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Influence of Infrastructure In Optimizing The Loading and Discharging Activities in Koja Peti Kemas Terminal

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Abstract. The purpose of this research is to calculated the effect infrastructure quality and amount of throughput koja container terminal. As a big archipelago country in the world with over 250 million people, Indonesia has a chance to be a independent countries and developed countries in the economic field. But that chance can't be utilized correctly, there is basic problem that have to be fix like infrastructure quality that can support logistic system more effective and efficient. The growth of Indonesia in early 1990s has led to increase of export and import activities through Tanjung Priok port. The existing two container terminals were no longer able to handle the massive volume of containers. In order to meet the steeply rising demand form container handling services, the state-own company, PT Pelabuhan Indonesia II (Persero) in cooperation with private company, PT Hutchison Ports Indonesia, jointly developed a completely new terminal, the Koja Container Terminal (Terminal Petikemas Koja – TPK KOJA). These two companies have also formed a Joint Operation (JO) to handle the daily operations of terminal. By doing some optimalization programs, the capacity has been increased from 680 thousand become more than 1 million TEUs of containers per year, and is ready to serve large fourth generation of container ships. This study uses the snowball sampling method as data retrieval. Facilities and infrastructure must be very supportive in the export-import activities carried out by the company, this is the reason for the researchers to further examine the facilities and infrastructure in the container terminal

1. Introduce

T Seaport, plays an essential role in facilitating global trade and economic development. Ports handle 80% of trade and provide many strategic areas for fishing and cruise activities all over the world. Therefore, port stability needs to be fully analyzed in the context of risk management since it has a crucial role in providing various kinds of services. The performance of infrastructure is especially a key concern in retaining the stability of port operations. However, a lot of port infrastructures are highly deteriorated. It was reported that the majority of ports (60%) were built before 1955 and many significant damages have been noticed by the port surveyors [1]

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have discussed the potential benefits of an improved infrastructure network and its capability of fostering both regional competitiveness and economic development. Within this framework, it is relevant to highlight the link among the transport infrastructure endowment, the level of regional connectivity, and the international freight flows Transport network investments aimed at improving connectivity with international markets is an important issue within the debate on expansive policy interventions, especially for those countries whose economic growth is heavily linked to international trade[2]

The port is a supporting facility sea transportation that is very effective for connecting an area to a region others in island areas like Indonesia. Construction of port facilities and infrastructure needed to support the economic growth of the community. Water transportation duly able to accommodate visitors and triggering regional economic growth that is.[3]

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Within last thirty years we have witnessed the rapid development of container transportation including containervessel's large-size trend, soar of container trade volume as well as escalation of container port throughput. The Within last thirty years we have witnessed the rapid development of container transportation including container biggest container vessel's capacity has reached 20000 TEU and further larger vessels' deployment has been vessel's large-size trend, soar of container trade volume as well as escalation of container port throughput. The biggest

Container transportation development, especially with container vessel's large-size trend, drives gradual transportation cost saving and provides strong technical support to global trade.

provided causal evidence for containerization to be a large driver of 20th century globalization after reviewing 157 countries' data from 1962 to 1990. He found the concurrent effect of containerization was to raise bilateral trade flows on average by 320% within first five years in twenty-two industrialized countries and cumulative average treatment effect of containerization over a twenty year time period amount to a staggering 790% which could be compared with the contribution of GATT to international trade. [4]

2. Research Methodology

This research uses qualitative descriptive method using primer data from observation interview with Mr. Emil Gumanti as business developer and Mr. Sulaiman as terminal operatetd in export import department from TPK Koja Terminal over a period 10 years calculated from 1998 until now

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This research use qualitive in nature. A qualitative research is defined as an inquiey process of understanding a social or human problem social or human problems, based on building a complex, holistic picture, well – formed with words, reporting detailed views of informants, and conducted in a setting of naturan. (creswell,1994)

1. Instrumental input of this research is UU No 17 Tahun 2008
2. Input of this research is condition of infrastructure in TPK koja
3. Subject of this research is infrastructure, throughput, loading and discharging activity
4. Object of this research is infrastructure performance and port activities
5. Output of this research is realization of good performance of infrastructure to support port activity

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3. Discussion and Result

TPK KOJA INFRASTRUCTURE

TPK KOJA'S FACILITIES

No.	SPECIFICATION	TOTAL	UNIT
I.	BERTH		
	- Length	650	meters
	- Width	40	meters
	- Draft Channel	-14	m LWS
	- Draft Wharf	-13	m LWS
II.	CONTAINER YARD		
	- TGS	5.700	slot
	- Area	25.72	HA
	- Static Capacity for CY Import	9,828	TEUs
	- Static Capacity for CY Export	9,072	TEUs
	- Reefer Plug	310	Plug
III.	EQUIPMENT		
	- Gate	6	units
	- Gantry / Container Crane	7	units
	- Head Truck	48	units
	- Chassis	60	units
	- RTG	25	units
	- Reachstacker	3	units
	- Fire Figthing Car	1	unit

PICTURE NO. 1.1

The following description is:

1. Berth in TPK Koja have 650 meters length, 40 meter width, -14 m LWS draft channel, -15 m LWS draft wharf.
2. Container Yard in TPK Koja have 5700 tonnage ground slot, 25,72 HA Area, Static Capacity for cy import 9.828 teus for export 9.072 teus, and reefer plug have 310 plug.
3. The equipment in koja have 6 units gate, 7 units gantry / container crane, 48 units head truck, 60 units chassis, 25 units RTG, 3 units reachstacker, 1 unit free fighting car[5]

INFRSTRUCTURE ACTIVITY IN KOJA

NO	KINERJA	STANDAR	TAHUN 2018												AVERAGE
			JAN	FEB	MAR	APR	MEI	JUN	JUL	AGS	SEP	OKT	NOP	DES	2018
1	Waiting Time (Jam)	1	2,09	3,19	2,53	3,18	3,24	2,31	1,16	1,28	2,68	2,22	1,12	1,15	2,18
2	Aproach Time (Jam)	2	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,50
3	ET : BT (%)	85	89,3%	88,3%	88,2%	89,8%	90,9%	84,5%	89,1%	89,3%	88,6%	90,4%	88,4%	89,5%	88,9%
4	Turn Round Time (TRT)		31,82	32,42	29,37	32,67	34,02	29,84	33,04	31,45	28,13	31,77	34,23	29,17	31,50
5	Dwelling Time Import		4,99	3,46	3,06	3,29	3,50	4,69	3,99	3,72	3,51	4,37	3,04	3,00	3,72
	Dwelling Time Export		2,95	3,17	3,03	3,03	3,40	3,35	2,91	2,99	3,39	4,48	3,28	3,30	3,27
6	General Cargo		-	-	-	-	-	-	-	-	-	-	-	-	
7	Bag Cargo		-	-	-	-	-	-	-	-	-	-	-	-	
8	Unitized		-	-	-	-	-	-	-	-	-	-	-	-	
9	Curah Cair		-	-	-	-	-	-	-	-	-	-	-	-	
10	Curah Kering		-	-	-	-	-	-	-	-	-	-	-	-	
11	B/C/H (TPK)	25	26,11	29,62	29,42	27,72	29,56	27,69	28,28	28,42	25,40	27,52	28,89	28,04	28,06
12	BSH	60	65,89	65,40	65,96	62,71	67,45	61,17	70,31	63,11	60,56	63,97	63,07	66,29	64,66
13	Receiving Petikemas	90	45,66	40,51	40,69	38,75	46,53	46,28	42,36	38,10	39,64	37,33	40,30	34,70	40,90
14	Delivery Petikemas	120	112,93	98,43	97,48	89,54	104,39	120,43	105,12	85,11	91,32	84,21	106,85	85,95	98,48
15	BOR (%)	70	60,66	61,46	63,08	58,76	63,85	47,72	52,96	54,82	58,40	51,92	64,63	54,71	57,75
16	SOR (%)		-	-	-	-	-	-	-	-	-	-	-	-	
17	YOR (%)	65	52,48	45,48	41,89	40,92	48,62	39,46	45,25	38,13	43,16	40,65	38,92	40,02	42,92
18	Kesiapan Peralatan QCC	80	96,9%	95,9%	96,5%	95,7%	96,3%	96,6%	96,7%	84,8%	96,8%	88,8%	87,9%	96,6%	94,1%
19	Kesiapan Peralatan RTG	80	84,6%	83,5%	85,1%	90,8%	90,1%	91,2%	83,3%	83,9%	86,6%	91,2%	88,4%	87,4%	87,2%

PICTURE NO. 1.2

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The following description:

- Waiting time: time issued by the Ship to processing of activities in berthing area to get the service of berthing at the Port or Pier, to do loading and unloading activities in a Port.
- Approach time: guide service time ship to berthing area
- ET:BT (Effective time: berth time): percentage between effective time of employee working shifted with berthing time ship
- Turn around time: average time of internal truck moving in koja to loading and discharging activities
- Dwelling time: average time of goods process that is needed since the goods are dropped from the ship or the goods are piled up until the goods leave the port, the standard of dwelling time itself is 3 days
- B/C/H (BOX CRANE HOUR): average time of Quay container crane performance that can move goods from ship to truck until complete ship operation
- BSH (box ship hour): average amount goods loading and discharging that perfomence from command discharge until ship complete loading
- Receiving container: average turn run time of external trucking activities that counted from enter the gate until exit the gate
- Deliveriy container: average turn run time of external trucking activities that counted from outside gate until enter the gate
- BOR (berth operating ratio): percentage of berthing activities
- YOR (yard operating ratio): percentage of CY activities
- Readiness QCC and RTG : percentage of Readiness equipment that koja owned[6]

EXPLANATION:

Based on picture NO. 1.2. the activity of infrastructure and equipment can calculated from this data of operational performance report in koja, following details is

- waiting time decreasing every month because koja can manage the equipment in quay port good as possible from QCC till internal trucking.
- ET:BT percentage is in above 80%, it means effective time and berthing time equally good
- Approach time of ship in TPK koja is stable, the wharf have good quality and complete equipment, the mooring system in good condition, and pilotage service quite good
- Dwelling time for export and import is unstable, but still the time below the standard set , sometim
- The B/C/H raising every month , even the equipment in koja outdated , not like the koja competitor , koja still using equipment like QCC (quay container crane) in old version with single crane/lift (picture NO. 1.3) but they can manage to dealt with it , so the circulation of B/C/H can reduce the gaps to standard set
- BSH slightly above from the stamdard, it means circulation of ship operation at berth area in good condition

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- for readiness operational of the equipment in koja (RTG , Quay container crane) above 80% its fit with the standard optimal port equipment mostly in port tanjung priok[6]

PICTURE NO. 1.3

ALAT	MERK	UNITS	SWL				TAHUN PEMBUATAN								
			<35	35	40 - 45	> 60	1996	1997	1998	2003	2009	2010	2011	2012	2013
QUAY CONTAINER CRANE	Mitsubishi	5	0	5	0	0	5	0	0	0	0	0	0	0	0
	Doosan	1	0	1	0	0	1	0	0	0	0	0	0	0	0
	ZPMC	1	0	0	0	1	1	0	0	0	0	0	0	0	0
	TOTAL	**7**	**0**	**6**	**0**	**1**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PICTURE NO.1.4

ALAT	MERK	UNITS	SWL				TAHUN PEMBUATAN								
			<35	35	40 - 45	> 60	1996	1997	1998	2003	2009	2010	2011	2012	2013
RTG	Mitsubishi	11	0	11	0	0	11	0	0	0	0	0	0	0	0
	Sumitomo	9	0	9	0	0	0	6	3	0	0	0	0	0	0
	ZPMC	5	0	2	3	0	0	0	0	0	0	2	0	0	3
	TOTAL	**25**	**0**	**22**	**3**	**0**	**11**	**6**	**3**	**0**	**0**	**2**	**0**	**0**	**3**

PICTURE NO.1.5

ALAT	MERK	UNITS	SWL				TAHUN PEMBUATAN								
			<35	35	40 - 45	> 60	1996	1997	1998	2003	2009	2010	2011	2012	2013
REACH STAKER	Kalmar	3	1	0	2	0	0	0	0	0	0	0	0	2	1

PICTURE NO 1.6

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ALAT	MERK	UNITS	SWL				TAHUN PEMBUATAN								
			<35	35	40 - 45	> 60	1996	1997	1998	2003	2009	2010	2011	2012	2013
HEADTRUCK	Terberg	48	48	0	0	0	0	0	0	0	20	0	20	0	8

ALAT	MERK	UNITS	SWL				TAHUN PEMBUATAN								
			<35	35	40 - 45	> 60	1996	1997	1998	2003	2009	2010	2011	2012	2013
CHASSIS	Harmoni	30	0	20	0	10	0	0	0	0	10	0	10	10	0
	Guangdong	30	0	30	0	0	0	0	0	0	0	0	30	0	0
	TOTAL	60	0	50	0	10	0	0	0	0	10	0	40	10	0

PICTURE NO.1.7

EXPLANATION : (in picture no. 1.4 – 1.7) , we can see that the equipment koja specification and production year , for QCC and RTG produced before year 2000s , it means quite old than competitor have , for headtruck , reachstacker and chassis produced after year 2010 and still work significantly good , for SWL (safety weight load) , the equipment have standard quality[6]

THROUGHPUT TPK KOJA

THROUGHPUT TANJUNG PRIOK 2014

	2014	2015	2016	2017	2018
TPK KOJA	872.508	975.438	826.095	1.092.665	889.034
JICT	2.250.269	2.222.182	2.144.394	1.610.809	2.057.131
JICT 2	105.634	995			
MAL	339.171	298.205	394.045	332.981	377.283
MTI/PTP	66.819	17.728	30.641	28.853	33.290
OJA	69.199	80.808	171.624	236.428	203.013
TSJ	291.531	192.969	317.307	316.628	204.012
NPCT1			71.856	893.924	1.259.157
TOTAL	3.995.131	3.788.324	3.955.962	4.512.287	5.022.919
		-206.807	167.638	556.326	510.632
		-5,18%	4,43%	14,06%	11,32%

EXPLANATION:

This data explain that TPK koja among other competitor have a difference amount throuput than JICT and NPCT 1, but still in above average. the reason we suspect is the competitor have modern equipment and bigger work space area, that means as note for TPK koja to fix facilities and equipment to improve container activities in koja.[6]

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EQUIPMENT OF JICT

DESCRIPTION	TERMINAL JICT
I. Berth	
Length	1,640 M
Width	26.5 - 34.9 M
Depth alongside	12 M - 16 M
II. Container Yard	
Area	45.50 Ha
Capacity	39,884 Teus
Ground Slot	10,560
Reefer 380 V	546 Plugs
III. Equipments	
Quay Crane Container	16 Units
Rubber Tyred Gantry Crane	63 Units
Head Truck	128 Units
Chassis / Trailer	128 Units
Forklift Diesel	15 Units
Reach Stacker	4 Units
Side Loader	6 Units
IV. Berth	7

PICTURE NO. 1.8

EXPLANATION:

If we compare with picture no. 1.1 and picture no.1.8 , there gaps unit and equipment between koja and jict , in JICT have bigger length area than TPK Koja, container yard area in JICT bigger than TPK koja and also the equipment in TPK koja not 100% proper for loading and discharging activites, the reason we compare KOJA and JICT infrastruckture is we want to research the highest standard that can KOJA improve next period to improving quality of loading and discharging activity , so throughput can get more than before [7]

4.Conclusion

From the discussion and result we can conclude that the infrastructure is important for loading and discharging activities. so if the infrastructure is not proper, loading and discharging activities will be carried out. In TPK Koja we know that the infrastructure is still lacking and very far from it's competitor, quality of equipment is outdated and sometimes theres minor problem like malfunction that can make the activity jammed even the readiness above 80%. Equipment in TPK Koja is very lacking especially quay container crane, in JICT already use quay container crane the twin lift system technology which can increase loading and discharging activities while at TPK Koja only have a few quay container crane with twin lift technology system, area for container yard and capacity still very small compared to other terminals. We think this is the reason why throughput TPK Koja lost and unstable different from competitors who always increase.

Our advice for TPK Koja is improve existing the equipment on TPK Koja, expand land, maximie existing resources.

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