (MSIT) fishing classes since 1985.

AMSEA trains MSITs in many ports and supplies these instructors with curriculum, teaching aids, supplies and other means of support. This network did not exist anywhere else in the U.S. When the Safety Act was passed and required DC training, AMSEA trained instructors were ready to help fishermen meet the safety training requirements of the Safety Act. Not only was Alaska better prepared to meet these training requirements and deliver it to remote fishing villages, but Alaska has also benefitted from the largest drop in fishing fatalities in the U.S. In addition, this project has allowed AMSEA to deliver this training to many other parts of the nation that lacked training infrastructure.

The importance of training fishermen in survival equipment use and emergency procedures has been noted in numerous Coast Guard and National Transportation Safety Board (NTSB) casualty reports, as well as in survivor interviews AMSEA and NIOSH has conducted.

Originally there was no DC training refresher requirement. A NIOSH APRO research paper noted that the protective benefits of training fade after 5 years from initial date of training. A DC skills retention study was conducted by AMSEA and the University of Washington to demonstrate the amount of “skills decay” over a period of 1, 3 and 21 months and found it significant. The USCG has also proposed making refresher training a requirement. More emphasis has now been placed on DC refresher training in this project period and 515 fishermen have had refresher training. In addition 196 new MSITs have been trained who support and/or deliver DC training.

The impact of this project has been in part responsible for Alaska fatalities falling to 11 fatalities per year during this project period. This is the lowest number of fatalities since 1990, when the NIOSH APRO started keeping records. The five years of this project period has also seen the largest number of DC’s instructed in any five year period- 3,455. This project has continued and expanded MSIT and DC training for fishermen throughout Alaska and with more frequency across the U.S. Most fishermen trained as DCs in the U.S. have been trained due to the resources allowed by this project.

HIGHLIGHTS/SIGNIFICANT RESULTS.

The seven aims of this project and the final results follow:

1. **Aims:** Conduct Marine Safety Instructor Training (MSIT) for 20 people per year in one week MSIT training workshops with one of these workshops being held outside Alaska. For this five year project period this would total at least 100 new MSITs trained in at least 10 MSIT workshops, 5 of which would be outside of Alaska.

Results: 18 MSIT workshops were conducted during this five year project period. This included ten workshops in Alaska and eight taught outside Alaska (Washington, Massachusetts, Florida (2), Texas (3) and MIssissippi. These workshops trained a total of 196 new MSITs. We have meet the aim of MSIT courses by 180%, and our number of MSITs trained by 196%.

2. **Aims:** Instructional materials produced targeting commercial fishing vessels with three issues of Marine Safety Update per year and at least two other video or printed products per year. For this five year project period this would total at least 15 Marine Safety Update issues and 10 videos or publications.

Results: 18 issues of Marine Safety Update that were distributed to over 1,000 stakeholders meeting this aim by 120%. Four broadcast quality DVDs were produced on the topics of Fishing Vessel Stability, Flooding Control, Marine Debris and Safety and Man Overboard: Prevention & Recovery meeting this aim by 200%. Five brochures and two placards were developed on fishing vessel safety topics. Additionally, new editions of the textbook and instructors manual were revised, printed and distributed during this project period, meeting this aim by over 100%.

3. Aims: Drill Conductor (DC) training provided to 350 people per year. For this five year period this would total at least 1,750 new Drill Conductors trained.

Results: 3,455 DCs were trained during this five year project, almost twice as many as our objective. 355 DC workshops for fishermen were conducted. Over 2/3 of these workshops were held in Alaska and almost 1/3 in 13 other coastal states from the East, West and Gulf coasts. We have met our aim of training DCs by 197%.

4. Aims: DC refresher training to at least 65 people per year. For this five year period this would total at least 325 Drill Conductor refreshers.

Results: 515 DCs were refresher trained during this five year project. We have meet our aim of training DCs by 158%.

5. Aims: One MSIT refresher course offered per year. For this five year period this would total at least five MSIT refresher courses.

Results: 13 MSIT refresher workshops were held for a total of 70 MSIT instructors refresher trained. Some of these MSIT refreshers took part in regularly scheduled full MSIT courses. We have met our aim of MSIT refresher training opportunities by 260%.

6. Aim: Outcome evaluation conducted on the effect the training has had on lessening fatalities in the Alaska fishing industry.

Results: During the period of 2005-2009, the fatality rate in commercial fishing in Alaska was 113/100,000 FTE from its previous high of 171/100,000 in the early 1990's.

7. Aim: Objective- Study will be conducted to determine the importance of safety refresher training for commercial fishermen.

Results: A survival skills retention study took place in two phases. The study identified skills loss over time (1 month, 3 months and again at 21 months). The study identified the loss of skills needed in an emergency at sea over these training interval time periods. The rate of skills lost was determined to be significant.[1]

OUTCOMES/RELEVANCE/IMPACT

One of the most important results of this project is that DC safety training infrastructure and thus availability has increased in Alaska, Washington, Oregon and California. In addition, great gains have been made in training instructors who are providing training for commercial fishermen from Texas to Florida, and from the Carolinas to Massachusetts. This is significant due to the fact that fishermen in most of these coastal states had no access to federally required DC safety training outside of this project. On the East and Gulf Coast of the U.S., the Coast Guard was not enforcing the DC requirement due to a lack of trainers to teach DC courses. Now as a result of the training in this project, courses are being made available on these coasts and enforcement can take place.

Many commercial fisheries are required to have a National Oceanic & Atmospheric Administration (NOAA) fisheries observer onboard before they can fish. Before these observers can leave on a fishing vessel, the vessel must complete a USCG dockside safety examination. This exam also includes a requirement that a fishing vessel operator show proof of completing a Drill Conductor course. Thus a vessel required to carry an observer cannot go to sea so its crew can earn a livelihood without this training. AMSEA, with the support of NIOSH in this project, has made this training available to fishermen who had no other training resources available to them.

The Coast Guard has been increasing enforcement of this training requirement across the U.S. during this project period. Since the DC training in this project must be completed before these vessels can fish, this project allowed fishermen to earn their livelihood without interruption, as well as learn important

occupational safety skills. In fact, the Coast Guard would not have been able to enforce these safety training requirements had there not been training that was made available by this project.

TECHNICAL REPORT

BACKGROUND FOR THE PROJECT:

The overall goal of this project has been to reduce the loss of life to commercial fishing due to vessel disasters through an Alaskan and now, national network of qualified marine safety instructors who can deliver federally required Drill Conductor training. These fishermen live in far-flung, often rural ports across Alaska and the rest of the U.S., often far from formal training facilities. Commercial fishermen suffer the highest occupational fatality rates according to the U.S. Department of Labor, preliminary data showing a fatality rate of 116/100,000 workers compared to a rate of 3.5/100,000 for all occupations.[2] The DC course is the only formalized safety training that is required of most fishermen.

The Drill Conductor course was a requirement from the 1989 federal Fishing Vessel Safety Act. This Act set a September 1, 1994 deadline for fishermen to get DC training. However the vast majority of fishermen were not trained by that date due to the lack of training infrastructure in the nation. AMSEA has been working since 1991 to deliver this training to fishermen in Alaska and the need has grown increasingly across the U.S. Currently the majority of instructors teaching DC courses in the U.S. are AMSEA marine safety instructors. Often these instructors are experienced fishermen themselves and understand the nature, techniques, fisheries and culture of the fishermen they are teaching.

Research by the NIOSH Alaska Pacific Regional Office (APRO) demonstrated that AMSEA DC trained fishermen had a 1.5 times higher likelihood of surviving an emergency at sea.[3]

Not only is this training needed for prevention of fatalities, but it is also a requirement for many vessels before they can commercially fish. Since very few resources are available nationally to meet this training requirement, this project has allowed many fishermen to maintain employment. When training infrastructure has been unavailable in a region, the USCG has been reluctant to enforce the safety training requirement and its protective benefits to safety. By providing training to a geographically wide range of fishing ports, it has allowed the USCG to ramp up enforcement which increases the number of fishermen who access safety training found in DC courses.

SPECIFIC OBJECTIVES:

There were seven objectives of this project and the final results follow:

1. Objective- Conduct Marine Safety Instructor Training (MSIT) for 100 people in

at least 10 MSIT workshops, 5 of which would be outside of Alaska. The results were18 MSIT workshops conducted including ten in Alaska and eight taught outside Alaska for a total 196 new MSITs.

2. Objective- Instructional materials produced targeting commercial fishing vessels totaling at least 15 Marine Safety Update issues and 10 videos or publications. As a result of this project, 18 issues of Marine Safety Update that were distributed to over 1,000 stakeholders. Four broadcast quality DVDs were produced as well as five brochures and two placards on fishing vessel safety topics. Additionally, new editions of the textbook and instructors manual were revised, printed and distributed.

3. Objective- Drill Conductor (DC) training to qualify at least 1,750 new Drill Conductors. This project resulted in 3,455 DCs trained.

4. Objective- DC refresher training to at least 325 previously trained Drill Conductors. This project resulted in 515 DCs being refresher trained

5. Objective- Five MSIT refresher training courses offered. This project resulted in a total of 13 MSIT refresher training workshops being held for a total of 70 MSIT instructors refresher trained.

6. Objective- Outcome evaluation conducted on the effect the training has had on lessening fatalities in the Alaska fishing industry. During the period of 2005-2009, the fatality rate in commercial fishing in Alaska was 113/100,000 FTE from its previous high of 171/100,000 in the early 1990's.

7. Objective- Study conducted to determine the importance of safety refresher training for commercial fishermen.

The survival skills retention study took place in two phases during this project period. These studies identified skills loss over time (1 month, 3 months and again at 21 months). These studies identified the loss of skills needed in an emergency at sea over these training intervals.

RESULTS AND DISCUSSION:

Impact on training accessibility to fishermen:

In terms of bringing performance skills based marine safety training to fishermen, this project exceeded all its training aims/objectives. This project has made training accessible to fishermen by bringing DC and DC refresher training (Aims 3 & 4) into fishermen's homeports across Alaska and other areas and territories of the U.S. In this five year project period DC training was delivered to 55 rural fishing ports in Alaska- most of these ports have no road access. In addition, another 49 fishing ports were reached from American Samoa, down the west coast, across the Gulf of Mexico and up the east coast to New England. Many of

these fishing ports were reached with training numerous times. Most of these fishing ports had no other option for receiving this safety training without traveling hundreds of miles.

The outreach into the rest of the U.S. from Alaska was due to requests AMSEA received from the fishing industry from other parts of the U.S. lacking training infrastructure. To build this regional instructor base, eight MSIT workshops were held outside Alaska with an emphasis on the S.E. of the U.S., which was recognized as having the least access to DC training. These eight MSIT workshops, and the ten MSIT workshops in Alaska, as well as MSIT refresher training (Aims 1 & 5) were of vital importance in maintaining this instructor base for fishermen.

Despite meeting the increased DC training need outside of Alaska, the training infrastructure within Alaska was also increased due to additional demand, instructor turnover and new entrants to commercial fisheries. Travel to rural indigenous commercial fishing villages in western Alaska on the Bering Sea is a challenge. Such travel is only available by air, often involving expensive and long transport times in small planes with accompanying weather delays. However, this group suffers from some of the highest fatality rates and thus, is a priority to reach. Despite these difficulties, 26 of the 55 Alaska ports that received DC training are located rural western Alaska.

Increased DC training availability which resulted in more USCG enforcement, coupled with new proposed DC refresher training requirements and more efficient training coordination from AMSEA increased the number of DC's trained in this five year project period to 3,455. In the last year of this project period, the number of DCs trained doubled over the previous year. As a comparison in the previous five year period project 2001-2006, 2,371 DCs were trained.

MSIT or train the trainer workshops and MSIT refreshers (Aim 1 and 5) were of great importance in training new instructors (MSITs) to teach DC courses. 40% of MSIT courses were taught outside Alaska to underserved fishing communities nationally. This resulted in approximately 1/3 of DCs trained being from outside Alaska.

Producing additional training materials (Aim 2) was important to keep the instructor network updated with new training resources due to marine survival equipment updates and due to the demand for more computer assisted learning such as DVDs and computer presentation software. This also had the advantage of ensuring that standardized instructional materials were used. These were of great assistance in class preparation to new instructors of DC classes.

In this project period we also greatly increased the use of our website (www.amsea.org) to distribute instructional materials to a wider audience. New updates on course materials, training opportunities, scheduling, and other news

of marine safety updates are made several times a week on our website. We also provide informational updates and promote training via social media such as Facebook and Twitter several times a week. Many of these social media portals barely or did not even exist when this five year project period began but have become important communication links to the fishing industry.

Impact on Reducing Risk and Fatalities:

An outcome evaluation conducted on the effect the training has had on lessening fatalities in the Alaska fishing industry was conducted by the NIOSH Alaska Field Office for this five year report. It was hoped that a comparison between AMSEA trained and not AMSEA trained fishermen who had been in a fishing vessel disaster and were fatalities or survivors would be able to show the protective effects of surviving such a disaster. However the small numbers of fatalities, the short period of a five year time line, and the fact that not all survivors names are known so that their training background can be checked, prevents this from being a statistically valid measurement.

Safety training as having a protective effect during an at sea emergency was demonstrated by several other statistics. According to casualty data that was examined by the NIOSH APRO for this final project report, out of all AMSEA trained fishermen who were involved in a vessel disaster in this five year period, there was only one fatality.16 other survivors were AMSEA trained, for an AMSEA trained fatality percentage of 6%. In the category of fishermen who were involved in a vessel disaster but were not AMSEA trained, there were 49 fatalities out of 335 fishermen for a fatality percentage of 15%- more than double the trained percentage.

It is difficult to determine the number of fishing vessels that were never involved in a vessel disaster because the DC training caused a behavior change that lessened their risk. Post- course evaluations include many comments of behavior change that fishermen mention they will take to reduce risk (Appendix A) due to safety training. The previous 5 year period (2000 – 2004) experienced 129 fishing vessel disasters in Alaska. However the number of vessel disasters from the year 2005 to 2009 was 91- a 31% decrease according to NIOSH APRO.

Also worthy of note is that no fishermen who had been DC refresher trained (Aim 4) has ever been involved in a fatality. In addition, most USCG and NTSB casualty reports on fishing vessel disasters over the past 20 years, have listed a lack of safety training as a contributing cause to the casualty.

There are many factors that determine the outcome of a casualty at sea. These include distance from rescue, weather conditions, survival equipment available, training in how to use survival equipment, the frequency of emergency drills being conducted, following proper procedures, random chance etc. The training in this project directly and positively influences several of these controllable survival factors such as the use of survival gear, following emergency procedures,

and frequency in conducting drills. This training also positively impacts survivability since purchasing additional survival gear and practicing emergency drills more often is an outcome that fishermen often note on post course evaluations (Appendix A).

Alaska fishing vessel fatalities recorded since 1990 (the year the original fishing vessel safety requirements were developed) have demonstrated a linear regression line. (Appendix B). Based on this trend, the annual fatality rate decreased 55%, from 171 to 77 per 100,000 FTE during this period. The positive downward trend is also demonstrated in actual numbers of fatalities. According to data from the NIOSH APRO, the average number of fatalities per year in Alaska has fallen to 10.8 per year in this five year project period from 2006 to 2010. This compares to an average number of fatalities from 2001 to 2005 of 14.8 per year in the previous five year period.

Impact on National Policy:

By 2006, Congress had taken an interest in advancing fishing vessel safety legislation further by a number of new proposals. Some of these proposals included requiring the training of more fishermen, additional training topics and requiring refresher training. The AMSEA Director and PI of this project, was requested to provide congressional testimony in April 2007, which provided input for some of the recommendations on safety training for fishermen found in the U.S. Coast Guard Authorization Act of 2010.

The AMSEA fishing vessel survival skills study (Aim 7), was supported by the Pacific Northwest Agriculture Safety & Health (PNASH) group and the University of Washington with NIOSH support. The survival skills chosen to be tested are those that are often mentioned in survivor interviews conducted by AMSEA staff and mentioned in USCG and NTSB reports as important to perform in emergencies at sea. These include such skills as donning immersion (survival) suits within 60 seconds following a prescribed procedure, giving a proper MAYDAY, etc.

This study demonstrated that there was a significant decrease in survival skills (13%) demonstrated in just 3 months from initial training (p-value = 0.001) and that an even greater decrease in survival skills took place in skills retention (24%), 21 months after initial training.[4] This supports the need for periodic refresher training in survival skills during an emergency at sea.

The survival skills study conducted by AMSEA was also used by the U.S. Coast Guard (USCG) to support the need for DC refresher training in the Authorization Act. Most fishermen have not had training in survival and emergency drills since they took their initial DC training in the1990s. A future requirement for DC refresher training was included in the Authorization Act.

In addition, the AMSEA Director/project PI was involved in the initial years of the

National Occupational Research Agenda (NORA) Agriculture, Fishing and Forestry (AgFF) Sector Council meetings. He assisted in establishing national priorities in occupational safety for the fishing sector. The AMSEA Director also gave a presentation to the National Academy of Sciences (NAS) during their review of the NIOSH AgFF program. The NAS final report gave the Fish Sector portion of the program high marks and stated that it was a model program for how an occupational safety program should be conducted.

CONCLUSIONS

Although scheduling classes around fishermen's erratic schedules and sometimes unknown fishing seasons can be challenging, staff on this project coordinated classes and used contacts within the fishing industry to be able to accommodate training. There have been no problems or insurmountable obstacles in achieving any of the aims of this project.

This project trained additional MSITs from many regions of the nation, who in turn trained 3,455 Drill Conductors to provide the required months emergency drills on fishing vessels. This training project has played an important role in reducing cost barriers to training by making training accessible to home fishing ports, as well as playing a critical role in reducing occupational risk in this high risk industry.

PUBLICATIONS

Journal Articles

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Dzugan, J. The Development and Efficacy of Safety Training for Commercial Fishermen, Journal of Agromedicine. Oct. 2010. Vol 15(4): pp. 351-356.

Books

Jensen, S., Dzugan, J. (2009) Beating the Odds on Northern Waters. Alaska Sea Grant College Program, Sixth edition. pp 244.

Hiscock, R., Walker, M., Dzugan, J., (2008) Commercial Fishing Vessel Safety Digest. AMSEA. 98 pages.

Dzugan, J., et al (2006) Marine Safety Instructor Training Manual, Alaska Marine Safety Education Association, eighth edition. pp. 384.

Proceedings

Dzugan, J.: (2009) Skills Retention in Commercial Fishing Safety Training. Reykjavik, Iceland. NIOSH, IFISH conference paper, May 2009.

Dzugan, J.: (2007) Survival Skills Decay in Commercial Fishing. Salt Lake City, U.S. (NORA) Young/New Investigators Symposium. April 20, 2007.

DVDs

Dzugan, J.: Man Overboard: Prevention and Recovery (2011). DHHS (NIOSH) publication # 2011-126d. 17:33 minutes.

Dzugan, J.: Trashing Your Livelihood (2008). AMSEA/Alaska Sea Grant/U.S. Coast Guard/NOAA. 16 minutes.

Dzugan, J.: Flooding Control: Knowledge & Tools to Prevent Sinking, (2007). AMSEA/Alaska Sea Grant/U.S. Coast Guard. 14 minutes.

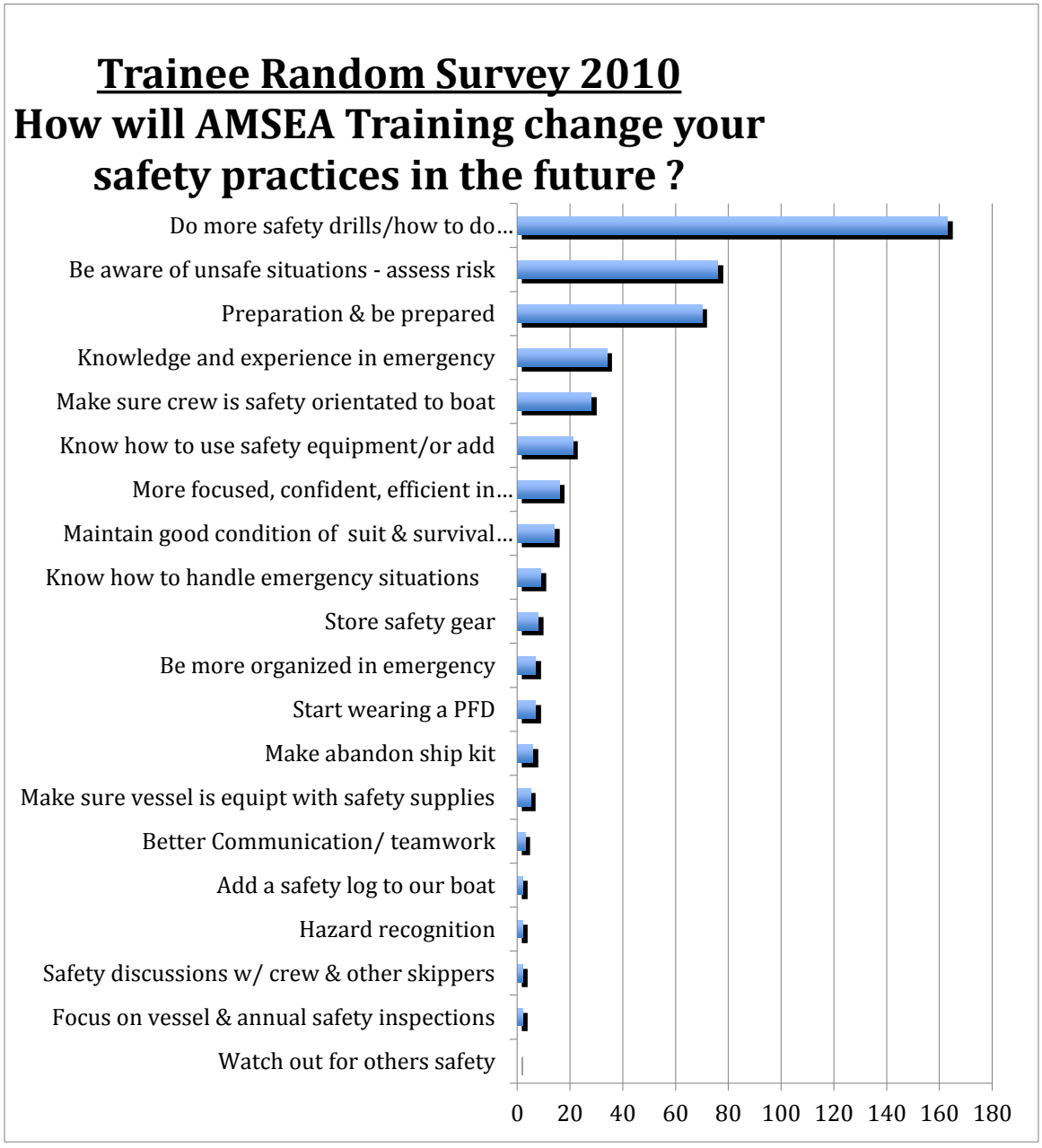
Dzugan, J. Fishing Vessel Stability: Operational Practices. AMSEA/Alaska Sea Grant/U.S. Coast Guard. 20 minutes.

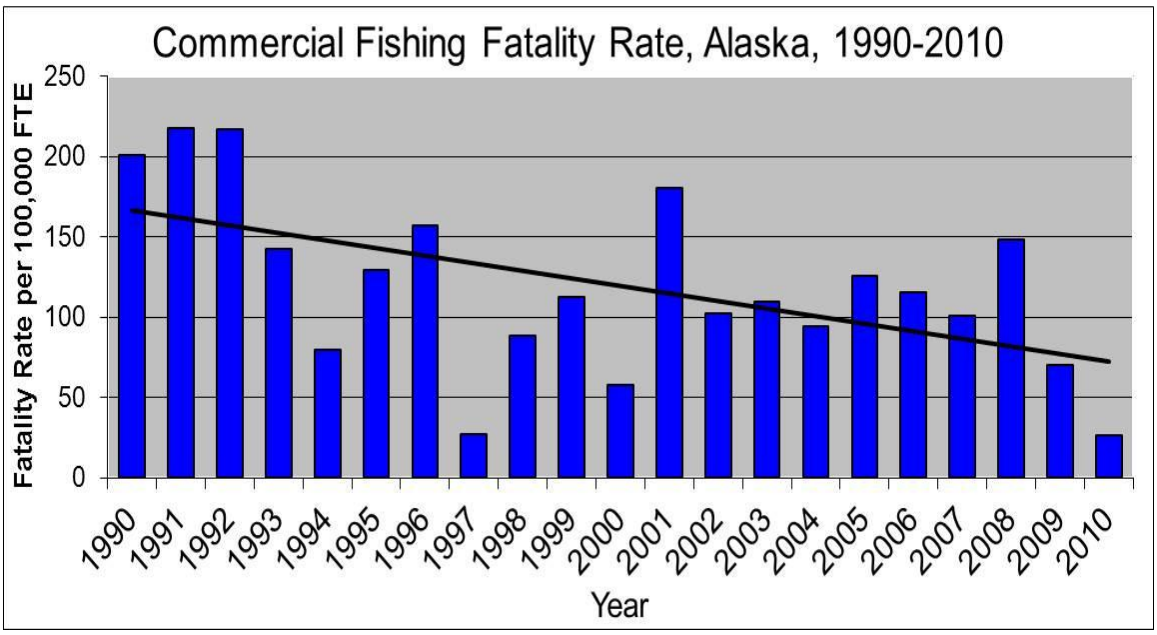
Research

Dzugan, J., Galvin, K.. Powers, K. 2007 – 2009: "Skills Retention in Commercial Fishing Safety Training", Pacific Northwest Agricultural Safety and Health Center, University of Washington, Phase 1& 2 unpublished paper. PNASH CDC Cooperative Agreement No. 2 U50 OH007544-06, CFDA No. 93.262 & No. 5 U50 OH007544-08, CFDA No. 93.262

APPENDIX **TABLES/ILLUSTRATIONS.**

APPENDIX A





APPENDIX B

[1] Dzugan, J., Galvin, K.. Powers, K. 2007 – 2009: *Skills Retention in Commercial Fishing Safety Training*, Pacific Northwest Agricultural Safety and Health Center, University of Washington, Phase 1& 2 unpublished paper.

[2] U.S. Bureau Labor Statistics, U.S. Department of Labor, Current Population Survey, Census of Fatal Occupations injuries and U.S. Census Bureau, preliminary 2010 data, 2011.

[3] Lincoln J. *Fresh Seafood at a Price: Factors Associated with Surviving Fishing Vessel Sinkings in Alaska,1992–2004* [unpublished doctoral dissertation]. Baltimore, MD: Johns Hopkins University; 2006.

[4] Dzugan, J., Galvin, K.. Powers, K. 2007 – 2009: *Skills Retention in Commercial Fishing Safety Training.*