MAIN DIMENSIONS OF HANDLINE FISHING BOATS AT BRONDONG FISHERIES PORT AREA, LAMONGAN REGENCY, EAST JAVA

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ABSTRACT

Fishing boats have different characteristics compared to other types. The construction of a boat must be following the rules of naval architecture. This is shown to provide the boat's capability by its designation. However, the construction of fishing boats in Indonesia is often carried out in traditional shipyards that have not implemented naval architecture rules, one of which is handline fishing boats built in the Lamongan Regency. To assess the characteristics of the boat, the purpose of this research is to obtain the value of the main dimension ratio. The main dimension ratio data is then compared with a pre-existing reference value. The results showed that the main dimension ratio on handline fishing boats in Lamongan Regency was included in the range of the main dimension ratio values in the reference. Based on the comparison between the shapes of handline fishing boats in Lamongan Regency in general, Ijon-ijon and perau have a larger breadth and depth than etek. These differences can show different characteristics compared to other types of static gear fishing boats in general.

Keyword: *Fisheries, Handline, Resistance, Shipbuilding, Stability.*

1. INTODUCTION

Fishing boats in Indonesia have a variety of sizes and shapes. This diversity can be found in almost every different area [1]. Differences in each size and shape of fishing boats occur based on several factors from the purpose of fishing operations activities, such as the type of fishing gear used, the number of crew on board, the fishing location to be approached, the number of supplies to be brought [2]. For this reason, fishing vessels have a variety of activities carried out on them.

Fishing boats have different characteristics when compared to other types of boats. This happens because fishing boats have a variety of activities carried out on them. These various activities are fishing activities such as chasing schools of fish, operating fishing gear, processing and also storing catches. This causes fishing boats to be built to support the success of fishing operations at sea [3]. In addition, fishing operations sometimes have to be carried out during bad weather, so fishing boats must be built to be able to survive even in extreme weather but still pay attention to safety factors [4].

The construction of a ship must be following the rules of naval architecture. The rule is intended to plan the suitability of the ship based on its designation. However, the construction of fishing boats in Indonesia is generally still carried out in traditional shipyards that do not use naval architecture rules. The construction of fishing boats is carried out by ship craftsmen only based on the results of experience passed down from generation to generation [5].

Thus, in the process, there is no lines plan, general plan, or hydrostatic calculation. This happened in the construction of handline fishing boats in Lamongan Regency, East Java.

Handline fishing boats in Lamongan Regency have unique shapes and characteristics compared to fishing boats in other areas. Local people call it "ijon-ijon" and also "perau". Ijon-ijon and perau have almost the same shape but differ in the shape of the bow and stern. Ijon-ijon has the shape of the bow and stern like a spoon, then the tip of the bow has a square shape. Meanwhile, the perau has a much higher and sharper bow tip [6]. These differences make people give different names. Even so, ship craftsmen in Lamongan Regency also often build ships with a general shape which they usually call "etek". In general, local people are reluctant to use etek because they have been operating ijon-ijon and perau for a very long time. This happens because they are not accustomed to using etek so that it can affect the operation of fishing gear at sea [7].

This paradigm is the reason why government grant ships are not accepted in the Lamongan Regency area. For example, the government grant ship in Cilacap also needs to be modified first so that it can match the shapes and sizes that have become the habits of fishermen in the area. In addition to the difference in shape, the difference in size was also one of the factors that people were reluctant to use the government grant ships [8]. Some other examples such as in Bengkulu, Jambi, Medan, Maluku, Lampung, and several other areas where even the fishing boats are not used and abandoned to be damaged [9]. Therefore, it is necessary to conduct research related to the main dimensions of handline fishing boats in the Lamongan Regency. This study aims to be able to assess the characteristics of handline fishing boats in Lamongan Regency based on the value of the main dimension ratio.

2. MATERIAL AND METHODS

This study uses a quantitative approach with several stages. The sample used is a handline fishing boat built in a traditional shipyard and docked at the Brondong Fisheries Port Area (PPN). Based on data from fishing vessels at PPN Brondong, the total number of fishing boats leaning around the port is 10 boats consisting of 7 boats that have a characteristic regional shape (Ijon-ijon and Perau) and 3 units that have a shape on the generally (Etek). Data retrieval in the field by measuring the main dimensions of the ship, such as length, breadth, and depth. The measurement of the main dimensions of the ship is carried out using a measuring tape or laser distance meter. The main dimensions obtained are then calculated in comparison using the following equation:

- L/B : Length / Breadth...(1)
- L/D : Length / Depth ....(2)
- B/D : Breadth /Depth...(3)

The main dimension ratio data is presented in the form of tables and graphs for further comparison descriptively. The comparison is based on research conducted by Iskandar & Pujiati (1995) who previously had grouped ships based on their fishing gear operating methods in Indonesia. Based on the method, fishing gear is included in statically operated fishing gear. This is because during the operation of the fishing gear the ship tends not to move over the waters. The main dimension ratio values for the types of vessels operating static fishing gear are presented in Table 1.

Table-1. Main dimension ratio on static gear type ships [10]

	L/B	L/D	B/D
Min	2,83	4,58	0,96
Max	11,12	17,28	4,68

The data will also compare between ijon-ijon, perau and etek. The differences in the shape of the bow on ijon-ijon, perau, and etek are presented in Figure 1.

(a)

(b)

(c)
Fig-1. (a) Ijon-ijon, (b) Perau, (c) Etek

3. RESULT AND DISCUSSION

The main dimension measurements were carried out on 10 handline fishing boats registered and docked at PPN Brondong, Lamongan Regency. Based on the measurements that have been made, the length of the handline fishing boats ranges from 13 to 15 meters with an average of 13.43 meters, the width of the handline fishing boats ranges from 4 to 5.5 meters with an average of 4.77 meters. The depth of handline fishing boats ranges from 1.37 to 2.8 meters with an average of 1.96 meters. Handline fishing boats have a depth that ranges from 1.37 to 2.8 meters with

an average of 1.96 meters. The main dimensional data on handline fishing boats resulting from the measurements are all presented in Figure 2
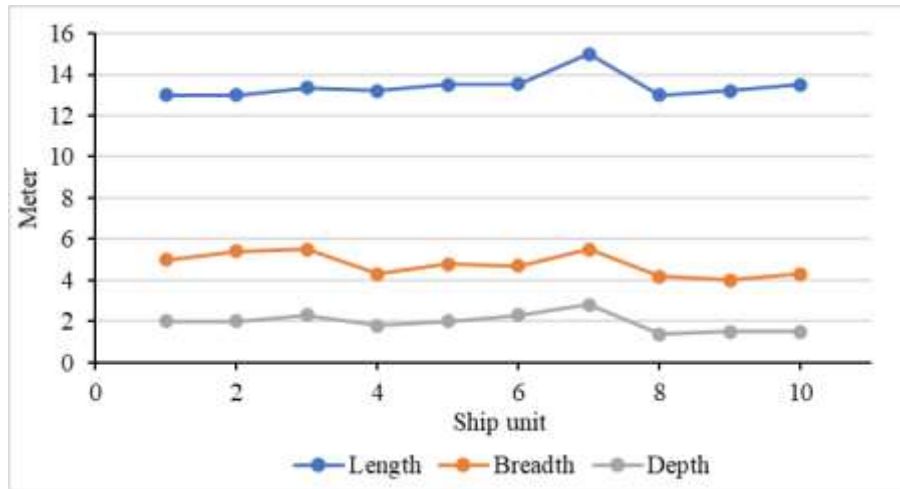
Chart-1. The main dimensions of handline fishing boats in PPN Brondong

### 3.1 Main Dimension Ratio of Fishing Boats in Indonesia

Table-2. Handline fishing boat main dimension ratio

	Brondong	Iskandar & Pujiati (1995)
L/B	2,41 - 3,30	2,83 - 11,12
L/D	5,36 - 9,49	4,58 - 17,28
B/D	1,96 - 3,07	0,96 - 4,68

The ratio of the main dimensions is presented in Table 2. Based on the value of the main dimension ratio, the L/B value of handline fishing boats based in PPN Brondong is in the range from 2.41 to 3.30 with an average value of 2.85. In addition, the L/D value ranges from 5.36 to 9.49 with an average of 7.14, and the B/D value ranges from 1.96 to 3.07 with an average of 2.5. When compared with the research results of Iskandar & Pujiati (1995), the main dimension ratio produced by handline fishing boats in the research area is still included in the range of the main dimension ratio values on static gear vessels in Indonesia. Even so, there is a range of L/B values on handline fishing boats in the research area with values that are smaller than the range of L/B values for fishing vessels in Indonesia. This shows that the fishing boats in PPN Brondong have a larger ship width compared to fishing boats in Indonesia. The lower the L/B value ratio will have a bad effect on the ship's resistance [11].

3.2 Ratio of Main Dimensions of Fishing Vessels Based on Boat Shape

Handline fishing boats that have regional peculiarities such as ijon-ijon and perau have a different main dimension ratio with etek. In general, ijon-ijon and perau have a smaller dimension ratio than etek. The results of the comparison of L/B ijon-ijon and perau have a value ranging from 2.41 to 3.07 with an average value of 2.7, while the L/B value of etek has ranged from 3.10 to 3.30 with an average of 3.18. This shows that ijon-ijon and perau have a wider size compared to the etek. A ship with a larger breadth will have a greater resistance and is inversely proportional to the speed [12]. Main dimensions ratio of the ijon-ijon, perau and etek are presented in Figure 3.
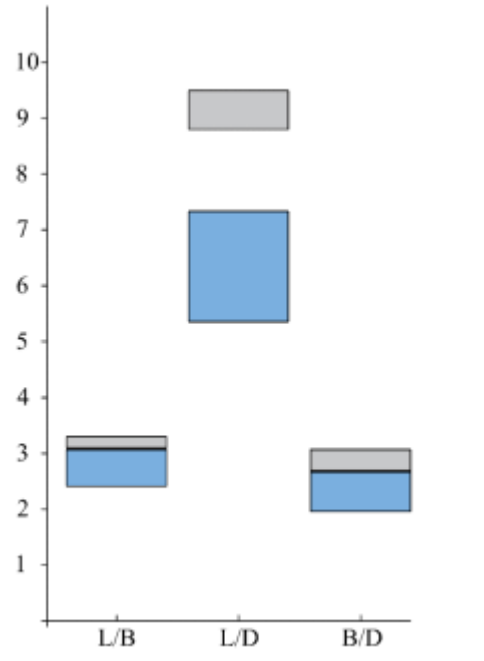
Chart-2. Main dimension ratio based on boat shape

Figure 3 shows that the L/D value of ijon-ijon and perau is lower than that of etek. The L/D value of bonded-bondage and perau are in the range of 5.36-7.33 with an average of 6.3. While the value of L/D etek ranged from 8.8 to 9.49 with an average of 9.10. The smaller the value of L/D, the ship has a lower depth. This shows that the larger L/D will provide poor longitudinal strength [13].

4. CONCLUSIONS

Handline fishing boats based in Brondong PPN generally have a dimension ratio value which is included in the reference value. However, ijon-ijon and perau have a smaller main dimension ratio compared to ships with etek or general shapes. This shows that ijon-ijon and perau are had a larger breadth and depth than etek. Therefore, handline fishing boats that have an ijon-ijon and perau shape have better longitudinal strength, stability, and maneuverability, but have a greater resistance capacity than etek.

6. REFERENCES

[1]. Burella G, Moro L, Colbourne B. 2018. Noise sources and hazardous noise levels on fishing vessels: The case of Newfoundland and Labrador's fleet. Ocean Engineering Journal. 173: 116-130.
[2]. Fyson J. 1985. Design of Small Fishing Vessels. Fishing News Book: London.
[3]. Nomura M, Yamazaki T. 1977. Fishing Techniques. Japan International Cooperation Agency: Tokyo.
[4]. Riantoro MR, Iskandar BH, Purwangka F. 2017. The potential of work accident on the liftnet fisheries in PPN Palabuhanratu, West Java. Jurnal Teknologi Perikanan dan Kelautan. 8(2): 221-236.
[5]. Puspita HID, Utama IKAP. 2017. Hydrodynamics characteristic study of the traditional fishing vessel in Puger Jember waters. Jurnal Kelautan Indonesia. 12(1): 1-7.
[6]. Putra PKDNY, Novita Y, Iskandar BH. 2020. The diversity of fishing vessels shapes in Brondong Fisheries Port Area. Saintek Perikanan: Indonesian Journal of Fisheries Science and Technology. 16(4): 235-242.
[7]. Tandipuang P, Novita Y, Iskandar BH. 2015. Operational design suitability of an inkamina 163 fishing vesel based in Sadeng fishing port, Yogyakarta. Jurnal Kelautan Nasional. 10(2): 103-112.
[8]. Soeboer DA, Iskandar BH, Imron M, Ardiyani WA. 2018. Utilization Of The Inka Mina In PPP and PPS Tegalsari Cilacap, Central Java. ALBACORE. 2(3): 357-368.
[9]. Petrus KB. 2018. Analysis of ship procurement: a case study in the office of marine and fisheries affairs of North Sulawesi Province. Gadjah Mada University: Yogyakarta.

[10]. Iskandar BH, Pujiati S. 1995. Technical demonstration of fishing vessels in several regions of Indonesia. Department of Fisheries Resources Utilization: Faculty of Fisheries and Marine Sciences IPB.

[11]. Khan AMA, Gray TS, Mill AC, Polunin NVC. 2018. Impact of a fishing moratorium on a tuna pole and line fishery in eastern Indonesia. Marine Policy Journal 94: 143-149.

[12]. Palembang S, Luasunaung A, Pangalila FPT. 2013. Study on the design of 13 GT fiberglass multifunctional fishing boat at CV Cipta Bahari Nusantara Minahasa shipyard North Sulawesi. Jurnal Ilmu dan Teknologi Perikanan Tangkap 1(3): 87-92.

[13]. Novita Y, Martiyani N, Ariyani RE. 2014. Quality of payang ship stability in Palabuhanratu based on load distribution. Jurnal IPTEKS Pemanfaatan Sumberdaya Perikanan. 1(1): 28-39.

[14]. Caamano LS, Geleazzi R, Nielsen UD, Gonzalez MM, Casas VD. 2019. Real-time detection of transverse stability changes in fishing vessels. Ocean Engineering Journal. 189.