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THE HANDLING AND STORAGE OF FISH CATCH ON PURSE SEINE VESSELS BASED AT OCEANIC FISHING PORT, KENDARI

Penanganan dan Penyimpanan Hasil Tangkapan Ikan di Kapal Pukat Cincin yang Berbasis di Pelabuhan Perikanan Samudera (PPS), Kendari

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ABSTRACT

The handling of fish catches in fishing activities is a very important initial handling and determines the quality of further fish. The handling fish on board while adhering to the guidelines for appropriate handling is very important and absolutely applied during and before fishing. This information indicates the importance of carrying out this research which aims to provide an overview of the techniques of handling and storing fish catches by paying attention to the principles of appropriate handling on board. This study was carried out from November 2023 - January 2024. The research used an incidental method, by selecting a fishing vessel with purse seine gear, namely KMN. Nurhikmah 02. Data collection used a purposive sampling method, the parameters studied included the feasibility of facilities and infrastructure for handling and storing fish catches on board. Next, the application of the process of handling and storing fish catches on board in accordance with the principles of handling. The data obtained are primary data from direct observation on the ship and secondary data through the interview process on the ship. The outcomes demonstrated that the types of fish caught on the ship included small and large pelagic fish groups with a total weight of fish catches reaching 13.65 tons of fish. The facilities and infrastructure used in handling are generally in decent condition, although rusty tools are still found. The application of the process of handling and storing fish catches on board has applied the principle of "3C & 1Q", as well as storage techniques with the bulking method as an application of the cold chain system in handling fish on board.

Key words: Bulking Method, Fish Quality, Fish Handling Principles

ABSTRAK

Penanganan hasil tangkapan ikan pada kegiatan penangkapan ikan menjadi bagian penanganan paling awal yang sangat penting, serta menjadi penentu mutu ikan berikutnya. Proses penanganan ikan diatas kapal yang sesuai dengan prinsip penanganan yang tepat sangat penting dan harus diaplikasikan pada saat maupun sebelum aktivitas penangkapan. Informasi tersebut mengindikasikan pentingnya melaksanakan penelitian ini yang bertujuan untuk memberikan gambaran terkait teknik penanganan dan penyimpanan ikan hasil tangkapan dengan memperhatikan prinsip penanganan yang sesuai di atas kapal. Penelitian ini dilakukan pada November 2023 - Januari 2024. Penelitian menggunakan metode insidental, dengan memilih kapal penangkap ikan dengan alat tangkap pukat cincin yaitu KMN. Nurhikmah 02.

Pengumpulan data menggunakan metode purposive sampling, parameter yang dikaji meliputi kelayakan sarana dan prasarana penanganan dan penyimpanan ikan hasil tangkapan di kapal. Berikutnya penerapan proses penanganan dan penyimpanan yang sesuai dengan prinsip penanganan ikan di kapal. Data yang diperoleh berupa data primer sebagai hasil observasi langsung di kapal dan data sekunder melalui proses wawancara di kapal. Hasil penelitian menunjukkan bahwa jenis hasil tangkapan ikan pada kapal termasuk kedalam kelompok ikan pelagis kecil maupun besar dengan bobot total hasil tangkapan ikan yaitu mencapai 13,65 ton ikan. Sarana dan prasarana yang digunakan dalam penanganan secara umum berada dalam kondisi layak, meskipun tetap ditemukan alat yang sudah berkarat. Penerapan proses penanganan dan penyimpanan ikan hasil tangkapan di atas kapal telah menerapkan prinsip "3C & 1Q", serta teknik penyimpanan dengan metode bulking sebagai penerapan sistem rantai dingin (cold chain) untuk penanganan ikan di atas kapal.

Kata Kunci: Metode Bulking, Mutu Ikan, Prinsip Penanganan Ikan

INTRODUCTION

Fishery products are one of the products that spoil relatively quickly (Anwar, n.d.; Ernaningsih *et al.*, 2023). The process of quality deterioration will immediately take place during the process of removing the fish from the water and it dies. Therefore, handling during fishing activities is part of the initial handling which is the key to the success of subsequent fish quality. This means that the capture fisheries sector is the most upstream sector and holds the key to the success of fisheries quality security through proper handling at the start. If the initial handling, in this case the handling activities on board the vessel by the capture fisheries sector, is not successful in maintaining the freshness of the fish, it will result in the fish becoming less valuable because it is difficult to improve the freshness of the fish in the next process.

The quality and quality (freshness) of the fish caught is one of the determining points in its selling value or market value later. Fish caught with better quality and quality results in a higher selling value. Likewise, the quality of fish that is not good due to errors in initial handling can certainly be correlated with a decrease in the selling value of the fish later. Handling is an important part of the fishing industry chain, because of its role in influencing the freshness quality of fish. Apart from that, it is good or bad to handle fish as food and raw material for further processing (Afrianto & Liviawaty, 1989). The aim of handling is to try to maintain the freshness of the catch as long as possible, at least to ensure the freshness of the fish reaches consumers. (Purwaningsih, 1995), explained that handling is one of the most effective ways to prevent the process of quality degradation by autolysis and bacteriology at a fairly cold temperature.

This indicates that knowledge related to the decline in the quality of fish caught for the capture fisheries sector as the most upstream sector is important and must be taken into account. Finally process handling fish on boat very important And should be done on during or before fishing activities. Handling on a ship starts from handling during fishing activities, the fish are lifted onto the ship's deck. According to Metusalach *et al.*, (2014), facilities and methods handling can affect the quality of the resulting fish catch.

Process handling fish results catch in on ships in principle have a purpose to maintain the quality or grade of fish so that the quality can be maintained until it is marketed (Tani *et al.*, 2020). Several previous studies related to the handling of fish catches on board have not linked it to the principles of proper and appropriate handling (Larasati *et al.*, 2024; Sari & Nawafil, 2023). This indicates the importance of studying how to implement the fish handling process on board the ship by paying attention to existing handling principles. This information is important to provide an overview of techniques for handling and storing fish catches by paying attention to appropriate handling principles on board ships.

METHODS

The research was carried out in November 2023 - January 2024. The research used the incidental method. This method is used by selecting a fishing vessel with purse seine fishing gear, namely KMN. Nurhikmah 02. This ship is based at the Kendari Ocean Fisheries Port (PPS), Abeli District, Kendari City, Southeast Sulawesi (Figure 1)



Figure 1. Location of *fishing ground* from KMN. Nurhikmah 02

Tools and materials

The tools and materials used include stationery, cameras for documentation purposes, questionnaires, ship captains, and ship crew members (ABK). The procedure carried out was to take part in a ship trip for 3 months to collect data regarding handling and storage techniques for fish caught on the purse seine vessel, namely KMN. Nurhikmah 02. Next, observe and document the implementation of the process for handling and storing caught fish.

Data collection

purposive sampling method was used in this research, namely by selecting KMN ships. Nurhikmah 02 as a research object. The parameters studied include the feasibility of facilities and infrastructure for handling and storing fish caught on ships. Next, it is related to the implementation of the process for handling and storing caught fish on the purse seine vessel. Research data was obtained in the form of primary data and secondary data. Primary data is the result of direct observation on the ship and secondary data through an interview process on the ship using the crew as respondents.

Data analysis

Data from observations of fish catch handling activities on ships were analyzed descriptively. The results are presented in the form of a flow diagram so that it can provide a complete picture of the process of handling the fish caught on the purse seine vessel.

RESULTS

Types and weights of fish caught on KMN purse seine vessels. Nurhikmah 02 can be seen in Table 1 and Figure 2.

Category	Local Name	Indonesian name	Latin name
Main	Pani pani	Yellowfin tuna	Thunnus albacares
	Jurai	Skipjack tuna	Katsuwonus pelamis
	Deho	Cob	Auxis thazard
	Bachelor	Kite	Decapterus sp.
Side	Lammada	Lemmadang	Coryphaena hippurus
	Pogot	Pogot	Melichthys Niger
	Squid	Squid	Loligo sp.
	Bloating	Selar Large splotch	Selar crumenophthalmus
	р 1	C 1'	

Table 1. Types o	of fish caught or	n KMN purse	e seine vessels	s. Nurhikmah 02
21	0			

The research results show that there are several types of fish as main and side catches. These catches fall into the groups of small and large pelagic fish. In general, the catch is also fish with a high selling value.



Figure 2. Weight of fish caught at KMN. Nurhikmah 02

Observation results show that there were 5 trips during the research. Trip 5 produced the highest total weight of fish caught. During these 5 trips, the total fish caught reached 13.65 tons. During the research, it was obtained that on trip 3 the lowest weight of fish caught was 150 kg, even 0 on trip 2.

Facilities and infrastructure used in the process of handling and storing fish catches on ships KMN. Nurhikmah 02 (Figure 3).

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Figure 3. (a) Ice grinding machine; (b) Ganco; (c) Shovel; (d) Basketball basket; (e) Gloves; (f) *Boots*; (g) Ice

Handling process flow diagram and storage of fish catches at KMN. Nurhikmah 02 and documentation of its activities can be seen in Figures 4 and 5.

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Figure 4. Flow diagram of the handling process and storage of fish catches



Figure 5. (a) Ice preparation; (b) Fish removal; (c) Applying ice; (d) Fish storage

DISCUSSION

The results of the research show that the types of fish caught on KMN vessels. Nurhikmah 02 during the trip was included in the group of small and large pelagic fish (Table 1). The total weight of fish caught during the five trips reached 13.65 tons of fish (Figure 2). The catch is in accordance with the capacity of the ship, namely the KMN ship. Nurhikmah 02 is a purse seine vessel measuring 30 gross tons (GT). This ship has 4 holds with a total hold capacity of 22 tons. The fishing gear used in carrying out fishing operations is a *purse seine net*. This ship has 20 crew members consisting of the captain, head of the engine room (KKM), and chef. The screen time for carrying out capture operations is a maximum of 7-10 days. This ship is based at the Kendari Ocean Fisheries Port (PPS) and carries out fishing operations in the Banda Sea.

Fish handling on board must be done properly and correctly. This ensures that the freshness of the fish is maintained. Considering the long duration of sailing on a ship, fish handling on the ship must be good and appropriate so that the quality of the fish can be maintained until it is landed later. The success of handling fish on board can of course be caused by several factors such as handling equipment, availability of cooling media, handling techniques and work skills. Handling equipment used for handling and storing fish catches at KMN. Nurhikmah 02 is generally suitable according to the criteria of (Badan Standarisasi Nasional, 2006). The ice grinding machine on the ship helps to crush the ice to be used during storage using cooling techniques. The condition of the ice grinding machine is still suitable according to BSN 2006, namely that the machine has a smooth surface and does not peel (Figure 3a).

Next, the *ganco* is used to make it easier for fishermen to pull chunks of ice that have just been removed from the hold, to then be put into the grinding machine. ice. Condition *ganco* in boat not included in the criteria worthy . BSN in 2006 stated that requirements for facilities and infrastructure used in handling fish, namely No rusty, not cracked, and does not peel (Figure 3b). This is different from the shovel which also functions to make it easier to transport ice that has been crushed by the ice grinder and then put into the hold. The condition of the shovel on the ship is still good because it is not rusty (Figure 3c).

Basketball baskets are used by fishermen to make it easier to lift fish during the *hauling process* which are modified with additional rubber tires. This is so that the handle of the basket more long for makes it easier process appointment fish. The condition of this basketball basket is considered to be still suitable according to requirements such as not rusting and being easy to clean. According to Astawan (2019), a fish container can be a hatch, *cool box*, or any container for holding fish. Fish containers for handling can be in the form of barrels or baskets with a box-like shape. The container material can be made of plastic, aluminum, wood, bamboo, *fiberglass*, or a combination of several materials. Apart from that, it should be noted that the container should be easy to store, fold, arrange or stack, and should not be too large in size. The bottom or bottom of the container needs to have a water outlet hole. This is so that the melt water does not stagnate in the container. Likewise, the surface of the container is smooth, rust-resistant and easy to clean. The basketball basket observed on the ship met the criteria as described (Figure 3d).

Gloves and boots *are* absolute personal protective equipment (PPE) and must be used when handling and storing fish catches (Sari & Nawafil, 2023). This is related to the safety of fishermen's work. It is very important for fishermen to use PPE in handling fish catches, including to protect, maximize and reduce cold when lifting chunks. ice. Condition: The gloves and boots *on* the ship are suitable for use (Figures 3e and 3f).

It is important to assess the condition of the handling equipment used in handling and storing fish catches first before the handling process or technique itself, because it is related to the quality of the fish. Metusalach *et al.*, (2014), explained that there are several factors that

cause a decrease in the quality or damage of fish after the fish is caught, namely inadequate facilities and fish handling processes that do not comply with procedures. The quality of a product can be maintained consistently good so that it can increase consumer confidence (Oladosu-Ajayi *et al.*, 2011).

Implementation of the process for handling and storing fish catches at KMN. Nurhikmah 02 began with ice preparation by the ship's crew. Ice is removed from the hold using tools such as *ganco* and crew members use gloves and boots *as* PPE. Next, the fish lifting stage is carried out by the ship's crew by entering the net with a basket to hold the fish and then lifting it onto the deck. Then in turn the fish are put into the hold.

The fish cooling technique stage uses ice blocks that have been crushed using an ice grinder. Ice is then put into the hold evenly between the piles of fish caught. The most effective cooling technique used in handling is the application of ice. Moeljanto, (1992)explained that one of the main properties of ice in handling is that it absorbs fish body heat and inhibits the development of spoilage bacteria which causes a decrease in fish quality.

Next is the storage stage. The results of observations on the ship show that the storage techniques used on KMN. Nurhikmah 02 is a bulking method. The fish catch is mixed with ice and then put into the hold. Ilyas (1983),also explained that the preparation of fish and ice uses the bulking method, namely ice cubes are spread at the bottom of the fish storage hatch, then the fish is mixed into the hatch. The top layer is covered with crushed ice, then the hatch is closed to prevent contact with the surrounding air. During the storage phase of fish on the ship, it is necessary to pay attention to the condition of the ice in the hold. If the ice melts, you need to add enough ice to maintain the quality of the fish. There are two techniques for storing fish catches used on ships, namely the bulking and boxing methods. This adapts to the yield of fish caught, if the catch is abundant then use the bulking method, otherwise if the catch is low or small the boxing method is chosen.

Several things were found during the research, namely that the facilities and infrastructure used in handling were generally in decent condition, although tools were still found that were rusty (Figure 3). A rusty container is an unhygienic environment for fish, which can affect the growth of fungus (Palawe *et al.*, 2016). Next is the process of handling and storing the caught fish at KMN. Nurhikmah 02 is still not in accordance with the flow when viewed from the perspective of the stages in accordance with the flow of the process of handling small-sized fresh fish on fishing vessels in SNI 8087:2021 (BSN, 2021).

The handling flow on the ship has not yet carried out the stages of killing fish, sorting and washing fish in accordance with the process flow for handling small size fresh fish on fishing vessels in SNI 8087:2021 (Figures 4 and 5). However, the findings in the field are in KMN. Nurhikmah 02 was not sorted after being on board the ship, in order to maintain the *quick principle*, namely being quick in the handling process. This is known as a form of anticipation in maintaining the quality of the fish so that it is not exposed to direct sunlight due to the *hauling process* during the day. The fish obtained will be immediately put into the hold without prior sorting. This sorting process will still be carried out when the fish have arrived on land. Sorting is done to group fish based on type, size and quality of fish (Sari & Nawafil, 2023; Silalahi *et al.*, 2018; Simarmata, 2012; Wati, 2023). Sorting is carried out with the aim of making it easier to handle and market.

Likewise, the fish washing stage cannot be carried out on the ship, but is carried out after the fish reaches land, namely when unloading the fish. According to (Junianto, 2003), explains that the washing process functions to clean remaining blood and bacteria from the skin. The process of washing fish after the *hauling process* on the KMN ship. Nurhikmah 02 was not carried out, because the washing process was carried out during dismantling at the Fish Auction Place (TPI). *The* most important principles to pay attention to when handling and storing fish catches are called "3C and 1Q" which means clean, careful, cold chain and quick. (Febrianik *et al.*, 2017; Handoko & Yuniarti, 2023; Nurani *et al.*, 2023; Pandit *et al.*, 2021)This principle has generally been well implemented in handling fish on ships. The *quick* factor is the main concern of fish handling activities by crew members on ships by cutting out handling stages such as sorting fish during activities. Likewise with the application of other principles such as storage techniques using the bulking method to implement a cold chain system *in* handling. The principle of caution and cleanliness is of course still applied during fish handling activities on the ship.

CONCLUSION

Implementation of the process for handling and storing caught fish on board KMN vessels. Nurhikmah 02 has implemented the "3C & 1Q" principle, as well as storage techniques using the *bulking method* as an application of the cold chain system *in* handling fish on board. The handling equipment used for handling fish on board ships is generally in decent condition, although rusty equipment is still found.

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