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Effect of Unloading Equipment Rubber Tyred Gantry Crane on Productivity *of Unloading PT Port of Indonesia II Port Panjang Lampung*

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Abstract: Panjang port is one of the ports under the management of PT. Pelabuhan Indonesia II with the main activity of serving port services and national logistics. With the reduction of loading and unloading equipment for rubber tyred gantry cranes, port productivity has decreased. This study aims to determine the effect of loading and unloading equipment rubber tyred gantry crane on loading and unloading productivity using quantitative research methods using primary data sources. The results of data processing prove that there is an effect of the number of loading and unloading equipment of rubber tyred gantry crane on loading and unloading productivity.

Keywords : harbor, rubber tyred gantry crane, productivity, crane

Abstrak: Pelabuhan Panjang merupakan salah satu pelabuhan dibawah pengelolaan PT. Pelabuhan Indonesia II dengan kegiatan utama melayani jasa kepelabuhanan dan logistik nasional. Dengan berkurangnya peralatan bongkar muat untuk rubber tyred gantry cranes, produktivitas pelabuhan mengalami penurunan. Penelitian ini bertujuan untuk mengetahui pengaruh alat bongkar muat rubber tyred gantry crane terhadap produktivitas bongkar muat dengan menggunakan metode penelitian kuantitatif dengan menggunakan sumber data primer. Hasil pengolahan data membuktikan bahwa terdapat pengaruh jumlah alat bongkar muat rubber tyred gantry crane terhadap produktivitas bongkar muat.

Kata Kunci : pelabuhan, derek gantri berban karet, produktivitas, derek

1. Introduction

The port is a water area that is protected against waves, and also the port has a very important function so that the loading and unloading process runs well. And ports must also be equipped with marine terminal facilities, such as docks where ships can dock for loading and unloading goods, loading and unloading equipment cranes that function to facilitate the loading and unloading process, marine warehouses (transit) and storage places where ships unload their cargo, and warehouses, where goods can be stored for a longer time while waiting for delivery to their destination or shipment.

PT. Pelabuhan Indonesia II is one of the State-Owned Enterprises that carries out activities in the field of port services and national logistics. The number of loading and unloading equipment at the Panjang port of Lampung is very adequate, but there are often repairs to loading and unloading equipment, especially the Rubber Tyred Gantry Crane, which has an impact on loading and unloading activities which causes a decrease in loading and unloading productivity This is what

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underlies the researcher to conduct a study with the title "Influence Of Rubber Tyred Gantry Crane Unloading Equipment On Productivity Of Unloading Pt Port Indonesia Ii Port Pong Lampung".

Loading and Unloading Equipment

L. Barnabas (2016) argues that loading and unloading equipment is a tool used to speed up activities to unload goods from ship to land or vice versa. With loading and unloading tools that are commensurate with the type of goods to be unloaded or loaded, loading and unloading performance will be more effective and efficient. The following are the completeness of loading and unloading equipment at the port:

a. Mobile Crane

Mobile crane is loading and unloading tool at the port that can move places and has flexible movement so that it can be used for loading/unloading containers and bulk goods/general cargo with a lifting capacity

b. Ship Cranes

Container loading and unloading equipment that can move in the stacking yard that serves to raise/ lower containers from and the top of the trailer or vice versa in the stacking area

c. Crane Kapal

Ship cranes can be used to carry out stevedoring activities for both container and bag cargo types

d. Hopper

Serves to accommodate bulk cargo that is supplied before being forwarded to other means of transport such as a dump truck

Rubber Tyred Gantry Crane

Lasse (2014) argues that Rubber Tyred Gantry Crane is a lifting device/crane that moves using rubber wheels/tyres and its function is to lift, raise and lower containers from the trailer chassis head to the stacking yard and vice versa, from the stacking yard to the chassis head trailers.

Productivity

According to Schermerharn (2018) "Productivity is defined as the result of measuring a performance by taking into account the resources used, including human resources". Anoraga (2018) argues that the factors that can affect work productivity in this study are employee motivation and work, work discipline, skills, and the sophistication of the technology used.

Unloading and Loading

According to Ahsanatun Nadia (2019), loading and unloading is an activity engaged in loading and unloading of goods from and to ships at the port, in which there are stevedoring, cargodoring, and receiving/delivery activities.

There are four loading and unloading activities :

a. Stevedoring

Is the process of unloading cargo from the ship's deck to the edge of the port using loading and unloading heavy equipment, and conversely for export goods being raised from the edge of the pier to the top of the ship's deck.

b. Cargodoring

Is the process of bringing goods from the ship's cargo on the edge of the port to the port's warehouse for storage or stockpiling, and vice versa for export goods to be removed from the warehouse and brought to the dock on the side of the ship to be ready to be loaded onto the ship's deck.

c. Delivery

Is the process of sending goods from ships that are already in the port storage warehouse to the outside of the port environment for storage.

d. Receiving

Is the process of re-transporting goods in factories or companies or industries to be sent back to the port storage warehouse.

Framework and Hyphothesis

H0 : There is no effect between Rubber Tyred Gantry Crane and loading and unloading productivity.

H1 : There is an influence between the Rubber Tyred Gantry Crane variable and loading and unloading productivity.

2. Method

The research method used in this study is a quantitative approach because the loading and unloading equipment of Rubber Tyred Gantry Crane (X) Long Port on Productivity (Y) Unloading is in the form of quantitative data.

V. Wiratna Sujarweni (2014) argues that quantitative research is research that creates findings that can be obtained using statistical procedures or other means of quantification (measurement). This study was made to determine the effect of the rubber tyred gantry crane loading and unloading equipment on loading and unloading productivity.

The tests carried out for this study were the classical assumption test (while still meeting the requirements of the normality test and heteroscedasticity tes). Simple linear regression test, correlation coedficient test, adjusted r2 test. In this study, the authors used a significance level of 0,05 as a determination of whether or not the item was appropriate.

3. Discussion and Results

As a facility in a container terminal, container loading and unloading equipment are expected to be able to meet the company's productivity targets, because if the container equipment is damaged or is in the maintenance process, the level of container productivity will also have an effect and decrease productivity. The following is data on operating hours and the number of rubber tyred gantry crane units available in the 2021 period.

Month	Year	Hour	RTG CRANE (X)	PRODUCTIVITY (Y) (BOX)
January	2021	1011	4	10092
February	2021	1031	4	9857
March	2021	1159	4	11482
April	2021	1096	4	11040
Mey	2021	1012	4	10037
June	2021	1035	4	10580
July	2021	1110	4	11003
August	2021	1110	4	10792
September	2021	1173	4	11400
October	2021	1160	4	11420
November	2021	1397	5	14283
December	2021	1421	5	14557

Normality Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1967.200	910.864		2.160	.056		
	RTG_Crane	-366.040	217.738	-.469	-1.681	.124	1.000	1.000

a. Dependent Variable: ABRESID

Ghozali (2018;137) argues that the heterocedasticity test aims to test whether in a regression model there is an inequality of variance from the residuals of one observation to another. The table

above shows a significant value for the independent variable rubber tyred gantry crane with an absolute residual of 0.124 > 0.05 so that it can be stated that there is no heteroscedasticity

Simple Linear Regression Test Results of Rubber Tyred Gantry Crane and Productivity

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-3828.500	1877.793		-2.039	.069
	RTG_Crane	3649.700	448.878	.932	8.131	.000

a. Dependent Variable: Produktivitas

$$Y = a + \beta X$$

$$Y = -3828.500 + 3649.700X$$

If the value of the Rubber Tyred Gantry Crane (X) variable has a value of zero, then the loading and unloading productivity variable has a value of – 3828.500

The coeficient value of the loading and unloading aquipment for Rubber Tyred Gantry Crane (X) is 3649.700, indicating that for every 1% increase in the varible loading and unloading equipment for Rubber Tyred Gantry Crane, the Productivity of loading and unloading (Y) will increase by 3649.700.

T Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-3828.500	1877.793		-2.039	.069
	RTG_Crane	3649.700	448.878	.932	8.131	.000

a. Dependent Variable: Produktivitas

This test aims to determine whether the independent regression model partially has a significant relationship to the dependent variable. Based on the t-test regression analysis using SPSS

Based on the results processed by SPSS 25, it is known that:

The value of T count > T table is 8.131 > 1.812 with a significance level of 0.000 < 0.05 (H1 is accepted) which means that the variable loading and unloading equipment Rubber Tyred Gantry Crane partially affects the productivity of loading and unloading

F Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22200516.817	1	22200516.817	66.108	.000[b]
	Residual	3358196.100	10	335819.610		
	Total	25558712.917	11			

a. Dependent Variable: Produktivitas

b. Predictors: (Constant), RTG_Crane

This test used to determine whether in the regression model the RTG Crane variables simultaneously have a significant relationship to the productivity variable.

Based on the table above, the value of F count > F table is 66,108 > 4.96 with a significant level of 0.000 < 0.05, then H0 is rejected, which means that the Rubber Tyred Gantry Crane variable has a partial effect on the productivity of loading and unloading containers.

Coefficient of Determination and Coefficient Correlation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.932[a]	.869	.855	579.499	1.632

a. Predictors: (Constant), RTG Crane

b. Dependent Variable: Produktivitas

Guidelines for interpreting correlation coefficients

Coefficient Interval	Level of Relationship
0,00 – 0,199	Very Low
0,20 – 0,399	Low
0,40 – 0,599	Normal
0,60 – 0,799	Strong
0,80 – 1,000	Very Strong

The coefficient of determination and correlation table shows an R-value of 0.932 which means that the rubber tyred gantry crane correlation has a very strong relationship and the coefficient of determination R square is 0.869 or 86.9%. This value indicates that the variable loading and unloading productivity of containers can be explained by the rubber tyred gantry crane variable of 86.9%, the remaining 13.1% is influenced by other variables not examined.

4. Conclusion

This study shows satisfactory results, the loading and unloading equipment of the rubber tyred gantry crane is very important to consider to increase the productivity of loading and unloading containers because these variables have a significant relationship to the productivity of loading and unloading containers.

This is evidenced by the results of the study which show that the significant value of Fcount 66,108 is greater than Ftable 4.96 and the significance level of 0.000 is smaller than alpha 0.05, which means that the overall variable, namely loading and unloading equipment for rubber tyred gantry cranes, has a relationship with productivity variables.

The results of calculations using simple linear regression analysis, the regression coefficient value is 8.131 for loading and unloading equipment for rubber tyred gantry cranes (X). A positive regression coefficient value indicates that the relationship between the variables is positive or in the direction of the dependent variable

From the conclusion above, the loading and unloading equipment of the rubber tyred gantry crane (X) has a positive or unidirectional relationship to the productivity of loading and unloading of containers (Y), meaning that if the loading and unloading equipment of rubber tyred gantry cranes increases, the productivity of loading and unloading also increases.

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