Jurnal Sains Teknologi Transportasi Maritim
Volume 7 No. 1. Mei 2025 pp.61-68
DOI: 10.51578/j.sitektransmar.v7i1.89
e-ISSN 2722-1679 p-ISSN 2684-9135

ANALYSIS OF THE COMPLETENESS OF SHIPYARD FACILITIES AT PT. X

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(**Received**: 07-05-2024; Reviewed: 11-11-2024; Revised: 17-11-2024; Accepted: 15-05-2025; Published: 26-05-2025)

ABSTRACT

Ports are key infrastructure in maritime trade and transportation activities that play a vital role in facilitating the flow of goods and ships and in supporting economic growth and regional prosperity. PT. X, as a shipyard company, has a strategic interest in ensuring complete and efficient port facilities to support its operations. This study aims to analyze the completeness of port facilities at PT. X with the aim of increasing operational efficiency and improving overall port performance. This research approach uses a qualitative descriptive method with data collection techniques through observation, interviews, and document studies. Primary data were obtained through direct observation at PT. X and interviews with employees of the port facilities and infrastructure department. While secondary data were obtained through literature studies from related articles, journals, and books. The results of the analysis show that PT. X has various important facilities such as docks, workshops, warehouses, offices, and functional facilities. Although most of the facilities are in good condition and have been utilized, some facilities are damaged or in poor condition that require further maintenance. This study provides an in-depth understanding of the importance of port facility analysis in improving operational efficiency and overall port performance and provides recommendations for necessary repairs and maintenance. Thus, the port can be more effective in supporting Port Operations.

Keywords:dock; shipyard facilities; ship repair

INTRODUCTION

A port is a water area protected from waves and used as a place to anchor ships or other water vehicles (Cairns et al., 2016), that function to pick up or drop off passengers, goods or animals, repairs, refueling (Gubbins, 2002). Facilities of ports are equipped with a dock for mooring ships, cranes for loading and unloading goods, transit warehouses, and storage places for goods for a longer period of time, while waiting for distribution to the destination area or the next shipment (Branch, 2012). So, ports are vital infrastructure in maritime trade and transportation activities. The quality of port facilities plays an important role in facilitating the flow of goods and ships (Jeevan et al., 2019), as well as in supporting economic growth and regional prosperity (Fanghu et al., 2024). Therefore, the analysis of the completeness of shipyard facilities is an urgent need for companies involved in the maritime sector.

PT. X is one of the companies engaged in the field of shipyards in the largest port area located in Jakarta. Liu, (2022) claim that a shipyard is a place in the waters of a ship that functions to carry out the process of building (new ships), repairing ships (ship repair), and also carrying out maintenance (maintenance). The construction process includes design, installation of initial ivory, installation of hull plates, installation of equipment, checking, feasibility testing, to classification by the designated Class (Ikenyiri, 2010). While the repair/maintenance process can include repairing hull construction, repairing sterntube propellers, main engine maintenance and other equipment (Narto & Vembriarta, n.d.). As a

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major player in the ship repair and construction sector, PT. X has a strategic interest in ensuring complete and efficient port facilities.

Completeness of facilities Shipyard is an important thing to be able to run the company's operations optimally (Setiyantara et al., 2024; Shablykova, 2020). Facilities in the shipyard sector are divided into 2 groups of facilities, namely basic facilities and supporting facilities. Basic facilities are the main facilities needed by the port such as docks, port pools, shipping lanes. While supporting port facilities are facilities that support port operations such as warehouses, security facilities and other facilities needed to support port operations. In this study, the researcher analyzed the completeness of port facilities at PT. X, although the port of PT. X has been operating well in several aspects, there is still potential to improve efficiency and quality of service. Analysis of the completeness of port facilities is a relevant study to support the success of the company's operations and growth. Port facility analysis relies on various concepts and theories related to supply chain management as well as the application of the latest information technology in port management.

Facility analysis process Port facility analysis involves a thorough evaluation of the port's infrastructure, equipment, and operational processes (Bichou, 2006; Molavi et al., 2020). The goal is to identify weaknesses, potential improvements, and efficiency opportunities to improve port performance. Analysis methods that can be used include performance monitoring, cost-benefit analysis, and simulation modeling. Causes may include infrastructure deterioration, lack of adequate maintenance, and lack of investment in technology upgrades. These issues can hinder port operational efficiency and harm local economic growth. Port facility analysis is an important step in improving port efficiency and productivity (Gonzalez & Quesada, 2024; Lu & Wang, 2017). By understanding the theoretical concepts involved, as well as factors such as PT. X and facility issues, port managers can identify areas for improvement and take necessary actions to improve overall port performance.

METHOD

The qualitative approach is implemented to this research (Ardyan et al., 2023; Moleong, 2017). In the study on the completeness of port facilities at PT. X, the researcher adopted a comprehensive approach using three main data collection techniques. First, observation was conducted by directly observing various facilities at the port, such as docks, workshops, and warehouses. Through this observation, the researcher can record the physical condition of each facility and how the facility is utilized in daily operations as showed in the figure 1. This observation provides accurate and detailed information about the condition of the facility, including any strengths and weaknesses that may exist.

In addition to observation, researchers also conducted interviews with employees from the facilities and infrastructure department (Sugiyono, 2015). These interviews aimed to dig deeper into information about port operations and the challenges faced in maintaining facilities. By listening to the perspectives of experienced employees, researchers were able to gain richer insights and nuances that might not be revealed through observation alone. In addition, researchers conducted document studies by collecting and analyzing various related documents, such as reports, archives, and literature relevant to port facilities. Through document studies, researchers can understand the context and history of facility management, as well as obtain additional data that can strengthen the findings from observations and interviews.

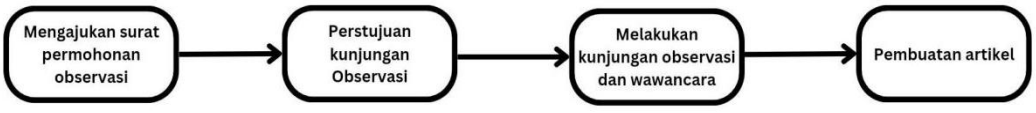

Figure 1. Research Design

In terms of data sources, this study utilized two types of sources. Primary data were obtained through direct observation and interviews with employees, providing direct and actual information on the condition and utilization of port facilities. Meanwhile, secondary data were obtained from literature studies, including articles, journals, and books related to the research topic, which provided additional context and allowed for comparison with findings from primary data. For sample selection, the researcher used a non-probability sampling technique. Employees who have worked for more than 10 years at PT. X in the field of facilities and infrastructure were selected as research samples. This selection aims to ensure that informants have sufficient experience and knowledge regarding port facilities. By selecting experienced employees, researchers hope to obtain more accurate and in-depth information regarding the conditions and challenges in facility management.

Overall, the steps taken in this study aim to provide a clear picture of the completeness of port facilities at PT. X. In addition, this study also focuses on identifying areas that require improvement, so that it is expected to improve operational efficiency and support the development of better facilities in the future.

RESULTS AND DISCUSSION

The port located at the shipyard has the same function as a port in general, namely as a place to anchor and moor ships. Every ship that will dock at the PT. X pier must have received a schedule to carry out ship repairs, for ships that will undergo repairs, of course PT. X has provided various facilities that support ship docking and repair activities. The various facilities provided by PT. X for its operational activities are as follows:

1. Dock

a. Floating dock

*Floating dock*is one of the most flexible types of docks in its use because it can sink and float ships, floating docks can also be moved easily according to needs and can repair ships faster than graving docks. However, floating docks also have disadvantages, namely the placement of floating docks must be in fairly deep waters of around 15-20 meters and the water area is protected from excessive wind, currents and waves. Floating docks also require special knowledge to carry out routine maintenance to maintain their quality and lifting power (Mustain et al., 2019). If routine maintenance is not carried out, floating docks will experience a decrease in lifting power and cause the pontoon or base of the dock to break which functions as a place to lift ships as showed in the tabel 1.

Table 1. Floating docks at PT. X

NO.	NAME OF THE PIER	SIZE (METER)	YEAR PROCUREMENT	CONDITION	CAPACITY
1.	Pier K	152 x 35	2020	Good	6000 TLC
2.	Pier J	166 x 29	1935	Good	9,000 TLC
3.	Y Pier	150 x 43	1964	Damaged	12,000 TLC

*Source:*PT.X

Pier K is*floating dock*new at PT. X this dock was ordered in 2017 completed and started to be used in 2020 until now this floating dock is still functioning well, this floating dock has a capacity of 6000 TLC. If dock K is a new floating dock then dock J is the oldest Floating dock, this floating dock started operating in 1935 and had experienced broken damage to the pontoon section so that it could not be used for +/- 5 years, and in 2023 dock J was revitalized and started operating again in 2024. Just like dock J, dock Y also experienced broken damage to the pontoon section due to reduced lifting capacity

and the age of this floating dock which was almost 60 years old. Dock Y started operating since 1964 with a maximum capacity of 12,000 TLC, in 2018 this dock experienced damage to the pontoon section which caused the floating dock to sink. Because the number of docks is still adequate and dock K is in the process of being made, finally this floating dock was auctioned by DJKN (Directorate General of State Assets).

b. Slipway dock

*Slipway dock*is a special facility that allows ships to dock efficiently by utilizing a rail system to move ships from water to land or vice versa using cranes and steel ropes, via rails that extend into the water as showed in the tabel 2.

Table 2. Slipway dock at PT. X

NO.	NAME OF THE PIER	SIZE (METER)	TYPE	CONDITION	CAPACITY
1.	Pier A	70 x 17	*Airbag*	Good	1200 Ton
2.	Pier H	60 x 15	*Helling*	Damaged	800 Ton

*Source:*PT.X

The use of slipway dock at PT. X is more often used to dock small ships because the amount of lifting capacity is not large. Slipway dock located at pier H has a maximum capacity of 800 tons, with the amount of capacity this slipway dock can only pull +/- 5000 DWT. This slipway experienced damage to the rail section, the iron rails were rusted quite badly so that they could not be used anymore. While the slipway dock at pier A can still be used until now, with a capacity of 1200 tons it can pull ships up to 7,700 DWT.

2. Workshop

The workshop is one of the facilities that supports the operational sustainability of the shipyard company, PT. X has 7 workshops that have their respective functions according to their names, namely plate workshop, construction workshop, casting workshop, mechanical workshop, electrical workshop, pipe workshop and outfitting workshop as showed in the tabel 3.

Table 3. Workshops available at PT. X

Number	Workshop Name	Unit	Procurement Year	Condition	Utilization
1.	Plate workshop	1	1964	Good	Already utilized
2.	Construction Workshop	1	1964	Good	Already utilized
3.	Casting Workshop	1	1964	Good	Already utilized
4.	Mechanic Workshop	1	1964	Good	Already utilized
5.	Electrical Workshop	1	1964	Good	Already utilized

6.	Pipe Workshop	1	1964	Good	Already utilized
7.	Outfitting Workshop	1	1964	Good	Already utilized

*Source:*PT.X

3. Warehouse

Warehouses have a strategic role in logistics management and material procurement for the ship production process at PT. X. Warehouses at PT. X are carefully designed to ensure efficient and optimal arrangement of various types of materials needed, from raw materials for shipbuilding to spare parts for maintenance and repair as in the table 4.

Table 4. Warehouses at PT. X

Number	Warehouse Name	Total Unit	Procurement Year	Condition	Utilization
1.	Central Warehouse	1	1964	Not good	Already utilized
2.	Hariang Warehouse (Asset & Logistic)	1	1964	Not good	Already utilized
3.	Oil Warehouse	1	1964	Not good	Already utilized

*Source:*PT.X

From table 4, there are 3 warehouses in PT. X, namely the central warehouse, daily warehouse and oil warehouse. The central warehouse in PT. X is used as a storage center for large quantities of materials and long periods of use, but now the central warehouse is rarely used because it is more often used to store materials in the daily warehouse. This is because the use of the daily warehouse is for materials that will be used in the near future, materials stored in PT. X are usually only stored for a period of 1-4 weeks, that is why the daily warehouse is used more often than the central warehouse. At PT. X there is also an oil warehouse, this warehouse functions to store oil for fuel for ship repair engines that require fuel oil. From the data in Table 4 it can be seen that all warehouse conditions are not good, each warehouse needs maintenance so that it can still be used.

4. Office

Offices are included in facilities that support operational activities, there are 3 offices in PT. X, namely; main office, production office and marketing office. Each office has its own duties and functions, generally the office functions to receive, organize, record and provide information. The main office of PT. X has a function to manage the main operations of the company, this office usually handles administrative submissions by ships that will undergo repairs. In addition to the main office, PT. X also has a production office, this office handles the production process or ship repair process and ensures that all equipment and materials needed are available. To market its company, PT. X has a marketing office that focuses on marketing its services and participating in tender auctions to get shipbuilding consumers. All offices at PT. X have been utilized and are in good condition, so that the company's operational activities run well as showed in the tabel 5.

Table 5. Offices at PT. X

NUMBER	FACILITY	UNIT	PROCUREMENT YEAR	CONDITION	UTILIZATION
1.	Head Office	1	1964	Good	Already utilized
2.	Production Office	1	1964	Good	Already utilized
3.	Marketing Office	1	1964	Good	Already utilized

*Source:*PT.X

5. Functional facilities

At PT. X there are other functional facilities that function to help the company and employees in doing their work, these facilities are usually used for daily routine activities that are usually carried out by employees as showed in the tabel 6.

Table 6. Functional facilities at PT.X

NO	FACILITY	UNIT	PROCUREMENT YEAR	CONDITION	UTILIZATION
1.	prayer room	1	1990	Good	Already utilized
2.	Guard Post	1	1964	Not good	Already utilized
3.	Security post	1	1964	Good	Already utilized
4.	Kitchen	1	1964	Not good	Already utilized
5.	BRI ATM	1	2017	Good	Already utilized
6.	Employee mess	15	1964	Good	Already utilized
4.	Motor Boat Station	1	1964	Good	Already utilized
5.	K3 Room	1	1964	Not good	Already utilized

*Source:*PT.X

In table 6, it can be seen that the functional facilities provided by PT. X are used for the benefit of employees, such as employee mess which functions as a residence for employees who work as repair technicians or ship builders. In addition, there are also kitchen facilities for cooking employee lunches, but since 2020 the kitchen has stopped operating and for employee lunches it is replaced with meal money.

CONCLUSION

PT. X has basic facilities such as docks, workshops, warehouses, offices, and supporting facilities such as prayer rooms, guard posts, security posts, kitchens, ATMs, employee messes, motor boat stations, and K3 rooms. Based on the results of the analysis of the condition of shipyard facilities at PT X, 18 facilities or 69.23% were in good condition, 6 facilities or 23.07% were in poor condition, and 2 or 7.7% of facilities were in damaged condition. The completeness of the facilities at PT. X is very complete and meets all the facilities needed for operations in the shipyard. However, it is necessary to pay attention to the condition and maintenance of each existing facility so that it can still be used properly, and does not cause work accidents when the facilities or equipment are being used. The need for revitalization to repair every facility that is damaged and cannot be reused in order to improve ship repair services and increase company revenue from every facility that has been revitalized. In addition, it is necessary to maintain each facility according to the needs of the facility so that it can be used for a long time.

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