

THE FACTOR ANALYSIS OF THE DIFFERENCE IN PRODUCTIVITY OF UNLOADING PROCESS BETWEEN WEST BERTH AND NORTH BERTH AT JICT ON 2019

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Abstract. Jakarta International Container Terminal (JICT) has two berths, west berth and north berth. Where in each berth has different level of productivity. The purpose of this research is to determine the factors which affect the difference in productivity of unloading process at west berth and north berth at JICT. In 2019, the total containers entered the north berth reached 756,214 TEUs, while at the west berth only 375.389 TEUs. At the West berth, within one hour each container crane can only transport 25-30 boxes. While at the north berth, each container crane can transport 55-60 boxes within one hour. Based on the interview and observation, the factors that affect the difference in the productivity of the unloading process between the two berths are the equipment factor and the depth pool in the berth factor.

Keywords: berth, productivity, unloading, container, container crane.

Introduction

Having a greater water area than the land area makes Indonesia a vast Maritime State. As a maritime country, which has 17,504 islands and having two-thirds of its territory as territorial waters, sea transportation is indeed being a main support. The role of the ports becomes very crucial for the country's economy. Port is a mean of connecting between islands and countries. Port holds an important role within trade chains, both inter-island, and international trade.

Port of Tanjung Priok is one of the busiest ports in Indonesia. It has become an economic access especially for Jakarta to meet the needs of the society and it has several ports which facilitated with container yard. Jakarta International Container Terminal (JICT) is one of it.

JICT, which was established in 1999, is the largest container terminal in Indonesia with a total area of 100 hectares. . JICT is accredited to ISO 9002 standards and aims to provide excellent services through dedication of their experienced workforce and the application of the latest cutting edge technology. JICT has two berths, west berth and north berth. The two berths have different levels of productivity. The purpose of this research is to determine the factors which affect the difference in productivity of unloading process at west berth and north berth at JICT.

Components which also functioned as facility of a container terminal to support the smooth handling of containers inside the terminal, must be equipped with various facilities such as berth. Berth is the place where ships are docked and usually have a certain length and depth depending on the type of ship that is anchored (Pratama, 2015). Berth is an infrastructure built inside the port. The role of berth is very important because it is the place where ships are berthed to carry out loading and unloading activities.

The definition of "unloading" process is a process of moving the containers from a ship, while the "loading" process is the process of moving the containers into a ship (Hendra Gunawan, Suhartono, & Sianto, 2008).

Productivity in the loading and unloading process is the speed of loading and unloading company in moving containers from the vessel to the trailer and vice versa using container units per hour (Setiawati, Caehsa, & Badarusman, 2017). According to Dowd and Leschine, the productivity of the container terminal is limited by several important factors such as efficient use of labor, equipment, and land support (Marzuki, 2008).

Equipment/Cranes are equipment used for container loading and unloading activities at the container terminal (Marzuki, 2008). At the moment, container handling is mostly done by using equipment placed at the berth (Handajani, 2004). In carrying out loading and unloading activities at the berth, Jakarta International Container Terminal is supported by heavy equipment, called container cranes. Container crane is equipment serves to assist the process of transporting (moving) goods from ships to trucks and vice versa. When the crane is not operating, the boom which faced the sea is raised in order to avoid disruption to the ship's maneuver when docking at the berth or exiting the berth, if it is to operate, the part is set to be in horizontal position again (Wahono, 2015).

According to Nasaruddin, "human resources is the key to the success of an agency or company as human resources in an agency has high values of ability, knowledge, and skill" (Emilda Ihsanti, 2014). According to Suyono, loading and unloading workers are all workers registered at the local port who carry out loading and unloading work at the port (Logahan & Bivariat, 2016). Workers who have a role in the process of unloading units at the berth are called container crane operators.

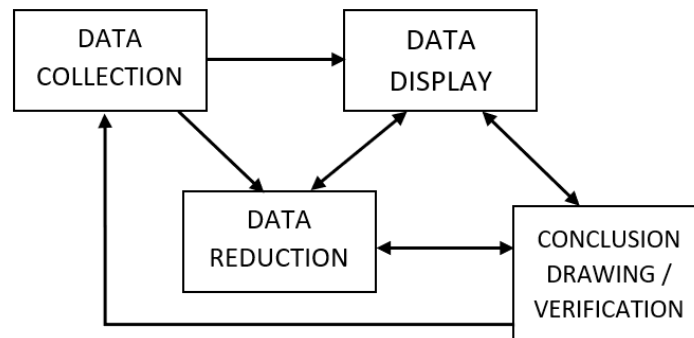
Method

For this research, researches used qualitative method. The data source used in this research was the primary data. Primary data is data collected by observation and interview techniques obtained from first party or other people as qualified sources (Risadianawati & Hanif, 2015).

Data collection techniques used in this research were observation and interview. Observation is the activity of collecting data directly from the field. While the interview is a process of interaction between the interviewer and the source of information or the person being interviewed through direct communication (Iryana & Kawasati, 2018). The researchers directly observed north berth and west berth to get accurate information about the container crane used. The researchers also conducted interviews with operational, marketing intelligence, and emergency departments, to get information about the human resources in unloading process at both berths, total containers entering each berth during 2019, data of pool depth in each berth, specification data and total operating container cranes.

The data analysis that was being used refer to the theory of data analysis model by Miles & Hubberman, which includes data collection, data reduction, data display, and conclusion.

Figure I. Data processing techniques



Source : (Miles & Hubberman, 2014)

1. Data reduction is the process of selecting, focusing on simplifying, abstracting, and transforming the data that is written in the records from the field.
2. Data display is a collection of structured information, gives the possibility of drawing conclusions and taking action.
3. The conclusions were also verified during the research period. If the conclusions are supported by valid evidence when the researchers were in the field, then the conclusions are credible.

Discussion and Result

The Productivity of Unloading Activities at JICT Berth

Following is the data of container flows of unloading process at the West berth and North berth in 2019.

Table 01. Container Flows of Unloading Process in 2019

Month	West Berth	North Berth
January	27.635	59.333
February	18.886	55.850
March	29.306	69.866
April	34.178	67.184
May	31.185	57.075
June	22.360	54.655
July	39.091	71.961
August	36.560	61.715
September	31.941	67.490
October	34.439	61.922
November	34.856	62.610
December	34.955	66.555
TOTAL	375.389	756.214

In 2019, the total containers entered on the north berth reached 756,214 TEUs, while at the west berth only 375.389 TEUs. At the West berth, within one hour each container

crane can only transport 25-30 boxes. While at the north berth, within one hour can transport 55-60 boxes each container crane. Productivity in the loading and unloading process is the speed of loading and unloading company in moving containers from the vessel to the trailer and vice versa using container units per hour (Setiawati et al., 2017). Therefore, it can be concluded that the unloading process at the north berth is more productive than west berth. According to Dowd and Leschine, the productivity of the container terminal is limited by several important factors such as efficient use of labor, equipment, and land support (Marzuki, 2008).

Equipment Factor

The researchers observed the berths and interviewed the emergency department to find out regarding the equipment used in the unloading process. During unloading process at the berth, Jakarta International Container Terminal is supported by total 16 units of container cranes (CC). The following is a table that shows the frequency of CC used in the unloading process at the West and North berth in 2019.

Table 02. The frequency of CC used in the unloading process

	Container Crane Number															
	West Berth								North Berth							
	1	2	3B	4	5	6	7	9	11	12	13	14	15	16	17	18
Jan	0	6	31	23	18	22	20	17	12	16	23	33	33	30	23	20
Feb	0	0	23	21	17	18	15	14	15	18	26	31	28	25	16	6
Mar	0	5	27	19	34	28	25	22	18	21	26	32	31	30	26	18
Apr	0	6	34	38	34	23	19	22	17	20	21	27	32	26	23	19
May	0	12	42	31	35	18	15	23	17	18	21	28	31	29	24	21
Jun	0	3	26	22	17	16	14	13	10	14	18	22	26	22	23	20
Jul	0	3	43	44	33	31	28	22	20	19	25	34	37	32	24	22
Aug	0	7	37	27	29	28	24	24	13	18	23	31	33	32	23	24
Sep	0	2	29	29	27	25	29	28	15	23	25	28	31	31	25	23
Oct	0	3	22	35	36	30	19	22	16	16	24	31	32	32	25	23
Nov	0	0	36	33	31	21	24	20	14	16	21	27	28	30	21	17
Dec	0	0	36	32	34	27	23	24	18	17	24	29	34	30	26	26

The table above shows that CC at the north berth is more often used than CC at the west berth. It is even stated that during 2019 CC 01 has never been used and CC 02 is rarely used, this is due to the specifications and age of each CC. The following are the specifications of JICT container cranes.

Table 03. Container Craine Specification

Berth	Crane Number	Year of Manufacturer	SWL	
			Spreader	Hook
			(Ton)	
West Berth	1	1984	35	40
	2	1978	35	40
	04, 05, 06	1991	40	45
	3B, 07, 08	1997	35	40

	9	2002	41	51
North Berth	11, 12	2000	45	48
	13, 14	2002	51	61
	15, 16	2008	61	71
	17, 18	2009	61	71

Based on the table above, the majority of CC at the north berth has a younger age than CC at the west berth, therefore, the carrying power of the CC at the north berth is better than the west berth. Researchers also obtained information about the CC energy source at each berth. CC 01 and CC 02 at the west berth still using diesel engines, while another CC has used electricity. Which means CC 01 and CC 02 is not preferable as it will cost more when being used. Besides, CC at the north berth are also uses twin lift cranes, while CC at the west berth has a single move crane type. As twin lift cranes can lift a pair of containers at one time, the unloading process will be faster than using single move crane type. Therefore the north berth is prioritized for berth than the west berth.

Based on the data above, we can conclude that the equipment factor affects the difference in the productivity of unloading activities at the north berth and west berth of JICT.

The Pool Depth in Berth Factor

Based on the results of interviews with operational officer, the west berth has a depth of -9m -11m, while the north berth has a depth of -14m. The maximum draft of a ship berthed at west berth is 10 meters, while the maximum draft of the ship at north berth is 13 meters. In other words, ships with large loads can only carry out loading and unloading activities at the north berth.

Thus, the pool depth in berth factor also affects the difference in the productivity of unloading activities at the north berth and west berth of JICT.

Human Resource Factor

Researchers also interviewed the operational officers to obtain information about human resources. The human resource who play a role in the process of unloading units at the berth is called container crane operator. Every CC operator at JICT has an SIO (operator license) that is renewed every 2 years. SIO is an Operator Permit, which is certified as a sign of passing the feasibility test of the operation of a production equipment/facility issued by an institution that has the authority given by DISNAKER (Department of Manpower in Indonesia). Besides, JICT also requires each CC operator to conduct a medical check-up once a year to ensure all operators are in good condition. Total of CC operators at JICT is 84 people as of 2019. In one day, CC operators are split into three shifts. Each container crane usually handled by 1-2 CC operators. However, JICT uses a rolling system in scheduling operator work placement so that all operators have a turn to work on the west berth and north berth. Therefore, there is no difference between Human Resource at the west and north berths.

Thus, the human resource factor does not affect the difference in the productivity of unloading activities at the north berth and west berth of JICT.

Conclusion

The north berth is prioritized for berth than the west berth due to, CC 01 and CC 02 at the west berth is still using diesel engines, while another CC has used electricity. Which means CC 01 and CC 02 is not preferable as it will cost more when being used. Besides, CC at the north berth are also uses twin lift cranes, while CC at the west berth has a single move crane type. As twin lift cranes can lift a pair of containers at one time, the unloading process will be faster than using single move crane type. Thus, the equipment factor affects the difference in the productivity of unloading activities at the north berth and west berth of JICT.

The depth of the pool at the north berth is deeper (-14m) compared to the depth of the pool at the west berth (-9m-11m). The maximum draft of a ship berthed at the west berth is 10 meters, while the maximum draft of the ship at the north berth is 13 meters. Consequently, ships with large loads can only carry out loading and unloading activities at the north berth. In addition, the pool depth in berth also affects the difference in the productivity of unloading activities at the north berth and west berth of JICT.

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The researchers concluded that, the unloading process at the north berth are more productive than the west berth and the factors that affect the difference in the productivity of the unloading process between the two berths are equipment factor and the pool depth in berth factor.

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