Analysis Of Container Yard Capacity in TPK Semarang

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Abstract. TPK Semarang is one of the container terminals located in the Tanjung Emas Port area, Semarang which has a special pier or terminal for container ship activities, where the Semarang Container Terminal area is in the Tanjung Emas Port area, Semarang in Central JavaProvince. It should be noted that the Yard Occupancy Ratio (YOR) in 2022 is 46%, based on theUNCTAD standard YOR classification, which is sufficient, given the condition of the existing stockpiling yard area. Semarang TPK is still able to serve the growing flow of containers until 2032, this is related to the yard occupancy ratio (YOR). In the 2032 analysis, the YOR value at TPK Semarang reached 79% and was included in the high category so that it would affect the level of service at the terminal.

Keywords: container, terminal, occupancy, port

1. Introduction

TPK Semarang is one of the terminals under the management of Subholding PT. Pelindo Container Terminal which has a special terminal for container loading and unloading activities, where the Semarang Container Terminal area is in the Tanjung Emas Port area, Semarang. In its role as an economic gateway in Central Java Province, export and import activities at the Semarang Container Terminal must be supported by adequate infrastructure in the form of a stacking yard or often called a container yard, which is an area used to deliver and receive containers (receiving/delivery).

Based on data from TPK Semarang, the Yard Occupancy Ratio (YOR) in 2022 is 46%, with a YOR rateof 46%, indicating an adequate ratio. The problems that will be faced by the Semarang Container Terminal regarding container stacking capacity will arise along with the current growth rate containersfrom year to year, as well as the problem of increasing logistics costs becomes quite a serious issue if the handling of container stacking cannot be managed properly at the terminal, then to maintain the YardOccupancy Ratio at the Semarang Container Terminal it is necessary to arrange or develop container yard facilities to maintain the value Yard Occupancy Ratio to projected container growth until 2032. [1]

The importance of controlling the Yard Occupancy Ratio (YOR) at the Semarang Container Terminal isto be able to maintain more optimal terminal services. The author wants to provide an overview of the projected yard occupancy ratio (YOR) until 2032 and how to solve it.

2. Methods

The calculation of container yard usage (yard occupancy ratio) is a comparison between the usage of container yard facilities and the available capacity expressed as a percentage. This indicator relates to the use of container yards (yard occupancy ratio) with the aim of calculating the use of available container yards at a port as follows [2][3]:

  a. Determining the required stacking area can be calculated by the formula:

$$A = \frac{T.\,D.\,Ateus}{365\,(1-BS)}$$

Information :

- T = Container Flow per year (teu's)
- A = Container Yard area required (m2)
- D = Dwelling Time or the average number of days the container is stored in the stacking yard
- $Ateus$ = Area required for one teus which depends on the container handling system and the number of containers in the fiele
- BS = Broken Stowage (area removed due to road or distance between containers in the stacking yard, depending on the pattern of operations implemented at the Terminal (estimated 25 -50%).

  b. Calculating the utilization of the stacking field can be calculated using the formula:

$$YOR = \frac{Available\ Capacity\ (m2)}{Available\ Capacity\ (m2)} \times 100\ \%$$

Information :

- YOR : Yard Occupation Ratio (%)
- Used Capacity : Used/required Stacking Field Area Capacity (m2)
- Available Capacity : Existing and planned stacking field capacity (m2)

The research methodology is the steps taken to achieve the research objectives. So that with the existence of a research methodology/planning it can direct a study to focus and get good results. The research is arranged in a research flowchart as follows:
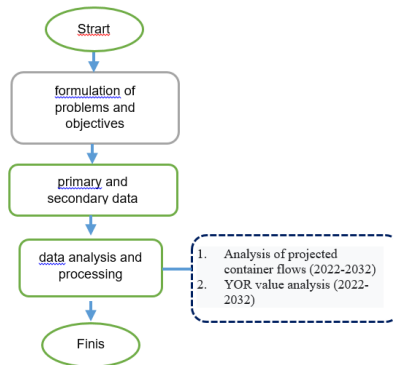

Figure 1

In the picture above, it explains that this study analyzes the projected needs of the stacking field by looking at the growth in container flows up to 2032, while the research begins by formulating the problem and analyzing some of the literature such as journals and related regulations. The collection of secondary and primary data is very important so that it can be processed into a projected value of YOR growth until 2023. or equal to 70%, it is necessary to modify the value of D (Dwelling Time), Ateus, and Available Field Area until the YOR value is obtained according to the performance standards of the Directorate General of Sea Transportation.

3. Results and Discussion :

Analysis of economic growth for existing data is obtained from data from the Central Statistics Agency, namely the Central Java PDRB Development Index at constant prices from 2013 to 2022, then projectedup to 2032. The macroeconomic projection method for Central Java Province assumes a 4% increase in2023 - 2032 according to the average macroeconomic growth data over the past 10 years [4][5].

Based on the results of the calculation of the linear equation with the resulting equation $Y = 0.988X - 242.88$, where "Y" is the flow of containers, while "X" is the value of GRDP in Central Java Province, the method used is the projected results of container flows at TPK Semarang at the beginning of the yearthe projection (2023) is 838,017 Teus, while the projection at the end of the observation year (2032) is 1,323,687 Teus

Table 1

YEAR	Central Java GRDP Index (Trillion Rupiah) (X)	Container Flow (Theus) (Y)	Information
2023	**1.095**	**838.017**	The Projected Equation of Container Flow is as follows: $Y = 0.988X - 242.88$
2024	1.141	883.517	
2025	1.189	930.932	
2026	1.239	980.343	Notes:
2027	1.291	1.031.835	Y = Projected Flow of Containers
2028	1.345	1.085.493	X = Projection of the GRDP Index
2029	1.402	1.141.411	with an assumption of "4%"
2030	1.461	1.199.682	growth
2031	1.522	1.260.407	
2032	**1.586**	**1.323.687**	

The flow of containers, while "X" is the index value of the PDRB of Central Java Province, which in the 2023 projection year generated a flow of 838,017 TEUs, whereas in the 2032 projection obtained a projected flow of 1,323,687 TEUs containers.

The calculation projection of container yard usage (yard occupancy ratio) is a comparison between the projected usage of container yard facilities and the available/existing capacity expressed as a percentage. This indicator relates to the use of container yards (yard occupancy ratio) with the aim of calculating theuse of available container yards at a port as follows:

Table 1

YEAR	Capacity Required/Used (m2)	Available/Existing Capacity (m2)	YOR
	a	b	c=(a/b)x100%
2023	131.196	262.419	50%
2024	138.320	262.419	53%
2025	145.743	262.419	56%
2026	153.478	262.419	58%
2027	161.540	262.419	62%
2028	169.940	262.419	65%
2029	178.694	262.419	68%
2030	**187.817**	**262.419**	72%
2031	**197.324**	**262.419**	75%
2032	**207.231**	**262.419**	79%

In the picture above, it can be seen that in the next 10 years, in addition to the number of movements of goods in the form of containers, it will increase every year, resulting in an increase in the need for stacking field capacity, as seen in 2032, the total area required for container stacking fields is 207,231m2 of the total field area. available area of 262,419 m2 or with a level of use/utilization of the yard (YOR) of 79%.

4. Conclusions:

After analyzing the capacity of the container stacking field by looking at existing data forthe 2013-2022 period and making projections for the 2023-2032 period, the writer can conclude the following:

a. Based on the results of the correlation between the PDRB index of Central Java Province and the flow of containers at TPK Semarang, a strong positive correlation value is produced, where the growth of the GRDP index of Central Java Province is followed by an increase in the number of container flows at TPK Semarang using the regression equation Y=0.988X-242, 88. From the calculation of the projected flow of containers with this equation, the projected value of growth in the flow of containers at TPK Semarang in the projected year 2032 is 1,323,687 Teus.

b. By knowing the value of the flow of containers in the projected year in 2032, it is possible to project the utilization/utilization value of container yards or Yard Occupation Ratio (YOR) until 2032 with a YOR value that exceeds 70% occurring in the 2030-2032 projection year with the value in 2030 is 72%, in 2031 it is 75%, and in 2032 it is 79%, so that the operational performance of the utilization of the piling up fields until the 2032 projection is stated to be not good according to the standards of the Directorate General of Sea Transportation.

c. The author provides suggestions so that changes to the external variables needed can be made up to the projected year so that the Semarang Container Terminal can make preparations to maintain the Yard Occupancy Ratio (YOR) value until 2032 according to the standards set by the Directorate General of Sea Transportation, namely below 70%, so The Semarang Container Terminal can guarantee the smooth distribution of national and international logistics so as to reduce logistics costs.

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