



Effectiveness Of Loading Unloading Operational Services At New Makassar Container Terminal

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Abstract

This research aims to determine the effectiveness of loading and unloading operational services at the New Makassar Container Terminal. The method that will be used in the research is qualitative by collecting primary and secondary data, then referring to several relevant literature studies, articles and research journals. Based on the analysis above, the efficiency and effectiveness of container loading and unloading activities at the new terminal is effective because the port is divided into two terminals, 60% of ship visits are at Soekarno Hatta (terminal 1) 40% of ship visits are at Makassar new port (Terminal 2), port selection is based on stakeholders, choose the next port, accessibility, distance, and road conditions/congestion at certain access points. The manager loses if the accumulation takes a long time, this is the maximum holding time for coins is 5 days, while the storage accumulation costs are 1 to 5 days with a cost of 18 thousand, if it exceeds the maximum day then there is a fine for storage accumulation with a calculation of 18 thousand per day with a maximum of 10 days. and if it exceeds 10 days, the fine will be increased to 32 thousand per day. The effectiveness of the workforce and infrastructure at the Makassar New Port terminal is very adequate.

Keywords: Effectiveness, Operational Services, Loading and Unloading

1. INTRODUCTION

Transportation development is directed to bridge the gap between regions and encourage equitable distribution of development results. Sea transportation plays an important role in the smooth running of trade because it has high economic value, including large carrying capacity and relatively low costs. In order to support trade and cargo traffic, ports are created as nodal points for the transfer of goods where ships can anchor, dock, load and unload goods and forward them to other areas (Kramadibrata 2001). Ports are important facilities, especially for sea transportation. With this transportation, the distance traveled will feel faster, especially for the economic development of a region where the center of consumer goods production can be marketed quickly and smoothly. In addition, in the economic sector, ports have a positive impact on the development of isolated areas, especially water areas where accessibility by land is difficult to do properly. So that it requires a container handling process at the port starting when the ship arrives at the dock, the containers are unloaded from the ship to the dock, then from the dock the containers are moved to the stacking yard. In the stacking yard, the containers are arranged and stacked to wait for the next transportation that will take the containers out of the port.

Based on the data, the Makassar container terminal was built in 1997, has 2 (two) dock segments intended for container ships with a length of 850 meters and a dock for dry bulk ships with a length of 150 meters with a minimum depth of -10 m LWS. The dock at Hatta Terminal can serve ships with a maximum capacity of 3000 TEU's. Soekarno-Hatta Terminal currently has a container stacking yard with an area of 11.44 Ha which is divided into 3 (three) parts, all of which are used as a container stacking yard (RIP Makassar, 2020). In early 2023, the RKAP for loading and unloading flows by Pelindo Regional 4 was set at 193,287 TEUs. However, seeing a significant increase, the target was raised to 212,675 TEUs in the 2023 Revised RKAP. Until November 2023, the total loading and unloading at Makassar New Port reached 257,981 TEUs. The maximum berthing time for ships at this port is now 24 hours, compared to the previous 48 hours.





Figure 1. Condition of the New Makassar Container Terminal, 2024.

The following is a table of loading and unloading of container cargo consisting of several shipping companies that carry out national logistics distribution activities at Soekarno Hatta Makassar Port.

Table. 1. Loading Unloading Movement of Container Cargo at New Makassar Container Terminal, 2024

No.	Shipping Company Name	Container Load				Amount		Total Container Movement
		Loading		Unloading		Loading	Unloading	
		20''	40''	20''	40''			
1	PT Meratus Line	404	88	444	133	429	577	1069
2	PT Tanto Lines	278	175	324	148	453	472	925
3	PT SPIL	51	52	102	40	103	142	245
4	PT. STCI	107	61	70	145	98	168	215
6	PT.	94	61	122	64	155	186	341
7	PT CTP Lines	148	132	138	118	180	256	436

Source: Processed Data (2024)

In table 1 above, it provides an overview of one voyage of a ship owned by PT pengiriman with loading unloading activities, with container types measuring 40 and 20 feet. Then the total movement of containers is quite high at the Port.

According to Defrianto, SB, & Ratih, P. (2023) Container terminal is a port facility consisting of a dock where ships dock, a container loading and unloading yard, and appropriate container handling equipment. Supriyono (2010) describes a container terminal as a meeting point for sea and land transportation according to the Union of Cargo System and containers as containers or warehouses, transportation facilities provided by container terminals.

The container handling process at the port begins when the ship arrives at the dock, the containers are unloaded from the ship to the dock then from the dock the containers are moved to the stacking yard. In the stacking yard the containers are arranged and stacked to wait for the next transportation that will take the containers out of the port. (Vis, IF, & Rene DK, 2003; Misliah, et al 2012)

According to Nasril, Ch (2015) Container loading and unloading activities at the port cannot be separated from supporting infrastructure such as docks, loading and unloading equipment, and stacking yards. Container docks are places for ships to dock to start loading and unloading activities. On the other hand, there is also loading and unloading equipment consisting of container cranes (CC), transtainers, reach stackers, forklifts, head trucks, and side or top loaders. This equipment handles container loading and unloading activities from ships to stacking yards or vice versa. In addition, there is also a container stacking yard (CY) which is a place for consolidating containers that will be unloaded or loaded onto/from ships.

According to Yuwana (2016) The loading and unloading process is a very complex activity. Interrelated parameters start from when the container ship arrives and docks to carry out loading and unloading activities. The parameters on the ship include the number of containers unloaded and loaded, the size and capacity of the ship, the number of tools used to unload the ship. According to Rasyid, et all (2016) Loading and Unloading Organizers as regulated in Article 2 of the Regulation of the Minister of Transportation Number PM.60 of 2014 are business activities of loading and unloading goods from and to ships at the port whose mechanisms include stevedoring, cargodoring, and receiving/delivery and are carried out by business entities that have a business license and are specifically established for loading and unloading. Loading and unloading equipment is the main tool to support loading and unloading work (Suyono 2007). Loading and unloading equipment is a production tool that functions to bridge the ship with the terminal, a productive tool

that shortens the parking period (ship berthing time). Furthermore, loading and unloading equipment and ship time in port are related to each other asymmetrically. Equipment can be a cause of an effect, namely ship time in port (Lasse 2014). According to Navianti, DR, et al. (2023) In an inventory process there are two processes, namely loading (loading process) and unloading (unloading process)

Based on the results of mapping several studies above, there are still gaps in previous discussions and research (research gaps), especially in the management, administration or service strategy at the container port at Soekarno-Hatta Port, Makassar. The novelty of this research will determine the pattern of the loading and unloading process and the mobility of container cargo movement at the Makassar Container Terminal.

2. METHOD

The method that will be used in the research is qualitative by collecting primary and secondary data, then referring to several literature studies, articles and relevant research journals. Basically, this research is to understand what phenomena are experienced by the subject of the research and is a descriptive research and tends to use analysis with an inductive approach. The qualitative approach is a case study at the Port which is a research method that uses various data sources that can be used to research, describe, and explain comprehensively various aspects of individuals, groups of a program, organization or event systematically.

- a. The data collection techniques used by the team were Observation, namely a survey conducted by directly observing the phenomena or characteristics of the parameters being reviewed, Literature, and Interviews.
- b. Data Analysis Method To analyze, namely by looking at the data that has been collected as a reference in the Research Title, Effectiveness of Loading Unloading Operational Services at the Makassar Container Terminal is as follows:
 - 1) Realization of container loading and unloading;
 - 2) Area of site for container yard;
 - 3) Dwelling Time.
 - 4) Container Queue

3. RESULTS AND DISCUSSION

a. Work Procedures in the Stacking Field

Container Shipping Process For Shippers who wish to ship goods using containers, the owner of the goods must first enter into a written contract with the company PT. Pelindo Terminal Petikemas Makassar regarding the cost of the goods carried, the owner of the goods must follow the following procedures:

- 1) The relation (shipper) comes to the company office. Then to CS (Customer Service) to fill in the SI (Shipping Instruction) needed for smooth delivery and to facilitate the creation of B/L (Bill Of Lading).
- 2) After the Shipper fills in the SI (Shipping Instruction) and returns it to the CS section, the CS Muat party issues a CRO (Container Release Order) related to the Container Seal which indicates that the Container Booking process has been completed.
- 3) The shipper brings the CRO (Container Release Order) to the operational section to carry out stuffing activities, by giving the CRO to the tallyman section to provide empty containers for stuffing, during the inspection of empty containers.
- 4) After the container check is complete, the owner of the goods prepares workers for stuffing until the container is full, for goods with large capacity that cannot use a forklift first.
- 5) Take care of the SPK (Work Order) at the shipping company office, then submit it to the operator section, to be stuffed with heavy equipment. After the stuffing process is complete, the container door is closed tightly and then sealed with the seal provided by the CS loading party.
- 6) Containers that have been stuffed have FTL (Full To Load) status, which indicates that the container is ready to be loaded onto the ship.
- 7) The operational party of PT. Pelindo Terminal Petikemas Makassar coordinates with the Pelabuhan Indonesia IV (Pelindo) Terminal Peti Kemas Makassar party which is the PBM party, for the activity of loading full containers onto the ship.
- 8) For containers that are already on board a ship or on their way to the destination port, the shipping company has made a manifest for the cargo.
- 9) Container Receipt Process. In the process of receiving containers at the destination port or unloading, the carrier informs Ship Clearance of the ship's arrival date through a notification letter. For receipt of goods that will undergo stripping activities.



To analyze, namely by looking at the data that has been collected as a reference in the Research Title, Effectiveness of Loading Unloading Operational Services at the Makassar Container Terminal is as follows: The following is a table of loading and unloading of container cargo consisting of several shipping companies that carry out national logistics distribution activities at Soekarno Hatta Makassar Port:

Table 2. Loading Unloading Movement of Container Cargo at New Makassar Container Terminal, 2024

No.	Shipping Company Name	Container Load				Amount		Total Container Movement
		Loading		Unloading		Loading	Unloading	
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6	PT.	94	61	122	64	155	186	341
7	PT CTP Lines	148	132	138	118	180	256	436

Source: Processed Data (2024)

In table 2 above, it provides an overview of one voyage of a ship owned by PT pengiriman with loading unloading activities, with container types measuring 40 and 20 feet. Then the total movement of containers.

b. Realization Loading Unloading container

Table 3. Cross tabulation between CC and Number of Containers Served

Crane Number	Number of Containers						Total
	Discharge			Loading			
	20	40	Total	20	40	Total	
CC 01	106	37	143	93	38	131	274
CC 02	128	38	166	132	38	170	336
CC 06	101	28	129	91	26	117	246
CC 07	80	43	123	95	37	132	255
Total	415	146	561	411	139	550	1111

Source: Processed Data (2024)

Based on the loading and unloading process carried out in the Makassar Regional Port area, the most dominant loading and unloading activities are served by container crane (CC) number 02 with the number of containers served by this CC as many as 170 loading and unloading activities). This number is far above other CCs because CC 02 is often used for the loading and unloading process of ships that only require one CC. Then, CC 01 serves 131 containers that are unloaded and loaded in the Pelindo IV port area. Meanwhile, CC 06 and CC 07 serve almost the same number of containers, each serving 117 and 132 loading and unloading activities. This is because the loading and unloading process carried out by CC 06 and CC 07 is carried out simultaneously, where when the ship served by CC 06 will also be served by CC 07.

Table 4. Cross tabulation between CC and Time

QCC	Working Time/Container (minutes)											
	0-1			1-2			2-3			>3		
	20	40	Total	20	40	Total	20	40	Total	20	40	Total
CC 01	20.69%	13.79%	34.48%	24.71%	16.67%	41.38%	11.49%	9.77%	21.26%	1.15%	1.72%	2.87%
CC 02	16.67%	11.83%	28.49%	25.27%	18.28%	43.55%	15.05%	10.75%	25.81%	0.54%	1.61%	2.15%
CC 06	21.54%	20.00%	41.54%	24.62%	19.23%	43.85%	7.69%	6.92%	14.62%	0.00%	0.00%	0.00%
CC 07	18.18%	18.18%	36.36%	23.64%	18.18%	41.82%	14.55%	7.27%	21.82%	0.00%	0.00%	0.00%

Average 19.17% 15.33% 34.50% 24.67% 18.00% 42.67% 12.33% 9.00% 21.33% 0.50% 1.00% 1.50%

Source: Processed Data (2024)



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From observations made on several ships, it was found that the average time required for one container to be unloaded from the ship's hold to be placed and stored in the container yard (CY) was 12.83 minutes. From the previous discussion, the average time required to unload one container and place it on a truck was 1.88 minutes. The process of transporting and moving containers that had just been removed from the ship's hold to the CY (HT Process) then became the process that took the longest time in the series of loading and unloading processes at the Makassar Regional Port. The average time required to bring a container from the dock to the CY was 8.95 minutes, with the fastest possible time being 3.70 minutes and the longest time being 27.35 minutes. Observations made showed that this significant difference in time could be caused by several factors, such as the location of the CY being far or close to the ship's dock depending on the location of the container placement in the CY, as well as congestion that occurred in the CY due to the accumulation of trucks at one point. From the interview conducted with the Manager of the Makassar Regional Port Container Terminal, containers unloaded from ships can be placed in the CY on the other side of the pier, or vice versa, they can be placed in the CY close to the pier according to the classification of the container, so the difference in distance from the pier and CY is one of the factors why the working time of this process takes quite a variety of times.

The next process after the container is in CY is the LOLO process, where the container will be unloaded from the transport truck and then stacked in CY according to applicable regulations. In this process, the average time required to move one container from the truck and stack it in the CY stack is around 1.99 minutes, with the fastest time recorded being 1.60 minutes and the longest time recorded being 3.25 minutes. This time difference can be caused by the queue of trucks waiting for the containers on top to be unloaded. From a series of processes of unloading containers from ships to being stacked in CY, the average time required is 12.83 minutes, with the fastest possible time being 7.25 minutes and the longest possible time being 30.90 minutes for one container.

c. Area of site for container yard;

Makassar Container Terminal is a port that specifically serves containers, the area of the stacking yard is 144,488.26 m², the average stacking time is 2.3 days, and the stacking yard capacity is 2,052,361.5 TEUs/year and the handling system used is the RTG system.

d. Dwelling Time

Based on the interview results, the maximum container dwelling time is 5 days, storage stacking for one to five days is 18 thousand, 6 to 10 x 18/day, 11 - etc. x 18 thousand x 2 = 32 thousand. This makes operational services in container loading and unloading activities at the port effective.

e. Container Queue

Based on the results of research conducted by the Terminal Manager, it is detrimental if the stacking time is 36% of the stacking of 70% of the container stacking capacity is divided into 2 ports so that the distribution of the container stack load is reduced, choosing a new terminal because stakeholders, choosing a port, continuing cargo, accessibility, travel distance, road conditions/congestion at certain accesses (Panampu market, bridges) so that the effectiveness of loading and unloading is very effective due to the division of terminals 60% of ship visits at Soekarno Hatta (terminal 1) 40% of ship visits at Makassar New Port (terminal 2).

f. The loading and unloading process is carried out at the port

Table. 4. Number of Containers Served in the Loading and Unloading Process of Makassar Regional Port

Number of Containers																		
Tanto Intimate Line			Meratus Line			Spill Line			Site Line			Indonesian Ocean			CTP Line			Total
20	40	Tot al	20	40	Tot al	20	40	Tot al	20	40	Tot al	20	40	Tot al	20	40	Tot al	
535	24	778	196	500	246	48	87	570	32	41	367	672	16	835	625	34	967	598
	3		5		5	3			6				3			2		2
512	15	668	260	607	320	36	18	378	56	51	107	747	18	929	558	30	865	711
	6		1		8	0			1	0	1		2			7		9
104	39	144	456	110	567	84	10	948	88	55	143	141	34	176	118	64	183	131
	7		6	7	3	3	5		7	1	8	9	5	4	3	9	2	01



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11	43	7%	11	13	14	100
%	%		%	%	%	%

Source: Processed Data (2024)

Based on table. 1 shows that the number of containers unloaded and loaded at the Regional Port IV Makassar within a period of one month is 13,101 containers. Containers from the Meratus Line company are the containers most served when compared to other companies with a total of 5,673 loading and unloading activities or 43%. The container with the least loading and unloading activities is the Spill Line company with a total of 948 loading and unloading activities or 7%.

g. Discussion

Based on the analysis above, the efficiency and effectiveness of container loading and unloading activities at the new terminal are effective because the port is divided into two terminals, 60% visitships in Soekarno Hatta (terminal 1) 40% of ship visits in Makassar new port (Terminal 2), port selection based on stakeholders, choosing a continuation port, accessibility, travel distance, and road conditions/congestion on certain access. The manager loses if there is a long buildup, this is a maximum container dwelling time of 5 days, while the cost of stacking storage is 1 to 5 days at a cost of 18 thousand, if it exceeds the maximum day then there is a fine for stacking storage with a calculation of 18 thousand per day with a maximum of 10 days, and if it exceeds 10 days then the fine is increased to 32 thousand per day. The effectiveness of labor and infrastructure at the Makassar new port terminal is very adequate. This is supported by several researchers planning efficient ordering for dock cranes to pick up containers from ships (Shields JJ 1984). And some study the routing problem, which seeks optimal sorting and stacking of containers in storage that minimizes handling time (Narasimhan, A, & Udatta, SP 2002). The purpose of loading and unloading transportation is to increase the utility and value of both goods and passengers transported from one port to the destination port. This is in line with the general purpose of transportation as formulated by Purwosutjipto, HMN (2003) namely "to increase the utility and value of both goods and passengers". Meanwhile, Abdul KM (1991) formulated the purpose of transportation as "arriving or arriving at the destination of transportation in the form of "arriving or arriving at the specified destination safely and the transportation costs are paid off.

4. CONCLUSION

Based on the analysis above, the efficiency and effectiveness of container loading and unloading activities at the new terminal are effective because the port is divided into two terminals, 60% of ship visits at Soekarno Hatta (terminal 1) 40% of ship visits at Makassar new port (Terminal 2), port selection based on stakeholders, choosing a continuation port, accessibility, travel distance, and road conditions/congestion at certain accesses. The manager loses if there is a long buildup, this is a maximum container dwelling time of 5 days, while the cost of stacking storage is 1 to 5 days at a cost of 18 thousand, if it exceeds the maximum number of days then there is a fine for stacking storage with a calculation of 18 thousand per day with a maximum of 10 days, and if it exceeds 10 days then the fine is increased to 32 thousand per day. The effectiveness of the workforce and infrastructure at the Makassar new port terminal is very adequate.

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