# Perception and Participation about Work Safety in Fisheries of Vertical Longline Ship Fishing at PPN Prigi Trenggalek Regency, East Jawa

*by* Herry Boesono

**Submission date:** 20-Nov-2019 11:46AM (UTC+0700)
**Submission ID:** 1217681908
**File name:** C6-IJOO13_2.277-291.pdf (370.15K)
**Word count:** 5473
**Character count:** 27880

International Journal of Oceans and Oceanography
ISSN 0973-2667 Volume 13, Number 2 (2019), pp. 277-291

http://www.ripublication.com

# Perception and Participation about Work Safety in Fisheries of Vertical Longline Ship Fishing at PPN Prigi Trenggalek Regency, East Jawa

**Irham Fanani Basya[a], Azis Nur Bambang, Herry Boesono**

*Masters in Coastal Resource Management*
*Faculty of Fisheries and Marine Sciences, Diponegoro University*
*Jl. Prof. Soedarto, SH, Tembalang, Semarang, Jawa Tengah – 50275, Indonesia.*

**Abstract**

One of the activities that have the danger of occupational health and safety is fishing activities. Fishing is one of the most dangerous and difficult jobs and job injuries are more frequent than other jobs. The purpose of this study was to analyze the ergonomic aspects of fishing activities with a long line at Prigi VAT and find out the factors that reduce the risk of workplace safety at sea based on the perceptions of fishermen with predetermined variables.

This study aims to know the factors in reducing the risk of workplace accidents at sea based on the perceptions of fishermen with predetermined variables, as well as knowing ergonomic factors in vertical longline fishing activities. This study took as many as 200 respondents of vertical longline fishermen and 1 vertical longline vessel. The analysis tool used was SEM (Structural Equation Modeling) version 24 as well as JSA (Job Safety Analysis). The results of data analysis for the whole model have met the criteria of Goodness Of Fit with chi squere values = 95.217, degrees of freedom = 60, probability = 0.03, CMIN / DF = 1.587, GFI = 0.933, AGFI = 0.898, TLI = 0.926, CFI = 0.943 and RMSEA = 0.054. Thus it can be said that the proposed research model is acceptable. From the results of the study it is noted that there is a direct influence and positive indirect influence between variables, namely: fishermen's lifestyle, ergonomic factors, work productivity and the risk of workplace accidents. Whereas for the JSA method, the level of comfort of work on a fishing vessel has not fulfilled comfort in accordance with ergonomic rules even though the crew said that they feel comfortable and familiar with the condition. As well as from an ergonomic point of view, there are several designs of equipment and tools on a vertical long line ship that have not been ergonomic.

**Keywords:** vertical longline, ergonomics, PPN Prigi, JSA, fishermen's lifestyle

## 1. INTRODUCTION

Occupational Safety and Health (K3) is an effort to create a safe and comfortable work environment to achieve the highest productivity, thus K3 must be implemented in every type of work without exception because OSH (K3) efforts are expected to prevent and reduce the risk of accidents and occupational diseases. One of the activities that have the danger of occupational health and safety is fishing activities. The fishing activities that they have to do need to be supported by the conditions and optimal body strength that each individual has. Fishermen must work continuously and make continuous movements thus they can experience muscle fatigue. (Sholihah, Hanafi *et al*. 2016).

Fishing is one of the most dangerous and difficult jobs. Job injuries are more frequent than other jobs (Chauvin and Le Bouar, 2007). The main cause of marine accidents which led to the loss of human life is purely human error. Other causes are the neglect carried out by sea transportation operators and related agencies, and sea transportation safety equipment that is far from adequate. Especially for fisheries activities, as much as 80% of marine accident factors are caused by human error (Purwangka, Wisudo *et al*. 2013).

The effort to reduce the risk of occupational accidents at sea is to improve the ergonomic workplace. Trenggalek is one of the districts located on Java Island, precisely in East Java Province. Trenggalek has great potential in the field of fisheries and marine affairs. The fisheries sector contributes to the economy of Trenggalek Regency. This is due to the position of Trenggalek Regency which is directly adjacent to the Indian Ocean, making it rich in potential fisheries.

Activities that occur during the operation of long line vertical ships often result in accidents experienced by crew members. Such as scratched fishing lines, plastered on the deck of the ship, falling during the operation of fishing gear and sinking of the ship due to overloading or errors when the ship moves. With many factors that cause accidents on long line vertical ships, an assessment of ergonomics must be done so that comfort and the cause of the accident can be known, thus the productivity of the crew can be increased. Based on these reasons, research on ergonomics on vertical longline vessels needs to be done. This research is expected to provide recommendations to improve the comfort of work on board. The purpose of this study is to describe fishing activities using vertical longline vessels at PPN Prigi VAT, analyzing the ergonomic aspects of vertical longline fishing activities at PPN Prigi, knowing the factors that reduce the risk of occupational accidents at sea based on fishermen's perceptions of variables determined and knowing the relationship between variables to know the factors of workplace safety at sea.

## 2. MATERIALS AND RESEARCH METHOD

### Research Method

The method used in this research is descriptive analysis research method. According to Sugiono (2009), the method that serves to describe or give an overview of the

object under study through data or samples that have been collected as it is without doing analysis and making conclusions that apply to the public. This study used a sample of 200 respondents for the SEM (Structural Equation Modeling) analysis method to understand fishermen's perceptions of very influential factors to reduce the risk of workplace accidents in the sea based on predetermined variables. As for the JSA (Job Safety Analysis) activity, it was done using a sample of 1 vessel belonging to the fisherman chairman to represent a vertical longline vessel at PPN Prigi. This method is intended to observe in detail the activities, equipment used, work methods and layout on the boat. Data processing was done using qualitative methods, namely by tabulating and making images needed for ergonomic analysis.

The sampling method for SEM (Structural Equation Modeling) analysis used a purposive sampling method. According to Notoadmodja (2010), purposive sampling is sampling based on certain considerations such as traits or characteristics that have been previously known. While the sampling method for JSA (Job Safety Analysis) activity was the quota sampling method. According to Bambang (2013), the quota sampling technique is a sampling technique that is carried out on the basis of a predetermined amount or quota.

The method used in data collection is the method of observation, interviews and documentation by collecting primary data and secondary data. Primary data is data obtained from research results and then processed while secondary data is used to support primary data. The following are variables, indicators and measurements used in SEM analysis presented in the table 1.

Measurement of interval scale 1-5 with score determination criteria as follows:

- S*core* 5: very often
- S*core* 4 : often
- S*core* 3 : sometimes
- S*core* 2 : rarely
- S*core* 1: never

**Table 1.** Variables, Indicators and Measurement

| Variables | Indicators | Measurement | Sources |
|---|---|---|---|
| Fishermen lifestyle | - Stay up late<br>- Drink alcohol<br>- Smoking | Measurements using scale intervals from 1 to 5 increased to 5, then it is more agreed | (Park, Cheong et al. 2010) |
| Ergonomic factors | - Working hours<br>- Work facilities<br>- Work position | Measurements using scale intervals from 1 to 5 increased to 5, then it is more agreed | (Hashim and Taha 2015) |

| Variables | Indicators | Measurement | Sources |
|---|---|---|---|
| Work productivity | - Health condition<br>- Work ability<br>- Effective<br>- Efficient | Measurements using scale intervals from 1 to 5 increased to 5, then it is more agreed | (Mayasari, Kustono et al. 2016) |
| Workplace accidents risks | - Physical fatigue<br>- Injury<br>- Work stress | Measurements using scale intervals from 1 to 5 increased to 5, then it is more agreed | (Hashim and Taha 2015) |

*Source: developed in research, 2019.*

## 3. RESULTS AND DISCUSSION

### General Conditions at PPN Prigi

Strategic location both in terms of the availability of natural resources and transportation and marketing channels has caused this region to experience rapid development. Fishermen operating in Prigi are not only local residents, but also migrants who generally are fishermen from other regions such as Banyuwangi, Sendang Biru, Pacitan, Sulawesi and others. The types of fishing gear in PPN Prigi are trawl rings, tonda fishing rods, gill nets, payang, vertical longline, clit net, and beach trawl.

The development of fishing gear and fishing fleets operating in Prigi waters continues to decline in number. This is because the more distant their fishing operations are due to the diminishing availability of natural resources around the bay due to continuous exploitation..

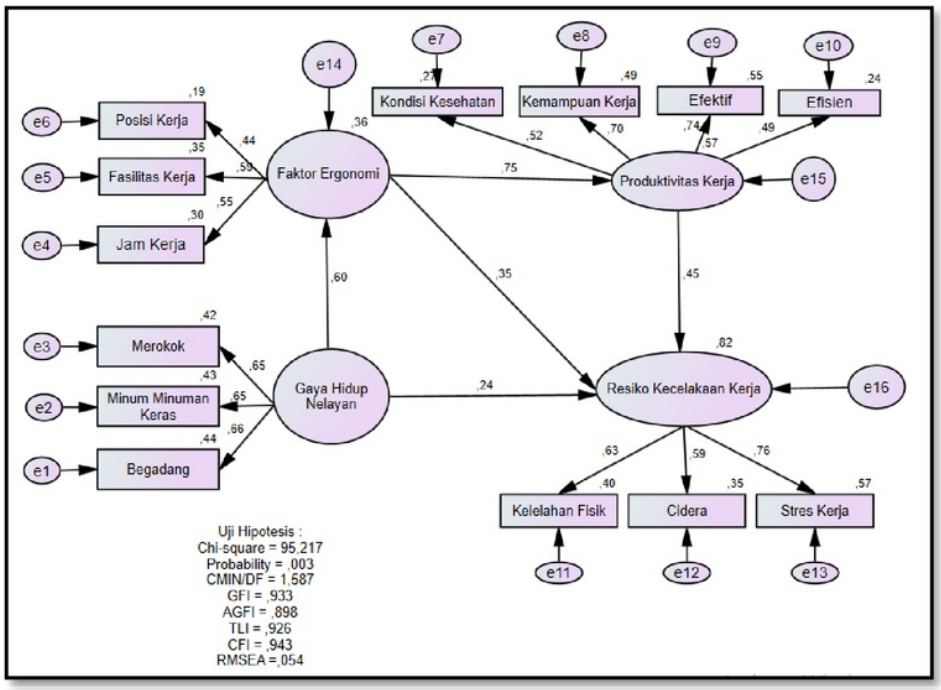
### Relationship between Fishermen's Lifestyle, Ergonomic Factors, Work Productivity and Occupational Risk

Fishermen's lifestyle is a description of behavior, patterns and ways of life shown by fishermen. In this study, indicators of the fishermen's lifestyle are: smoking, drinking and staying up late. The variables in the fishermen's lifestyle are related to the risk of workplace accidents in the sea, because the better the lifestyle of the fishermen, it will reduce the risk of workplace accidents at sea. The second variable is the ergonomic factor, which has three indicators, namely working hours, work facilities and work positions. The ergonomics factor is one of the most important factors in reducing the risk of workplace accidents at sea, because ergonomics itself is the science of optimizing work systems to suit their needs. Thus the more ergonomic workplaces owned by fishermen, it will reduce the risk of workplace accidents at sea.

Ergonomic factors such as suitable working hours, suitable work facilities, and good working positions can increase fisherman productivity such as working effectively, efficiently, having good health conditions due to ergonomic work positions and good work ability. Thus the more ergonomic workplaces owned by fishermen, it will increase work productivity. By having good work productivity, it can reduce the risk of workplace accidents at sea such as physical fatigue, work stress and injuries which are indicators of the risk of workplace accidents at sea. With this explanation, it can be concluded that to reduce the risk of accidents at sea, namely by various factors, namely a good fishermen's lifestyle, ergonomic factors in work and having good work productivity.

## SEM ANALYSIS METHOD

Analysis of *Structural Equation Model* (SEM) with the full model is intended to test the models and hypotheses in the study. Model testing is done in two ways, namely the suitability of the model and the test of significant causality through the regression coefficient test. The following below is the data processed for SEM analysis.




*Source : Processed primary data. 2019*

Table 2 shows the results of the feasibility test of the SEM model and obtaining good results and fulfilling the Goodness of Fit Indices criteria with the full model chi-square test with a value of 95.217, above chi squere tables with 60 degrees of freedom at a significant level 5% of 79.08. The probability value obtained is 0.003 below the required probability limit of 0.05. The RMSEA result is 0.054 below the limit that is required by RMSEA which is 0.80. The GFI value of 0.933 exceeds the number required for the GFI value of 0.90. AGFI value of 0.898 is less than 0.90 which is an AGFI requirement. TLI value of 0.926 is less than 0.95 which is a requirement for TLI. The CMIN / DF value of 1.587 is below the 2.00 limit which is a condition requirement for CMIN / DF. While the results of CFI 0.943 are less than 0.95 which is a condition of CFI. The following below results from regression weight SEM analysis.

**Table 2.** SEM Model Feasibility Test Results

| No | *Goodness of fit indexs* | *Cut off value* | Analysis Results | Model Evaluation |
|---|---|---|---|---|
| 1 | *Chi-Squere* | ≤ 79,08 (Chi Squere dengan df 60 dan taraf signifikan 0,05) | 95,217 | Not Good |
| 2 | *Probability* | ≥0,05 | 0,003 | Good |
| 3 | RMSEA | ≤ 0,08 | 0,054 | Good |
| 4 | GFI | ≥ 0,90 | 0,933 | Good |
| 5 | AGFI | ≥ 0,90 | 0,898 | Marginal |
| 6 | TLI | ≥ 0,95 | 0,926 | Marginal |
| 7 | CMIN/DF | ≤ 2,00 | 1,587 | Good |
| 8 | CFI | ≥ 0,95 | 0,943 | Marginal |

*Source: Primary data processed, 2019*

Testing the hypothesis can be seen from the results of processing research data using SEM analysis. Test the hypothesis by analyzing the value of C.R (Critical Ratio) and the value (Probability) contained in the results of Regression Weights. The statistical limits used is by having a C.R value. (Critical Ratio) above ≥ 2.00 and P value (Probability) of 0.05. If the processed data results have met these requirements. then the hopotesis that has been submitted is acceptable. The following are the results of data processing that have been done to test the research hypothesis presented in table 3.

**Table 3.** Hypothesis Testing

| | | | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|
| Ergonomic Factor | <--- | Fishermen's Lifestyle | ,554 | ,123 | 4,495 | *** |
| Work Productivity | <--- | Ergonomic Factor | ,616 | ,134 | 4,594 | *** |
| Risk of Work Accidents | <--- | Work productivity | ,646 | ,258 | 2,500 | *** |
| Risk of Work Accidents | <--- | Fishermen's Lifestyle | ,610 | ,138 | 4,500 | , *** |
| Risk of Work Accidents | <--- | Ergonomic Factor | ,507 | ,260 | 4,467 | *** |

*Source: Primary data processed, 2019*

Testing Hypothesis 1

H1: The better lifestyle possessed by fishermen, it will also make the workplace be ergonomic.

The effect of fisherman lifestyle variable was measured through indicators of staying up, drinking and smoking. The CR value of the fishermen's lifestyle towards the workplace with ergonomics is 4,495 above that of the specified CR requirement of ≥2.00. Whereas for the P value of 0,000 has a value that is in accordance with the P requirement that is equal to P 5 0.05. The results of these values indicate that the first hypothesis of this study is accepted and it can be concluded that the fishermen's lifestyle has a positive effect on the ergonomic workplace thus hypothesis 1 is proven.

Testing Hypothesis 2

H2: The more ergonomic workplaces possessed by fishermen it will increase work productivity.

The effect of ergonomic factor variables was measured through indicators of working hours, work facilities and work positions. The results of the data contained in Table 4.30 are the CR values of ergonomic factors with work productivity of 4.594 above the specified CR requirements, namely ≥2.00. Whereas for the P value of 0,000 has a value in accordance with the P requirement that is equal to P 5 0.05. The results of these values indicate that the second hypothesis of this study is accepted and it can be concluded that ergonomic factors have a positive effect on work productivity thus hypothesis 2 is proven.

**Table 4.** *Standardized Direct Effects*

| | Fishermen Lifestyle | Ergonomic Factor | Work Productivity | Work Accident Risk |
|---|---|---|---|---|
| Ergonomics factor | 0,601 | 0,000 | 0,000 | 0,000 |
| Work productivity | 0,000 | 0,754 | 0,000 | 0,000 |
| Risk of Work Accidents | 0,244 | 0,347 | 0,451 | 0,000 |

*Source: Primary data processed,2019*

Testing Hypothesis 3

H3: The better work productivity possessed by fishermen, it will reduce the risk of workplace accidents at sea.

The high and low work productivity of fishermen to reduce the risk of workplace accidents at sea can be seen from the results of SEM analysis where the results of the data in Table 4.30 are CR values of work productivity with a work accident risk of 2,500 above the specified CR requirement of ≥ 2.00 . For a P value of 0,000, it has a value in accordance with the terms in P, which is equal to P 5 0.05. The results of these values indicate that the third hypothesis of this study is accepted and it can be concluded that work productivity has a positive effect on the risk of workplace accidents thus hypothesis 3 is proven.

Testing Hypothesis 4

H4: The better lifestyle possessed by fishermen, it will reduce the risk of workplace accidents at sea.

The effect of fisherman lifestyle variables is measured through indicators of staying up, drinking and smoking. The CR value of the fishermen's lifestyle towards the risk of workplace accidents at sea is 4,500 above the specified CR requirement of ≥2,00. Whereas for the P value of 0,000 has a value in accordance with the P requirement that is equal to P 5 0.05. The results of these values indicate that the fourth hypothesis of this study is accepted and it can be concluded that fishermen's lifestyle has a positive effect on the risk of workplace accidents at sea thus hypothesis 4 is proven.

Testing Hypothesis 5

H5: The more ergonomic workplaces possessed by fishermen, it will reduce the risk of workplace accidents at sea.

The influence of ergonomic factors on the risk of workplace accidents at sea can be

seen from the results of SEM analysis where the value of cr ergonomic factors with the risk of workplace accidents at sea is 4,467 above the specified CR requirement of ≥2.00. Whereas for the P value of 0,000 has a value in accordance with the P requirement equal to P 5 0.05. The results of these values indicate that the fifth hypothesis of this study is accepted and it can be concluded that ergonomic factors have a positive effect on reducing the risk of workplace accidents at sea thus hypothesis 5 is proven.

Based on table 3 above, the ergonomic factor variable statistically is proven to have a positive effect on work productivity of 0.754. While the fishermen's lifestyle variable directly influences the ergonomic factor which gives a large positive effect of 0.601. Meanwhile, the direct effect of work productivity on the risk of workplace accidents has a smaller positive effect of 0.451. For ergonomics factor variables contribute positively in influencing the risk of workplace accidents which is equal to 0.347, while the fisherman lifestyle variable has a small value in the risk of workplace accidents equal to 0.244. The indirect effects are presented in table 5 below:

**Table 5.** *Standardized Indirect Effects*

| | Fishermen Lifestyle | Ergonomic Factor | Work Productivity | Work Accident Risk |
|---|---|---|---|---|
| Ergonomics factor | 0,000 | 0,000 | 0,000 | 0,000 |
| Work productivity | 0,453 | 0,000 | 0,000 | 0,000 |
| Risk of Work Accidents | 0,413 | 0,340 | 0,000 | 0,000 |

*Source: Primary data processed,2019*

From table 5 above it can be read that statistically the lifestyle of fishermen has an indirect influence on work productivity of 0.453. In addition, the lifestyle of fishermen also indirectly has a positive influence with a high value on the risk of workplace accidents by 0.413. And ergonomic factors which indirectly also have a positive effect on the risk of workplace accidents by 0.340.

Based on the results of this study, it can be seen that the perception of fishermen to reduce the risk of workplace accidents at sea which is very influential is work productivity with a value of 0.451, because by working effectively and efficiently and having good work ability; it can reduce work stress and physical fatigue due to good work productivity. Followed by ergonomic factors that have a direct effect with a value of 0.347, because with a good working position and good working hours it can also reduce the risk of workplace accidents such as physical fatigue, because if the work position is not in accordance with the rules, it will quickly physically tiring, but in reality all fishermen are accustomed to these conditions and the fishermen's lifestyle has a direct effect with a value of 0.244, because a good fisherman's lifestyle

makes the body more fit and focused on work thus it can reduce the risk of workplace accidents. These three factors have a direct effect on the risk of fishing accident.

**General Condition of Sample KM Hikmah for JSA**

The study was conducted on a vertical longline KM Hikmah owned by Moch. Sugeng. This wood-based vertical longline vessel unloads the catch at the East pier, Nusantara Prigi Fisheries Port.

Ship specifications are given below:

| | |
|---|---|
| Vessel name | : Hikmah |
| Materials/Vessel type | : Wood |
| Length | : 13,15 m |
| Width | : 1,94 m |
| Height | : 1,20 m |
| Brand of engine | : Kubota |
| Engine size | : 2 engines Kubota 19 PK |
| Fuel | : Solar |
| Total ABK | : 1 - 3 Persons |

Based on the shape of the ship's kasko, the ship's hull is in the form of a V-shaped bow. The more center it tends to form rounds and the more backward forms the U. The ship's kasko forms allow vessels to move freely. This is in accordance with the statement of Farhum (2010) which said that the K-A sample ship with the form of round-sharp bottom has a higher stability criteria than the other three ships..

This 5 GT vessel performs 1 day fishing, this boat departs from the fishing base at 3:00 p.m. and returns tomorrow the day before 9:00. The journey to the fishing ground is taken at speeds of 4-5 knots to latitude 9-10 LS, vertical longline vessel like this does not require such high speed but needed a good maneuver to support fishing. The setting activity was carried out at Mr. Sugeng as many as 5 pieces of FADs, the first setting was carried out at around 6:00 p.m. for 30 minutes, then proceed to the second FAD until the fifth FAD. The length of time for each immersing catch was 2.5 - 3 hours, followed by hauling the first catch and the last five, the process of hauling was quite long for about 1 hour because 1 fishing gear had 150 fishing rods, after the first hauling of crew 1 and crew 2 returned to their task of sorting fish and installing bait for settings to the next FAD.

**Ergonomic Aspects in the Activity of Vertical LongLine Vessels**

The ergonomics study emphasizes the comfort and safety of work on vertical long line vessels starting from departing, operating and handling catches. The

implementation of ergonomics on board is intended to achieve work comfort so that jobs can be created to support the optimality of marine fishing operations. The activities observed were 5 in total, starting from preparation, setting, immersing, hauling and post-catch handling. The activity on average is carried out by sitting, squatting, bending, lifting and walking. However, most are done in a sitting position.

The work activities are carried out similarly every day that these activities can cause Musculoskeletal pain in vertical longline vessels fishing activities. According to the Occupational Health and Safety Council of Ontario (OHSCO) (2007) in Lestari et al., (2014), musculoskeletal complaints are a series of aches in tendons, muscles, and nerves. With these conditions, the researcher is interested in studying these activities.

**Ergonomic Aplication**

The parties involved in implementing ergonomics applications on board are:

1. Ship craftsmen, responsible for making designs and ships that facilitate fishing activities, good quality will support fishing activities.
2. The ship owner, is responsible for the safety and comfort of the crew, maintenance of the ship and fishing gear. In addition, it is also necessary to pay attention to the needs of crew members in fishing operations on board to support optimal work, thus there are no workplace accidents.
3. The crew (ABK), fishing operations are expected to run well. ABK must also maintain equipment properly so that it is always ready for use.

**Comfort of ABK Working on the Ship**

**Job Safety Analysis**

The risk of fishing is very high because the terrain is very dangerous, namely in the sea which is very unpredictable. Job Safety Analysis (JSA) is carried out to increase comfort in working on a boat. Table of Job Safety Analysis submitted attachments on the types of hazards that must be considered when completing the JSA in order to take action to reduce the risk / hazard:

*1) Impact of fally/ flying items.*

Break dysfunction, buckets, coolboxes and buoys that are placed in unstable or slippery places allow the object to move or shift or even fall. Risks like this can be minimized by using head protection, but the ship does not provide helmets for crew members.

*2) Sharp objects pins*

Puncture like a knife for handling, hook and ganco can hurt the crew's hand. Caution that makes this danger happen. The risk can be reduced by wear packs and hand protectors such as gloves made from plastic or wool.

*3) Fall or slip*

The condition of the ship is very easy to get wet by rain and sea water. This can cause fungus to grow. Mushrooms that grow have mucus that can make the crew slip and can also cause infection. Reducing the risk of slipping is done by cleaning the deck and being careful in stepping.

*4) Lift pushes, pulls or reaches excessively*

Buoy signs, blanks, buckets, coolboxes, buoys and catches are some of the most frequently moved objects. The transfer of the tool is still done manually. Heavy loads often lead to accident and health risks. Pulling fishing gear in the hauling process should use tools such as line haulers and pulleys.

*5) Feel the engine vibration, noise, cold or heat, breathe smoke.*

This is most often felt in catching operations. The position of the engine in the middle results in excessive noise which can cause ear interference. Smoke from the engine will automatically lead backward to the crews, this results in irritation to the eyes, shortness of breath and dizziness because the brain lacks oxygen. The addition of an upward-looking exhaust pipe needs to be used so that the worker is not exposed to smoke directly.

*6) Repetitive movement*

Repetitive movements performed may pose a health hazard. These activities include stretching the main line, throwing the branch line and rolling up branch line.

*7) Possibility of sinking.*

The possibility of the ship sinking can be avoided by providing mature training to fishermen in carrying out their movements and trying to survive in adverse weather conditions. However, fishermen only rely on fishing experience. The port has obliged to use safety equipment, but ship owners do not provide life jackets for security, but the crews do not care about that.

## 4. CONCLUSIONS AND SUGGESTIONS

### Conclusions

The conclusions that can be drawn from this study are:

1. Activities on a vertical longline vessels are divided into several activities, namely preparation, fishing operations (setting, immersing and hauling), after arrest and rest. Preparation activities consist of: preparation for fishing ground and preparation of tools. The capture operation starts from setting, immersing and hauling. Post-operation activities are carried out by handling fish by killing fish and cleaning them so they can be stored immediately.

2. In terms of ergonomics, the level of comfort of work on a fishing vessel has not fulfilled comfort according to ergonomic rules even though the crew said they were comfortable and familiar with the condition. From the point of view of ergonomics, the design of equipment and tools on a vertical longline vessels has not been ergonomic. The design of equipment and tools that are not yet in accordance with the rules of ergonomics are as follows:
   a. The steering seat has no backrest and is too far from the steering wheel and gas lever;
   b. GPS position should be permanent;
   c. Crew rest rooms and coaches are not feasible;
   d. Noise in the engine room area due to the sound of the ship's engine
   e. Smoke from the exhaust of the ship regarding the driver;
   f. Equipment for fishing gear operation is still a manual method;
   g. The working position of fishermen is still very high risk of accidents and muscle complaints
3. Based on the results of the study, the factors that can directly influence to reduce the risk of workplace accidents in the sea are the fishermen's lifestyle with a value of 0.244, this can be in the form of staying up late when not working, not drinking on the boat while working to increase the level of focus on fishermen and not smoking for the health of the fishermen themselves so as to reduce the risk of workplace accidents, then ergonomics factors with a value of 0.347 effects such as good working hours, work facilities that are in accordance with standards and good working positions to reduce the risk of workplace accidents and factor of work productivity with an effect value of 0.451 because working productively can reduce the risk of workplace accidents on board.
4. Based on the results of the study, the four variables used as research instruments, these variables are interrelated and have a direct and indirect influence to reduce the risk of workplace accidents in the sea and positively influence the CR value of the four variables above from the specified CR requirement, ≥ 2 , 00. Whereas the P value of 0,000 has a value in accordance with the conditions of P, which is equal to P 5 0.05.

**Suggestions**

Suggestions that can be given in this study are:

*1. Scientific Suggestions/ Recommendations*

For future research, it is expected to be able to develop new models for ergonomics for fisheries as well as the need to develop knowledge about ergonomics to reduce the risk of fisherman work accidents.

*2. Practical Aplication Suggestions/ Recommendations*

Shipowners are expected to pay attention to the health condition of the crew as well as the condition of the vessel's feasibility, the completeness of equipment, tools and security equipment. This is intended to ensure that the comfort, safety and productivity of vertical longline vessel operations remain optimal. It is necessary to conduct socialization to the vertical longline crew members through education and training on ergonomics so that activities on board can be carried out comfortably and safely. Furthermore, it is expected that an evaluation of ship ergonomics and its effect on the activity and comfort of the crew will be evaluated.

*3. Policy Implication Suggestions/ Recommendations*

The results of research conducted on vertical longline fishermen, it is known that fishermen still do not have a healthy lifestyle and work not in accordance with ergonomic factors because they are used to which it should not be good for their health thus it needs training and counseling on the importance of ergonomic aspects against the risk of workplace accidents at sea.

**REFERENCE**

[1] Bambang, Azis Nur.2013. Metoda Penelitian dan Teknik Pengambilan Sampel. Dinas Kelautan dan Perikanan. Semarang

[2] Chauvin, Christine. dan Gilbert Le Bouar .2007. "*Occupational Injury in the French Sea Fishing Industry: A Comparative Study Between the 1980s and Today*." *Accid Anal Prev* 39(1): 79-85.

[3] Ferdinand, Augusty Tae .2014. Metode Penelitian Manajemen Pedoman Penelitian Untuk Penulisan Skripsi Tesis Dan Disertasi Ilmu Manajemen. Semarang, Indonesia, Badan Penerbit Universitas Diponegoro.

[4] Hashim, Yusof bin. dan Zahari bin Taha .2015. "*Partial Least Square Method for Modelling Ergonomic Risks Factors on Express Bus Accidents in the East Coast of Peninsular West Malaysia.*"

[5] Lestari, Ni Luh Putu Susi Mardi., Ns. I Made Sukarja, S.Kep, M.Kep dan Ns. Wayan Suari, S.Kep. 2014. Pengaruh *Stretching* terhadap Keluhan Muskuloskeletal pada Perawat di Ruang Ratna dan *Medical Surgical* RSUP Sanglah. [skripsi]. Program Studi Ilmu Keperawatan. Fakultas Kedokteran Universitas Udayana. Bali

[6] Mayasari, Peppy, Djoko Kustono, dan Mazarina Devi.2016. "Faktor-Faktor Ergonomi Yang Berhubungan dengan Produktivitas Kerja di Sentra Industri." Pendidikan 1: 52-62.

[7] Notoatmodjo, S. 2010. Metodologi Penelitian Kesehatan. Jakarta : Rineka Cipta

[8] Park, Byung Chan, Hae-Kwan Cheong, Eun A-Kim, dan Soo Geun Kim. (2010). "*Risk Factors of Work-related Upper Extremity Musculoskeletal Disorders in Male Shipyard Workers: Structural Equation Model Analysis*." Saf Health Work 1(2): 124-133.

[9] Purwangka, Fis,Sugeng Hari Wisudo, Budhi H. Iskandar, dan John Haluan .2013. "Identifikasi Potensi Bahaya Dan Teknologi Keselamatan Kerja Pada Operasi Perikanan Payang di Palabuhanratu, Jawa Barat." Kelautan Nasional 2.

[10] Sholihah, Qomariyatus, Aprizal Satria Hanafi,Ahmad Alim Bachri dan Rahmi Fauzia.2016. "*Ergonomics Awareness as Efforts to Increase Knowledge and Prevention of Musculoskeletal Disorders on Fishermen." Aquatic Procedia* 7: 187-194.

[11] Sugiyono. 2009. Memahami Penelitian Kualitatif. Alfabeta.Bandung

# Perception and Participation about Work Safety in Fisheries of Vertical Longline Ship Fishing at PPN Prigi Trenggalek Regency, East Jawa

ORIGINALITY REPORT

| 0% | 0% | 0% | 0% |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |

PRIMARY SOURCES

| | | | |
|---|---|---|---|
| Exclude quotes | On | Exclude matches | < 3% |
| Exclude bibliography | Off | | |