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Analysis of the Influence of Ship Scheduling Factors, Pilotage Services, Loading and Unloading Productivity on Ship Waiting Time
(Study on the Port of Sei Kolak Kijang Pelindo I Tanjungpinang)

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Abstract : Ship waiting time is one of the problems that always receives serious attention in every country. Sea transportation is the main transportation in the field of trade. Almost 90% of foreign trade activities are carried out by sea. The transportation of goods carried out through the sea becomes very efficient because of the large carrying capacity so that the role of the port as a place where ships can load and unload goods is very important with adequate facilities and infrastructure. If the performance of the port is not optimal, it will have a direct impact on services so that it will incur high costs, which has a direct impact on the price of goods in the market. This study aims to find out the analysis of factors that affect Ship Scheduling, Guiding Services, Loading and Unloading Productivity to Ship Waiting Time. This research was conducted on Sei Kolak Kijang Port as a sample. Data collection was carried out through observation methods, literature studies, interviews, documentation and questionnaires. The analysis technique used is multiple linear regression with the help of the SPSS V.20 program. Based on the results of the research and multiple analysis, the equation was produced: Y = 15.326 - 0.220 The Adjusted R Square figure of 0.665 shows that 66.5 percent of the ship waiting time variables can be explained through the three independent variables in the regression equation. While the remaining 33.5 percent were explained by other variables other than the three variables used in this study.

Keywords : Scheduling, Ships, Guiding Services, Productivity.

1. BACKGROUND

Indonesia is the largest archipelagic country in the world consisting of tens of thousands of islands located in Southeast Asia which is crossed by the equator and between two continents, namely the Asian and Australian continents, and between two oceans, namely the Pacific Ocean and the Indian Ocean, so Indonesia is often also referred to as an archipelago / archipelago. As a large country surrounded by the sea, it is necessary to have a maritime sector for the smooth running of the economy and modes of transportation, in Indonesia itself has many ports spread throughout Indonesia making Indonesia an archipelagic country that has an important role in trade, Indonesia optimizes sea transportation as a connecting medium with other countries.

Transportation by sea plays a very important role for national transportation and national economic growth which will automatically increase the country's foreign exchange earnings. Marine transportation infrastructure in this case port infrastructure is very important as a supporter in international trade activities, both export and import. The quality of well-connected transportation infrastructure will have implications for the very fast turnover of trade goods so that it will have an impact on increasing trade volume and economic growth. So that the port becomes an important node for building strong maritime territory. In addition to adding and enlarging the port infrastructure, it also has a port information system that has the ability

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to make ship services related to document services and procedures for handling ships that are about to dock better and is expected to be able to make the time used more efficient.

A port is a place consisting of land and surrounding waters with certain boundaries as a place for government activities and economic activities that are used as a place for ships to dock, anchor, embark and disembark passengers and or load and unload goods equipped with shipping safety facilities and port support activities, as well as a place of transportation. So it can be interpreted that the port has a function as a place for ships and other water vehicles to dock and dock, a place for goods, animals, passengers to board and disembark before being loaded onto the ship or after being unloaded from the ship, as a place for economic and industrial activities and so on. (Herman Budi, 2012: 1)

PT. Pelabuhan Indonesia I (Persero) Tanjungpinang Branch manages three ports, namely Sri Bintan Pura Port, Sri Payung Port (UBM), and also Sei Kolak Kijang Passenger and Container Port. Sei Kolak Kijang Port is a multipurpose port where this port serves various types of cargo such as cargo to containers. Not only that, this port also has a passenger terminal that serves up to four Pelni voyages every week, namely KM Kelud, KM Sabuk Nusantara, and KM Bukit Raya.

Ship waiting time based on Decree of the Director General of Sea Transportation Number: UM.002/38/18/DJPL-11 of 2011 concerning Port Operational Performance Standards, namely the amount of time since the submission of a mooring application after the ship arrives at the anchorage location until the ship is moved to the mooring until it arrives at the mooring. Or it can be interpreted as the waiting time spent by the ship to undergo the process of activities in the port waters area, aiming to obtain berthing services at the port or pier, in order to carry out loading and unloading activities at a port. For example, a ship that is queuing in Bintan waters submits a berthing application to PT. Pelindo I Tanjungpinang Branch at 10.30 WIB, then the pilot comes to pick up the ship at 11.30 WIB, then the Waiting Time is 1 hour. So a delay of 1 hour can be said to be wasted time (non-productive) that must be borne by the ship, the shipping company or the shipper who has used the port facility services, which is due to certain factors at the port.

In entering the port, there are several activities that must be carried out by the incoming ship. The ship moves from the waters to the pier, from the pier to another pier, from the pier to the waters, where the facilities used will be needed, including storage warehouses, transportation equipment, etc. The pattern of ship arrivals can be considered as a queue so that a mathematical queue model is needed so that the level / pattern of ship arrivals can be known.

The ship berthing system usually follows the First Come First Service pattern, but sometimes there are certain types of ships that must be served first, such as the size of the ship is not sufficient if the mooring process is carried out and there are ships with smaller sizes in the queue so that service will be prioritized if the size of the ship is sufficient and does not have to wait in the queue (service priority) (Natalia Damastuti, 2015).

Ship pilotage is an activity of a pilot in assisting, providing advice and information to the captain about the condition of local waters so that navigation can be carried out safely, orderly and smoothly for the safety of the ship and the port environment, and is one of the things that needs to be considered from the entire series of services at the port, because it is the provision of the first and last service provided to ships that will visit and depart from the port (Lasse, 2014). while the pilot officer is a nautical sailor who meets the requirements to guide the ship into the pier through the port channel and the pilot officer is also responsible for the safety of the ship from the anchorage location to mooring at the pier. Punctuality in being able to dock at the pier is an assessment of the performance of ship pilotage services, because it affects the waiting time of the ship.

Loading and unloading productivity is the ability of workers or loading and unloading equipment to carry out their duties of unloading or loading goods from or to ships and docks (Fitri Indriastiwi, 2014). The higher the quality of the loading and unloading workforce, the higher the productivity of loading and unloading. The current loading and unloading service system is based on ship scheduling rules with first in first service (FIFS) where the earliest ship will be served first, but sometimes there are certain types of ships that are served first even though the ship is still in the queue, such as the size of the ship is not sufficient if the mooring process is carried out and there is a ship with a smaller size in the queue so that service will be prioritized if the size of the ship is sufficient and does not have to wait in the queue (service priority), (Damastuti Natalia, 2015).

Sei Kolak Kijang Port has a very large potential to be developed in the future because Sei Kolak Kijang Port is one of the entry terminals for various basic necessities to Bintan Island and then the goods are distributed to all Bintan Regency and to Tanjungpinang. In the loading and unloading process, each ship which should take 1 day can take up to 1 day or more and can also take up to 2 days or more, due to the lateness of the pilot ship on duty to dock the ship that will carry out loading and unloading activities, the condition of the busy shipping lane will interfere with the process of the ship that will moor, and natural factors and operational performance of the existing officers are not good in managing performance. This raises concerns that growth in volume, without adequate quality improvements with fixed facilities

and infrastructure and suboptimal port performance, of course this will result in ship waiting time, and the capacity of the dock ship loading and unloading services will increase the waiting time of ships at Sei Kolak Kijang Port. The scheduling of mooring ships greatly affects the time the ship will load and unload, because ships that are scheduled to arrive earlier can be delayed due to natural factors and so on, and types of cargo that do not last long can arrive on time, all of which will result in a ship waiting time, therefore there must be a way to cut the flow that results in waiting time, because all of this will be detrimental to all service users who use sea services.

From the preliminary study conducted, there is an indication of waiting time at Sei Kolak Kijang Port, due to the flow of containers which has increased by 20-30% each year and if the operational performance of the port is not optimal, it will have a direct impact on services in the field so that it will cause new problems, namely the ship's waiting time is getting higher, so that it will cause high economic losses, which have a direct impact on the price of goods on the market. Therefore, there must be a way to reduce the impact that causes ship waiting time because it will harm all service users who use sea services.

Based on the description above, the author wants to study it further and write it in the form of a thesis entitled "Analysis of the Influence of Ship Scheduling Factors, Guidance Services, Loading and Unloading Productivity on Ship Waiting Time"

2. THEORETICAL STUDY

Ship Waiting Time Based on the Decree of the Director General of Sea Transportation Number: UM.002/38/18/DJPL-11 of 2011 concerning Port Operational Performance Standards, it is stated that ship waiting time is the amount of time since the submission of a mooring application after the ship arrives at the anchorage location until the ship is moved to the mooring until it arrives at the mooring. Waiting time can also be interpreted as the waiting time spent by the ship to undergo the process of activities in the port waters area, aiming to obtain berthing services at the Port or Pier, in order to carry out loading and unloading activities at a port. For example, a ship that is queuing in Bintan waters submits a berthing application to PT. Pelindo I Tanjungpinang Branch at 10.30 WIB. Then the pilot officer comes to pick up the ship at 11.30 WIB, so the Waiting Time is 1 hour. So a delay of 1 hour can be said to be wasted time (non-productive) that must be borne by the ship, shipping company or shipper who has used the port facility services, which is caused by certain factors at the port.

Whether a port's transportation management system is good or not can be seen from the waiting time for a ship to dock. The more time it takes for a ship to dock, the less time it takes for a ship to dock, the better the port's transportation management system. Conversely, if the less time it takes for a ship to dock, the better the port's transportation management system is. According to the waiting time for a ship to dock, it is the waiting time spent by the ship to undergo the process of activities in the port waters area, with the aim of obtaining berthing services at the port or pier, in order to carry out loading and unloading activities at a port.

The indicators that influence ship waiting time consist of:

1. *Approach Time*(AT) or pilotage service time is the amount of time used for the ship to move from the anchor location to tying the rope to the mooring.
2. *Effective Time*(ET) or effective time is the amount of effective time used to carry out loading and unloading activities while the ship is moored.
3. *Idle Time*(IT) is ineffective or unproductive time or wasted time while the ship is at the mooring due to the influence of weather and damaged loading and unloading equipment.
4. *Not Operation Time*(NOT) is the pause time, the planned stop time while the ship is in port.
5. *Berth Time*(BT) is the mooring time from the first line to the last line.
6. *Berth Occupancy Ratio*(BOR) or dock utilization rate is the comparison between the time the dock is used and the time available (dock ready for operation) in a certain time period expressed as a percentage.
7. *Turn Around Time*(TRT) is the arrival time of a ship anchored at the pier and the departure time of the ship after carrying out loading and unloading activities (TA to TD).
8. *Postponed Time*(PT) is the waiting time caused by administration at the port (document processing).
9. *Bert Working Time*(BWT) is the time for loading and unloading activities while the ship is at the mooring/pier.

Ship Scheduling

Optimizing the port by adjusting the position of the ship's mooring can increase port productivity. There are several things to consider in accordance with the existing system and procedures, including a service pattern that follows first come first service with a priority scale and considering the safe distance of the ship in maneuvering (safety clearance).

Ship service operations include activities of planning and implementing ship moorings that are directed so that the utilization of mooring locations can be adjusted to the type and type of ship. The ship berthing system and loading and unloading service system usually follow the first come first service pattern, the earliest ship to arrive will be served first but sometimes there are certain types of ships that must be served first, such as the size of the ship is not sufficient if the mooring process is carried out and there are ships with smaller sizes in the queue so that service will be prioritized if the size of the ship is sufficient and does not have to wait in the queue (service priority) (Natalia Damastuti, 2015).

However, there are some cases that cause a ship to be served first even though the ship is still in the queue, for example because the raw materials in the warehouse are critical. The nature of the cargo is the main factor because it is related to the level of inventory as safety stock. So there must be a certain limit so that the inventory is safe. The second is time, the first time that is seen is of course arrival. This means that on the date the dock is available, if there are no ships in the queue to unload, then the ship will be processed immediately. If there are several ships in the queue, then the due date will be considered. This due date will be related to the amount of demurrage that may occur on the ship if the ship is delayed. And the third is demurrage, if the ship is still waiting and exceeds the due date.

So the priority is the demurrage value of each ship in the queue.

3. RESEARCH METHODS

Research methods are defined as scientific ways to obtain data with specific purposes and uses. There are four keywords that need to be considered, namely, scientific methods, data, purposes, and specific uses. Scientific methods mean that research activities are based on scientific characteristics, namely rational, empirical, and systematic. The data obtained through research is empirical data (observed) that has certain criteria, namely valid, reliable, and objective (Sugiyono, 2018:1).

Research Variables and Operational Definitions

Research Variables

The word "variable" only exists in quantitative research, because quantitative research believes that a symptom can be classified into variables. If there is a question about what you are researching, then the answer concerns the research variable. So research variables are basically anything in any form that is determined by the researcher to be studied so that information about it is obtained, then conclusions are drawn (Sugiyono, 2018:55). In this study,

the researcher used 2 (two) variables, namely the independent variable and the dependent variable:

1. Independent Variable (Free Variable)

   Independent variables are often referred to as stimulus, predictor, antecedent variables. In Indonesian, they are often referred to as free variables. Independent variables are variables that influence or cause changes or the emergence of dependent variables (bound) (Sugiyono, 2018:57). In this study, the independent variables are Ship Scheduling (X1), Pilotage Services (X2), and Loading and Unloading Productivity (X3).

2. Dependent Variable (Bound Variable)

   Dependent variables are often referred to as output variables, criteria, consequences. In Indonesian, they are often referred to as dependent variables. Dependent variables are variables that are influenced or that are the result of the independent variable (Sugiyono, 2018:57). In this study, the dependent variable is Ship Waiting Time (Y).

Operational Definition

Operational definition is the determination of the construct or characteristic to be studied so that it becomes a measurable variable. Operational definition explains a particular method used to research and operate the construct, making it possible for other researchers to replicate measurements in the same way or develop better methods of measuring the construct (Sugiyono, 2015). The operational definition of the variables to be studied in this study is as follows:

Independent Variables

The independent variables in this study are:

Ship Scheduling (X1)

The current loading and unloading service system is based on ship scheduling rules with first come first served (FCFS) the earliest ship will be served first, but sometimes there are certain types of ships served first even though the ship is still in the queue, such as the size of the ship is not sufficient if the mooring process is carried out and does not have to wait in line so that the service will be prioritized if the size of the ship is sufficient and does not have to wait in line (service priority), (Damastuti Natalia, 2015). Research indicators for ship scheduling factors can be measured by:

a. Ship Arrival Date

   The ship's arrival date is the date on which the ship arrives and reports that it is in the waters of the port area.

b. Service Procedures

Service procedures are activities or a series of service activities that support loading and unloading activities and can reduce demurrage and ship waiting time.

c. Setting the Ship's Mooring Position

Setting the mooring position of a ship is to consider the safe distance of the ship for the safety of the ship and its environment.

Guide Service (X2)

Pilotage services are the activities of a pilot in assisting the ship's captain, so that navigation can be carried out safely, orderly, and smoothly by providing information about the condition of local waters that are important for the safety of the ship and passengers (Andrianto Yudha, Wicaksono Achmad, 2016). So the research indicators for the pilotage service factor can be measured by:

a. Document Services

Document services are services for ships and services for cargo (goods and passengers) which include documents related to applications for docking and carrying out activities at the dock.

b. Readiness of the Guide Officer

Readiness Pilots are nautical sailors who have met the requirements set by the government to carry out pilotage duties. In carrying out their duties, pilots must always be alert in carrying out pilotage activities so that navigation can be carried out safely, orderly, and smoothly.

c. Readiness of Guidance Aids

Readiness of pilotage aids is the readiness of equipment that is directly used to assist pilots in carrying out pilotage tasks, for example radio operators and pilot boats.

d. Loading and Unloading Productivity (X3)

Loading and unloading productivity is the level of capability and speed of implementation of handling of unloading activities from the ship to the warehouse or stacking yard or vice versa (Gurning & Budiyanto, 2007). Research indicators for loading and unloading productivity factors can be measured by:

e. Performance of stevedoring workers

The performance of stevedoring workers is the speed of the workforce in carrying out loading and unloading supported by skills, auxiliary equipment and load characteristics.

f. Readiness of loading and unloading equipment

Readiness of loading and unloading equipment means that loading and unloading equipment or supporting equipment for loading and unloading are always ready.

g. Loading and unloading process time

Loading and unloading process time is a process that is seen from the speed and accuracy of the loading and unloading activity implementation system.

Dependent Variable

The dependent variables in this study are:

a. Ship Waiting Time

Waiting time is the waiting time spent by a ship to undergo an activity process in the port waters area, aimed at obtaining berthing services at the port or pier, in order to carry out loading and unloading activities at a port. (Perdana, et al., 2017). Research indicators for ship waiting time can be measured by:

i. Ship queue

Ship queue is a waiting line for service users/ships to obtain ship mooring services at the pier.

ii. The ship was late in docking

A ship being late in docking is a ship being late in receiving docking services or exceeding the time specified for a ship to receive docking services at the pier.

iii. The number of ship arrivals

The number of ship arrivals is the large number of ships that will dock at the pier to receive service activities while at the port.

4. RESULTS AND DISCUSSION

PT Pelabuhan Indonesia I (Persero) during the Dutch colonial period was originally a company with the name "Haven Bedrijf". After the independence of the Republic of Indonesia, in the period 1945-1950, the Company changed its status to the Port Bureau. In 1969, the Port Bureau was transformed into a State-Owned Enterprise (BUMN) with the status of State Port Company, abbreviated as PNP.

Period 1969-1983, PN Pelabuhan changed into a Port Entrepreneur Institution with the name of Port Entrepreneurship Agency abbreviated as BPP. In 1983, based on Government Regulation No. 11 of 1983, the Port Entrepreneurship Agency (BPP) was changed into

Perusahaan Umum Pelabuhan I abbreviated as Perumpel I. Based on Government Regulation No. 56 of 1991, Perumpel I changed its status to PT Pelabuhan Indonesia I (Persero).

The change of the Company's name to PT Pelabuhan Indonesia I (Persero) based on Deed No. 1 dated December 1, 1992 from Imas Fatimah, SH, Notary in Jakarta and has obtained approval from the Minister of Justice of the Republic of Indonesia based on Decree No. C2-8519.HT.01.01 of 1992 dated June 1, 1992 and has been announced in the State Gazette of the Republic of Indonesia No. 8612 dated November 1, 1994, supplement No. 87.

Based on Deed No. 207 dated June 30, 2014 issued by Notary Risna Rahmi Arifa, SH, the Company's articles of association were amended by increasing the company's authorized capital from Rp1,800,000,000,000 (Rp1.8T) divided into 1,800,000 shares with a nominal value of Rp1,000,000,000 per share to Rp6,800,000,000,000 (Rp6.8 trillion) divided into 6,800,000 shares with a nominal value of Rp1,000,000 per share. Based on the deed, there has also been an increase in the Company's paid-in capital from Rp511,960,000,000 divided into 511,960 shares with a nominal value of Rp1,000,000 per share to Rp. 1,700,000,000,000 divided into 1,700,000 shares with a nominal value of Rp. 1,000,000 per share. The amendment to the articles of association has received approval from the Minister of Justice and Human Rights of the Republic of Indonesia No. AHU.05403.40.20.2014 dated July 11, 2014.

The Company is domiciled and headquartered at Jalan Krakatau Ujung No. 100 Medan 20241, North Sumatra, Indonesia. Based on Government Regulation No. 64 of 2001, the position, duties and authorities of the Minister of Finance as Shareholder in a Limited Liability Company are transferred to the Minister of State-Owned Enterprises of the Republic of Indonesia, while Technical Operational guidance is in the hands of the Ministry of Transportation of the Republic of Indonesia and is implemented by the Directorate General of Sea Transportation.

Before 2008, the Company was engaged in port services, container services, container terminals and depots, shipyard business, land, electricity and water services, fuel filling, consolidation and distribution including animals, port consulting services and customs area management. Since 2008, in order to optimize resources, the Company can carry out other business activities including transportation services, rental and repair of facilities, ship and equipment maintenance, ship transhipment, property outside the main port activities, industrial areas, tourism and hotel facilities, consultant and surveyor services, communication and information, port construction, expedition, health, supplies, shuttle bus, diving, tally, port pass and scales.

PT. Pelabuhan Indonesia I (Persero) Tanjungpinang Branch manages three ports, namely Sri Bintan Pura Port, Sri Payung Port (UBM), and also Sei Kolak Kijang Passenger and Container Port. Sei Kolak Kijang Port is a multipurpose port where this port serves various types of cargo such as cargo to containers. Not only that, this port also has a passenger terminal that serves up to four Pelni voyages every week.

The business fields carried out by PT. Pelindo I Tanjungpinang Branch currently include:

1. *SHIPPING*
   a. *Fleet and operations*: who manages the merchant fleet and operations.
   b. *Shipping agency* : administrative management of handling ships that will arrive at ports in Indonesia.
   c. *Shipping agency* : serves around 100 calls per month.
2. *MARITIME*
   a. *Freight forwarding*: an individual or company that runs a business, takes care of various documents and formalities required to enter or remove goods from a ship.
   b. *Custom Clearance*: customs document administrator.
   c. *Cargo Handling* : handle loading/unloading of materials from and to the ship.
   d. *Water Supply* : manages the distribution of water from the bottom to the top of the ship.

Vision and Mission of PT. Pelindo I Tanjungpinang Branch

a. Company Vision

   Becoming Indonesia's Main Gateway to the Global Logistics Network.

b. Company Mission

   Providing reliable and integrated port and maritime services with industrial areas to support Indonesian and global logistics networks by maximizing the economic benefits of the Malacca Strait.

5. CONCLUSION AND SUGGESTIONS

Based on the results of multiple linear regression analysis and the distribution of respondents' answers regarding the Independent Variables (Ship Scheduling, Pilotage Services, and Loading and Unloading Productivity) which affect the Dependent Variable (Ship Waiting Time), the following conclusions can be drawn:

1. The results of the study at Sei Kolak Kijang Port at PT. Pelabuhan Indonesia I Tanjungpinang Branch with the Ship Scheduling variable (X1) affecting the Ship

Waiting Time (Y), so that the better the Ship Scheduling provided, the less the Ship Waiting Time caused by Ship Scheduling. This is related to the ship's arrival date, service procedures, and arranging the ship's mooring position. So it can be concluded that the increasing efficiency of employee performance in the smooth running of the Ship Scheduling process will reduce the level of Ship Waiting Time at Sei Kolak Kijang Port at PT. Pelabuhan Indonesia I Tanjungpinang Branch.

2. The results of the study at Sei Kolak Kijang Port at PT. Pelabuhan Indonesia I Tanjungpinang Branch with the Guidance Service variable (X2) affecting the Ship Waiting Time (Y), so that the better the Guidance Service available, the less the Ship Waiting Time caused by the Guidance Service. This is related to Document Services, Readiness of Pilot Officers, and Readiness of Guidance Facilities. So it can be concluded that by providing good service and according to what the ship wants from the Guidance Service, it will reduce the level of Ship Waiting Time at Sei Kolak Kijang Port at PT. Pelabuhan Indonesia I Tanjungpinang Branch.
3. The results of the study at Sei Kolak Kijang Port at PT. Pelabuhan Indonesia I Tanjungpinang Branch with the variable Loading and Unloading Productivity (X3) affects the Ship Waiting Time (Y), so that the better the Loading and Unloading Productivity available, the less the Ship Waiting Time caused by Loading and Unloading Productivity. This is related to the performance of the stevedoring workforce, the readiness of the loading and unloading equipment, and the loading and unloading process time. So it can be concluded that the increasing performance of employees during the loading and unloading process and with the readiness of adequate loading and unloading equipment will reduce the level of Ship Waiting Time at Sei Kolak Kijang Port at PT. Pelabuhan Indonesia I Tanjungpinang Branch.

Suggestion

Based on the conclusions above, the author can provide the following suggestions:

1. Ship Scheduling, it is expected that PT. Pelabuhan Indonesia I Tanjungpinang Branch will further improve the reception of information on arriving ships, improve the service procedures that will be provided for ships to dock, arrange the position of ship moorings and increase the number of docks according to the needs of the port in order to facilitate making decisions accurately and quickly in making ship scheduling that will dock.
2. Guidance Services, guidance services are a major concern in the process of entering and exiting ships. For this reason, it requires a guide officer who is always alert, readiness of

guidance aids such as radio operators and document services that will help so that the ship does not wait too long. Therefore, it is expected that PT. Pelabuhan Indonesia I Tanjungpinang Branch can improve the performance of the guide officers, as well as improve document services and provide routine briefings to handle unexpected things such as shipping lane conditions. So that guidance activities can run well and smoothly.

3. Loading and unloading productivity also affects the length of time the ship waits at the port. Therefore, it is expected that PT. Pelabuhan Indonesia I, Tanjungpinang Branch, will increase the maintenance and care activities of loading and unloading equipment and increase routine inspections of equipment completeness and accelerate the addition of equipment if there is a shortage of equipment in order to reduce the ship's waiting time, so that loading and unloading runs according to the established operation plan properly and smoothly.
4. Suggestions for further researchers, it is better to be able to add and improve, because there are still many variables that affect the ship waiting time factor at the Port of Sei Kolak Kijang at PT. Pelabuhan Indonesia I Tanjungpinang Branch apart from the variables that I took, namely Ship Scheduling, Guidance Services, and Loading and Unloading Productivity.

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