Study of Service Counter Needs at the Ampera 16 Ilir Port, Palembang

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ABSTRACT

Services at Port 16 Ilir below Ampera are still irregular, both in passenger boarding/alighting services and vehicle loading/unloading, such as the large number of drop-off/pick-up vehicles entering to the point of disrupting the comfort and safety of dropping off/picking up passengers and , the main cause is the still high queue of vehicles entering the Port including the fairly high queue of passengers.

From the five percent sample used, an analysis of the need for counters for vehicles and passengers was conducted which was analyzed using Queue Theory in order to calculate the need for counters, it was found that the number of counters for vehicles and passengers was 2 gates/or counters for passengers and 2 counters for passing vehicles, so that no queues were formed, thus reducing service users who were not in their place, namely the passenger waiting room when waiting to board the ship and frequent crossings between passengers (pedestrians) and vehicles, causing irregular traffic flow at the port. In addition, there are also no facilities that can support port activities such as adequate ticketing facilities that can limit passengers and unauthorized persons.

To facilitate service activities at the port to be more orderly and effective, the passenger and vehicle traffic flow pattern system will be regulated by building 2 counters to serve service users. And this is in accordance with theoretical calculations between the needs or requests for services and the capacity offered by service providers.

Keywords: Port, service, passengers, counter, facilities, request.

1. INTRODUCTION

Transportation is activity transfer goods (load) And passengers from somewhere to the place others (Salim, 2000:6). One of the benchmarks of the functioning of transportation is the smooth flow of traffic, both passengers and goods that are converted into smooth traffic movement. And one of the supporting elements of efforts to smooth the flow of traffic is also supported by supporting facilities and infrastructure, for that this study in order not to deviate from the target to be obtained so as not to deviate from this study is to include an analysis of minimum service standards for port service facilities, especially for passengers queuing to travel from Palembang City via Ampera Pier to the hinterland (upstream activities and social activities that are regular, or in other words the main purpose of this study is to calculate the number of counters needed in order to improve passenger services at

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Ampera Pier, because until now the service system at the pier still looks irregular, mixed between goods and people, and sometimes there is also a pile of goods along with two-wheeled area) who carry out daily activities, both economic vehicles, bicycles and goods in the form of luggage which greatly disrupts the smooth mobility of movement from and to the pier.

2. RESEARCH METHODOLOGY

The research implementation period used by the author for this research was carried out starting from date 01 February 2024 until with August 10 , 2024 as well as The implementation of this research took place at the Ampera Lower Pier City Palemban and this research activity was carried out at Port 16 Ilir or Ampera.

Type study Which used For gather data as material reference study This is type study qualitative. Study Qualitative data is data in the form of sentences, words or images. ... Qualitative data can also be defined as data in the form of categorization, characteristics tangible question or words (Martono, 2014:84).

Instrument study on basically tool Which used For gather data in study (Purwanto, 2018). Tools Which used For gather data in study is as following:

Form Measurement

Type measurement Which used that is type measurement in a way direct. Direct measurement is a measurement that is directly explicitly takes the characteristics of the object to be measured without the need for process it first formerly. Object which will measured that is :

1. the area of the parking area used
2. The area of the waiting room for the ticketing process for both vehicles and passengers.
3. Daily traffic of vehicles and passengers entering the port.

3. RESEARCH RESULTS AND DISCUSSION:

1. Passenger and Vehicle Traffic Analysis

a. Analysis Current flow patterns (*existing conditions*)

The irregular traffic flow pattern at Ampera Port results in frequent encounters and even *crossings* between passengers and vehicles both when entering and exiting ships.

1) The accumulation/mixing of cargo (passengers and vehicles) at *the ramp door* both when entering and exiting the ship, this is because all service users are scrambling to get out first. This is very dangerous for safety, especially for passengers.
2) Vehicles leaving the ship often stop their vehicles in the vehicle entry and exit lane.
3) The non-functioning of existing arrangements and facilities for vehicles entering the port area often results in congestion when vehicles want to enter the ship because the height of the vehicle does not match the mouth of the ship.

4) Passengers boarding the ship rarely use *the waiting room* as a passenger entry point, so the departure room facilities that are available are never used as intended.
5) Passenger drop-off/pick-up vehicles often park on the vehicle exit lane, making conditions very crowded and disorderly.
6) Especially for passenger transport vehicles that have different routes where vehicles in this category go to the ship without going through the toll gate, and the route used uses the route for vehicles leaving the port so that there is a narrowing of the route out of the port, because the existing route is divided into 2 routes where one route is for vehicles leaving the port and another route is for the entry route for passenger vehicles.

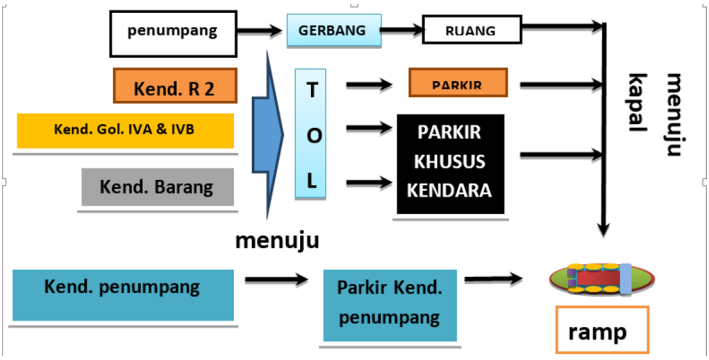

Figure 1 Passenger and Vehicle Traffic Flow Patterns Getting Off the River Transport Ship at This Time

b. Passenger and Vehicle Arrival Procedure Analysis
1) Passenger
a) Passengers exit through the rampdoor following instructions from the ship operator (zone C).
b) Passengers walk out through the designated path (zone C), towards the arrivals/waiting room (zone B), then out of the port (zone A).

2) Vehicle
a) All vehicles exit through the rampdoor dock in an orderly manner according to the ship operator's instructions (zone C).
b) Vehicles can immediately exit the port area via the exit provided (zone A).

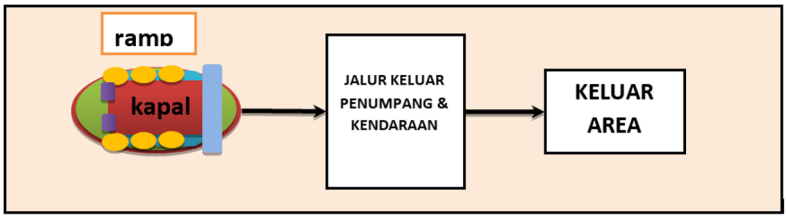

Figure 2. Passenger and 2-Wheeled Vehicle Traffic Flow Patterns Get off the ship

c. Passenger and Vehicle Departure Procedure Analysis

1) Passenger

a) All passengers and drop-off/pick-up vehicles enter through the main gate of the port and drop off passengers at the drop-off/pick-up vehicle parking area, then head to the passenger ticket counter (zone A);

b) Passengers wait in the waiting room (zone B);

c) Passengers enter the ship via *the gangway,* where tickets will be checked (zone C);

d) Passengers enter the ship via *the Moveable Bridge* by following the ship operator's instructions (zone C).

2) Vehicle

a) All types of vehicles enter through the main gate of the port to the vehicle ticket counter. Especially goods vehicles must go through the weighbridge first (zone A) .

b) All vehicles enter the parking lot, queue for vehicles to enter the ship (zone B);

c) 4-wheeled or more vehicles enter the ready-to-load vehicle parking lot according to the instructions of the port operator and ship operator (zone C);

d) Vehicles enter the ship via *the Moveable Bridge* regularly according to the ship operator's instructions (zone C).

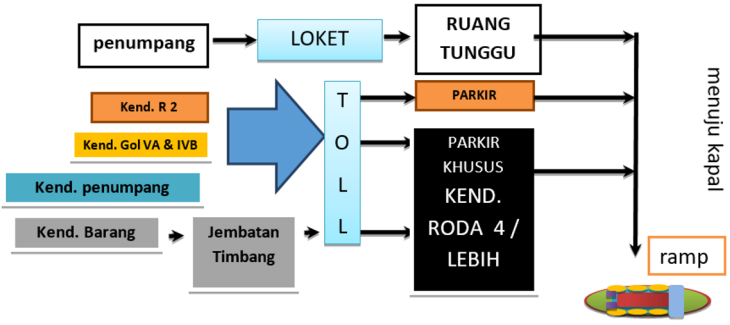

Figure 3 Passenger and Vehicle Traffic Flow Patterns

2. Counter needs analysis

Queues occur because the process of traffic flow movement is disrupted and makes the traffic flow management atmosphere at the Port uncomfortable and irregular due to the existence of a service activity that must be passed. The following calculations were carried out by taking sample data on Monday, April 23, 2024 .

Table 1
Passenger Arrival Time at Ampera Port
On April 23, 2024

time interval	counter 1	counter 2	vehicle	PNP Amount
08:00-09:00	10	14	5	21
09:00-10:00	3	27	2	16
10:00-11:00	16	24	5	19
11:00-12:00	10	34	2	35
12:00-13:00	8	34	3	35
13:00-14:00	10	32	2	31
14:00-15:00	9	31	2	40
15:00-16:00	7	24	1	46
16:00-17:00	13	29	5	50
17:00-18:00	10	24	6	33
18:00-19:00	12	24	5	13
19:00-20:00	8	18	0	7
20:00-21:00	10	14	0	5
21:00-22:00	11	12	3	4
22:00-23:00	9	9	1	0
23:00-24:00	7	13	1	0
24:00-01:00	6	10	1	0
01:00-02:00	9	5	0	0
02:00-03:00	7	3	0	0
03:00-04:00	6	0	0	0
04:00-05:00	2	2	0	0

05:00-06:00	**5**	**0**	**0**	**10**
06:00-07;00	**2**	**0**	**0**	**8**
07:00-08:00	**0**	**0**	**0**	**23**
amount	**190**	**383**	**44**	**396**

Source, Calculation Results, 2024

Below we can see the average calculation of vehicle and passenger arrivals/hour:

Average arrival of goods vehicles at counter 1:

$$\lambda = \frac{1}{n}(\sum xi)$$
$$\lambda = \frac{1}{24}(190)$$
$$\lambda = 7{,}916673$$
$$\lambda \approx 8\ kendaraan \ldots\ldots\ldots\ldots \quad (1)$$

Average arrival of private vehicles at counter 2:

$$\lambda = \frac{1}{n}(\sum xi)$$
$$\lambda = \frac{1}{24}(383)$$
$$\lambda = 15{,}958346$$
$$\lambda \approx 16\ kendaraan \ldots\ldots\ldots\ldots \quad (2)$$

Average passenger vehicle arrivals:

$$\lambda = \frac{1}{n}(\sum xi)$$
$$\lambda = \frac{1}{24}(44)$$
$$\lambda = 1{,}8333348$$
$$\lambda \approx 2\ kendaraan \ldots\ldots\ldots\ldots \quad (3)$$

Average passenger arrival at the passenger counter:

$$\lambda = \frac{1}{n}(\sum xi)$$
$$\lambda = \frac{1}{24}(396)$$
$$\lambda = 16{,}500013$$
$$\lambda \approx 17\ penumpang \ldots\ldots\ldots\ldots \quad (4)$$

So it can be concluded as in the following table:

Table 2. Average Service Time of Vehicles and Passengers at Ampera Port On April 23, 2024

time interval	counter 1	counter 2	vehicle	PNP Amount
08.00-08.00	8	16	2	17

Source, Calculation Results, 2024

Table 3 Vehicle Service Hours at the Ticket Gate On April 23, 2024

TYPE OF VEHICLE	SERVICE TIME		
	FAST	THE LONGEST	AVERAGE
PERSONAL VEHICLES	5	42	14
GOODS VEHICLES	10	182	38

Source, Calculation Results, 2024

Average service time (wp) of private vehicles:

$$wp = \frac{1}{n}(\sum xi)$$

$$wp = \frac{1}{358}(5131)$$

$$wp = 14{,}332422$$

$$wp \approx 14\ detik \ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

Average service time (wp) of goods vehicles:

$$wp = \frac{1}{n}(\sum xi)$$

$$wp = \frac{1}{191}(7331)$$

$$wp = 38{,}382184$$

$$wp \approx 38\ detik \ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

Table 4 Passenger Service Hours at the Counter On April 23, 20 24

LONGEST	FASTEST	AVERAGE

21	5	**12**

Source, Calculation Results, 2024

a. Determination of the number of passenger counters

Number of counters required $(p) = \frac{\lambda}{\mu}$

Description : $\boldsymbol{p}$ = number of counters required
$\boldsymbol{\lambda}$ = arrival rate/hour
$\boldsymbol{\mu}$ = service level/hour

Where:

$\boldsymbol{\lambda}$ = 17 passengers/hour..... (4)

$$\mu = \frac{interval\ waktu}{waktu\ pelayanan\ rata{-}rata}$$

$$\mu = \frac{3600\ detik}{12\ detik}$$

$\mu =$ 300service/hour

So that,

$$p = \frac{\lambda}{\mu}$$

$$p = \frac{17\ penumpang/jam}{300\ pelayanan/jam}$$

$$p = 0{,}057 < 1$$

So, based on the service time that occurred in the field, namely on April 23, 20 24 , it can be concluded that by only operating one counter for passenger service, it is enough to serve all passengers coming to Ampera port, especially on April 23, 20 24 which has an arrival rate of 17 passengers/hour. So there is no need to add a freight vehicle counter.

b. Determination of the number of goods vehicle counters (counter 1)

Number of counters required $(p) = \frac{\lambda}{\mu}$

Description : $\boldsymbol{p}$ = number of counters required
$\boldsymbol{\lambda}$ = arrival rate/hour
$\boldsymbol{\mu}$ = service level/hour

Where:

$wp \approx 38\ detik$..... (6)

$\boldsymbol{\lambda}$ =8 vehicles/hour..... (1)

$$\mu = \frac{interval\ waktu}{waktu\ pelayanan\ rata - rata}$$

$$\mu = \frac{3600\ detik}{38\ detik}$$

$\mu =$ 95service/hour

So that,

$$p = \frac{\lambda}{\mu}$$

$$p = \frac{8\ kendaraan/jam}{95\ pelayanan/jam}$$

$$p = 0{,}084 < 1$$

So, based on the service time that occurred in the field, namely on April 23, 2024 , it can be concluded that by only operating one counter for goods vehicle services, it is enough to serve all goods vehicles per day that come to Ampera port, especially on April 23, 2024 which has an arrival rate of 8 vehicles/hour. So there is no need to add a goods vehicle counter (counter 1).

c. Determination of the number of private vehicle counters (counter 2)

Number of counters required $(p) = \frac{\lambda}{\mu}$

Description : $\boldsymbol{p}$ = number of counters required
$\boldsymbol{\lambda}$ = arrival rate/hour
$\boldsymbol{\mu}$ = service level/hour

Where:

$wp \approx 14\ detik$..... (5)

$\boldsymbol{\lambda}$ =16 vehicles/hour..... (2)

$$\mu = \frac{interval\ waktu}{waktu\ pelayanan\ rata - rata}$$

$$\mu = \frac{3600\ detik}{14\ detik}$$

$\mu =$ 257service/hour

So that,

$$p = \frac{\lambda}{\mu}$$

$$p = \frac{16\ kendaraan/jam}{257\ pelayanan/jam}$$

$$p = 0{,}062 < 1$$

So, based on the service time that occurred in the field, namely on April 23, 2024 , it can be concluded that by only operating one counter for goods vehicle services, it is enough to serve all goods vehicles per day that come to the Ampera ferry port, especially on April 23, 2024 which has an arrival rate of 16 vehicles/hour. So there is no need to add a private vehicle counter (counter 2).

B. SELECTION OF A NEW SYSTEM

In selecting a new system, the following are alternative flow patterns offered for Ampera port, namely:

1. Passenger arrival flow pattern (getting off the ship)
    1) Passengers exit through *the ramp door* following instructions from the ship operator (zone C);
    2) Passengers exit through the designated *gangway , head to the arrivals hall, then exit the port (zone A).*

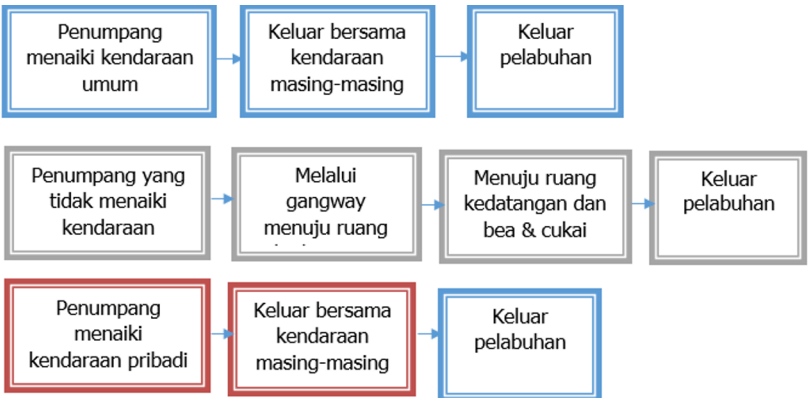

Figure 4 Passenger Arrival Flow Pattern Scheme At Ampera Harbor

2. Vehicle arrival flow pattern (disembarking from the ship)
    1) All vehicles exit via *the movable bridge* in an orderly manner at a speed not exceeding 8 km/h in accordance with the ship operator's instructions (zone C).
    2) Head straight to the port area exit (zone A).

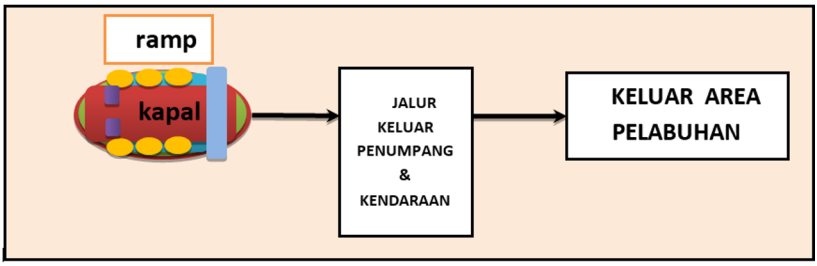

Figure 5 Vehicle Arrival Flow Pattern Scheme At Ampera Harbor

3. Passenger departure flow pattern (boarding the ship)
    1) All passengers and drop-off/pick-up vehicles enter through the main gate of the port and drop off passengers at the drop-off/pick-up vehicle parking area, then head to the passenger ticket counter (zone A);
    2) Passengers wait in the waiting room (zone B);
    3) Passengers head to the ship via the road *shelter ,* where ticket checks will be carried out (zone C);
    4) Passengers enter the ship via *a movable bridge* following the ship operator's instructions (zone C).

Passenger Departure Flow Pattern Scheme at Pier 16 Ilir Palembang

4. Vehicle departure flow pattern (boarding the ship)
    1) All types of vehicles enter through the main gate of the port and go directly to the vehicle ticket counter, especially goods vehicles, first go to the weighbridge (zone A).
    2) All vehicles enter the parking area for vehicle queues to enter the ship. For 2-wheeled vehicles, enter the special 2-wheeled parking area (zone B).
    3) 4-wheeled or more vehicles enter the ready-to-load vehicle parking lot according to the instructions of the port operator and/or ship operator (zone C).
    4) Vehicles enter the ship via *the movable bridge* in an orderly manner.
        ship operator instructions (zone C).

4. COMPETING INTERESTS

Based on the results of the analysis conducted, it is necessary to improve the system for regulating passenger and vehicle traffic patterns at the 16 Ilir Port of Palembang by adding several passenger regulation facilities and for vehicle services entering the Ampera Port area, namely:

a. For vehicle gates, two counters need to be made according to the results of queuing theory calculations.
b. For passenger gates, it is also necessary to add and build counters for service.
c. It is necessary to regulate the flow of people and goods using the applicable systems and provisions.
d. It is also necessary to create a traffic flow pattern in the parking area.

5. CONCLUSION

Based on the analysis using Queue Theory at Port 16 Ilir below the Ampera Bridge, it is evident that the current irregularities in passenger and vehicle services—marked by congestion and unsafe conditions—stem primarily from an insufficient number of service counters. The study concludes that the construction of 2 passenger counters and 2 vehicle counters is essential to eliminate queues, improve orderliness, and enhance both safety and efficiency at the port. By aligning service capacity with user demand, this infrastructure improvement will minimize unnecessary crowding, reduce interactions between vehicles and pedestrians, and support smoother port operations. Furthermore, the addition of proper ticketing facilities is also necessary to restrict access for unauthorized individuals and ensure a more secure and controlled environment.

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