DEPIK
Jurnal Ilmu-Ilmu Perairan, Pesisir dan Perikanan
Journal homepage: www.jurnal.unsyiah.ac.id/depik

A study on the development of a fishing shipyard in Peukan Bada District, Aceh Besar using fishbone analysis: A short comunnication

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ARTICLE INFO

Keywords:
Fisherman
Shipyard
Fishing bone
Human Resources
Material
Potency
Peukan Bada

DOI: 10.13170/depik.11.2.27236

ABSTRACT

The People of Peukan Bada generally work as fishermen. The ships used by the Peukan Bada people are generally wooden material. The capture fisheries sector in the Peukan Bada area is currently still small in scale. This can be seen from the type of fishing gear used by ships operating in the waters of Peukan Bada. The problem is that the shipbuilding industry in Peukan Bada is currently not developing following the challenges faced. So it is necessary to develop a fishing boat yard in the area. The purpose of this research is to find out what meters need to be considered in the development process. The method of collecting data used in this study is the survey method. The survey that will be carried out is by directly observing the conditions and assessing factors related to fishing vessels, the data needed to support this research method is primary data. The primary data were obtained from direct observations of various activities carried out in the shipyard and the results of interviews obtained with workers in the shipyard. The data analysis used is Fishing Bone Analysis the result of this research is that this shipbuilding industry has developments that are still far from capacity, potential, needs, and the need for the development of land parameters, human resources, machinery, materials, methods or ways of working, shipping flows and production capacity.

Introduction

Good ship conditions are needed to ensure the safety of the crew (Othman, 2018). Good ship condition is a determining factor for crew safety. Therefore, a shipyard is needed to repair and maintain ships. A shipyard is a capture fishery supporting industry that can meet the needs of repairs for ships that will carry out loading and unloading at the port. The support of facilities and ship management will determine the level of shipyard technology which will ultimately affect the quality of ship repair services (Sari, 2021). For shipbuilding, traditional shipyards generally control the experience and habits of shipyard workers (Kholis, 2020).

To support the increase in production and productivity of fishery businesses, especially marine fisheries, it is necessary to have boats or fishing vessels. Fishing vessels are one of the elements in determining the success of fishing operations other than gear and fishermen. Shipbuilding in Aceh in general is still traditional, that is, based on people's habits from generation to generation. This habit is inherited from the experience of previous people without being based on calculations of naval architecture, general arrangement, line plan, deck profile, body plan, and profile construction (Rusmilyansari et al, 2014).

The shipyard industry has not developed following the challenges it faces. The developments that occur are still far from the capacity, potential, ship needs, and market demands. The challenge faced in efforts to develop shipyards in Indonesia, in general, is that the shipyard industry is not yet strong as an economic sector that can balance other economic sectors (Nofrizal et al, 2014). Currently, shipyard engineering companies in developed countries have great business opportunities (Joo, 2013).

Fishing vessels are vessels that do not have a fixed shipping lane and the design of fishing vessels must be adjusted to the way the fishing gear operates (Arkam et al., 2017). Shipbuilding and design are the

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p-ISSN 2089-7790; e-ISSN 2502-6194
Received 29 July 2022; Received in revised from 13 August 2022; Accepted 30 August 2022
Available online 31 August 2022

most important activities in the shipyard. The time, place, and input resources needed for shipbuilding are determined following the production planning, shipyard productivity, and the quality of production planning (Who et al., 2021). The production capacity of a shipyard is in most cases determined by the guaranteed resources, land area, and the degree of proximity of each factory and work stage (Song et al, 2013).

The existence of a traditional wooden shipyard in the Peukan Bada sub-district has the potential to be developed in the future. The selection of a traditional shipyard development strategy is a complex problem, this is because several alternative strategies must be chosen but each alternative contains several criteria that must be assessed based on priorities (Lumaksono, 2014). Therefore, research is needed the study the development of fishing shipyards in Peukan Bada District, Aceh Besar. Research conducted by Sari (2021) says that the fishing shipyard business will continue to run well when the demand from consumers and producers can be fulfilled. The sustainability of the shipyard business is influenced by several factors, including the availability of raw materials, the price of raw materials, the presence of external parties who become competitive, and regulations governing the shipyard business.

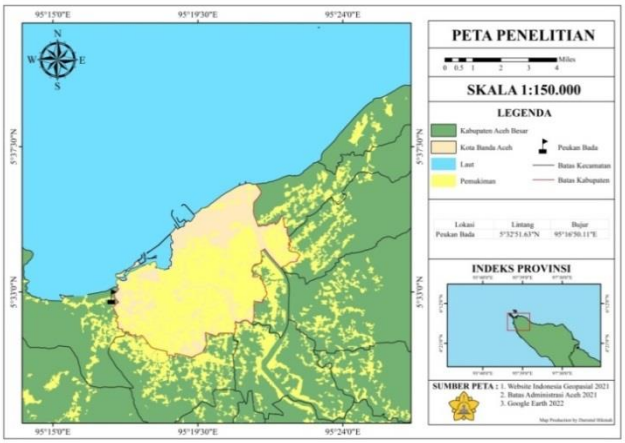

Figure 1. Place of research.

Materials and Methods

Time and place of research

This research was conducted in February 2022. The research location is in the fishing shipyard in Peukan Bada District, Aceh Besar. The map of the research location can be seen in Figure 1.

Method of collecting data

The data collection methods used in this study were survey methods and interviews using questionnaires. The survey was carried out by observing directly the conditions and examining factors related to the development of fishing shipyards in Peukan Bada District, Aceh Besar. The data needed to support this research method are primary data and secondary data. The primary data collection was obtained from direct observation of various activities carried out at the Peukan Bada shipyard and interviews using questionnaires. Secondary data were obtained from literature, journals, and books.

Data analysis

Analysis of the data used in this study is descriptive analysis to determine the development system for fishing shipyards in Peukan Bada District, Aceh Besar. This fishbone analysis is used to identify problems and determine the causes of the emergence of problems (Hindri, 2013). The basic function of a fishbone diagram is to identify and organize the possible causes of a specific effect and then separate the root causes (Fikri, 2016).

Results

This research was conducted in a fishing shipyard located in Lamteh village, Peukan Bada sub-district, Aceh Besar. This shipyard is one of the shipyards that always operates in the Aceh Besar District. The results of the identification of problems at the fishing shipyard in Lamteh village, Peukan Bada sub-district, Aceh Besar are as follows:

Table 1. Observation parameters at the shipyard Peukan Bada.

Observed factors	Problem happened
1) Human Resource	a) Lack of workers
	b) No organizational structure
	c) Non-permanent employees
2) Machinery	a) Less complete
	b) Unupdated technology
3) Land	a) Non-strategic conditions
	b) Semi-closed shipyard
4) Material	a) Good quality materials are hard to find
	b) Delays in goods/material shipping
5) Shipping Lane	a) Difficult shipping lane
	b) High sedimentation
6) Method and Procedure	a) Unclear working time
	b) No office building
	c) Lack of awareness of Occupational Health and Safety
	d) Unavailability of Waste Impact Management Analysis
7) Production Capacity	a) Number of ship production per year
	b) Number of ship production per month
	c) Number of ships repaired per year
	d) Number of ships repaired per month

Source: Personal data

After identifying the problem, a fishbone diagram can be made as follows:

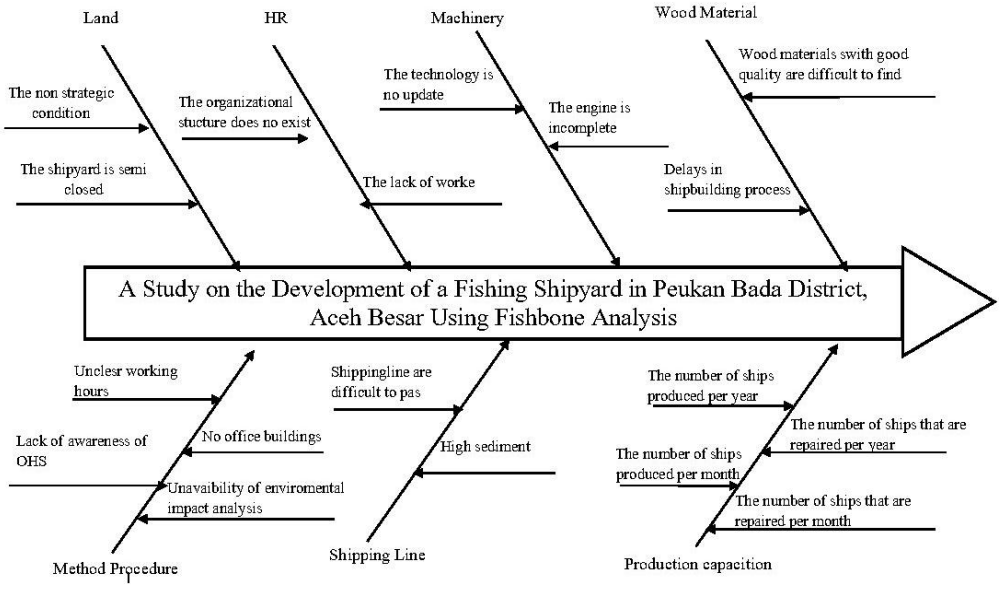

Figure 2. Fishbone analysis result.

Discussions

A shipyard is a capture fisheries support industry that can meet the needs of repairs for ships that will carry out loading and unloading at the port. The existence of a shipyard is very important. For ship building, traditional shipyards generally control the experience and habits of shipyard workers (Kholis, 2020). The Peukan Bada shipyard, Aceh Besar was established in 1987-2004. In 2004 the tsunami occurred, a year after that the owner of this shipyard cooperated with a private party from France who was located in Lhoknga. In 2007 this shipyard was moved to Mata Ie behind a private house. In 2009 when access to the village of Lamteh was built, the shipyard was rebuilt in its original place and continues to this day.

The existence of the shipyard industry plays an active role in supporting the availability of suitable, reliable, quality fishing fleets, and the shipyard industry also plays a role in the formation of employment opportunities. The production capacity of shipyards in many cases is determined by guaranteed resources, land area, and the degree of proximity of each factory and work stage (Song et al, 2013). Today's shipyard industry has a development that is still far from the capacity, potential, needs, and efforts to advance the technology. This is shown by the problems faced in the effort to develop shipyards in Indonesia in general, namely the lack of strength of the traditional shipyard industry as an economic sector in Indonesia (Ahmad et al., 2004).

Based on the diagram above, this research (see Figure 2) takes several parameters which are described as follows:

Human resource

The problems that arise from the shipyard's human resources are the lack of workers, the organizational structure does not exist, and the non-permanent employees. This shipyard has 4 permanent workers who come from villages around the shipyard. According to Farida (2021), human resources is one of the resources that has the potential to improve company performance and is very influential on the performance of a shipyard. The high quality of human resources is believed by experts to affect improving the company's organizational performance.

The lack of workers in a shipyard causes a longer time to build or repair a ship. If the use of human resources in the process of building new ships is not effective, there will likely be a lot of excess in some productions and a shortage of manpower resulting in over jobs. This will lead to a swelling of production expenditures or delays in the completion of production which ultimately results in huge losses to the shipyard industry (Dicky, 2012). According to Rizki (2020), the problem of lacking human resources in an industry can be overcome by economically procuring new workers. If possible, for a Peukan Bada shipyard to add potential employees in the field of production and repair of a ship. Various other efforts can also be offered by most companies with compensation, salaries, promotions, welfare service programs, and training.

An organizational structure is needed in the industry. The organizational structure is the design of the leader of an organization to achieve organizational goals (Gammahendra, 2014). Therefore, the organizational structure must exist in a shipyard and be well designed for an effective organization in which the presence of human resources in the organization of a company organizational structure can be implemented according to the organization's work system for effective and efficient organizational goals.

Machinery

The problems that arise from the Peukan Bada shipyard engine are that the engine is incomplete and the technology is not updated. The most decisive business development and expansion is the technology and market for ship production and services issued by the shipyard. This will affect the productivity and efficiency of the shipyard business. The Peukan Bada shipyard still uses traditional tools to support all its activities, such as saws, hammers, axes, machetes, measuring tools, screwdrivers, crowbars, electric drills, electric planers, and chainsaws. According to Vita (2011), non-renewable technology is a technology used in a shipyard for ship maintenance and repair that will indirectly affect the quality of work and performance of the ship.

According to Hasan (2019), production machines are important for maintenance and renewal, the aim is to avoid premature damage to machines caused by excessive heat. The technology developed is appropriate technology that can be adopted properly and has a real positive impact. The development of technology in the shipyard is expected to have a positive impact on the performance of fishing vessels. Good performance will ensure the operational safety of the ship to extend the economic and technical life of the ship.

Land

Peukan Bada shipyard has a land area of 500 m². The problem that arises from the shipyard land is the non-strategic condition, the shipyard is semi-closed. Location is a science that investigates the spatial planning of economic activities, a science that investigates the geographical allocation of potential sources, as well as its relationship with the influence on the existence of various kinds of businesses or other activities both in the economic and social fields (Tarigan, 2006).

Location selection is very important because it relates to the size of the price, operating costs, and competitiveness. According to Munawaroh (2013), determining the location has several objectives according to the type of business to be carried out, namely:

1. For the industry, to minimize cost
2. For retail and professional services, to maximize revenue
3. For warehouse locations, to minimize delivery speed and minimum costs

The choice of location must consider various aspects which of course encourage sales and provide benefits for a company. According to Murdifin and Mahfud (2007), business location management needs to consider several aspects:

1. Location related to long-term investment with conditions full of uncertainty
2. Location determines a boundary framework (includes law, labor, community, etc.).
3. Location has a significant impact on the company's competitive position. This will minimize production costs as well as marketing costs for the resulting output.

Wood material

Problems caused by the Peukan Bada shipyard materials are wood materials with good quality are difficult to find and delays in the delivery of goods or materials. The scarcity of raw materials causes delays in the shipbuilding process. These problems can delay the production process of a ship. The ship's materials for ship ribs use Alban or laban wood, the rest use red Shorea wood. The wood raw materials used are partially obtained from logging companies or carpenters around Banda Aceh and Aceh Besar.

According to Suardi et al (2017), the availability of materials will affect the efficiency of ship production. The time required to produce ships will be longer due to having to wait for material delivery. If the material management activities carried out in an industry run smoothly, production activities will not experience delays. The importance of material management activities in production activities means that material management includes a crisis process that can affect all production activities. According to previous research by Swastriadi (2017) the purpose of implementing material management is to obtain good material quality, sufficient quantity of material supply, appropriate usage time, appropriate sources (suppliers), and costs that are within the budget.

Method or procedure

Problems arising from the methods or workings of the Peukan Bada shipyard are unclear working hours, no office buildings, lack of awareness of OHS (Occupational Health and Safety), unavailability of Environmental Impact Analysis, and unstructured workforce. The working time at the shipyard is unclear because the workers work at different times

each day. The shipyard does not have an office building, only providing a place for ship production and repair. A shipyard should provide an office building, this makes it easier when external parties come to the shipyard (Sari, 2019).

Environmental Impact Analysis is a study of the major and significant impacts of a planned business or activity on the environment that are required for the decision-making process of an activity or business. The results of the study, Environmental Impact Analysis is an important part of the project development planning itself (Marizka et al., 2020).

The shipyard is an environment with busy activities, hot work, heavy equipment uses, working in confined spaces and many other things. To create a safe working environment, the owner or manager of a shipyard must make efforts to implement safety appropriately. In order for the safety target of shipyard workers to be achieved, it is necessary to develop an OHS program (Occupational Health and Safety). The step that needs to be done is to make a list of requirements at the shipyard for the fulfillment of OHS requirements. As a guide, we can look at the criteria contained in the Government Regulation of the Republic of Indonesia No. 50 of 2012 concerning OHS Management System. Implementing OHS is an effort to prevent accidents, occupational diseases, and equipment damage (Silfinus, 2018).

Shipping lane

Problems caused by shipping lanes at shipyards, shipping lanes are difficult to pass and high sedimentation. Sedimentation is caused by the deposition of rock material that has been transported by wind or hydropower (Robi et al., 2016). This shipyard is located on the edge of the river mouth, making it easier for the up and down process from the shipyard and to the shipyard. However, they still rely on the ebb and flow for the process of getting in and out of the ship.

Tides are natural phenomena that are visible in the sea, namely the vertical movement (regular rise and fall of seawater) of all seawater mass particles from the surface to the interior of the seabed (Sherly et al., 2017). This is due to the influence of the gravitational force. According to Andi (2003), the tidal type will affect the shipyard. The shape of the tides in different regions is different. The Peukan Bada shipyard has shallow water conditions and high sedimentation. The problem of sedimentation is an important agenda that disrupts shipyard operations. The high land erosion in the area is the main source of the high sedimentation of the shipyards. This is generally driven by the use of land that does not pay attention to conservation rules in the shipyard. By deepening the problem of erosion and sedimentation processes that occur, it is important in solving basic problems related to high sedimentation rates in a watershed.

According to Teguh (2013), sedimentation management can generally be divided into four types of activities, reducing the rate of erosion in the upstream area, minimizing the amount of sediment that settles in the reservoir, minimizing the load of sediment entering the reservoir, and removing sediment deposits in shipping lanes. Besides that, other efforts that can be taken are through land management and social management, where the community is involved in the management of this sedimentation.

Production capacity

The problems that arise from the production capacity of this shipyard are the number of ships produced per year, the number of ships produced per month, the number of ships that are repaired per year, and the number of ships that are repaired per month. Productivity is one of the important factors in influencing the development process of the shipyard industry. The size of the ship produced at this shipyard is divided into 3, for a ship length of 18.5 m it takes 8 months, for a ship length of 14.5 m it takes 4 months, and for a ship length of 6.5 m it takes 2 months. The length of time and the cost of shipbuilding or ship repair depends on the size of the ship being built or repaired.

National shipyards can produce ships with a high level of productivity through the application of modern production technology and management (Ma'ruf, 2014). The ability of a shipyard to obtain new ship orders lies in its productivity level, namely the ability to build ships according to quality specifications and requirements, short delivery times, and competitive prices. Overall, the Peukan Bada, Aceh Besar shipyard needs improvement to optimize production performance and standardize the shipyards in Aceh.

Conclusions

This study concludes that the shipyard in Peukan Bada District, Aceh Besar requires significant development to become the first modern shipyard in Aceh Besar. Several parameters that need to be developed are land, human resources, machinery, materials, methods or procedure, shipping lines, and production capacity.

Acknowledgment

The author would like to thank all those who have prayed for, provided motivation, and provided related information.

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How to cite this paper:
Firdus, F., C.P. Fathalina, L. Fitri. 2022. Characterization of potential probiotic bacteria in digestive tract of *Mugil cephalus* (Linnaeus, 1758). Depik Jurnal Ilmu-Ilmu Perairan, Pesisir dan Perikanan, 11(2): 246-251.