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THE PERFORMANCE OF SURABAYA CONTAINERS TERMINAL IN SUPPORTING THE FLUENCY OF NATIONAL LOGISTIC TRANSPORTATION

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ABSTRACT

As shown by the Blue Print of National Logistic System, our logistic system could be locally integrated and also be connected to global. All components had a synergy and created innovation and breakthrough to achieve the targets with immediate realization. Sea Transportation was the leading transportation in Indonesia as the biggest island-nation of the world, and sea transport played important role in the national and international logistic chain. Tanjung Perak Sea Harbor was known as it had Surabaya Containers Terminal (SCT) which had been awarded as one of Top 50 World Containers Port based on the assessment from The Journal of Commerce in the 2015 August Edition. Being one important infrastructure, SCT must push its potential to the maximum by improving performance, modernizing equipment, and increasing human resource quality to support its standing as one of main sea harbors in Indonesia that was capable to help fluencing logistic transportation line. This paper was made to understand the existing condition of performance at Surabaya Containers Terminal and to compare this performance with the Performance Standard of Sea Harbor Operational Services pursuant to the Decree of the General Directorate of Sea Transport No.UM.002/38/18/DJPL.2011. The analysis was quantitative involving various standard formulas. Result of analysis indicated that some criteria of performance were met while the others were below the stnadard.

KEYWORDS: Performance, Containers Terminal, Transportation, National Logistic

INTRODUCTION

The vision of Indonesian Logistic in 2025, as stated in the Blue Print of National Logistic System, was to create the logistic system that could be integrated locally and connected to the global in order to improve national competitiveness and people welfare. Both local interation and global connection could be achieved through an efficient integration of elements in logistic chain, including distribution network, transportation network, information network, and financial network, which the fluency of all these elements was supported by the actor and provider of logistic service. To make this vision into a reality, all stakeholders must work in synergy with innovation and a necessary breakthrough to attain the target on predetermined time.

Being the biggest islands-nation in the world, Indonesia sea transportation played important role in domestic and international trades. The efficient sea transportation would support the establishment of just and balancing economic development across the regions (Adisasmita, 2011). In fact, domestic sea transportation caused a high level of price differential among the regions and also engendered more expensive movement of shipment across islands in the nation than its movement from and to abroad (UNCTAD, 2014).

Higher cost in sea transportation triggered a more expensive logistic price in some remote area, including the eastern part of Indonesia. Some factors caused this problem, and it was related witht the costs of filling, loading-unloading, hoarding, and transporting. It should be more efficient but 60 percents of shipping cost were the cost of clearances in the sea harbor (Business Economic News, 28 March 2014). According to Raul Pino et al (2013) and Christopher (2005), the standard of containers transportation structure implied a direct impact to transportation efficiency and should not cause high cost economy in the shipping pattern.

Logistic National Sector faced a heavy challenge in the era of ASEAN Economic Community (MEA) in 2015. The problem was that the logistic transportation cost in Indonesia was still very high as indicated by the ratio of national logistic cost to Gross Domestic Income (PDB) that reaching 23.6%. This ratio was indeed flying too far beyond other countries, such as United States with 8.50%, Europe with 10%, Japan with 10.60%, and South Korea with 16.30%. Other thing to worry about was the low standing of Logistic Performance Index (LPI) for Indonesia. It is supported by the finding of research and survey from Global Competitiveness Index done by World Economic Forum, that ranked Indonesia on the position of 53 among countries in the world. Even, this rank was below other ASEAN

countries, such as Singapore (5), Malaysia (25), and Thailand (53). LPI measurement by World Bank involved six factors, such as: administrative efficiency in the custom office; competitive shipping cost; better quality and competence of logistic service; good capacity in tracing and investigating the shipment; and favorable shipping time (Arvis et al, 2014).

Poor competitiveness of the infrastructure only worsened the stream of the distribution of shipment and logistic to support international trade activity (Utami, 2015). Lee (2001) explained that the increasing movement of shipment across the countries might show a positive correlation between the countries for years. Logistic was one of big expense for a business although the rate was varying with sector (Waters, 2003). Consequently, in the competitive environment, there was immediate need to control over logistic cost, and thus, it was important to measure the performance as a parameter to achieve the success indicator of the business.

Dealing with this condition and also suppressing sea harbor operational cost, the government initiated a system called Pendulum Nusantara, which was used as Indonesia International Gateway to create one integrated service covering six main sea harbors connecting east to west parts of Indonesia. The area coverage included Belawan, Batam, Jakarta, Surabaya, Makassar and Sorong, which all these area were arranged into one schedule of route with sub-systems following this route. It might help empowering sea transport and improving the existing domestic transport (President Decree No.26/2012). So far, sea harbor operator set different price and cost, and it was expected that this tariff would be similar. To achieve such goal, sea harbors must be redesigned to improve its feasibility and service.

Figure 1: Sea Harbor Service with Indonesia International Gateway.

Tanjung Perak Sea Harbor had Surabaya Containers Terminal (SCT) as the main sea harbor serving containers. Based on the release of The Journal of Commerce on 2015 August Edition, titled with JOC of Top 50 World Containers Port, SCT of Tanjung Perak was given a rank of 48, and it decreased from its previous rank of 46. This fact indicated that the perforamnce of Surabaya Containers Terminal failed to compare with the achievement of other international sea harbors. The realization of containers flow in Surabaya Containers Terminal must achieve 3,127,895 TEUS or equaled to 2,623,090 Box. In 2013, the Terminal attained 2,993,932 TEUS or 2,517,017 Box. (PT. Pelindo III, 2014).

METHODOLOGY

Data about Surabaya Containers Terminal were collected. A measurement survey was conducted on this containers terminal. Data were then subjected to quantitative analysis, and the result was discussed.

Early step involved data exposition. The analysis was performed on the performance of containers terminal to assess performance on the observation period, precisely on February 2015, and then to compare the result with with the Performance Standard of Sea Harbor Operational Services pursuant to the Decree of the General Directorate of Sea Transport No.UM.002/38/18/DJPL.2011. The performance of containers terminal was understood through the criteria of assessment or evaluation based on governmental regulation that might provide strong base for the initiative to improve performance. The criteria were described as following.

Ship Service

Berthing Time (BT)

It was a time when the ship was set at berth. It was counted from since the ship set the rope at berth until the rope was released. (Adisasmita, 2011).

BT = BWT + NOT ……... (1)

Where :

BT : Berthing Time (hour).

BWT : Berthing Working Time; The planned time for berthing for load-unload activity (hour).

NOT : Not Operating Time; The planned time for no-activity (hour).

Berth Working Time (BWT)

It was a time when the ship was scheduled to berth and to do load-unload activity. (Adisasmita, 2011).

BWT = ET + IT …….. (2)

Where:

ET = effective time

IT = idle time

Containers Service

Ton per Ship Hour in Port (TSHP)

It was the speed of load-unload activity at the sea harbor, or the amount of works needed for load-unload activity per ship per hour. All labors or equipments engaged for this activity were counted as the output of the ship. (Supriyono, 2010).

$$TSHP = \frac{\sum(Load - Unload\ \ Activity\ \ per\ \ Ship)}{TRT\_per\ \ ship} \quad \text{……. (3)}$$

Ton per Ship Hour in Berth (TSHB)

It was the speed of load-unload activity at the berth, or the average number of load-unload activity per ship per hour during berthing. (Supriyono, 2010).

$$TSHB = \frac{\sum(Load - Unload\ \ Activity\ \ per\ \ Ship)}{BT\_per\ ship} \quad \text{…….. (4)}$$

Berth Service

Berth Throughput (BTP)

It was the ability of shipment to flow at berth, or the number of TEUS/m shipment that could pass every meter of available length of the berth. (Supriyono, 2010).

$$BTP = \frac{\sum(Shipment/TEUS\ in\ \ one\ \ period)}{Available\ \ Length\ of\ the\ \ Berth} \quad \text{……(5)}$$

Berthing Occupancy Ratio (BOR)

It was the usage rate of the berth, and it was counted by comparing the length of the ship and the length of berth at the time when the berth was used in one period. The measuring unit was percentage. (Supriyono, 2010).

$$BOR = \frac{\sum(Ship\ \ Length + 5)\,x\ \ Berthing\ Time}{Berth\ \ Length\ x\ Available\ \ Time} \quad \text{……...(6)}$$

Container Yard Occupancy Ratio (CYOR)

It was how many container yard to use for hoarding containers. It was estimated by comparing the number of containers at certain time period and the capacity of container yard on this period. The measuring unit was percentage. (Supriyono, 2010).

$$CYOR = \frac{TEUs\,x\,day}{CY\,Capacity\ \ x\ \ day\ \ in\ \ a\,momth/\,year} \quad \ldots\ldots\ldots\ldots (7)$$

The Performance Standard of Sea Harbor Operational Services

Sea Harbor Authority was the manager of sea harbor. It administered some functions and roles, and was required to maintain the fluency and orderliness of the delivery of service for ship, shipment and passenger. The governemnt, through the General Directorate of Sea Liaison in the Department of Liaison, had made the performance standard of sea harbor operational services that must be obeyed by each sea harbor operator in Indonesia. This performance standard was set into the Decree No: UM.002/38/18/DJPL.2011. The indicator of this performance covered some items, such as:

(a) Waiting time (WT)
(b) Guiding service time (approach time/ AT)
(c) Effective time (ET)
(d) Work productivity (B/C/H)
(e) Receiving or delivery of containers
(f) Berth occupancy ratio (BOR)
(g) Shed occupancy ratio (SOR) and
(h) Yard occupancy ratio (YOR).

Surabaya Containers Terminal was one sea harbor that served containers transportation for export, import and domestic shipping. All these works had a certain limit in consistent with the operational guidance in the following table.

Table 1:

The Operational Performance Standard of Surabaya Containers Terminal Pursuant to The Decree of General Directorate of Sea Transport No. UM.002/38/18/DJPL.2011					
No	**Indicators**		**Limit Rate**		
1	Waiting Time	WT	:	2.00	hour
2	Approach Time	AT	:	4.00	hour
3	Effective Time/Berthing Time	ET / BT	:	70.00	%
4	Load-Unload Performance\	(Box/CC/H)	:	25.00	box/hour
5	Berth Occupation Ratio\	BOR	:	70.00	%
6	Yard Occupation Ratio	YOR		70.00	%

Source: General Directorate of Sea Transport, 2011

RESULT AND DISCUSSION

Ship Visit (Ship Call)

When the government made relevant policies over logistic issues as stated in the Blue Print of National Logistic System, economical growth started increasing and it was indicated by the visit of the containers ships to various sea harbors in Indonesia. In 2014, Surabaya Containers Terminal was visited by many containers ships from abroad. Data of ship visit (ship call) was shown in the following.

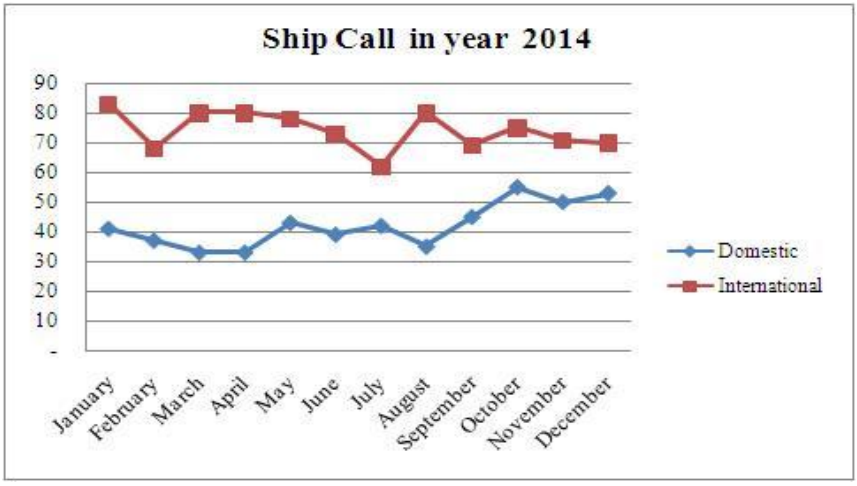

Figure 2: Ship Call to Surabaya Containers Terminal.

Containers Flow

Logistic transprotation flow to Indonesia was increasing. Tanjung Perak Sea Harbor was the second biggest sea harbor after Tanjung Priok in jakarta. The number of containers for export

(loading), import (discharge), and domestic shipping that was handled in Surabaya Containers Terminal was displayed in the following figures.

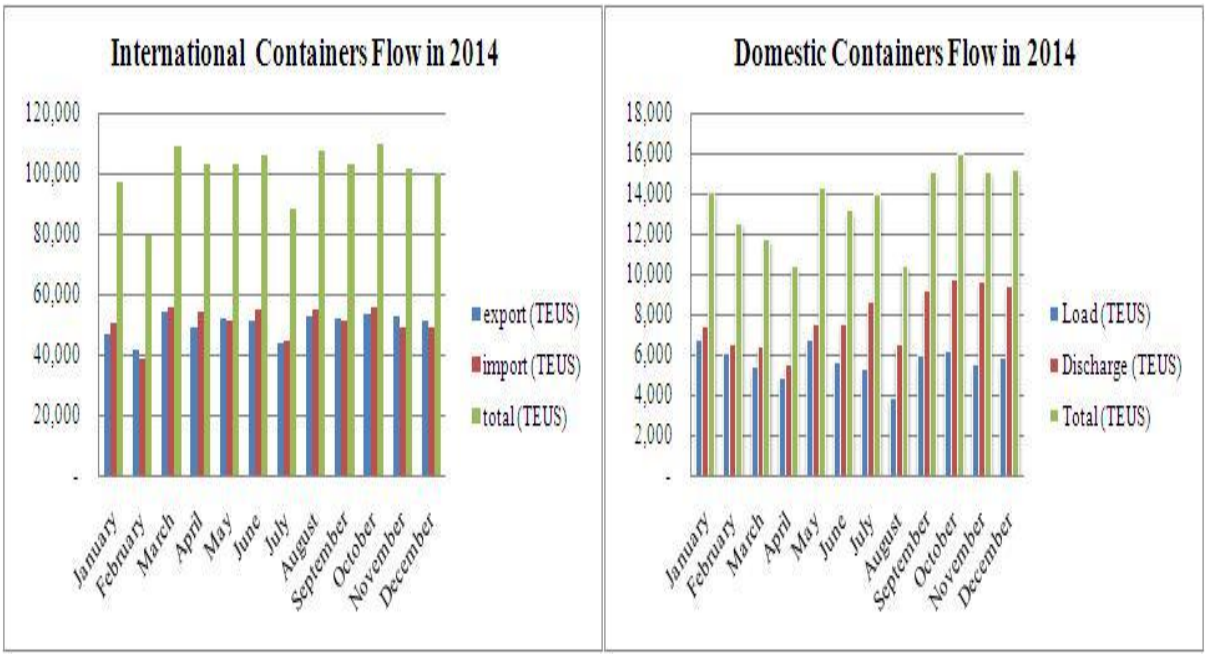

Figure 3: Containers Flow in Surabaya Containers Terminal.

The performance of containers terminal was assessed on the existing condition of data collection, precisely on February 2015. Result of descriptive analysis was compared with the governmental regulation, in this case represented by the Decree of General Directorate of Sea Transport No.UM.002/38/18/DJPL.2011 about The Performance Standard of Sea Harbor Operational Service. The data of relevanat facilities and containers flow in Surabaya Containers Terminal were shown in the following tables:

Table 2:

Data of Facilities at Surabaya Containers Terminal

No	Name of Facilities	Dimension			
1	International Berth	Length	:	1,000.00	m
		Width	:	50.00	m
		Depth	:	10.50	m
2	Domestic Berth	Length\	:	450.00	m
		Width	:	50.00	m
		Depth	:	7.50	m
3	Containers Yard	Area	:	290,000.00	m^2
		Capacity	:	34,000.00	TEUs
		Import	:	14,445.00	TEUs
		Export	:	9,179.00	TEUs
		Domestic	:	2,974.00	TEUs
		Shipping			
4	Container Freight	Area	:	10,000.00	m^2
	Station (CFS)	Dangerous			
		Shipment	:	6,500.00	m^2
5	Equipments				
	Container Crane			12	units
	Rubber Tyred Gantry			33	units
	Reach Stackers			6	units
	Side Loader			1	units
	Sky Stacker			3	units
	Forklift Diesel			6	units
	Forklift Electric			12	units
	Head Truck			80	units
	Chasis			124	units
	Low Bed Chasis			3	units
	Cassette			90	units
	Translifter			7	units

Table 3:

International Containers Flow

NO	NAME OF SHIP	LOA (m)	SHIP ARRIVAL		EARLY TREAT		UNLOAD RATE		LOAD RATE		TOTAL OF LOAD-UNLOAD		FINAL TREAT		SHIP DEPART	
			DATE	TIME	DATE	TIME	BOXES	TEUS	BOXES	TEUS	BOXES	TEUS	DATE	TIME	DATE	TIME
01	WAN HAI 281	183	30 Jan	18.20	30 Jan	20.31	332	489	376	564	708	1,053	31 Jan	22.18	01 Feb	0.10
02	COUGAR	186	31 Jan	20.50	31 Jan	22.30	243	362	487	630	730	992	01 Feb	16.57	01 Feb	17.45
03	PELICAN	172	31 Jan	10.45	31 Jan	11.25	403	627	715	966	1,118	1,593	01 Feb	23.21	02 Feb	0.55
04	NOBLE MATAR	229	01 Feb	1.15	01 Feb	2.05	478	774	373	530	851	1,304	02 Feb	3.01	02 Feb	4.20
05	OTTO	179	31 Jan	19.55	31 Jan	21.21	629	887	731	907	1,360	1,794	02 Feb	4.20	02 Feb	6.30
06	UNI POPULAR	182	02 Feb	5.30	02 Feb	6.05	428	727	271	438	699	1,165	03 Feb	4.40	03 Feb	6.05
07	EVER PEARL	182	02 Feb	8.50	02 Feb	10.00	91	160	319	444	410	604	03 Feb	3.18	03 Feb	6.20
08	MEDCORAL	181	02 Feb	6.45	02 Feb	7.01	538	717	352	496	890	1,213	03 Feb	7.49	03 Feb	8.20
09	STADT ROSTOCK	222	01 Feb	20.15	01 Feb	21.01	562	781	915	1,246	1,477	2,027	03 Feb	8.50	03 Feb	12.45
10	UNI AHEAD	165	03 Feb	9.05	03 Feb	9.39	420	649	288	458	708	1,107	04 Feb	4.45	04 Feb	6.25
11	FESCO TRADER	147	03 Feb	13.30	03 Feb	14.22	460	566	511	613	971	1,179	04 Feb	17.01	04 Feb	18.10
12	WESERWOLF	211	03 Feb	11.20	03 Feb	12.27	687	964	791	1,081	1,478	2,045	05 Feb	6.45	05 Feb	7.20
13	UNI-ANGEL	165	04 Feb	12.15	04 Feb	13.25	420	593	165	247	585	840	05 Feb	6.02	05 Feb	7.45
14	WARNOW CHIEF	181	04 Feb	9.55	04 Feb	10.37	575	816	402	572	977	1,388	05 Feb	9.08	05 Feb	11.00
15	HANSA FRESENBURG	176	04 Feb	19.20	04 Feb	20.21	579	805	447	668	1,026	1,473	06 Feb	0.30	06 Feb	0.45
16	JAN RITSCHER	209	05 Feb	12.10	05 Feb	12.57	300	453	70	102	370	555	06 Feb	3.32	06 Feb	5.40
17	RACHA BHUM	211	05 Feb	9.45	05 Feb	10.26	326	459	303	417	629	876	06 Feb	4.14	06 Feb	6.55
18	PRINCESS OF LUCK	183	06 Feb	11.30	06 Feb	13.55	313	460	311	444	624	904	07 Feb	11.13	07 Feb	12.30
19	SANYA	183	06 Feb	17.45	06 Feb	21.23	794	1,063	632	957	1,426	2,020	07 Feb	19.26	07 Feb	20.15
20	KAMALA	200	06 Feb	22.35	06 Feb	23.31	415	566	531	744	946	1,310	08 Feb	0.38	08 Feb	1.45
21	PELICAN	172	07 Feb	3.40	07 Feb	4.08	405	654	573	776	978	1,430	08 Feb	1.03	08 Feb	2.15
22	HS MASTER	188	07 Feb	14.00	07 Feb	15.24	594	798	317	459	911	1,257	08 Feb	10.27	08 Feb	14.10
23	BOX VOYAGER	230	07 Feb	22.45	08 Feb	0.15	493	772	405	538	898	1,310	08 Feb	20.08	08 Feb	21.15
24	LEO PERDANA	200	08 Feb	17.50	08 Feb	19.07	510	765	270	434	780	1,199	09 Feb	14.55	09 Feb	16.00
25	MAERSK JURONG	223	08 Feb	6.00	08 Feb	6.40	645	844	803	1,077	1,448	1,921	09 Feb	18.20	09 Feb	19.43
26	HANJIN DALIAN	200	09 Feb	7.50	09 Feb	9.01	195	290	293	445	488	735	09 Feb	21.24	09 Feb	22.45
27	COUGAR	186	09 Feb	11.55	09 Feb	14.34	636	847	379	515	1,015	1,362	10 Feb	10.37	10 Feb	12.05
28	ITHA BHUM	171	09 Feb	20.40	09 Feb	21.34	426	514	376	497	802	1,011	10 Feb	13.23	10 Feb	14.20
29	FESCO TRADER	147	09 Feb	23.45	10 Feb	0.51	443	569	580	672	1,023	1,241	10 Feb	21.00	10 Feb	21.50
30	HANSA FRESENBURG	176	11 Feb	1.45	11 Feb	2.34	673	982	590	845	1,263	1,827	12 Feb	4.41	12 Feb	6.00
31	WARNOW CHIEF	181	11 Feb	8.20	11 Feb	9.01	583	816	597	866	1,180	1,682	12 Feb	8.36	12 Feb	10.05
32	KMTC PORT KELANG	187	13 Feb	1.35	13 Feb	2.52	436	617	551	779	987	1,396	14 Feb	12.20	14 Feb	13.15
33	MEDCORAL	181	13 Feb	15.45	13 Feb	17.00	411	558	307	412	718	970	14 Feb	16.15	14 Feb	17.12
34	PELICAN	172	13 Feb	18.30	13 Feb	19.33	390	591	559	775	949	1,366	14 Feb	23.02	14 Feb	23.59
35	HS MASTER	188	13 Feb	11.55	13 Feb	16.25	633	914	477	702	1,110	1,616	15 Feb	0.30	15 Feb	1.29
36	SANTA BELINA	222	14 Feb	23.00	15 Feb	0.18	408	622	475	704	883	1,326	15 Feb	18.59	15 Feb	19.55
37	SANYA	183	15 Feb	3.15	15 Feb	4.01	858	1,185	684	1,044	1,542	2,229	16 Feb	13.58	16 Feb	14.40
38	EVER PEARL	182	16 Feb	1.45	16 Feb	3.04	359	573	316	504	675	1,077	16 Feb	20.52	16 Feb	22.00
39	CHILOE ISLAND	222	15 Feb	5.03	15 Feb	6.16	727	1,017	965	1,294	1,692	2,311	16 Feb	23.37	17 Feb	1.25
40	FESCO TRADER	147	16 Feb	11.50	16 Feb	12.30	463	555	583	687	1,046	1,242	17 Feb	12.00	17 Feb	13.00
41	LARENTIA	216	16 Feb	16.45	16 Feb	20.20	286	393	550	781	836	1,174	17 Feb	23.35	18 Feb	0.35
42	ARUNA IPSA	197	17 Feb	1.05	17 Feb	2.02	331	507	421	572	752	1,079	18 Feb	3.35	18 Feb	5.35
43	HANJIN CHITTAGONG	200	17 Feb	7.00	17 Feb	8.35	161	248	342	523	503	771	18 Feb	7.10	18 Feb	9.15
44	SEOUL TRADER	210	18 Feb	11.25	18 Feb	12.24	377	551	214	323	591	874	19 Feb	6.40	19 Feb	7.40
45	HANSA FRESENBURG	176	18 Feb	1.45	18 Feb	2.28	644	793	534	736	1,178	1,529	19 Feb	8.10	19 Feb	10.55
46	WARNOW CHIEF	181	18 Feb	8.20	18 Feb	9.00	580	844	597	836	1,177	1,680	19 Feb	10.45	19 Feb	12.10
47	UNI-ANGEL	165	18 Feb	18.00	18 Feb	19.16	479	652	297	510	776	1,162	19 Feb	10.50	19 Feb	12.30
48	CAPE MORETON	222	19 Feb	8.45	19 Feb	9.26	242	369	529	654	771	1,023	20 Feb	9.04	20 Feb	10.40
49	ITHA BHUM	171	19 Feb	11.15	19 Feb	11.45	473	628	295	477	768	1,105	20 Feb	10.04	20 Feb	11.00
50	KMTC SHANGHAI	187	19 Feb	15.45	19 Feb	21.30	440	555	551	782	991	1,337	21 Feb	3.45	21 Feb	6.20
51	COUGAR	186	20 Feb	13.50	20 Feb	14.28	355	509	308	443	663	952	21 Feb	5.50	21 Feb	8.30
52	HS MASTER	188	20 Feb	13.35	20 Feb	14.23	547	722	493	646	1,040	1,368	21 Feb	19.51	21 Feb	21.10
53	WAN HAI 281	183	20 Feb	22.25	21 Feb	0.28	364	496	272	413	636	909	21 Feb	19.44	21 Feb	21.45
54	HS ONORE	213	21 Feb	10.20	21 Feb	11.07	526	663	21	32	547	695	22 Feb	3.38	22 Feb	4.40
55	PELICAN	172	21 Feb	8.15	21 Feb	9.02	436	696	532	730	968	1,426	22 Feb	12.18	22 Feb	14.10
56	HS WAGNER	231	21 Feb	23.30	22 Feb	1.00	553	834	419	593	972	1,427	23 Feb	2.25	23 Feb	3.15
57	HERMANN WULFF	211	21 Feb	23.50	22 Feb	1.01	767	1,035	885	1,170	1,652	2,205	23 Feb	13.35	23 Feb	14.20
58	HANJIN DALIAN	200	22 Feb	18.20	22 Feb	19.01	458	652	410	609	868	1,261	23 Feb	14.58	23 Feb	16.35
59	MEDCORAL	181	23 Feb	6.35	23 Feb	7.08	199	278	353	477	552	755	23 Feb	21.13	23 Feb	22.05
60	SANYA	183	22 Feb	17.40	22 Feb	18.27	798	1,095	672	982	1,470	2,077	24 Feb	0.55	24 Feb	2.00
61	UNI POPULAR	182	23 Feb	15.10	23 Feb	17.04	86	127	255	373	341	500	24 Feb	3.23	24 Feb	5.05
62	FESCO TRADER	147	23 Feb	18.00	23 Feb	19.00	391	453	434	537	825	990	24 Feb	9.57	24 Feb	11.00
63	UNI AHEAD	165	24 Feb	18.00	24 Feb	18.54	461	670	177	252	638	922	25 Feb	10.00	25 Feb	11.10
64	JAKARTA TOWER	212	25 Feb	0.40	25 Feb	1.39	341	542	189	282	530	824	25 Feb	18.25	25 Feb	18.50
65	HANSA FRESENBURG	176	24 Feb	23.10	25 Feb	0.41	703	959	671	924	1,374	1,883	26 Feb	5.26	26 Feb	6.35
66	WARNOW CHIEF	181	25 Feb	8.40	25 Feb	9.21	530	784	745	1,006	1,275	1,790	26 Feb	12.54	26 Feb	14.20
67	RACHA BHUM	211	26 Feb	9.20	26 Feb	10.08	320	464	560	746	880	1,210	27 Feb	8.00	27 Feb	9.00
68	KAMALA	200	26 Feb	21.05	26 Feb	22.06	291	366	515	765	806	1,131	28 Feb	1.45	28 Feb	2.50
69	BUSAN TRADER	210	28 Feb	3.40	28 Feb	5.18	457	498	69	100	526	598	28 Feb	15.38	28 Feb	16.15
70	HS MASTER	188	27 Feb	11.45	27 Feb	13.13	544	737	611	860	1,155	1,597	28 Feb	20.15	28 Feb	21.53
71	PELICAN	172	27 Feb	18.55	27 Feb	20.05	504	769	737	1,000	1,241	1,769	28 Feb	20.50	28 Feb	23.30
	GRAND T O T A L	13,422					32,925	46,290	32,748	45,683	65,673	91,973				

Source: Result of Survey by TPS, 2015

Based on data exposition above, some criteria of harbor performance then could be analyzed with previous formulas.

Effective Time (ET)

It was a time used to conduct load-unload activity at the berth. ET in the data was 24.31 hours. This component was quite influential to the performance of berthing time although it was not determined as the standard criteria.

Not Operation Time (NOT)

It was a time when the ship did not do activity at the berth. Such time could be resting time and time to wait for laborers. NOT in the data was 2.13 hours. Similar to ET, this component was not performance standard but it was influential to other component.

Idle Time (IT)

It was unused working time during load-unload activity at the berth. IT in the data was 0.63 hours. Usually, IT at the sea harbor with complete and adequate facilities, supported with feasible workers, could be minimum, meaning that wasting time was reduced.

Berthing Working Time (BWT).

It was a time when the ship was scheduled to berth and do the load-unload activity. BWT comprised of ET+IT and BWT in the data was 24.94 hours. The presence of BWT might influence the performance of berthing time (BT). At minimum, BWT might influence the productivity of load-unload activity at the berth.

Berthing Time (BT)

It was a time used by the ship at the berth. The component of BT involved BWT + NOT. BT in the data was 27.07 hours. The standard for component was not available, but it could still influence the productivity of containers load-unload activity at the berth. The lower BT was the greater productivity of load-unload activity.

Ratio of Effective Time to Berthing Time (ET: BT)

It was a comparison between effective time of load-unload activity and time when the ship was berthing. The measuring unit was percentage (%). Based on the data, the ratio was 89%. It was adequate in relation with the performance standard of sea harbor operational,

minimally to 70%. Positive result was achieved from the effective time of load-unload activity in order to produce optimum utilization at optimum berthing time.

Turnaround Time (TRT)

It was a time when the ship remained at the sea harbor from since the ship arrived at the location until its departure. TRT in the data was 26.42 hours. The standard for this component was not made, but it was always infleuntial to the productivity of load-unload activity of containers in the sea harbor. Lower TRT would be greater productivity of load-unload activity.

Ton per Ship Hour in Port (TSHP)

As revealed by the data, the speed of load-unload activity in the sea harbor, or the number of works to do load-unload activity per ship per hour was counted for 24.36 boxes/hour. The criteria of sea harbor performance were published by UNCTAD, and pursuant to international sea harbor standard, this number was equaled to 25 boxes/hour, and this number was adequate.

Ton per Ship Hour in Berth (TSHB)

The speed of load-unload activity at the berth, or the average number of load-unload activity per ship per hour at the berth was obtained for 23.77 boxes/hour. As shown by the performance standard of sea harbor operational, the speed of load-unload activity at the berth was 25 boxes/hour, and this was below the minimum standard.

Berth Throughput (BTP)

It was the capacity of shipment flow at the berth. It was shown by TEUS/m that could be passed the shipment in every available meter length at the berth. Data showed that this capacity was 3.70 TEUS/meter.

Berthing Occupancy Ratio (BOR)

The usage level of the berth was known by comparing between ship length and berth length during the usage at certain period. The obtained level was 55%. If compared with the maximum performance standard of sea harbor operational that set as 70%, the current level was in good category.

Container Yard Occupancy Ratio (CYOR)

The usage level of container yard was estimated by comparing between number of containers and the capacity of container yard at certain period. This estimation was counted for 80%. If compared with the maximum performance standard of sea harbor operational that set as 70%, the current level must be definitely in poor category because it was above the maximum standard.

CONCLUSION

From the overview above, the conclusion could be made as following:

- Ratio of Effective Time (ET) to Berthing Time (BT) was 89%, and it was considered as adequate. It was higher than the minimum standard of 70%, meaning that time effective time and berthing time were optimum.
- The speed of load-unload activity at the berth (Ton Ship Hour in Berth / THSB) was 23.77 boxes/hour, and it was below the minimum standard of 25 boxes/hour. It improved the performance of the berth side.
- The usage level of the berth (Berthing Occupancy Ratio / BOR) was 55%. It was in good in relation with the maximum standard of 70% . This Berthing Occupancy Ratio at the existing condition must be maintained and be useful as reference.
- The usage level of container yard (Container Yard Occupancy Ratio / CYOR) was 80% and remained below the maximum standard of 70%. Thus, it needed improving performance in yard usage.

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