Fisheries Journal, 14(2), 856- 863 (2024)
http://doi.org/10.29303/jp.v14i2.824

OPERATION TECHNIQUE AND OPERATIONAL TIME CALCULATION OF PURSE SEINE IN FISH CAPTURE : A CASE STUDY ON KM. MUTIARA SEJATI

Teknik Pengoperasian dan Perhitungan Waktu Operasional Pukat Cincin Dalam Penangkapan Ikan: Studi Kasus di KM. Mutiara Sejati

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(Received April 24th 2024; Accepted June 20th2024)

ABSTRACT

A purse seine is an active fishing gear operated by encircling schools of fish. KM. Mutiara Sejati is one of the fishing vessels based in PPP Bajomulyo, Central Java, employing purse seine for small pelagic fisheries. That research aimed to explore the operational techniques of purse seine fishing gear and determine the time calculation for its operation. The study was conducted over five months, from October 2022 to March 2023, utilizing observation, interviews, and documentation as research methods. The operational area of the vessel was in the WPP 712 (Java Sea) with PPP Bajomulyo serving as the fishing base. Based on the research findings, the operational process of small pelagic purse seine began with a series of steps, including the deployment of fish aggregating devices, activation of vessel lights, deactivation of lights except for those at the stern, lowering of the boom lights, total shutdown of vessel lights, setting of the net, purse line retrieval, retrieval of the boom lights, net hauling process, catch retrieval, and ultimately, the re-arrangement of fishing gear. Calculation results indicated that the average operational time for the fishing gear during the nighttime was 87 minutes, while during the early morning hours, it was 83 minutes.

Keywords: Fishing gear, purse seine, operation time, operational techniques, small pelagic

ABSTRAK

Pukat cincin merupakan sebuah alat tangkap jaring aktif yang dioperasikan dengan cara mengelilingi gerombolan ikan. KM. Mutiara Sejati adalah salah satu kapal perikanan yang berbasis di PPP Bajomulyo, Jawa Tengah dan mengoperasikan alat tangkap pukat cincin pelagis kecil. Penelitian ini bertujuan untuk mengeksplorasi teknik pengoperasian alat tangkap pukat cincin serta menentukan perhitungan waktu pengoperasian alat tersebut. Penelitian dilakukan selama lima bulan, mulai dari bulan Oktober 2022 hingga Maret 2023, dengan

menggunakan metode observasi, wawancara, dan dokumentasi. Daerah pengoperasian kapal ini terletak di WPP 712 (Laut Jawa) dengan PPP Bajomulyo sebagai basis penangkapan ikan. Berdasarkan hasil penelitian, proses operasional pukat cincin pelagis kecil diawali dengan serangkaian langkah, termasuk penurunan rumpon, aktivasi lampu kapal, penonaktifan lampu kecuali yang berada di buritan, penurunan lampu bangkrak, mematikan lampu kapal secara total, penurunan jaring, proses penarikan tali kerut, pengangkatan lampu bangkrak, proses penarikan jaring, pengangkatan hasil tangkapan, dan akhirnya penataan kembali alat tangkap. Selanjutnya, hasil perhitungan menunjukkan rata-rata waktu pengoperasian alat tangkap pada studi ini selama malam hari adalah 87 menit sedangkan pada dini hari adalah 83 menit.

Kata Kunci: Alat tangkap, pukat cincin pelagis kecil, rata-rata waktu pengoperasian, teknik pengoperasian

INTRODUCTION

Trawl ring pelagic small is one type of Fishing Equipment made from net and operated in a manner surround school of fish. Once the fish is trapped, line it drawstring pulled to shape pockets to prevent fish from getting out all over the place direction (Putra *et al*., 2023). According to Minister of Maritime Affairs and Fisheries Regulation Number 18 of 2021, trawling ring is an active fishing tool. According to Siahaan *et al*. (2021), trawl ring considered active because method its work is to block, limit and narrow the space for fish to move, so that the fish cannot escape self and ultimately caught. This fishing gear is also classified as safe for fishermen (Aisyaroh & Zainuri, 2021). Trawl ring consists from net shaped rectangle long or trapezoidal equipped with rings and ropes kolor, operated by one or two vessels to reduce mesh at the bottom attractively rope kolor (BSN, 2015; Zakaria *et al*., 2017).

The type of fish that is the target for catching is pelagic small as usual gather in hordes. One of a type of fishing gear that is often used to catch pelagic fish small nor big is the trawl ring (Jatmiko *et al*., 2020). According to Bubun & Mahmud (2015), trawl ring can produce dead fish catch or fresh without destroying the habitat. Generally, operation trawl ring done well during the day day nor Evening day. At noon day, trawl the ring is used for chasing schools of fish, while at night day, operation trawl ring carried out with the help of lighting equipment addition to interest schools of fish (Sudirman & Mallawa, 2004).

Principle fishing using fishing gear trawl ring involves the process of circumambulating schools of fish with nets, which form wall vertically to prevent the fish from moving sideways. Operation fishing with trawls ring consists from a number of stage, ie search school of fish or search FAD (searching), decline net (setting), withdrawal rope wrinkle (pursing), withdrawal netting (hauling), and lifting the catch (brailing) (Pramesthy *et al*., 2021; Choerudin *et al*., 2022). Operation trawl involving ring circle schools of fish require consideration specifically regarding length and speed circle (Metekohy, 2021). During fishing activities, several frequent obstacles happens, covers slope the size of the ship (rolling) caused by the load pulling of fishing gear and catch, and needs to be done maneuvering on the track circle with limited time and speed (Metekohy, 2019). Therefore, this research aims to explore technique operation trawl ring carefully, as well do calculation of fishing gear operational time trawl ring at KM. Mutiara Sejati.

RESEARCH METHODS

Research activities are carried out with direct participation in operations fishing during five month period, starting from October 2022 to March 2023, using the Mutiara Sejati Motor Boat (KM). Based on letter permission operation arrest, KM. Mutiara Sejati given access to the area fishing grounds in the waters of the Java Sea which are included in the Management Area Fisheries (WPP) 712 (Regulation of the Minister of Maritime Affairs and Fisheries Number 18 of 2021). In its operations, this ship uses fishing equipment in the form of trawl

ring that has design shaped trapezoid upside down, with size net by 1 inch, long net reaches 370 meters, and depth nets about 70 meters long, which are operated at depth between 70 to 90 meters. Trawl The ring used on this ship is types of fishing gear included in the classification net principle circle it works by circling school of fish.

Collection methods used include observation, interviews and documentation. During participatory activities in operations arrests, notes and documentation related to operational times (both morning nor early days), duration operational (setting and hauling), as well as the catch for each session arrest taken. Time data collected then analyzed in a way statistics to search correlation between operational time and catch results, so as to identify the optimal time for fishing activities.

RESULTS

KM. Mutiara Sejati

Mutiara Sejati Motor Boat (KM) (Figure 1) is one of the ships based at PPP Bajomulyo. This ship was made in Rembang in 2008, built use material main form wood coated with fiberglass to enhance resilience to seawater corrosion and prolong service life. The ship has dimensions 16.5 meters long, 5.84 meters wide and 1.80 meters deep, with weight dirty reaching 29 GT and a crew capacity of 29 people. Machine parent used comes from from NISSAN RF8 brand with a power of 340 HP, while the engine help using FUSO F6D16-536606-190 PK as ship propulsion.

Figure 1. KM. Mutiara Sejati

Catching tool Trawl Ring Small Pelagics

Fishing equipment used on KM. Mutiara Sejati ie trawl cinicn pelagic small with one ship. Design and construction trawl ring on KM. True Pearl shaped trapezoid upside down, this fishing gear has size net (mesh size) 1 inch in length net 370 m, depth 70 m net operated at a depth of 70-90 m. Trawl ring on KM. True Pearl consists from several parts, namely, pockets web, web body, wings net, serampat, rope ris top, rope ris bottom, rope buoy, rope weights and rings. Catching tool trawl ring on KM. True Pearl is a fishing tool that is included in the classification net circle (*Surrounding Net*) which is the principle it works by circling school of fish. Catching tool trawl The ring can be seen in Figure 2.

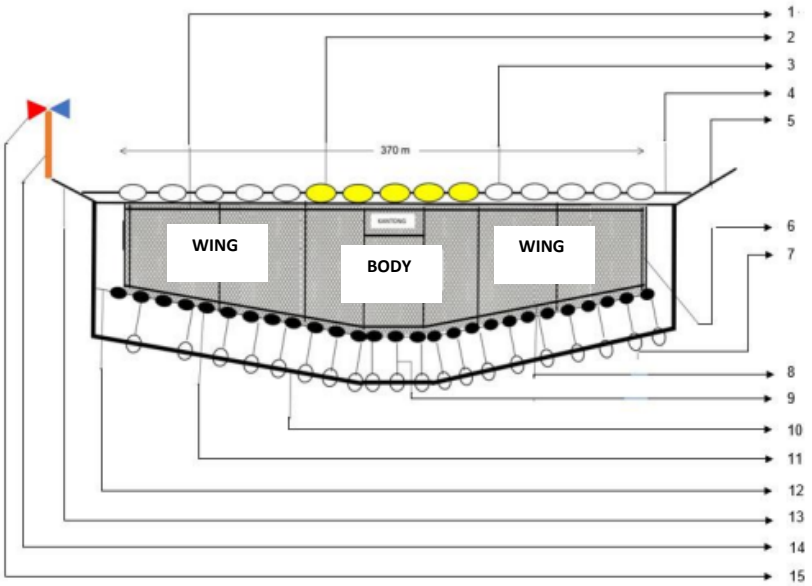

Figure 2. Fishing gear trawl ring

Information :

1. Ris rope on
2. Lifebuoy yellow
3. White buoy
4. buoy rope
5. Strap
6. Jampang rope
7. Ring
8. Ris rope lower
9. Ring strap
10. Ruffle strap
11. Ballast
12. Weight rope
13. buoy rope sign
14. Floating bamboo sign
15. Light sign

Operating Techniques Trawl Ring Small Pelagics

Stages operation of fishing gear trawl ring on KM. True Pearl starting with a series detailed steps. The process begins with a decrease FAD, followed by ignition ship lights and deactivation part light except for those at the stern. Next, do it decline light wreck and complete blackout of the ship's lights before the lowering process net (setting). Stages furthermore covers withdrawal rope wrinkle (pursing), lifting light bankruptcy, withdrawal netting (hauling), lifting the catch (brailing) and rearranging fishing gear (Figure 3).

Decline FAD carried out in the afternoon, around 3 or 4 o'clock at the stern of the ship by the Ship's Crew who serve as stewards. This is done to be interesting attract fish to gather around FADs, places that are considered places of refuge and resources food for fish. Next, the ship's lights are turned on moment it was getting dark by the Head of the Engineering Room (KKM) to withdraw schools of fish to gather around the ship. After that, the captain give directions for brawl or operation arrest, which begins with lethality part ship lights except lights on the stern pointing at the FAD, to focus fish's attention to the area.

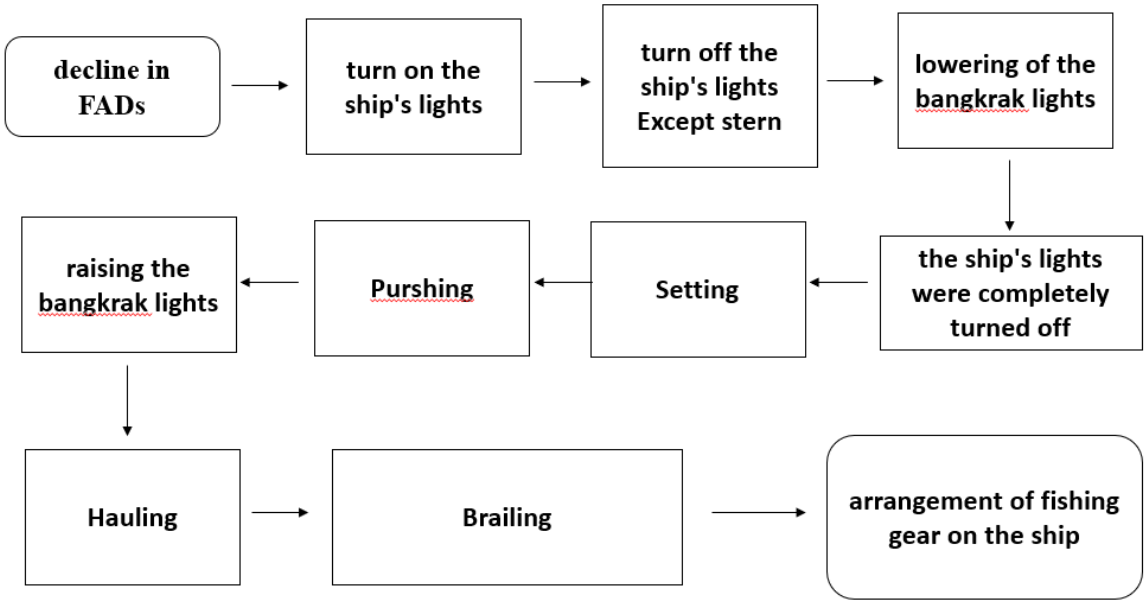

Figure 3. Flow of fishing gear operations

Then, decrease light bang done with help axle after part the ship's lights were turned off . Two crew members carrying The bangkrak descends to the surface of the water which is equipped with a buoy to make it easier float on water. After that, the ship's lights were completely turned off, only the lights permanent bankruptcy lights up, and FADs released from the ship to drift along the direction current. As long as the ship circles light bangkrak, crew members carrying it Bankruptcy should pay attention direction lights to keep the fish swimming area clear are in a circle net.

The next process is reduction net, which begins with a decrease rope corrugations, weights and rings followed by a decline nets and buoys. Half net that has been lowered then paired rollers stick in the middle hull. Net lowered while the ship was circling bank at a speed of 3.5 knots up to lifebuoy sign put on board the ship. Skipper pay attention direction wind and current before lower net to be sure aperture nets and optimal ship position during the hauling process.

After the net lowered, carried out withdrawal rope ruffled by two crew members from two different directions to emphasize the bottom net become like bowl so the fish can't escape self. Then, it's done ascension light wrecked by crew members and towed netting (hauling) which takes about 1 hour. When the fish collects in the bag net, done lifting the catch (brailing) using drawn scoop slowly so that the fish enters it. Catch boarded the ship with assistance strap on the power block.

During the hauling process, it is carried out arrangement nets and fishing gear others on board. Ruffles, weights, rings and nets arranged in a way sequentially and neatly, tied on a rope float with knot eight to keep from tripping. Structuring done carefully to be sure safety and efficiency in the use of fishing gear.

Fishing Gear Operating Time Trawl Ring

Based on observation during 1 fishing trip (5 months) above KM. Mutiara Sejati, operation of fishing gear trawl ring done at night day and early day. This activity is adapted to use lights as a tool catching fish. Operation at night day taking place from 18.00 to 24.00, while in the early hours day done from 1 am to 6 am. Although Thus, stages operation at both times did not experience difference; started from turn on ship lights up complete the process of arranging fishing gear.

KM ship. Mutiara Sejati capable do operation of fishing gear trawl ring 1-2 settings a day , depending on weather conditions . Weather extremes can affect fishing activities , with vessels inadequate for the conditions more likely setting it just once or not setting it at all. A number of influencing factors determination area fishing including moon , rain, and season conditions . Operational activities trawl ring on KM. True Pearls can be seen in Table 1.

Table 1. Operating time

Time	Number of *settings*	Average operating time (minutes)	Average catch (kg)
Evening	58	87	1243
Early days	68	83	1490

Calculation of the operating time of fishing gear trawl ring show that operation at night day nor early day own different patterns . Evening record the average operating time for 87 minutes with 58 settings and catches by 45%. Weather conditions are less favorable at night day can affect success fish catching . Meanwhile, operations are at an early stage day has an average operating time for 83 minutes with 68 settings and catches by 55%. Circumstances the weather is more conducive in the early hours day , like the wind is not strong , the waves are low , and the current is calm , making Operation at this time is more effective .

DISCUSSION

The results of this research show that technique operation of fishing gear trawl ring on KM. True Pearls follows a series detailed and structured stages (Figure 3). This process is principle fishing gear work trawl ring, which requires arrangement light and decline as well as withdrawal mesh with precision (Zakaria *et al*., 2017). Stages operation of fishing gear trawl ring on KM. Mutiara Sejati show differences with the techniques used on other ships, such as the KM. Sumber Abadi. The difference lies in the sequence and approach in the operating process. Example in KM. Sumber Abadi, operation starting with lowering the fishing gear (setting), withdrawing rope corrugation, pulling the net body (hauling) and raising the catch (brailing) (Hutapea *et al*., 2021). In this context, comparison between technique operation on different vessels can provide outlook additions regarding variations in practice catch fish.

Furthermore, the results of this study also show that operation of fishing gear trawl ring on KM. Mutiara Sejati experience variations in timing and catch between operation at night day and early day. Operation at night day record the average operating time for 87 minutes with a catch by 45%, while early day, the average operating time was 83 minutes with catches by 55%. This variation is caused by different weather conditions between Evening day and early day. At night day, weather conditions tends to be less favorable, with wind, waves and currents being able to influence it success fishing however The crew is still in strong condition. Meanwhile, in the early hours today, the weather conditions are more conducive, with not strong winds, low waves, and calm currents, so that operation of fishing gear to be more effective, but the condition of the crew tends to be tired (Yanis *et al*., 2018).

Variations in timing and catch between operation at night day and early The day is also influenced by factors technical arrest others, like speed winds and currents, as well speed withdrawal rope wrinkles (Danial *et al*., 2023). According to Yusuf *et al*. (2016), success operation arrest trawl rings are greatly influenced by factors technical arrest, like speed pull rope color and speed sinking net. Thus, weather conditions and factors technical arrest become factor key in determining success operation of fishing gear trawl ring.

The results of this study are consistent with the findings earlier that showed that weather conditions own impact significant on fishing activities. Sari *et al*. (2021) stated, that factor weather, like speed wind and height waves, can influence success fish catching. Likewise,

Limbong *et al*. (2017), emphasized importance pay attention to weather conditions in making your decision area fish catching.

Management and fishing strategies need to be adjusted to changing weather conditions (Yogiswara & Sutrisna, 2021). This is important for the operation arrests can be made in a way effective and efficient. By paying attention to weather conditions and factors technical fishing, fishing vessels can increase level success in catching fish. Therefore, further research regarding adapt fishing strategies to take into account varying weather conditions is expected to provide valuable contribution to management source Power fisheries.

CONCLUSION

Based on this research, it can be concluded that technique operation of fishing gear trawl ring on KM. Mutiara Sejati involve series quite detailed stages. The process begins with a decrease FADs and ignition ship lights, followed by deactivation part light except for those at the stern. Next, do it decline light wreck and complete blackout of the ship's lights before do decline net. Stages furthermore covers withdrawal rope wrinkle, lifting light bankruptcy, withdrawal nets, removal of catch, and rearrangement of fishing gear. In addition, the average duration of operating time for fishing gear trawl ring on KM. Mutiara Sejati during evening day is 87 minutes, while in the early hours day is 83 minutes. Calculation duration of operating time started from stage blackout ship lights except lights on the stern until lifting the catch onto the ship.

ACKNOWLEDGEMENT

Writer express gratitude and appreciation to all boat crew. True Pearl as well as to the leadership and all staff at PPP Bajomulyo who have give significant contribution to the implementation of this research. Likewise, the author also wants to express thanks to the team review anonymous and party manager of this scientific article is top their efforts in reviewing and presenting this article to the public.

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