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The Influence Of Quay Container Crane Performance And Container Yard Capacity On Increasing Container Throughput At TPK KOJA

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Abstract: This study examines the influence of quay container crane performance and yard capacity on increasing container throughput at Koja Container Terminal (TPK Koja). The main problem is the long waiting time for increased containers, averaging 3.5 days, which exceeds the government standard of 3 days. This condition reflects inefficiency in terminal operations and infrastructure, particularly the poor condition of container cranes at berths 1 and 6 of berth 7, as well as limited yard space that cannot accommodate the increasing volume of containers. The research applies a quantitative approach by collecting data through field observations, interviews, and questionnaires distributed to employees of the terminal operations division at TPK Koja. Data are analyzed using statistical methods to examine the effect of two independent variables, quay container crane performance (X1) and yard capacity (X2), on container throughput (Y). The results are expected to provide insights for increasing operational efficiency and supporting better terminal performance.
Keywords: *Quay Container Crane Performance; Container Yard Capacity; Container Throughput Increase; Dwelling Time; TPK Koja*

1. Introduction

Koja Container Terminal (TPK Koja), located at Tanjung Priok Port, is one of Indonesia's main container terminals supporting national trade activities. In recent years, container throughput at TPK Koja has continued to grow, showing an increase from 851,041 TEUs in 2020 to a projected 1,018,060 TEUs in 2024. However, this growth has not been matched by the terminal's operational efficiency, which is still constrained by equipment limitations and restricted yard space.

One of the key operational problems is the long dwelling time of imported containers. Based on (Ellenlies et al., 2021), the average dwelling time at TPK Koja reaches 3.5 days, exceeding the government standard of 3 days. This condition indicates that container flow from the terminal to the consignee is not optimal, causing congestion and delays in logistics distribution. Another major challenge is the limited yard capacity. With a total area of 25.72 hectares and a capacity of 7,560 TEUs per cycle, the container yard often operates above its optimal limit, causing the yard occupancy ratio (YOR) to reach a critical level and disrupt internal container movements (Bimarso et al., 2024).

In addition, internal data from TPK Koja (2024) show that two of the seven quay container cranes (QCC 1 and QCC 6) are still in poor condition, reducing loading and unloading productivity. Therefore, this study focuses on analyzing how the performance of quay container cranes and container yard capacity influence container throughput at TPK Koja. The results are expected to provide recommendations for reducing dwelling time, optimizing yard utilization, and improving overall port efficiency.

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2. Literature review

Quay Container Crane Performance

According to (Mangkunegara, 2009), performance refers to the outcomes of an employee's work in terms of both quality and quantity, achieved while carrying out their duties in accordance with assigned responsibilities. Meanwhile, (Sedarmayanti, 2011) explains that performance, as a translation of "performance," represents the work of an employee, a management process, or an organization as a whole, where the results must be demonstrated through concrete and measurable evidence based on predetermined standards. According to (Wibowo 2010) posits that performance is about doing the work and the results achieved from the work. Gilbert (1977), cited (Notoatmodjo, 2009) stating that performance is what a person can do according to his duties and functions.

The definition of the opinion of the experts above is concluded that performance is a work result achieved by an employee in accordance with the standards and criteria that have been set within a certain period of time.

A container crane is a type of upright-legged tall portal crane that lifts objects with a hoist mounted on a hoist trolley and can move horizontally on a pair of rails mounted under a beam or work floor. Gantry cranes are used to lift and move heavy loads and are widely used in ports for container unloading loading processes). The way the Container Crane works is that when the crane is not operating, the part of the portal facing the sea is lifted so as not to obstruct the maneuver of the ship docking to the dock or exiting the dock, if it wants to operate, the part is lowered horizontally. According to (Ridwan et al., 2023)The performance of QCC is measured through one of the technical indicators, among others, Box Crane per Hour (BCH): the number of containers that can be moved by a single crane in an hour.

Recent studies emphasize that quay crane performance plays a critical role in determining terminal productivity. (Ridwan et al., 2023) found that implementing dual cycle operations and improving QCC reliability can reduce vessel waiting time and significantly increase container throughput. Similarly, (Leela et al., 2022) highlighted that adopting preventive maintenance and operator performance monitoring systems enhances the efficiency of quay cranes. These findings strengthen the relevance of analyzing QCC performance in this research, as it directly affects the speed and smoothness of the loading and unloading process at TPK Koja.

Container Yard Capacity

Container Yard (CY) is a temporary storage place for containers that will be loaded onto ships or that will be sent to the owner of the goods (Lasse, 2014), This yard is usually divided into 2 fields dedicated to import containers and export containers. The stacking carried out in this field depends on the stacking equipment and the area used, but it must also be remembered that too high a stack can result in an increase in load handling time because the top container must be moved first if the bottom container will be moved.

Based on the opinions of the experts above, it can be concluded that a container yard is a field that is provided to accumulate containers within a certain time that later the container will be loaded onto the ship or will be sent to the owner of the goods.

Yard Operations is the activity of moving containers from the side of the ship to the container yard or from the container yard to the side of the ship at the dock using a trailer. Practically, the activity includes two types of movements, namely the movement of moving horizontally with the trailer, and the vertical movement of lowering and lifting (lift off – lift on) containers from/up the trailer using a yard crane. (Lasse, 2014)

It is concluded that the Container Yard Capacity Level is the amount of available field that is effectively provided and used to stack containers within a certain time that the container will be loaded onto the ship or that will be delivered to the owner of the goods

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expressed in the percentage (%).

Several recent studies have shown that the limitation of yard capacity is one of the major constraints in port performance. (Bimarso et al., 2024) stated that when the yard occupancy ratio (YOR) exceeds 75%, congestion in container movement significantly increases, leading to delays in internal distribution. (Mutiara Lintang et al., 2024) also found that optimal yard layout and the use of digital yard management systems can improve space utilization and shorten truck turnaround time. Therefore, this study considers container yard capacity as a key factor influencing throughput performance at TPK Koja.

Increased Container Terminal Throughput

Berth Throughput (BTP) is the number of TEU's (containers) handled by a single dock in a period per year. The value of BTP can be calculated by equation.(Triatmogjo, 2016). Based on the provisions of article 1 d of the Decree of the Board of Directors of the Port of Indonesia II Number HK.56/2/25/P.I-II-2002, the Container terminal is a terminal that is equipped with at least facilities in the form of moorings, docks, container yards, and equipment that is suitable for serving container loading and unloading activities.

According to (Collins, 2008) In the container system book, it is explained that the container terminal is a means of meeting shipping container handling from the ship or to the land (to the ship and to the landside) in an efficient way of operation.

(Supriyono, 2010) that the Container Terminal is a place for the transfer of modes (interface) of land transportation and container sea transportation is a limited area (districted area) from the container being unloaded from the ship until it is taken out of the port door. Shipping goods using Containers has been carried out a lot and the volume continues to increase from year to year. Transportation using containers allows various kinds of goods to be combined into one container so that loading and unloading activities can be mechanized. This can increase the amount of cargo that can be transported so that loading and unloading times become faster.

Definition The opinion of the experts above is concluded that a container is a terminal equipped with facilities in the form of moorings, docks, container yards and is used as a meeting place for sea and land transportation, where the collection or accumulation of containers from interland or other ports is carried out to further carry out the loading and unloading process from or onto the ship efficiently.

According to (Syayuti et al., 2023), container terminal throughput is a comprehensive indicator reflecting the combined performance of port equipment, yard management, and human resources. Efficient synchronization between quay cranes and yard operations determines the overall handling capacity of the terminal. In line with this, the present study aims to analyze how improvements in QCC performance and yard capacity can jointly increase throughput and support the operational efficiency of TPK Koja.

Conceptual framework

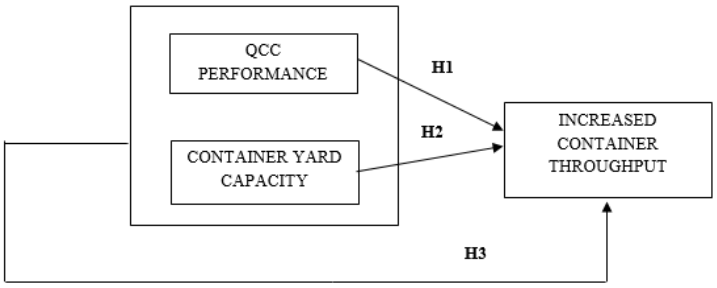

Figure 1. Research Model

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Hypothesis

- H_1: It is suspected that there is a significant influence between QCC performance on the increase in container throughput at TPK Koja.
- H_2: It is suspected that there is a significant influence between the capacity of the container yard on the increase in container throughput at TPK Koja.
- H_3: It is suspected that there is a significant simultaneous influence between QCC performance and container yard capacity on the increase in container throughput at TPK Koja.

3. Research method

The type of research uses a quantitative approach method. The population in this study were employees of KSO TPK Koja. The author collect data through a questionnaire via Google Form, with a Likert scale of 1-5 used to obtain responses consisting of 15 indicators from 3 variables. The sample collected was 109 respondents as most of the are employees of the KSO TPK Koja Terminal Operations division and parties who understand about container terminal operations. (Abdurachman et al., 2025)

The sampling technique applied in this study was purposive sampling, considering that the selected respondents were those directly involved in terminal operations and understood the technical aspects of loading and unloading activities. This approach ensures that the data obtained truly represent the operational realities of TPK Koja.

The measurement of variables used in this study included independent variables, namely the performance of the quay container crane, and the capacity of the container yard as well as the dependent variable, namely the increase in the throughput of TPK Koja containers. The instruments in this study were measured using the Likert scale which consisted of 5 points including (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree. The software used is SPSS 26. (Candra Susanto et al., 2024)

Table 1. Measurement of Variables

Variable	Operational definition	Indicators	Source
Performance of Quay Container Crane	QCC performance in the context of ports, especially container terminals, refers to the level of ability of cranes to carry out container loading and unloading activities, both from ships to land and vice versa, in a certain unit of time.	1. Tool Productivity 2. Tool Damage Rate 3. Operator performance 4. B/M planning 5. Distribution of work areas	(Leela et al., 2022) (Lesmini & Fadhlurrahman, 2021) (Siti & Nabila, 2023) (Asbullah et al., 2024) (SHELEMO, 2023)
Container Yard Capacity	Container yard capacity is the maximum number of containers that a port terminal can handle in a given period (usually per year), based on facility capabilities, equipment, manpower, and available area.	1. Area of CY 2. YOR 3. Ship Arrival Rate (BOR) 4. Amenities at CY 5. Field Planning	(Kuswandini et al., 2019) (Siti & Nabila, 2023) (Mutiara Lintang et al., 2024) (Ramadani, 2022)

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Container Terminal Throughput Increase	Throughput refers to the number of containers, measured in TEUs (Twenty-Foot Equivalent Units), that are handled both incoming and outgoing at a container terminal over a specific period, typically one year. Currently, Tanjung Priok Port has the highest throughput in Indonesia, handling over 7 million TEUs annually. This figure is expected to continue growing following the reorganization of major ports under the management of PT. Port of Indonesia.	1. Productivity B/M (BSH/BCH) 2. Employee Performance 3. Facility Completeness 4. BTP (Berth Throughput) 5. YTP (Yard Throughput)	(Logahan & Amril, 2016) (Bangunan, 2024) (Hilmi et al., 2018) (Putri & Rahmawati, 2022)

4. Results and discussion

Research Overview

Indonesia's growth in the early 1990s has encouraged an increase in export and import activities through the Port of Tanjung Priok. The two existing container terminals are no longer able to accommodate large quantities of containers. To meet the demand for these services, State-Owned Enterprises, PT. Pelabuhan Indonesia II (persero), in collaboration with a private company, PT. Hutchison Ports Indonesia, together developed a new terminal, the Koja Container Terminal. Therefore, Koja Container Terminal is an Operation Cooperation company or (KSO) not an Individual (Persero). The Koja Container Terminal serves both national and international cargo loading and unloading activities and has a strategic role in industrial and trade growth as well as business sectors that contribute to national development.

In the analysis of this study, parties who understand container terminal operations. In this study, 109 (One hundred and nine) respondents were obtained. In the questionnaire there are 3 (Three) variables, namely the X1 variable as the Quay Container Crane Performance, the X2 variable as the Container Yard Capacity, and the Y variable as the Container Throughput Increase.

Validity and Reliability Test

Table 2. Result Test Validity and Reliability

Yes	Variable	Items	R Counted	Cronbach Alpha	R Table	Cronbach Alpha Standart	Explanation	
1.	QUAY CONTAINER CRANE PERFORMANCE	X1.1	0,742	0,832	0,187	0,60	Valid	Reliable
		X1.2	0,765				Valid	
		X1.3	0,756				Valid	
		X1.4	0,656				Valid	
		X1.5	0,758				Valid	

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Yes	Variable	Items	R Counted	Cronbach Alpha	R Table	Cronbach Alpha Standart	Explanation	
		X1.6	0,656				Valid	
		X1.7	0,615				Valid	
		X2.1	0,779				Valid	
	CONTAINER YARD	X2.2	0,739				Valid	
2.	CAPACITY	X2.3	0,723	0,796	0,187	0,60	Valid	Reliable
		X2.4	0,735				Valid	
		X2.5	0,747				Valid	
		Y1	0,769				Valid	
		Y2	0,662				Valid	
	INCREASING	Y3	0,635				Valid	
3.	CONTAINER THROUGHPUT	Y4	0,761	0,838	0,187	0,60	Valid	Reliable
		Y5	0,782				Valid	
		Y6	0,722				Valid	
		Y7	0,738				Valid	

Source : Questionnaire data processing with SPSS 26.00

The table presents the results of the validity and reliability test of the research instrument consisting of three main variables, namely Quay Container Crane Performance, Container Yard Capacity, and Increasing Container Throughput. The validity test was carried out using the Corrected Item-Total Correlation value which was then compared with the r-value of the table of 0.187. All items in the three variables have correlation values above that limit, so all indicators are declared valid and suitable for use in further analysis.

The reliability test was conducted using Cronbach's Alpha value, with a minimum standard of 0.60 to declare an instrument reliable. The results showed that all variables had Cronbach's Alpha values that exceeded this limit: Quay Container Crane Performance of 0.832, Container Yard Capacity of 0.796, and Increasing Container Throughput of 0.838. This shows that the three variables are reliable.

Thus, all instruments in this study have met the criteria for validity and reliability, so it can be concluded that the measurement items used have proven to be feasible and can be used in further research, including in the context of international scale.

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Multiple Regression Analysis

Coefficient

Type		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5,141	1,257		4,089	,000
	X1	,328	,074	,341	4,457	,000
	X2	,737	,098	,577	7,542	,000

Source : Questionnaire data processing with Spss 26.00

a. From the linear equation above, it can be seen that the analysis of quay container crane productivity showsthat the increase in container terminal throughput has a unidirectional (positive) relationship. It is known from the coefficient value of b1 in the linear line above shows a positive value of 0.328, which means that every increase in the productivity of the quay container crane 1 unit is followed by an increase in the throughput of the container terminal by 0.328 units, and vice versa if there is a decrease.
b. From the linear equation above, it can be seen that the level of yard capacity of the container yard to the increase in container terminal throughput has a unidirectional (positive) relationship. It is known from the value of the b2 coefficient in the linear line equation above shows a positive value of 0.737, which means that every increase in the level of yard capacity of 1 unit is followed by an increase in the throughput of the container terminal by 0.737 units, and vice versa if there is a decrease.

Partial Test (t-test)

1. Quay Container Cran (X1) Productivity Analysis on Container Terminal Throughput Increase (Y)
   From the partial testing of spss 26.00, it can be obtained on the QCC productivity analysis variable on the increase in container terminal throughput. Where it is known that the significance level is 0.005 and the calculation is 4.457. The author has a total of 109 respondents, therefore the author looks for a t_{tabel} value with the following formula:

$$dk = n - k$$
$$dk = 109 - 2$$
$$dk = 107$$
$$DK\ 107 = 1.982$$

   The data t_{table} above can be found that:
   The value of $t_{counted}$ > from t_{table} is 4.457 > 1.982, so from these results Ho is rejected and Ha is accepted.
2. Container Yard Capacity (X2) to Increased Container Terminal Throughput (Y)
   From the partial test of spss 26.00 can be obtained on the variable of the container yard capacity to the increase in the throughput of the container terminal. Where it is known that the significance level is 0.005 and the tcount is 7.542, and the ttable value is 1.982
   From the data table above, it can be known that:
   The value of the t_{count} > from t_{table} is 7.542 > 1.982, so from these results Ho is rejected and Ha is accepted.

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Simultaneous Test (Test f)

ANOVA[a]

Type		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2092,721	2	1046,361	162,070	,000b
	Residual	684,361	106	6,456		
	Total	2777,083	108			

a. Dependent Variable: Increased Container Terminal Throughput
b. Predictors: (Constant), Container Yard Capacity, QCC Performance
Source : Questionnaire data processing with SPSS 26

The author conducted an f test to test the overall variable where the variables X1 and X2 affect the variable Y together. Where in this f test there is a hypothesis formulation, namely:
Ho : $\alpha = 0$ (no influence) and
Ha : $\alpha \neq 0$ (there is an influence).

As well as the existence of decision rules, namely:
Ho reception if $F_{counted} < F_{table}$ and
Reception Ha if $F_{counted} > F_{table}$

From the results of the questionnaire data processing using SPSS 26 above, it can be seen that the value of $F_{counted}$ as large as 162,070
To find the value of F_{table} , the author uses the following formula:

$$F_{table} = n - k - 1$$

$$F_{table} = 109 - 2 - 1 = 106$$

$$F_{table} = 3.08$$

It can also be obtained from the results of the analysis, namely that the $F_{counted}$ is 162,070. Thus, the $F_{counted} > F_{table}$, which is 162,070 > 3.08, proves that Ho was rejected and Ha was accepted.

Coefficient of Determination

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
868a	,754	,749	2,541

Source : Questionnaire data processing with SPSS 26

From the results of the calculation of the determination coefficient above, the author can conclude that the contribution of the quay container crane performance variables and the container yard capacity to the increase in container terminal throughput has an influence contribution of 75.3%

5. Conclusion

Based on the results of the research conducted at TPK Koja, it is concluded that there is a positive and significant influence between the performance of the Quay Container Crane (QCC) and the capacity of the container yard on the increase in container throughput, both

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partially and simultaneously. The first hypothesis (H1) states that QCC performance has a significant influence on throughput, because QCC is the main tool in the process of loading and unloading containers from ships to docks, so its performance greatly determines the operational efficiency of the terminal. When QCC units are not working optimally, the docking time becomes longer and productivity decreases. On the other hand, maximum QCC performance and integration with the operational system will speed up the ship service process and increase throughput. The second hypothesis (H2) shows that the capacity of the container yard also has a positive and significant influence on the throughput of the container terminal. Capacity limitations lead to a high yard occupancy ratio (YOR), which has an impact on slowing down the movement of containers, truck queues, and delays in delivery to end users. Therefore, efficient yard management and technology utilization are needed. The third hypothesis (H3) proves that the performance of QCC and the capacity of the containr yard simultaneously exert a positive and significant influence on container throughput, as the two are interrelated and cannot run alone.

6. Implications

Based on the results of the study on the influence of Quay Container Crane (QCC) performance and container yard capacity on increasing throughput at TPK Koja, there are several important implications that need to be considered in efforts to develop and improve terminal performance as a whole. First, the management of TPK Koja needs to immediately follow up on the condition of the two QCC units (Cranes 1 and 6) which are still in poor condition, by accelerating the rejuvenation process and improving the preventive maintenance program so that the performance of the equipment can be optimal and not become an obstacle in the loading and unloading process. This upgrade also needs to be complemented by operator training and a digital-based performance monitoring system to ensure the effectiveness of the tool. Second, the capacity of the container yard needs to be managed with a more adaptive and strategic approach considering that the limited area often causes the yard occupancy ratio (YOR) to reach a critical limit, thus hindering the smooth internal distribution of containers. Therefore, strategies such as efficient layout arrangements, container rotation scheduling, and automation technology integration are key in optimizing existing land use. Third, with the contribution of the influence of QCC performance variables and container yard capacity to terminal throughput which reaches 75.4%, cross-functional collaboration is needed in port organizations to ensure integration between equipment, human resources, and operational management systems in order to realize efficient, competitive, and sustainable terminal transformation amid increasing container volume growth.

7. Research limitations

This research has several limitations that can be used as a reference and encouragement for future researchers to obtain more comprehensive results and enrich the development of knowledge in related fields. First, this study only focuses on two independent variables, namely the performance of the Quay Container Crane (QCC) and the capacity of the container yard, with one dependent variable being the increase in container throughput at TPK Koja. Second, the number of respondents in this study was limited, which only involved 109 people, people who understand container terminal operations and some came from the KSO TPK Koja Terminal Operations Division, so the results of this study could not necessarily be generalized to the context of other terminals or ports. Third, data collection is carried out over a certain period of time with a quantitative approach through Likert scale questionnaires, which may not be able to fully capture the in-depth dynamics related to

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operational and infrastructure problems in the yard. For further research, it is recommended to add more diverse variables, involve respondents from various terminals so that the results are broader, use mixed methods between quantitative and qualitative, conduct observations for a longer time, and also follow external factors such as policies, competition, and developments in the shipping industry so that the results are more complete and generalized.

References

Abdurachman, E., Arifiani, L., Simarmata, J., Suryobuwono, A. A., Sholihah, S. A., Octaviani, R. D., Firdaus, M. I., Yuliantini, Olfebri, Keke, Y., Sihombing, S., Tatiana, Y., Saribanon, E., Ricardianto, P., Sari, M., Banjarnahor, A. R., Susanto, P. C., & Gunawan, A. (2025). *Metode Penelitian Transportasi dan Logistik* (A. R. Banjarnahor (ed.)). Damera.

Asbullah, Ginting, D., & Suparman. (2024). Analisis Keterlambatan dan Efisiensi Kegiatan Bongkar Muat Petikemas di Terminal PT Prima Terminal Petikemas Belawan. *Journal Of Social Science Research*, *4*(1), 10156–10166.

Bangunan, J. S. (2024). *Jurnal sains bangunan*. *1*(1), 49–56.

Bimarso, W., Warsito, B., M. R, T., & Triantoro, W. (2024). *Pedoman Pemeliharaan Fasilitas Bangunan Sipil Pelabuhan berupa Dermaga, Lapangan Penumpukan dan Gudang* (Edisi 1). ITL Trisakti Press.

Candra Susanto, P., Ulfah Arini, D., Yuntina, L., Panatap Soehaditama, J., & Nuraeni, N. (2024). Ranjbar, H., & Khosravi, S. (2015). The Effect of Using Likert Scale on the Validity of Research Results. International Journal of Humanities and Cultural Studies. *Jurnal Ilmu Multidisplin*, *3*(1), 1–12.

Ellenlies, E., Siahaan, L. D., Ayutia, Y., Andarini, A., Hiero Rio Kasenda, M., & Parhusip, V. (2021). Perbaikan Kinerja Dwelling Time Di Terminal Peti Kemas KOJA di Pelabuhan Tanjung Priok. *Jurnal Sistem Transportasi & Logistik*, *1*(2), 52–60.

Koleangan, R. M. (2008). *Manajemen Kepelabuhanan*. Erlangga.

Kuswandini et al. (2019). Bab 1 pendahuluan. *Pelayanan Kesehatan*, *2016*(2014), 1–6. http://library.oum.edu.my/repository/725/2/Chapter_1.pdf

Lasse, D. A. (2014). *Manajemen Kepelabuhanan* (Edisi 1). Rajawali Pers.

Leela, L., Kumar, A., & Bhanusri, C. (2022). *Apply Lean Methodology to Improve Reliability of Crane Sanketika Vidya Parishad Engineering College , India*. *10*(9), 83–86.

Lesmini, L., & Fadhlurrahman, D. R. (2021). Kinerja Quay Container Crane Dalam Kegiatan Bongkar Muat Petikemas Di Kso Terminal Petikemas Koja Jakarta Utara. *Jurnal Transportasi, Logistik, Dan Aviasi*, *1*(1), 55–64.

Logahan, J. M., & Amril. (2016). Pengaruh Pelayanan Kapal, Peralatan Bongkar Muat dan Operator Bongkar Muat Terhadap Kinerja Terminal Peti Kemas di JICT Tanjung Priok. *Jurnal Manajemen Dan Bisnis ASMI*, *2*(1), 39–42.

Mangkunegara, A. P. (2009). *Evaluasi Kinerja Sumber Daya*. Refika Aditama.

Mutiara Lintang, Y., Nugraha, B., Kasan Gupron, A., & Pelayaran Surabaya, P. (2024). Analisis Faktor yang Mempengaruhi Standar Waktu Pelayanan Truck Round Time PT Terminal Peti Kemas Surabaya. *Jurnal Bintang Pendidikan Indonesia*, *2*(4), 241–263.

Notoatmodjo, S. (2009). *Pengemangan Sumber Daya Manusia*. Rineka Cipta.

Putri, K. W., & Rahmawati, A. (2022). Analisis Kapasitas Dermaga Terminal Petikemas Makassar New Port Berdasarkan Nilai Berth Occupancy Ratio (Bor) Dan Berth Throughput (Btp). *Riset Sains Dan Teknologi Kelautan*, *5*(2), 143–150.

Ramadani, A. (2022). Analisa Pengaruh Waktu Tunggu Kapal Terhadap Biaya Logistik Di Terminal Peti Kemas Makassar. *Riset Sains Dan Teknologi Kelautan*, *5*(2), 168–174. https://doi.org/10.62012/sensistek.v5i2.24750

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Ridwan, Luhur, A., & Elnath G, M. (2023). Pengaruh Performa Quay Container Crane dan Penerapan System Single Cycle dan Dual Cycle Terhadap Bongkar Muat Peti Kemas di KSO Peti Kemas Koja Jakarta. *Jurnal Maritim Polimarin*, *9*(1), 45–57.

Sedarmayanti. (2011). *Manajemen Sumber Daya Manusia: Reformasi Birokrasi dan Manajemen Pegawai Negeri Sipil* (Cetakan ke). PT Refika Aditama.

SHELEMO, A. A. (2023). No Titleبیلی. *Nucl. Phys.*, *13*(1), 104–116.

Siti, S., & Nabila, A. (2023). Upaya Meningkatkan Kinerja Pekerja Operator Peralatan Bongkar Muat Dan Kesiapan Fasilitas Peralatan Bongkar Muat Petikemas di KSO Terminal Petikemas Koja. *Journal Of Social Science Research*, *3*(06), 9742–9756.

Supriyono, S. (2010). *Analisis Kinerja Terminal Petikemas di Pelabuhan Tanjung Perak Surabaya*. Universitas Diponegoro.

Syayuti, F., Thamrin, M., Majid, S. A., Sihombing, S., & Liana, E. (2023). Produktivitas Terminal dan Kinerja Operasional di Pelabuhan Tanjung Priok. *Jurnal Manajemen Transportasi & Logistik (JMTRANSLOG)*, *10*(2), 155.

Triatmogjo, B. (2016). *Manajemen Kepelabuhanan*. Beta Offset.

Wibowo, Prof. Dr., S.E., M. P. (2010). *Manajemen Kinerja* (Edisi 3). Rajawali Pers, Jakarta.