



Inventing Damage Fishing Results on Pole and Line Ship



Rolandsius Sareng^a
Dedi H. Sutisna^b
Deni A. Soeboer^c

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Abstract

In this study there are three objectives studied namely; characteristics of the vessels used, ways of catching and handling of fish on board, as well as knowing the opinions of ABK by using an instrument in the form of a questionnaire and tested using a Likert scale. Based on the results of the study note that the characteristics of the ship used are the ships used are traditional designs or following the design of the [WWF-Indonesia TEAM \(2015\)](#) where the location of the *pila* (angler) is on the bow of the ship. The method of catching is carried out namely, boy or bait thrower attracts fish's attention by using live bait and spray water to fool the fish's view. Fish that have been obtained are directly raised to the ship by throwing at different heights. The results of calculations using the Likert scale note that the percentage of opinions of the respondents who filled out the questionnaire was 48%. The percentage is at the normal point where the way of arrest can be dangerous or can be safe.

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Corresponding author:

Sareng, R.

Jakarta Institution of Fisheries, and Institute Pertanian Bogor, Indonesia

Email address: rolandeno2015@gmail.com

^a Jakarta Institution of Fisheries, and Institute Pertanian Bogor, Indonesia

^b Jakarta Institution of Fisheries, and Institute Pertanian Bogor, Indonesia

^c Jakarta Institution of Fisheries, and Institute Pertanian Bogor, Indonesia

1 Introduction

Besides easy skipjack tuna can also produce poison *skombrotoxin* or also called histamine poison that arises due to handling post-capture that is not good (Suara *et al.*, 2014; Kugler & Sariego, 2016). Export markets want high-quality assurance and food safety, not infrequently the case of rejection of Indonesian tuna fish products from the export market, especially the European Union and United States markets are quite high (Nurani *et al.*, 2016). The government's concern for quality assurance on fishery products is already quite high, namely the Decree of the Minister of Maritime Affairs and Fisheries No. 52A/Kepmen-KP/2013 concerning the Requirements of Quality Assurance and Safety of Fishery Products (Rossarie *et al.*, 2019; Hernandez & Kempton, 2003).

Research on the influence of handlers on pole and line ships has often been discussed. However, the issue of how fishermen treat fish caught in very fishing is very rarely to be discussed, even though it greatly affects the quality and quality of fish if considering fishing is the beginning of a series of processes related to fish conditions to determine the price of fish in the market can be seen in Table 1.

Table 1
Fish classes and fish prices

No	Fish Classes	Fish Prices (Rp)	
1	A	35.000	38.000
2	B	30.000	32.000
3	C	22.000	27.000
4	Local	12.000	13.000
5	Damage	8.000	10,000

The process of fish damage occurs starting from the process of catching and is very closely related to the treatment of fishermen on the ship, which will determine the quality of the catch, but research related to the treatment of fish when catching is still not a concern. Besides the shape and characteristics of the ship is also an important factor that plays a role in the quality of the catch such as the model of the ship, the type of deck material, and fishing gear. To improve the quality of the catches of Indonesian fishermen to be able to compete in world fisheries, research needs to be done to look at the characteristics of the ship, how to catch fishermen, and the relationship between how to catch and the condition of the catch.

2 Materials and Methods

The study was conducted from November to December 2020. Research on the relationship between how to catch fish on Pole and Line fishing vessels in the KCBS company and the level of damage to the catches obtained. Data collected includes the characteristics of the ship used, how to handle fish, and how to handle fish on board and qualitative data in the form of a questionnaire.

Data collection will be done using direct observation methods in the field, as well as conducting interviews with resource persons related to the research topic. The method of catching that was studied was how to get fish, and how to treat fish when boarding the fish on board. The method of handling that has been studied is how to treat ABK on post-capture fish, how to store fish in the hold, and the facilities used by ABK. To find out the level of damage to fish, *organolaptic* test SNI 2729: 2013 was used which only focused on the condition of the fish based on sight. Physical observations were carried out using random sampling using the requirements to distinguish between types of fish with good conditions and damaged fish conditions so that the *organolaptic* value is only 2. Based on the data in the KCBS company 60 fishermen work as Huhate Fishermen. The Huhate KCBS fishermen who were interviewed were 26 people who were the results of calculations using the Slovin formula (Sangadji & Sopiah., 2010; Chen & Liu, 2013).

$$n = \frac{N}{1 + Ne^2}$$

Information:

n: Number of Samples

N: Total Population

e: Error

To get the error limit in this study is 15%. 15% error limit is sufficient to represent if the sample conditions are relatively homogeneous (Arafat *et al.*, 2015; Falk & Ryan, 2007). The following is a calculation using the *slovin* formula:

$$n = \frac{60}{1 + 60 \cdot 0,15^2}$$

$$n = 25,5319$$

Test equipment made based on KEPMEN KP NO 52A in Table 2.

Table 2
Questionnaire to be distributed

NO	Questions	SCORE				
		5	4	3	2	1
1	Is the surface of the ship in direct contact with the fish made of waterproof material, does not damage the physical condition of the fish, is not corrosive.					
2	Are the fish handled carefully when catching?					
3	Is the fish immediately turned off after the fish is caught?					
4	Does the method of catching do not physically damage the fish?					
5	Are the tools and methods related to the fish quality assurance requirements?					
6	Are there efforts to prevent physical hazards in fishery products?					
7	Using hazardous materials that can cause contamination?					
8	Is the cleanliness of the <i>ship gladak</i> always noticed?					
	Score					
	Total score					
	\sum Observation score					
	Percentage of eligibility%					

Data analysis

To find out the relationship between fish damage and fishing methods, a psychometric test using the Likert summated rating method was performed. The Likert scale is one of the most commonly used attitude measurement techniques with attitude assessment strongly agree, agree, disagree, disagree, and strongly disagree (Noor, 2007).

3 Results and Discussions

Potential Damage to Fish While on the Ship

Based on direct observations on the KCBS pole and line ship, several activities were recorded that could be the cause of the decline in the quality of the caught fish. These activities are how to catch fish or when fishing, fish handling activities on the ship, and fish unloading activities at the port. Large pelagic fish are fish that decompose quickly if not handled properly, other than that large pelagic fish contain high histidine levels in their flesh which tend to undergo decarboxylation to histamine which is poisonous if not handled carefully (Sahubawa, 2016; Poulsen *et al.*, 2007).

Based on direct observations during the research, it is known that the sequence of activities that occur in fishing activities on pole and line vessels can be seen in Figure 1.



Figure 1. The sequence of activities from arrest to consumers

From observations during the study it was found that each plot of the image above, all have the potential to reduce the quality of fish. Potential problems that are often found during research based on the flow in the picture are the following explanations:

How to catch fish

During research on the KCBS 15 Poe and line vessels, it is known that before the fish are caught, fishermen must first draw the attention of the fish content gathered toward the ship with live bait and spray water. After that, the fish are fishing using a fishing rod and hook. Fish that get directly lifted employing being thrown into the air and then thrown on the *ship gladak*. Based on the results of the study, it is known how to catch causing several fish catches pole and line physical damage such as a broken head, broken stomach, and other physical damage. The damaged fish is separated directly from the fish whose physical condition is still intact. In addition to fishing methods that can physically damage the fish, there is also a support facility that is not realized, namely the flying deck or where the fish fell.

In KCBS construction, it does not use a damping device or cushion on the flying deck where the fish fall. However, it only uses ironwood which is part of the ship's joy. During the research, it was found that ironwood is a fairly hard material. Gladak is a part of the hull that is directly related to the process of fish slamming. Galadak pole and line ships have a flying deck which is a place made specifically to make it easier for fishermen to get the best position in fishing operations. In Japan, on a fishing boat with a *huhate fishing* line a net is spread to help hold the fish caught, the net is tilted slightly, so that the fish caught will slam into the net and slowly glide onto the deck, thus, the fish do not experience bruising (Pudjirahaju, 2017). Physical observation of fish is carried out to find out the number of fish damaged during each catch. The physical observations are in Table 3.

Table 3
Physical Observation Results of Fish

Trip	Number of fishing	Number of damages	Percentage of damages
First	153	39	25
Second	161	46	28,5
Third	166	43	25,9

Handling of fish on the ship

After the fish are caught, the fish are piled on a central deck on the boat for some time before the fish are put into the storage hatch. Fish that are still on the boat *gladak* are piled up and have the potential to be stepped on by moving fishermen. From the results of the study it was seen that the fish obtained did not die immediately so the fish was still moving its body. How to die fish determines the quality of fish, fish that are still moving their bodies after being caught will cause a decrease in the quality of fish (Tim Anova, n.d.). Fish handling facilities on the boat are also considered minimal because there is no individual equipment such as gloves, boots, helmets, and poppies. The storage of fish in the hold of the ship is stacked, with a maximum content of up to 2 tons. There are no cooling machines used on ships so only rely on the ice cubes that have been provided with the estimated amount.

Likert Scale Test Results

To find out the opinions of KCBS fishermen on how to catch on pole and line vessels, 26 respondents were assigned to them and then questionnaires were given. The questionnaire contains the respondents' opinions regarding how the arrest was carried out. The making of the Questionnaire will be based on the Regulation of the Minister of Maritime

Table 4
Questionnaire Scores of Respondents

NO	Questions	SCORE				
		5	4	3	2	1
1	Is the surface of the ship in direct contact with the fish made of waterproof material, does not damage the physical condition of the fish, is not corrosive.					
2	Are the fish handled carefully when catching?					
3	Is the fish immediately turned off after the fish is caught?					
4	Does the method of catching do not physically damage the fish?					
5	Are the tools and methods related to the fish quality assurance requirements?					
6	Are there efforts to prevent physical hazards in fishery products?					
7	Using hazardous materials that can cause contamination?					
8	Is the cleanliness of the ship <i>gladak</i> always noticed?					
	Score					
	Total score					
	\sum Observation score					
	Percentage of eligibility%					

4 Conclusion

From observations, it is known that the characteristics of the vessels used at PT KCBS are almost the same as the condition of pole and line vessels in other areas. Gladak which is the place where fish fall is also made of ironwood without a damper that slows the fall of the fish. The catching that was carried out on the KCBS boat was fishing with the help of bamboo, tied by a string which at the end had been hooked. Fish caught directly raised to the ship or flying deck by slamming or being thrown into the air and bumped on the boat *gladak* made of ironwood. Of the three trips carried out, after physical observation of fish, 128 fish were physically damaged from the 480 samples used. Based on the results of the validity test and reliability test results are obtained that the instrument used is valid with a standard probability of > 0.5 . Reliability test results on the instrument note that the measuring instrument used meets the criteria for using the instrument repeatedly. Based on the ranking sequence it is known that from the questionnaire data regarding the method of catching and handling fish on board, there are various kinds of assessments based on personal opinions. In the table above, there is one column that dominates, namely in the Less Agree column. The third option or the choice of disagreeing is the same as the neutral choice which is a safe point for respondents regarding questions (Eddy & Evi, 1989). Of the number of elections it allows businesses to go down or even increase, therefore there is a need for in-depth research on the problem.

Conflict of interest statement

The authors declared that they have no competing interests.

Statement of authorship

The authors have a responsibility for the conception and design of the study. The authors have approved the final article.

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