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Fish Boat Building as a Supporting Facility for Lobster Cultivation in Banyuwangi

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Abstract: The economic condition of the coastal communities of East Java, especially in Banyuwangi, is strongly influenced by the tourism and fishing sectors. This condition needs to be developed with supporting facilities such as the procurement of fishing vessels. Procurement of fishing vessels must be designed with a feasibility study on vessel operations. In general, coastal conditions have shallow water depths and are often used by coastal communities for lobster cultivation. The supporting fishing vessels must be able to maneuver properly and not damage the ecosystem so that the existence of coral reefs is maintained. The fishing boats that support lobster aquaculture are designed with good maneuverability by taking into account the speed, the result of the waves formed and the capacity of the ship. The results of the design of fishing boats supporting lobster cultivation obtained that the main size of the ship is 13.00 meters long, 3.00 meters wide and 0.8 meters draft with a speed of 12 knots, reaching a designed mileage of 30 km in shallow water operational conditions.

Keywords: fishing boats, lobsters, design, shallow waters, supporting facilities.

INTRODUCTION

Indonesia is a maritime country and has the largest archipelago in the world. One island and another island are separated by the sea, but that is not a barrier for every ethnic group in Indonesia to interact with the tribes on other islands. Since nautical times, shipping and inter-island trade have developed using various types of traditional boats. Our ancestors became reliable sailors who explored to make contact and interact with outsiders. Even more surprising, the voyages carried out by the Indonesians (Nusantara) in the maritime age had reached Madagascar. The evidence of the news itself is based on research conducted, namely the same type of boat used by the people of Kalimantan to sail "Fantastic" (Djatmiko, 2012). In the maritime era, it has become a trademark that Indonesia is a maritime country (Agus Sabarudin, 2019).

Indonesia is a maritime country that has many islands. The vastness of the sea is the main capital for building this nation. Indonesia is an "archipelagic country", Indonesia is an "archipelago", Indonesia is a "maritime country", and Indonesia is a "Maritime Nation". "Maritime Spirit" and "My ancestors were seafarers" are not just slogans. The sea is used as a livelihood field. The sea is also used as a place to gather strength. Having a strong naval fleet means being able to defend the kingdom from outside attacks. Indeed, the sea, in this case, has become very important since ancient times until today (Geologisia, 2019). Optimizing the potential of the sea to make the Indonesian nation advanced because Indonesia has enormous potential to develop the sea. The sea will provide very vital benefits for the growth and development of the Indonesian economy and trade in particular (Battacharyya, 1978)

The economic condition of the coastal communities of East Java, especially in Banyuwangi, is strongly influenced by the tourism and fishing sectors. This condition needs to be developed with supporting facilities such as the procurement of fishing vessels. The procurement of fishing vessels must be designed with a ship operational feasibility study (Bertram, 2011).

In general, coastal conditions have shallow water depths and are often used by coastal communities for lobster cultivation. Banyuwangi sea waters have been known as one of the producers of export-quality lobster. Even the Ministry of Maritime Affairs and Fisheries (KKP) is interested in establishing a lobster center in Banyuwangi. The area, which is one of the locations for lobster cultivation in Banyuwangi, is on the beach of Grand Watu Dodol (GWD), Banyuwangi. There is also a lobster cultivation pilot unit from the Marine and Fisheries Research and Human Resources Agency, Bangsring KKP Fisheries Training and Extension Center.

The problem that then arises is when fishermen or lobster cage farmers in their daily life monitor the existence of lobster cultivation on this beach. where every morning and evening they have to flock to attract cages to adjust to tidal conditions (Mansour, 1972). They must always monitor the presence of floating cages when adjusting the tides due to limited funds and very shallow coastal conditions. So it is necessary to design a fishing boat that supports lobster cultivation according to the capacity of fishermen by considering the geographical factor of shallow coastal depth (Budianto, Artha, Priyambodo, & Ruddianto, 2021), and conduct a study of the magnitude of the ship's resistance and the wave patterns formed (Auriga, 2020).

METHODOLOGY

In the analysis of environmental conditions, one of the most important things before conducting a literature study is the search for data on pandati depth, the geographical structure of the beach itself, and so on (Evans, 1959). After analyzing the environmental conditions, a literature study was carried out, namely the search for references and learning of cases that had occurred. This literature study was carried out so that the mistakes made by previous researchers were not repeated (Fyson). In the design of this ship, including the ship's resistance, is the ship's ability to withstand the working fluid force. The greater the value of the ship's resistance, the greater the main engine power required to propel a ship. The factor that influences the value of the resistance to be large or small on the ship is the shape of the hull at operational speed (Braun, 2018).Environmental conditions and ship resistance as a reference to determine the main size of the ship to be planned (BKI, 2001)

After doing the design, an analysis of ship resistance is needed. The analysis of ship resistance is used to find out whether or not a design of ship resistance is made (Harvald, 1992). In this analysis, the process is done using Maxsurf software. The ship line plan is made based on the main size of the ship that has been obtained. The shape of the body plan, sheer plan, and hull shape can be determined from the lines plan (Manning, 1956). Of course, the design made can be following the circumstances and needs of the ship itself. The general plan is a plan to determine the layout of the room and the size and equipment needed on the ship (Budianto T. W., 2018). On this tourist ship, an effective and efficient ship will be planned for passengers.

Needs analysis Design is a step to find out the needs of the system to be built (Budianto I. S., 2019). The analysis aims to simplify the process of designing the ship design to be built. The technologies that will be required are as follows: Where in the need for hardware to support running ship design, a hardware device is needed, namely a laptop with a quad-core processor and 2 GB of memory, as well as a 1 GB hard drive for storage and modeling. Software is safe in a ship design that is used when calculating ship resistance. It requires software to support the system as for the software needed, among others. such as MS Excel Student, Edition Maxsurf Student Edition, and Autocad Student Edition. The design of shallow water fishing vessels for shallow coastal waters, which we will work on in this research, is as shown in figure 1, a block diagram of the ship's plans as follows:

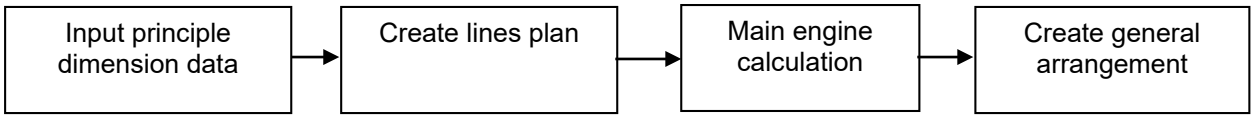

Figure 1. Block Diagram of Research

RESULTS

The line plan is the outer side of the ship's hull in a curved shape. In some cases, there is bending. The depiction of the ship's hull on a piece of drawing paper is called. The shape of the hull in general must follow the needs of buoyancy, stability, speed, engine strength, maneuverability, and so on. The line plan consists of an orthographic projection of the intersection of the hull surfaces and three sets of perpendicular planes. The Sheer Plan shows the intersection of the hull surface with the center plane, a vertical plane on the ship's center line, and a vertical plane parallel to it (center plane). The Half-Breadth Plan shows the intersection of the hull surface with a plane parallel to the base plane. The base plane is the horizontal plane that passes through the baseline. The intersection of these fields will produce a waterline plan. The Body Plan shows the shape of the station, which is the intersection between the surface of the ship's hull and the plane perpendicular to the buttock plane and the waterline plane. In general, the depiction of the body plan is divided into two left and right sides, the left side for the rear half and the right side for the front half. The surface of the hull referred to above is the surface of the molded/molded surface, which is the surface formed by the outer side of the ship's tusk or the inner side of the skin. The number of stations/sections is generally 21. Between the front vertical line and the back vertical line divided by 20 intervals, station identification starts from AP (station number zero) to FP (station number 13). The result line plan obtained on fishing vessels supporting lobster cultivation is shown as follows:

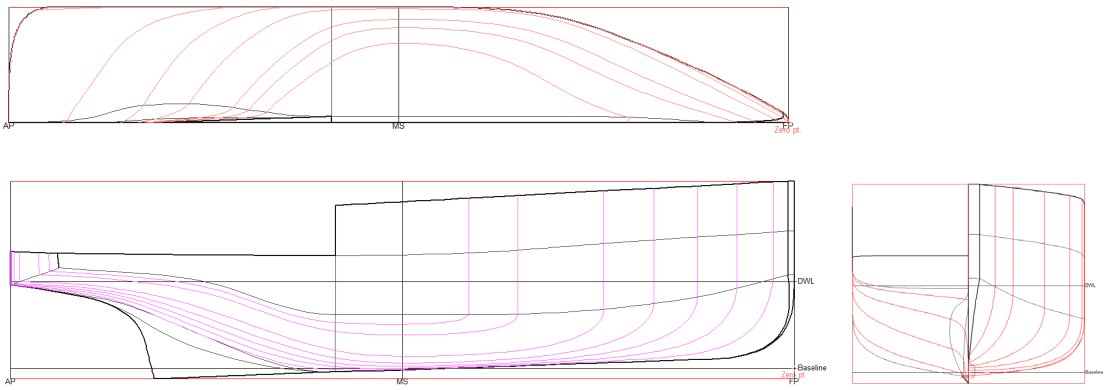

Figure 1. Lines Plan

Ship resistance is a fluid force acting on the ship's hull in such a way that it acts against the ship's motion. The power needed by the ship to move on the water is very dependent on the efficiency of the propulsion system against the resistance received by the ship. The resistance of the ship depends on the variables of the hull shape, displacement, and speed. Some of the main components of ship resistance are:

- Friction resistance
- Pressure resistance
- Wave resistance
- Additional resistance in waves
- Air resistance

Analyze using hullspeed with the following results:

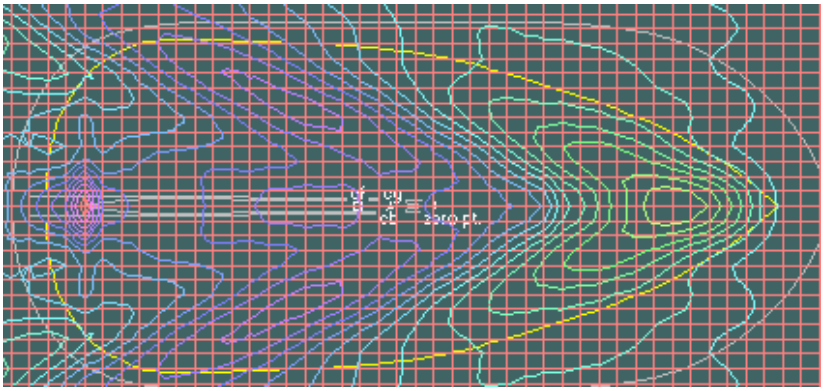

Figure 2. Resistance Analysis

The general plan of a ship can be defined as a design that determines or marks all of the required space, such as cargo space, engine room space, and accommodation, in this case, referred to as the superstructure (upper building). In addition, it is also planned to place equipment and determine the location of roads and several other systems and equipment. The manufacture of a ship includes several jobs which are broadly divided into two groups of work, namely: the first group is the design and construction of the hull, while the second is the design and installation of ship machinery.

The rooms provided on this ship are as follows:

- Cargo fish is a source of income, so large volumes of cargo fish are cultivated.
- Two rooms can transport fish after catching them.
- A store is a storage place that supports the netting and transportation of fish.
- A crew room includes a crew resting place, navigation room, galley or kitchen, toilet, and right above the engine void. A gear room is an equipment room that supports ship engines.

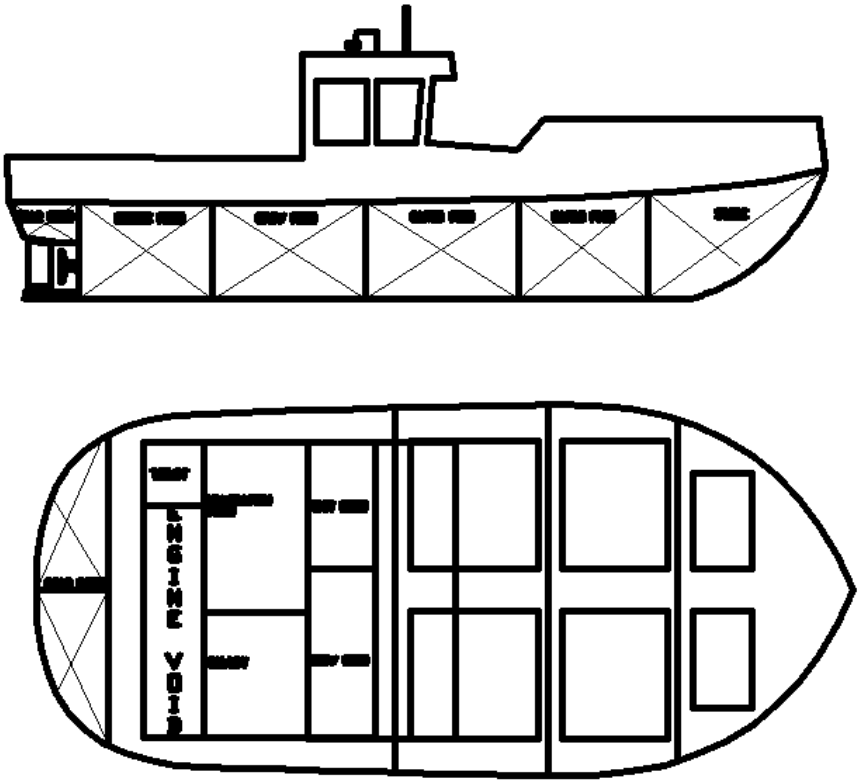

Figure 3. General Arrangement

The dimension of the ship:

Ship name	=	Fishing Boat Losbtary
LoA	=	13.00 m
B	=	3.00 m
H	=	1.50 m
T	=	0.80 m
Cb	=	0.75
Cp	=	0.60
Cm	=	0.7 m
Sailing Radius	=	30 Km
Service Speed	=	12 knots

CONCLUSION

The supporting fishing vessels must be able to maneuver properly and not damage the ecosystem so that the existence of coral reefs is maintained. The fishing boats that support lobster aquaculture are designed with good maneuverability by taking into account the speed, the result of the waves formed, and the capacity of the ship. The results of the design of fishing boats supporting lobster cultivation obtained that the main size of the ship is 13.00 meters long, 3.00 meters wide and 0.8 meters draft with a speed of 12 knots, reaching a designed mileage of 30 km in shallow water operational conditions.

REFERENCES

Agus Sabarudin, S. M. (2019). PENGARUH ARAH SERAT PADA SERAT AMPAS TEBU POLYMER COMPOSITES. *Momentum*, 156-161.

Auriga, R. (2020). Performance properties of plywood composites reinforced with carbon fibers. *Composite Structures*, 112533.

Battacharyya, R. (1978). *Dynamics of Marine Vehicles.* New York: John Wiley and Sons Ltd.

Bertram, H. S. (2011). *Ship design efficiency and economy, second edition.*

BKI. (2001). *BKI Volume II.* Jakarta: BKI.

Braun. (2018). *The Indian Ocean.*

Budianto, Artha, I. P., Priyambodo, & Ruddianto. (2021). Perancangan Rencana Umum Kapal Ikan Trimaran MV. Bisikan untuk Perairan Laut Selatan Jawa. *Seminar Master 2021* (pp. 11-18). Surabaya: PPNS.

.Budianto, T. W. (2018). Strength Analysis on Ship Ladder Using Finite Element. *Journal of Physics*, 012043.

Djatmiko, E. B. (2012). *Perilaku dan Operabilitas Bangunan Laut di atas Gelombang Acak.* Surabaya.: ITS Press.

Evans, J. H. (1959). Basic Design Concepts. . *Naval Engineers Journal*, Vol. 71. .

Fyson, J. (n.d.). Design of Small Fishing Vessel.

Geologisia. (2019). *Kondisi Geografis Pulau Jawa yang Khas dan Membedakannya dengan Pulau Lain di Indonesia.* geologisia.com.

Harvald, S. A. (1992). *Resistance and Propulsion of Ships.* Florida USA: Melbourne.

Manning, G. (1956). *The Theory and Technical of Ship Design.* London: The TECHNOLOGY Press of MIT, Jon Willey, and Sons, New York & Chapmand and Hall.

Mansour, A. E. (1972). Probabilistic design concepts in ship structural safety and reliability. *Design concept in the ship*, 67-73.

M. Basuki Rahmat, Budianto, Imam S. (2019). Vibration Analysis of Ship-RUV Structure in Operational Conditions. *IOP Conference Series: Earth and Environmental Science*, 012045