

Design and construction of fishing vessels in pangandaran

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Abstract

Pangandaran is one of the fishing centers in West Java South Sea. One of the main keys of fishing is there's a suitable based on the operation of fishing gears used. This research tries to determine the design and construction of fishing vessels that are used in Pangandaran. This research was held from August to September 2018, at 13 fishing bases in 4 districts of Pangandaran regency. The method used to collect the data is a sampling survey in the range 2-3 GT and analyzed by a comparative descriptive method. This research shows that fishing vessels in Pangandaran have a different construction from other fishing vessels. They have a ballast room, fishing gear place and fish box, machine place, board to hold *katir*, *katir* (outrigger), hole to hold bamboo, board and hole to hold a pole, and anchor board. These construction details make a vessel suitable to be used by Pangandaran's fishermen.

Keywords: construction, fishing vessels, general arrangement, lines plan, Pangandaran

1. Introduction

Pangandaran Regency is one of the regencies in West Java which borders by Ciamis Regency and Banjar City in the North, Cilacap Regency in the East, Indian Ocean in the South, and Tasikmalaya Regency in the West ^[1]. Geographically, Pangandaran Regency is located on 108° 41' - 109° E and 07° 41' - 07° 50' S. Based on the Minister of Maritime Affairs and Fisheries Regulation No.01 / MEN / 2009 concerning the Republic of Indonesia Fisheries Management Region, Pangandaran is one of the areas included in the Fisheries Management Zone or WPP-RI 573, covering the Indian Ocean south of Java to the South of Nusa Tenggara, Sawu Sea, and the West Timor Sea.

Pangandaran Regency is one of the centers of capture fisheries production in Indonesia, especially in West Java ^[2]. Fishing is one of the main sectors that can provide economic impact for the people in Pangandaran. The Pangandaran amounts to 858 units consisting of dogol (danish seine) & coastal trawlers 80 units (9,32%), gillnet 733 units (85,43%), trap 1 unit (0,01%), and basic long lines 44 units (5,13%) based on data from the West Java Marine and Fisheries Office in 2016. Based on data from Bappeda of West Java Province in 2016, fishing production in Pangandaran in 2014 amounted to 2,483,370 kg increased to 2,846,068.05 kg in 2015. The main commodities in Pangandaran Regency are shrimp, red snapper, white snapper, grouper, sharks, black pomfret, white pomfret, mackerel, hairtail fish and cob ^[3].

Boat or vessel is a floating building that is used by humans as a means of carrying out activities in the waters, both as a means of sea transportation and fishing business ^[4]. Fishing vessels are boats specifically used for fishing. Fishing vessels are one of the fishing units that have a very important role for fishermen, both as a means of transportation from fishing bases to fishing grounds and vice versa and as a

means to accommodate the catch ^[5]. Fishing vessels in an arrested operation carry out several activities, including searching for fishing areas (fishing ground), operating fishing gear (setting), and chasing fish groups ^[11]. The variety of activities carried out by them causes these vessels to have different characteristics from other vessels ^[6]. These differences can be seen in terms of size, deck equipment, cargo capacity, accommodation, machinery and equipment whose functions are related to fishing operations ^[4].

Every region in Indonesia has its own characteristics in manufacturing ^[7]. This is based on several considerations, among others; the purpose of vessel building (according to the fishing gear used), the characteristics of the waters, the design of the vessel and the availability of the materials used. The construction of fishing vessels is very diverse, ranging from traditional to modern ones that utilize advanced technology in line with the development of the technology itself. Most fishing vessels operating in Indonesia are built by traditional shipyards whose construction is not equipped with general planning and requirements. The construction of the fishing vessels does not use design drawings, such as general arrangement, lines plan, and profile construction. This happens because the development process is based on knowledge obtained from generation to generation ^[6]. Technical documentation of the construction design drawings of traditional fishing vessels in Indonesia is very necessary to conduct further architectural studies of shipping, such as design, construction and stability studies ^[10].

The unavailability of information and data collection on the characteristics of the design of fishing vessels operating in Pangandaran can be an obstacle in the development of fishing activities. Information about fishing vessels that are effective and have high productivity is important in the development of capture fisheries in Pangandaran.

Construction of ships that are suitable for the type of fishing gear used can support the safety and success of fishing operations. Availability of information on ship design characteristics will facilitate traditional shipbuilding in accordance with the specifications of fishing gear and local water conditions.

2. Materials and Methods

This research conducted on August-September 2018 in the waters of Pangandaran Regency, West Java. The location used as a research site is 13 locations of fishing base from 4 districts in Pangandaran.

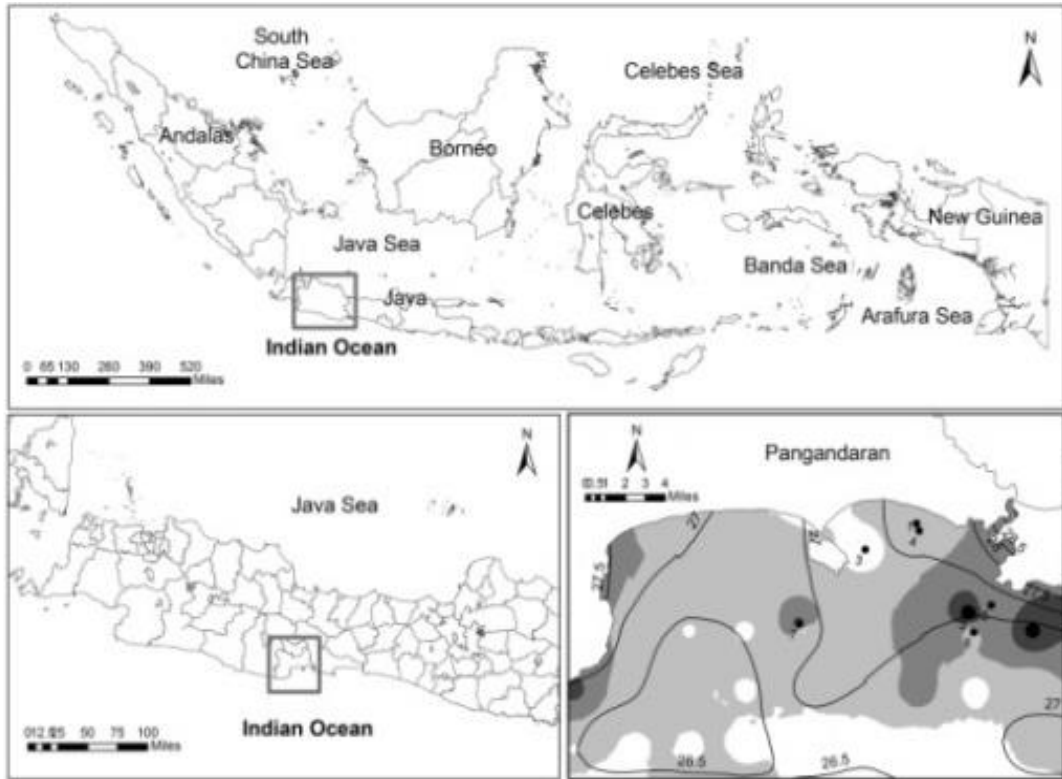


Fig 1: Research Location

The survey method which was analyzed descriptively, and also measure directly to draw the design of the fish vessel used in fishing operations in Pangandaran waters. The fishing vessel used in this research is the fishg vessel namely ‘‘SAR Legokjawa’’, using gillnet fishing gear.

In the Pangandaran fishing vessels, the equipment layout is regulated not based on the arrangement above or below the deck as the arrangement of fishing vessels in general, but arranged according to the needs of fishermen. Figure 3 it can be seen, the completeness and arrangement of the layout of the fishing vessels equipment in Pangandaran.



Fig 2: Legokjawa SAR fishing vessel as an object for making offset tables

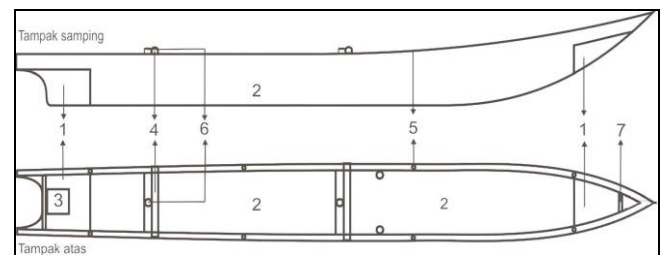


Fig 3: General Arrangement of fishing vessel in Pangandaran

3. Results & Discussion

General Arrangement

General plan drawings are images that show the completeness and layout of equipment on board. The layout is the location of fishing gear, machines, fish hatches and others [1]. The general description of the Pangandaran ship can be seen in Figure 3.

Fishing vessels in Pangandaran Waters do not have a deck.

Information:

- 1) Ballast room
- 2) Fishing gear place and fish box
- 3) Machine place
- 4) Board to hold katir
- 5) Hole to hold bamboo
- 6) Board and hole to hold a pole
- 7) Anchor board

General Facilities

i) Ballast room (Ballast tank)

Ballast space is a space in the bow and stern of the ship that

serves as a place of balance ^[4]. This section is the only part on the Pangandaran ship, which has a closed volume, and is considered a 'Pelampung' by fishermen. The ballast room serves to maintain the stability of the ship both when sailing and when the ship is loading and unloading. The location of the ballast room on the Pangandaran ship can be seen in Figure 3, number 1.

According to the Naval architecture, when the condition of the ship sails the ballast tank is empty, while when the ship unloads the ballast tank is filled with water to maintain the stability of the ship ^[8]. Unlike the ships in Pangandaran where the ballast space cannot be filled with water, so this stability is achieved only when the ship sails, but when loading and unloading the ship is less stable. This is because the process of loading and unloading fish in Pangandaran, does not take a long time, so there is no need for high stability when loading and unloading. This is in accordance with observations in the field, that the entire loading process only decreases 1-2 boxes of catch, with less than 5 minutes. On the contrary, the existence of this ballast space is extraordinary when sailing, due to the less stable shape of the ship which requires ballasts to increase the stability of the ship.

ii) Fishing gear place and fish box

Fishing gear and a place to store the catch (hold / fish box) are placed in the middle of the ship, this is because the space in the middle of the ship is quite wide. In addition, this space is used by ABK to carry out fishing activities. The location of fishing gear and fish hold can be seen in Figure 3, number 2.

iii) Machine place

The engine on the Pangandaran ship is placed on the back of the ship (above the stern plywood) because the type of engine used is a marine engine that is pushing. The location of the machine can be seen in Figure 3, number 3.

Additional completeness

Additional equipment is the equipment available specifically in the fishing vessels in Pangandaran, including:

i) Boards and Holes for Plugging Poles

Boards and pole mounting holes are made by fishermen in an effort to increase comfort in fishing operations (Figure 4). This pole is used as a roof support so that fishermen are not exposed to direct sunlight.

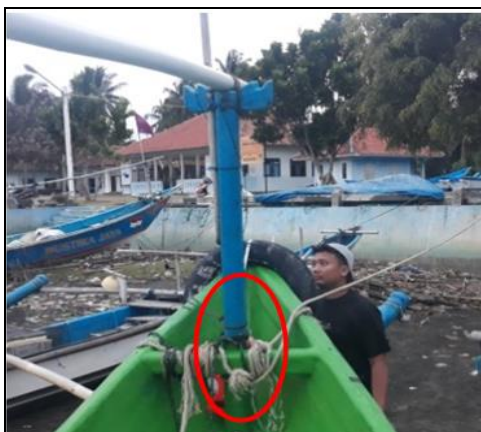


Fig 4: Board and hole to hold a pole

ii) Anchor board

The anchor board is made to tie the anchor both when dropped during the operation in the middle of the sea, and when the ship is docked either at the port or other anchorage. In Figure 5, it can be seen that the board is used to tie ships anchored in the river to trees on land.



Fig 5: Anchor board

iii) Hole to hold bamboo (Pameletan)

Leaks or winches are found on ships that were made before the tsunami and were not found on ships made above in 2010, so instead holes are made in the sheer section as a place to tie bamboo. Bamboo tied to this sheer (Figure 6) functions the same as a vessel's flap or winch before a tsunami occurs, which is to make it easier for fishermen to pull on the rope when hauling. This bamboo is called pameletan.



Fig 6: Hole to hold bamboo (Pameletan)

iv) Katir

The operation of fishing vessels in Pangandaran is equipped with two ketirs on both sides of the ship (mounted on the left and right side of the ship) and connected with two bamboo which are referred to as new shelters. The katir material used is made of paralon pipe (PVC) which is coated with fiberglass material. Alarm function as a tool to improve ship stability. The type of worry used by the Pangandaran ship is a type of double outrigger (outrigger found on both sides).

The average length of the Pangandaran ship is an average of 5 m measured from the tip of the tail which is tied to the joint in the bow to the tail end which is fastened to the joint at the stern part longitudinally. Baruyungan is made of bamboo. The fear diameter is divided into Pangandaran divided into 3 types, namely 4, 6 and 8 inches for ships made before a tsunami occurs. Based on the interview results, the larger the size of the diameter diameter, the higher the stability and security for fishermen. The katir used by the Pangandaran ship is made in conjunction with the ship in the shipyard, both in the Pangandaran shipyard and the Cilacap shipyard. Katir on fishing vessels in Pangandaran, can be seen in Figure 7.



Fig 7: Double outrigger katir

Lines Plan

i) Profile plan

The profile plan shows a plan drawing of the line from the slice of the ship side view [5]. This image shows 6 horizontal line sequences which are water line lines. The first horizontal line from below (0.0 m WL) is the beginning of the water line or also called the base line. The next line is the other 5 water lines, which is 0.0975 m WL; 0.1950 m WL; 0.2925 m WL; 0.3900 m WL; and 0.4875 m WL. The last water line (0.4875 m WL) as a draft (d) the ship is in full condition or also called Load of water line (Lwl). Water line shows the position of the ship against various water surfaces. Along the highest water line (Lwl) an upright line is made which divides the line into 10 parts.

This line consists of 11 ordinates given an ordinate number 1-10. The erect lines made later will be used to make the picture of the ship's slice appear above (half breadth plan) and the picture of the front slice of the ship (body plan).

ii) Half breadth plan

Half a breadth plan is a picture of a half-slice width of the ship that appears above which shows the water line position at each depth (0.0975 m WL - 0.4875 m WL). Buttok line is described as a straight line that cuts the water line and is made parallel to the center line.

On the plan drawings of aid ships and ships before the tsunami there are 3 buttok lines with a distance between lines of 0.1933 m and 0.1600 m, respectively. The water line shown in this picture shows the width of the ship body in each ordinate, so that the overall body shape of the ship can be seen from the top viewpoint.

iii) Body plan

The picture of the body plan illustrates the picture of the slice of the ship in front of the body shape in each ordinate. The shape of the image displayed is half of the overall shape of the ship's body. Ordinate 0-5 shows the shape of the ship body from after perpendicular (AP) or from the bow of the ship to the midship part (center of the ship). 5-10 ordinals show the shape of the ship body from the midship to the perpendicular fore (FP) or the stern part of the ship.

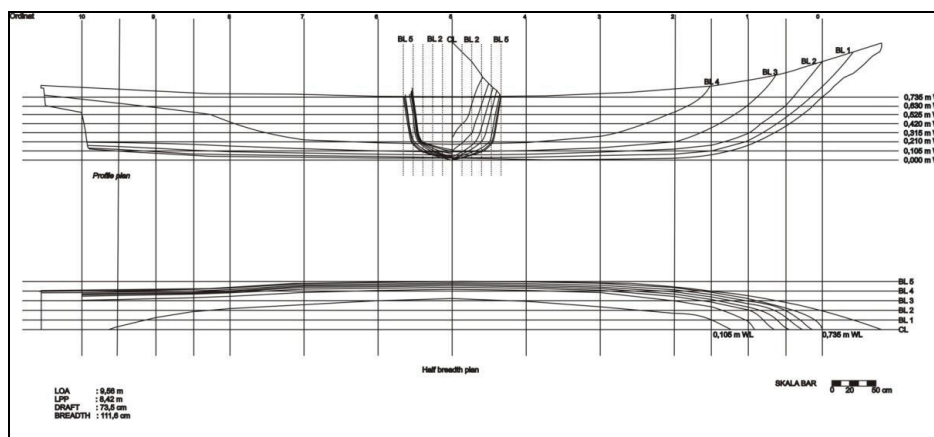


Fig 8: Lines plan Pangandaran fishing vessel (SAR Legokjawa)

Ship Construction

The construction of fishing vessels in Pangandaran is not equipped with connections such as in the construction of wooden ships in general. The ship does not have a full and high, but uses keel and high pseudo. This is because the main material of the ship is made of fiberglass material, where the manufacturing process is through the mold method. Construction of Pangandaran fishing vessels is supported by wood and plywood. This support material provides additional strength in length and transverse. Wood is used to help the strength of galar and ivory, while plywood is used to coat the bow and stern ballasts. The wood used is teak wood and materials for fiberglass using number 1 quality resin material. The selection of teak wood is due to a strong material for the ship, and the use of resin is easier to form according to the knowledge of the maker. The use of wood, which is very heavy, is partly replaced by resin which is lighter and tends to be easier to repair.

4. Conclusions

Fishing vessels in Pangandaran have almost the same design and construction for each fishing gear that used. The special feature of ships operating in Pangandaran is having an elongated ship design, and using katir (outrigger) on both sides of the ship. Fishing vessels in Pangandaran are made in traditional shipyards in 2 locations, Pangandaran and Cilacap. The design of the ship that was made was only based on experience and calculations based on the ship that had been made before, without going through the stages of existing shipbuilding planning. fishing vessels in Pangandaran has a different construction from another fishing vessels. They has a Ballast room, fishing gear place and fish box, machine place, board to hold *katir*, *katir* (outrigger), hole to hold bamboo, board and hole to hold a pole, and anchor board. These construction details, makes a vessels suitable to used by Pangandaran's fisherman.

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