The occupational safety study of purse seine fishermen at the Ocean Fishing Port (PPS) of Kutaraja, Banda Aceh, Indonesia

D Rianjuanda1*, M A Chaliluddin1, R Rinaldi1, K Melanie2, R M Aprilla1

1Department of Fisheries Resources Utilization, Faculty of Marine and Fisheries, Syiah Kuala University, Banda Aceh, Indonesia
2Department of Aquaculture, Faculty of Marine and Fisheries, Syiah Kuala University, Banda Aceh, Indonesia
*Email: rianjuanda@unsyiah.ac.id

Abstract. This study aims to determine the application of regulations related to work safety equipment and its availability on purse seine vessels in the Ocean Fisheries Port (PPS) of Kutaraja, Banda Aceh, and to find out fishermen's perceptions of the importance of work safety equipment. This research was conducted in July 2018, using the method of direct surveys and interviews concerning existing national regulations. Data were analyzed descriptively and linear regression analysis through SPSS program. The results showed that from all samples of vessels 11 GT - 61 GT (n = 21) the percentage of the presence or application of safety devices on purse seine vessels was 63%. In the 11 GT - 20 GT category the existence or application of safety equipment is 45% (n = 3), on the 21 GT - 30 GT vessel is 60% (n = 6), on the 30 GT - 50 GT ship is 65% (n = 7), on vessels 51 GT - 60 GT is 57% (n = 3) and on vessels larger than 61 GT is 86% (n = 2). In general, fishermen already understand the importance of work safety equipment, but the availability and number of occupational safety equipment on the ship are inadequate. Safety tools (independent) work influences the perception of fishermen (dependent) of only 1.83%; the rest of 98.17% is influenced by other factors outside the availability of work safety tools.

1. Introduction
Occupational safety and health is an activity to create a safe, comfortable work environment and ways to improve and maintain workforce health both physically, spiritually and socially. Occupational safety and health specifically aim to prevent or reduce accidents and their consequences and to secure ships, work equipment, and catch products. The use of work safety equipment has been used both nationally and internationally, so it must be used when going to carry out work activities primarily are work activities in the engine room [1], [14].

The cause of fatal accident of ship crews is the low awareness of the crew about work safety on shipping and fishing activities, the low mastery of competence in shipping and fishing safety, the ship is not equipped with safety equipment as it should, bad weather such as big waves and seriously ill in shipping [2], [11], [12].

The purse seine fishing gear is one of the dominant fishing gear in the Ocean Fisheries Port (PPS) of Kutaraja, Banda Aceh, based on data obtained that the number of this vessels are 261 units with sizes from 5 GT to> 61 GT [3]. With a wide range of fishing areas, the need for a study of work safety equipment on this vessels, especially the equipment availability on the vessels in order to minimize the risk of casualties and avoid fatal accidents when the vessels conduct fishing operations.
Lack of awareness and inadequate quality and skills of workers causes ship crews to neglect the work risks, such as not using safety equipment even though they are available or trained for it. The existence and use of the equipment that is following the standards can reduce the risk of early accidents and accidents that have occurred, to avoid the fatal consequences.

The study aims to determine the extent of the application of the regulation regarding fishermen's work safety tools on fishing vessels through the existence of these safety devices and know the fishermen's perceptions of the importance of work safety tools on the ship.

2. Materials and Methods
2.1 Time and site
This research was conducted in July 2018 at the Ocean Fisheries Port (PPS) of Kutaraja, Banda Aceh, Indonesia.

2.2 Research method
The research method used in this study is a survey method. The number of samples taken was 10% (21 vessels) of the total purse seine population available at the Ocean Fisheries Port (PPS) of Kutaraja, Banda Aceh (a total of 190 vessels consisting of 11-61 GT vessels).

2.3 Collecting data method
The data collection method is done by purposive sampling method. Primary data is taken from a qualitative questionnaire consisting of scores made based on the following rankings: [2]

- **SS**: Strongly Agree (score 4)
- **S**: Agree (score 3)
- **TS**: Disagree (score 2)
- **STS**: Strongly disagree (score 1)

Primary data collected in the form of fishermen's work safety equipment consisting of navigation equipment, maps, compasses, GPS, and SSB radio; personal safety: life jacket, lifebuoy; first aid kits; medicines; work equipment: work goggles, gloves, work shoes; working equipment: cranes, capstan, tools and the fire extinguisher. Primary data obtained through questionnaires and interviews with the captain, engine interpreter and or crew.

This research refers to regulations related to safety devices on fishing vessels [4, 5, 6, 7, 8, 9, 15].

2.4 Data analysis method
Data analysis uses the descriptive analysis methods and the linear regression analysis. The data analysis technique used in this study is a linear regression analysis that is processed through the SPSS Statistics 23 program.

3. Results and Discussion
The existence of GPS devices, SSB radios, and compasses is 100% meaning that all ships have these navigation devices. The existence of life jacket equipment is 67%, meaning that 14 vessels use while 7 vessels do not use it. While the existence of lifebuoy devices is 24% (5 vessels only) and the vessels not using this device is 16 vessels. Glasses work equipment is 29% or only 6 vessels that use it, the rest is 15 vessels do not use (71%). The existence of the use of gloves is 76% or 16 vessels using and not using are 24% or 5 vessels, and the use of working shoe equipment in the fishing fleet is 24% or 5 vessels using and not using are 76% or 16 vessels which do not use. Work equipment such as cranes are 86% or 18 ships that use and those that do not use are 14% or 3 ships. All vessels use the tool capstan and tooling tools, whereas the use of first aid kits for the vessels is 62% or 13 units of ships using and not using amounting to 38% or 8 vessels. Regarding the fire extinguishers on fishing vessels, 24% or 5 units of ships use and not use are 76% or 16 units of vessels.

The results of interviews with fishermen (n = 21) at the port regarding the importance of work safety equipment obtained the following results:
1. Fishermen understand the importance of safety equipment on board and are needed in every fishing operation (strongly agree = 9.5%, agree = 81% and disagree 9.5%).
2. Boat safety equipment that fishermen have prepared is only to fulfill sailing requirements (strongly agree 19.0%, agree 71.4% and disagree 9.5%).
3. The captain is responsible for what happens on the boat during fishing operations (strongly agree 28.6% and 71.4% agree).
4. In every fishing operation, there are using safety equipment such as rubber boots, gloves and life jackets (agree = 47.6% and 52.4% disagree).
5. Fire fighting equipment, life jacket, GPS, SSB radio, compass, boots and gloves are always available in good condition on the ship (agree = 38.1%, disagree = 52.4% and strongly disagree = 9.5%).
6. Always check the readiness of work safety equipment on board before fishing operations (strongly agree = 14.3%, agree = 66.7% and disagree 19.0%).
7. The fishermen understand the safety procedures on board (strongly agree = 4.8%, agree = 42.9%, disagree = 42.9% and strongly disagree = 9.5%).
8. Every person on board who knows that an accident occurs, within the limits of his ability must assist and report the accident to the nearest authorized official or another party (strongly agree = 28.6% and agree 76.2%).
9. The captain who knows the danger to the safety of sailing must take precautions and disseminate news about it to other parties (agree = 33.3% and agree = 66.7%).
10. The captain must assist within the limits of its ability to any person or ship found to be in danger in the waters and those who are in the flare tower (strongly agree = 9.5% and agree = 90.5%).
11. The captain involved in a collision with another ship must assist to passengers, crew, and vessels involved in the collision (strongly agree = 28.6% and agree = 71.4%).

The results of fishermen's questionnaire related to the safety tools obtained the highest and lowest values are 152 and 4 points, respectively. The following are the results of filling out the questionnaire in the following table:

| No | Category         | Percentage (%) |
|----|-----------------|----------------|
| 1  | Strongly Agree  | 16             |
| 2  | Agree           | 66             |
| 3  | Disagree        | 17             |
| 4  | Strongly Disagree | 2              |

The biggest percentage value is the perception of fishermen who agree (S) with a percentage value of 66% of the important criterion of work safety, this shows that fishermen truly understand the importance of work safety equipment however the availability of safety equipment on board is inadequate and the fishermen's lack of understanding of the use of safety equipment on board.

The calculation of the simple linear regression analysis between fishermen's perception (Y) and the availability of work safety tools (X) obtained the equation of the regression line \( Y = 22.790 + 1.004X \) with the correlation/relationship coefficient (R) = 0.427. From this output, the determinant coefficient (R Square) was obtained by 0.183, or 1.83%. Thus the availability of work safety tools (independent) influences perceptions of fishermen (dependent) of only 1.83% while the rest of 98.17% is influenced by other factors beyond the availability of work safety tools. Based on the \( t_{count} = 2.061 < t_{table} = 2.093 \) and with a significance level of 0.053 greater than 0.05, showed that no causal relationship/regression between fishermen's perceptions (Y) based on the value of the availability of work safety tools (X). It means that the safety tool does not affect the perception of fishermen.

The equipment is available almost on every vessel but their existence is only as a fulfillment of sea-worthy requirements. For navigation tools, nowadays the fishermen are guided by GPS. Some
equipment such as personal safety (life jacket and lifebuoy), first aid kits, and the fire extinguisher are inadequate furthermore the use of fire extinguishers on the ship is very less. The tools that have safety standards are only life jackets and lifebuoys however, fishermen generally also use other floating tools such as jerry cans. Jerry cans are not a ship safety tool but can be used as a ship safety tools, this is also done to save costs.

The availability of the safety equipment based on work safety device regulations on the vessels in PPS Kutaraja, Banda Aceh, on all vessels with size range 11 GT to > 61 GT is 63%. On 11 GT - 20 GT vessels is 45%, on 21 GT - 30 GT vessels is 60%, on 31 GT - 50 GT vessels is 65%, on 51 GT - 60 GT vessels is 57% and on vessels greater than 61 GT is 86%.

From the picture above shows the linear line produces an equation $Y = 22.79 + 1X$, meaning that the X value affects the Y value is equal to 1, so the effect on the Y value is very low. It is necessary to increase the use of safety equipment (X) on fishing vessels so that it has a positive impact on fishermen’s perceptions of safety tools on fishing vessels.

The readiness of ship safety equipment and ship worthiness is actually required in a voyage [5], [10], [11] but fishermen do not pay much attention on it, such as the fire extinguisher. Fishermen rely more on water pumps and buckets as containers for taking seawater rather than using the fire extinguishers in case of fire on the ship.

Each fishing vessel must fulfill all conditions mentioned above to be declared seaworthy [8], but in its application, not all of the provisions can be met by a traditional fishing vessel in Indonesia or in particular in this case are fishing vessels in the Banda Aceh PPS Kutaraja.

4. Conclusion
Based on the research results related to the study of work safety of fishermen in PPS Kutaraja, Banda Aceh it can be concluded that;

1. In general, the existence and application of work safety equipment on all vessels measuring 11-61 GT is 63%, meaning that only 37% do not have/apply safety equipment on the vessels studied. On 11 GT - 20 GT vessels is 45%, on 21 GT - 30 GT vessels is 60%, on 31 GT - 50 GT vessels is 65%, on 51 GT - 60 GT vessels is 57% and on vessels greater than 61 GT is 86%.

2. Fishermen already understand the importance of occupational safety equipment however, the availability and number of occupational safety equipment on the ship are inadequate.

References
[1] Jasman T 2015 Oceantek 9(1) 103-112
[2] Suwardjo D, Haluan J, Jaya I, Poernomo S H 2010 Jurnal Teknologi Perikanan dan Kelautan 1(1) 1-13

[3] Syahbandar 2017 Jumlah armada dan alat tangkap di PPS Kutaraja Banda Aceh

[4] Undang-Undang Republik Indonesia Nomor 45 Tahun 2009 tentang Perubahan Atas Undang-Undang Nomor 31 Tahun 2004

[5] Undang-Undang Republik Indonesia Nomor 17 Tahun 2008 tentang Pelayaran

[6] Peraturan Pemerintah Republik Indonesia Nomor 51 Tahun 2002 tentang Perkapalan

[7] Peraturan Menteri Nomor 7 Tahun 2010 tentang Alat Perlindungan Diri

[8] Keputusan Menteri Perhubungan Nomor 46 Tahun 1996 tentang Sertifikasi Kelaiklautan Kapal Penangkap Ikan

[9] Undang-Undang Nomor 1 Tahun 1970 tentang Keselamatan Kerja

[10] Huda A M, Boesono H, Setiyanto I 2012 Journal of Fisheries Resources Utilization Management and Technology 1 87-96

[11] International Maritime Organization 2001 Document for guidance on training and certification of fishing vessel personnel 2001 Edition FAO of United Nations, ILO and IMO. International Labor Organization, and Food Agriculture Organization 2006 Code of Safety for Fishermen and Fishing Vessels 2005

[12] Putra R S, Purwangka F, Iskandar B H 2017 Albacore I(1) 037-046

[13] Santara A G, Purwangka F, Iskandar B H 2014 Ipteks PSP I 53-68

[14] Lincoln, JM., M.S., Hudson, DS., Conway, GA., Pescatore, Rachel2002. Proceedings of the International Fishing Industry Safety and Health Conference. U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control and Prevention, National Institute for Occupational Safety and Health, Occupational Health Program, Department of Environmental Health, Harvard School of Public Health. Massachusetts, USA

[15] Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 3/PERMEN-KP/2013 tentang Kesyahbandaran di Pelabuhan Perikanan