

## The Influence of Terminal Booking System (TBS), Yard Operation Plan (YOP), Turn Round Time (TRT) on Operational Effectiveness PT Pelindo Terimnal Peti Kemas Semarang

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### Abstract

PT Pelindo Terminal Peti Kemas Semarang (TPKS) is a subholding of PT Pelindo that focuses on export and import container services. TPKS is one of the pioneers of the smart port concept in Indonesia, one of which is by implementing the Terminal Booking System (TBS) and Yard Plan to reduce Turn Round Time (TRT). However, in practice, there are still many discrepancies between booking and gate-in hours, which have an impact on operational activities. The purpose of this study is to determine the effect of the Terminal Booking System, Yard Operation Plan, and Turn Round Time both partially and simultaneously and to see the factors that most influence the operational effectiveness of TPKS. This study used a quantitative method of explanatory format with a population of planning, control, and operational management divisions using total sampling. The results of this study indicate that there is a positive and significant influence between the Terminal Booking System, Yard Operation Plan, and Turn Round Time both partially and simultaneously on the operational effectiveness of TPKS. Meanwhile, the most influential factor is the Turn Round Time variable. The conclusion is that there is a positive and significant influence between TBS, YOP, and TRT either partially or simultaneously on the operational effectiveness of TPKS. The researcher's suggestion for PT Pelindo TPKS is to be able to optimize loading and unloading activities and receiving delivery in domestic CY (Container Yard).

### Keywords

*operational effectiveness; terminal booking system; turn round time; yard operation plan*

## INTRODUCTION

The port is the berthing place of various types of ships, ranging from passenger ships, container ships, barges, bulk carriers, and tankers. Ports provide facilities and infrastructure to carry out activities based on the type of port. One type of port is the container terminal port whose main activity is loading and unloading containers. In Indonesia, ports are managed by PT Pelindo. Container terminal ports will play an important role in the wheels of the economy both locally and internationally. This is demonstrated by the increased activity of export and import loading and unloading container flows, including at PT Pelindo Terminal Peti Kemas Semarang (TPKS), which is the only container terminal in Central Java. Until now TPKS has always been innovating by continuing to create new breakthroughs to increase the effectiveness and efficiency of its operational activities, one of which is digitalization such as the implementation of the Terminal Booking System (TBS) which was only implemented on July 1, 2022. However, the implementation of TBS is still not running optimally because customers do not follow up by updating the situation and condition of the receiving delivery truck on the Web access system.

There are still many discrepancies between the time of booking and its realization. The level of conformity of international TBS was only 48%, meaning that there were 71,823 TEUs of containers that matched between booking hours and gate-in times of a total of 148,668 TEUs, while 76,845 TEUs did not comply with CY TPKS. Meanwhile, for domestic TBS the conformity rate was only 27%, meaning that there were 4,510 TEUs of suitable containers between booking hours and gate-in, out of a total of 16,581 TEUs, while 73% did not match as many as 12,071 incoming containers to CY TPKS. This problem will have a sustainable effect on the Yard Operation Plan that has been prepared by the planning division (Planner) and will change according to the actual conditions in the field. The planner will make readjustments and this process takes time. A Yard Operation Plan (YOP) is a plan for operational activities in the yard or CY (Container Yard) by projecting and arranging the loading and unloading of containers according to their classification. Thus it has the potential to hinder the completion time or Turn Round Time (TRT) which can have an impact on the level of operational effectiveness of the TPKS. TRT is the time used from the arrival of the ship/truck until the departure of the ship/truck out of the container terminal area. The purpose of this study is to determine the effect of the Terminal Booking System (X1), Yard Operation Plan (X2), and Turn Round Time (X3) partially and simultaneously and to find out which of the three independent variables has the most influence on operational effectiveness at TPKS.

## LITERATURE REVIEW

### *Ports*

According to Abubakar et al (2010), a port is all activities related to the utilization of port functions to support the mobility, safety, and orderly security of ships, goods transported, or passengers and can stimulate the economy of the country and the local area.

### ***Container Terminal***

According to Koleangan (2008: 37), a container terminal is a facility that brings together sea transportation modes and land transportation modes in which it is specifically for container loading and unloading activities with the help of heavy equipment and competent operational personnel to achieve effectiveness and efficiency.

### ***Terminal Booking System (TBS)***

According to Shichao Sun et al (2022) Terminal Booking System (TBS) is a system for scheduling the receiving or receiving of containers and the delivery or delivery of containers which aims to digitalize innovation and simplify or simplification of operational activity procedures at TPKS.

### ***Yard Operation Plan (YOP)***

According to PT Pelindo TPKS Yard Operation Plan (YOP) is a planning for operational activities in the yard or CY (Container Yard) by projecting and arranging the loading and unloading of containers according to their classification.

### ***Turn Round Time (TRT)***

According to Lasse (2014), TRT is the time used from the arrival of the ship/truck until the departure of the ship/truck out of the container terminal area.

### ***Operational Effectiveness***

According to Hidayat (1986), effectiveness is a benchmark for achieving the target the higher the target is achieved, it will be in line with the level of effectiveness.

## **METHODS**

The type of research in this research is explanatory research with a quantitative approach. Explanatory research is research that is used in explaining the causal relationship between latent variables through the process of testing hypotheses that have been. The research method used in this study was to use questionnaire methods, observation, and documentation. The population used as the object of study is the staff of planners, controllers, and operational at PT Pelindo TPKS as many as 32 people. The technique used is total sampling which all populations are used as respondents. The research model uses multiple linear regression and is calculated with SPSS 25. The hypothesis in this study is:

H1: There is a partial influence between Terminal Booking System (X1), Yard Operation Plan (X2), and Turn Round Time (X3) on the operational effectiveness (Y).

H2: There is a simultaneous influence between Terminal Booking System (X1), Yard Operation Plan (X2), and Turn Round Time (X3) on the operational effectiveness (Y).

H3: Between Terminal Booking System (X1), Yard Operation Plan (X2), and Turn Round Time (X3) on the operational effectiveness (Y); Turn Round Time (X3) has the most significant effect on the operational effectiveness (Y).

In determining the H3 Hypothesis, researchers refer to previous research conducted by Anshul Balamwar, et al, (2022) which explains that TRT is a key factor in assessing port performance and expediting the flow of supply chain network systems faster.

**RESULT**

**T Test**

According to Sugiyono (2012) the t-test functions to look for the influence of the independent variables separately (partially) on the dependent variable. Here are the results:

**Table 1. T-test result**

<b>Coefficients<sup>a</sup></b>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.070	3.758		-1.349	.188
	X1 (TBS)	.297	.107	.326	2.769	.010
	X2 (YOP)	.276	.110	.334	2.520	.018
	X3 (TRT)	.437	.115	.445	3.792	.001

a. Dependent Variable: Y (EFEKTIVITAS)

Based on the table, all the significance values of the variables X1 (0,010), X2 (0,018), and X3 (0,001) are smaller than 0,05 so H1 is accepted. Meanwhile, based on the value of standardized coefficients, Turn Round Time (X3) has the most significant effect on the operational effectiveness with 0,445 which is greater than Terminal Booking System (X1) and Yard Operation Plan (X2) so that H3 is accepted.

**F Test**

According to Sugiyono (2012) the F test functions to look for the influence of the independent variables simultaneously (simultaneously) on the dependent variable. There is the results:

**Table 2. F test result**

<b>ANOVA<sup>a</sup></b>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	134.130	3	44.710	22.420	.000 <sup>b</sup>
	Residual	55.838	28	1.994		
	Total	189.969	31			

a. Dependent Variable: Y (EFEKTIVITAS)  
 b. Predictors: (Constant), X3 (TRT), X1 (TBS), X2 (YOP)

Based on the table, the significance value of 0,000 is smaller than 0,05 so H2 is accepted.

## DISCUSSION

The results of this study are theoretically in line with the theory put forward by Shichao Sun, et al (2022), which states that the arrival of external container trucks (Gate in) concentrated during peak hours usually causes serious traffic jams in the gate area and CY container terminal. In this context, the application of the TAS (Truck Appointment System) is considered an effective way to manage the distribution of the arrival time of container trucks so as to help reduce truck congestion and reduce truck round time. Thus the level of suitability of the TBS (Terminal Booking System) between booking hours and the arrival time of external trucks (gate in) to the TPKS CY (Container Yard) area will determine the level of operational effectiveness of the TPKS. In the Terminal Booking System, both parties, in this case TPKS and service users, exchange information about the arrival time of external trucks carrying containers to be sent to other areas. After the information has been received, the planner will then plan the allocation of trucks in certain CYs based on the classification of the transported containers.

The results of this study are theoretically in line with the theory of Muhammad Riza Affiat, et al (2021), to achieve efficiency in the buildup yard, the port must improve operational systems such as the use of TOS (Terminal Operating System). Thus digitalization plays an important role in achieving efficiency in operational activities. At TPKS itself, its operational activities already use the TOS (Terminal Operating System) system in the form of Web access and CBS (Container Billing System) which are integrated in real-time. This can then make it easier to monitor existing activities in the field so that the YOP (Yard Operation Plan) can be made optimally.

The results of this study are theoretically in line with the theory of Shichao Sun, et al (2022), TAS (Truck Appointment System) can be applied to quickly overcome the problem of reducing the turnaround time for external container trucks at terminals. Thus, the speed of the TRT is determined by the smooth flow of truck traffic in the CY area. Truck queuing traffic is influenced by several factors such as the allocation of the intended CY, weather conditions, unreadable job slips, and system errors. TPKS itself has set a KPI (Key Performance Indicator) for receiving activities for 40 minutes and delivery for 50 minutes.

## CONCLUSION

1. Terminal Booking System (X1), Yard Operation Plan (X2), and Turn Round Time (X3) had a positive and significant influence partially on the effectiveness of operational activities at PT Pelindo TPKS with significance value X1 (0,010), X2 (0,018), X3 (0,001). All value of the significance variable is smaller than 0,05. Therefore, it is concluded that the Terminal Booking System, Yard Operation Plan, and Turn Round Time have a partially significant positive effect on the operational effectiveness of TPKS.
2. Terminal Booking System (X1), Yard Operation Plan (X2), and Turn Round Time (X3) have a positive and significant influence simultaneously on the effectiveness of operational activities at PT Pelindo TPKS with a significance value of 0,000 that mean is smaller than

0,05. Therefore, it is concluded that the Terminal Booking System, Yard Operation Plan, and Turn Round Time have a simultaneously significant positive effect on the operational effectiveness of TPKS.

3. Turn Round Time (X3) has the most significant effect on the operational effectiveness with a value of 0,445 which is the greater than value of the Terminal Booking System (0,326) and Yard Operation Plan (0,324).

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