

Container Transportation System in Makassar

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Abstract: Container transportation system is the superior of sea and land transportations in general; container transportation has the advantage of cargo safety aspects and speed of loading and unloading processes. Along with the development of time and demands of market needs, in Indonesia a container port full container terminal has been built and operated, one of which is in Makassar port, semi container and conventional port that handles containers. This study uses the operational performance of container transportation in both ports and highways. The method used is qualitative comparative analysis of secondary and primary data, it can be explained that the container service system is good according to service standards. The road transportation network for container transportation to the Depot and South Sulawesi regions is not yet adequate, especially in the aspect of geometric road construction services. Soekarno-Hatta Port with Makassar Container Terminal (MCT) becomes the center of distribution and accumulation of commodities transported, with containers especially in Eastern Indonesia.

Keywords: Infrastructure, transportation, container, road network

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I. Introduction

The Soekarno-Hatta container loading port is the port of origin and destination of cargo in container packaging to all regions in South Sulawesi and Eastern Indonesia in general [1]. Container transportation through road networks with limited capacity, distance is relatively far, and the physical quality of roads is still low for the quality of container transportation. The impact of long distance container transportation and being located in the center of Makassar can trigger congestion, increase road accidents, be less efficient and effective because the costs and timing of distribution are large[2] increase the cost of physical maintenance of roads due to frequency and load trucks and or trailers that transport containers [3].

The researchers have previously discussed that ports have an important role in the sea transportation system [4], especially in island countries like Indonesia. The port is a node between the sea transportation system and the land transportation system in order to support and to develop an economic development of a region or country[5]. The port is also a place to carry out loading and unloading activities (B/M) for trade commodities[6].

The Makassar Container Terminal (MCT), which serves container loading and unloading, is required to improve ship service performance and tool productivity in anticipating an increase in container flows by 8.4% per year. In the city of Makassar the number of 2-wheeled vehicles increases 13 to 14 percent per year and 4-wheelers increase 8 to 10 percent per year. The number of two-wheeled and four-wheeled vehicles reached 2.4 million (1.1 million motorcycles and 1.3 million cars), higher than the population of Makassar city of 1.7 million. If there is no effort to improve the transportation pattern, it will experience total congestion[7].

In developing road network infrastructure can increase economic growth and reduce disparities between regions. So that it directly influences the increase of economic growth, it will be followed by regional development that enables the utilization of natural resources optimally. Road network infrastructure plays an important role in maintaining a balanced distribution of cargo and services. In addition, it can also reduce transportation and production costs from potential natural resource locations to industrial locations to consumers of industrial products[1]. Container cargo transportation is different from cargo transport in general, in addition to its large form, which is a 20 feet container weighing 24 tons and a 40 feet container weighing 48 tons[8]. Ideally, the road through which freight transport is above 10 tons and must go through class 2 roads with a minimum width of 11 meters, so as not to cause damage to roads that do not match the age of the plan and will not interfere with travel traffic with the container freight transportation[9]. This can be realized by evaluating operational performance and service systems so that the distribution of container transport traffic can be measured[3].

II. Materials And Methods

This research is classified as qualitative and quantitative descriptive, direct observation is carried out at Container ports in Makassar, Container Terminal *Depo* Meratus on Ir. Sutami road Parangloe warehouse in Makassar Industrial area. Comparative analysis is carried out by comparing the average performance values and container growth trends in the last 4 years according to port operational data from the Port Authority, terminal managers and container depots.



Figure 1. Location of Makassar Container Terminal and Meratus Sutami Depot

Observation samples that are considered to represent the terminal population and container depots are carried out at the Container Terminal, namely the terminal in the Makassar port and container Depot along with all container transportation operations in Makassar, South Sulawesi Province.

III. Results And Discussion

Performance Characteristics

Based on the results of the data in Table 1, it can be explained that the realization of Waiting Time (WT) for domestic and foreign ship services in 2018 is smaller, compared to the standard Waiting Time performance of at least 1 hour, at Makassar main port, considered to have reached a standard and categorized well. Realization of Approach Time (AT) for domestic ship services of 0.97 hours is smaller than the Approach Time (AT) performance standard of 1.25 hours, and then the approach time for domestic ship service in Makassar port reaches a good category standard. The Approach Time (AT) of overseas shipping is 1.67 hours compared to the Approach Time performance standard of 1.25 hours. Approach Time (AT) for foreign ship services in Makassar Port is categorized as good.

Table 1. Indicator of Service for the last 4 years Makassar Container Terminal

Performance Standard Indicators		Description	Realization				Explanation
			Year 2015	Year 2016	Year 2017	Year 2018	
WT	1	Domestic	0,11	0,00	0,00	0,00	Good
	(hour)	Overseas	0,08	0,03	0,01	0,00	Good
AT	1,25	Domestics	0,97	1,21	1,09	0,97	Good
	(hour)	Overseas	1,99	1,98	1,88	1,67	Poor
ET:BT	80%	Domestics	79,14	82,40	81,26	78,62	Good
		Overseas	79,14	82,40	81,26	80,32	Good
Productivity	25	B/C/H	29	28	27	27	Good
	38	B/S/H	37	35	33	38	Good
Receiving	30	Minutes	24,97	29	28	28	Good
Delivery	20	Minutes	25,06	29	28	29	Good
BOR	70	%	44,21	51,52	56,97	77,11	Good
YOR	70	%	61,04	54,09	61,01	70,55	Good
Equipment Readiness	90%	Floating Eq.	96,99	88,95	92,59	92,05	Enough
		Land Eq.				48,69	Poor

Source: Makassar Port Authority, 2019

In Table 1, the average value for the last four years is 0.028 for the waiting time and Approach Time of 3.5 hours and ET/BT at 80.36%, the container terminal above is included in the good category, because it is below the maximum standard value set.

Realistic Effective Time (ET) and Bert Time (BT) for domestic and foreign ship services in the container terminal in 2018 amounted to 80.72%, when compared with the Effective Time (ET) and Bert Time (BT) performance standards of 80%, then the realization of Effective Time (ET) and Bert Time (BT) for ship services at the Soekarno-Hatta port terminal in Makassar has reached the standard with the good category. The loading/unloading speed of unloaded/unloaded 1 (one) crane in a period of 1 (one) hour in Makassar port container terminal is 27 boxes/crane/hour. When compared with the standard of performance that has been set at 25 box/crane/hour, the speed of loading and unloading of container has reached the standard categorized good.

The loading and unloading speed of containers which are unloaded in 1 (one) hour as long as the ship is docked at the Makassar Port container terminal at 38 boxes/crane/hour, when compared with the performance standard set at 38 box/crane/hour. So the speed of container loading and unloading has not reached the standard and is categorized good. The average realization of the container receiving speed of 28 minutes is lower than the performance standard set at 30 minutes and the container delivery is 29 minutes.

When compared with the predetermined performance standards are classified as good, dock utility Berth Occupancy Ratio (BOR) in 2018 amounted to 71.02% when compared to the standard dock utility BOR of 70%, the pier utility BOR at Soekarno-Hatta Port of Makassar can be categorized as poor. The realization of stacking utility Yard Occupancy Ratio (YOR) is 70.55% when compared with the dock utility standard of 70%, then the stacking utility (YOR) in the container terminal of Makassar Port is still not good. The readiness of floating equipment in 2018 was 92.05%, land equipment 48.69% when compared to the standard operating equipment readiness of 90%, then the readiness of floating equipment operations at the Soekarno-Hatta Port of Makassar was classified as good and land equipment with a 48.69% utility rated not good.

Road Network Analysis

Geometric conditions/widths of roads in several segments, roads based on survey results are varied. The width of the road segment A.P Pettarani and Boulevard are the widest, ranges from 28 to 34 meters. The degree of saturation or Degree of Saturation (DS), which is the ratio of the number of vehicles (pcu/hour) is the majority ranging from 0.4 to 0.74. Some roads such as A.P Petarani road have reached saturation levels of 0.75 to 0.8 as shown in Figure 2.

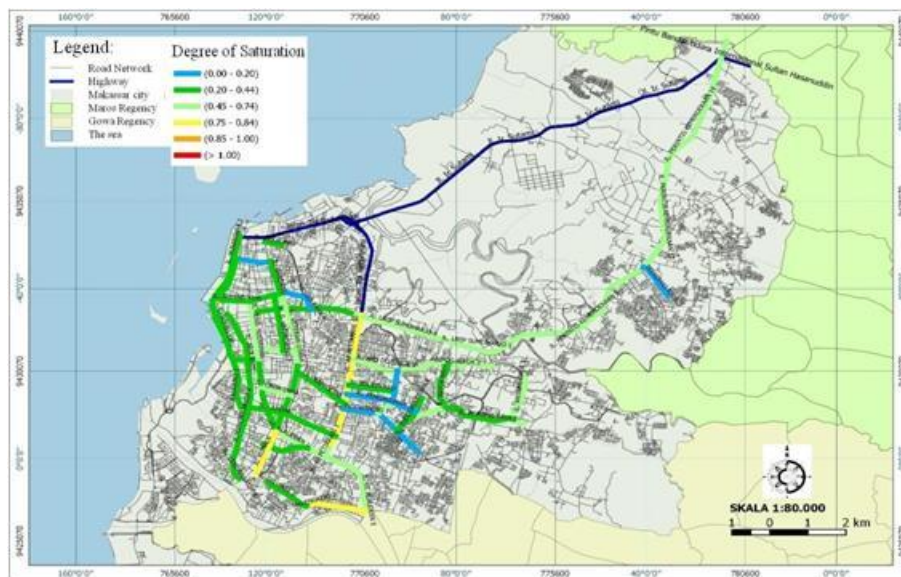


Figure 2. The degree of saturation of Makassar city traffic[10]

Based on Figure 2, it is seen that, on the A.P Pettarani road, Malengkeri, and Kumala have the highest degree of saturation (DS), namely 0.75 to 0.84. The Adiyaksa, Pengayoman, Hertasing, Mesjid Raya, and Student armies have the lowest degree of saturation (DS).

The level of road service in Makassar city can be seen on the AP Pettarani, Malengkeri, and Kumala road segments, which have a category of road service (LoS) categorized as F with forced zones causing congestion or very low speed, the queue of vehicles is very long and barriers are very many[11]. And the Pengayoman and Telkomas Raya road segments have a level of road service (LoS) with category A. Free flow conditions at high speed and low traffic flow volumes.

Analysis of Container Traffic

The movement of container transport in Makassar area is generally distributed from the Soekarno-Hatta port node and the Makassar Container Terminal, both South Sulawesi surplus commodities and cargo transiting from outside the city. Traffic flows from the destination port to Meratus Sutami Depot to the Parangloe Warehouse and Kima Depot Area and the distribution of container transportation networks has covered all districts and cities in South Sulawesi Province, even propagation has been found outside South Sulawesi Province, although the number is still relatively limited. Movement of containers aimed at Makassar port or vice versa from Meratus Sutami Depot to the Parangloe Warehouse Zone and Kima Daya Depot, is quite encouraging because it has reached the majority of districts, cities in South Sulawesi Province because it is supported by access to the Trans Sulawesi road conditions, the transportation movement conditions are appropriate the interaction needs of the destination and origin of the movement which is influenced by the development of the city/regency within the South Sulawesi Province Container movements in the city of Makassar have 4 track accesses to the surrounding cities / regencies or other provinces on the island of Sulawesi.

The description of the main line access to the internal/urban trajectory in Makassar city, the line of container transport vehicles is as follows

- a. Line I, from Makassar Port - Urip Sumoharjo Road – A.P. Pettarani road.
- b. Line II, Makassar Port - Toll Road Ir. Sutami Kima and Daya (industry), Salodong and Patene (warehousing)
- c. Line III, Makassar Port - Metro- Perintis Kemerdekaan road-Borong/Antang (trade/housing) Toll road.
- d. Line IV, Makassar Port – Sangir road – Veteran road- Parangtambung (Trade/Housing) level of road service and aspects of Degree of Saturation vary between 0.45-0.75

External/regional trajectory (Mamminasata area and its surroundings) container transport vehicles are:

- a. Line I, Makassar Port-Urip Sumarjo road – A.P.Pettarani road Sultan Alauddin - Talasalapang/Minasaupa/ (trade/housing) line I has a degree of saturation between 0.75 - 0.84
- b. Line II, Trans Sulawesi-Pare-Pare and surrounding Barru-Pangkep–Maros- Tol Road – Ir. Sutami (warehousing), has a degree of saturation between 0.45 - 0.75
- c. Pinrang – Maros III Line - Independence Pioneer Road (warehousing/Makassar Depot / Port), where the degree of saturation is between 0.45 - 0.75
- d. Line IV, Bantaeng/Bulukumba, Takalar-Gowa, Sultan Alauddin Road (warehousing/Depot port of Makassar), where the degree of saturation is between 0.75 - 0.84

The movement of most freight vehicles is found on the Makassar exit route to Maros (30.75%) whereas from Maros with the purpose of entering Makassar (40.17%) specifically the movement of freight transport vehicles with container systems from Maros to Makassar and its destinations 257 to 315 container vehicles per day (3.3% to 4.04% of total freight vehicles per day). The development of freight transportation, according to the policies of the Makassar city area, is proposed to be a logistics and trade center in Eastern Indonesia and East Asia. Makassar City is the main node in the distribution of goods for the city/regency area in South Sulawesi distributed Makassar container port transportation with port to port and door to door systems.

IV. Conclusions And Recommendations

Overall, the operational performance of Makassar container ports is in a good category, the container service system with service indicators has met the best service, reaching 80%. This is supported by an increase in facilities and time effectiveness in handling containers, so that they get rewards from year to year with guarantee service level categories. The traffic of container transport on the Highway from the port is only partially in good condition with the road density level below the national average. Accessibility to industrial/warehousing areas is still very low due to the condition of the road that may be passed by container transport trucks is national roads with road construction still class II and will affect the development of goods traffic and the level of road services that container transportation may be able to pass.

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