Facility Optimization in Kolaka Ferry Port, East Celebes Province

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Abstract

Kolaka is a districts in Province Southeast Celebes. With the state of the region's surface, Kolaka generally consists of Mountain and Hill which extends from Numberrth to South, have some river which has the potential to be used as a power source, the need industry, Household necessities and needs irrigation and tourism, Kolaka ferry ports. In an effort to improve ferry transport service required adequate port facilities in order to create security, comfort, safety and order for passengers, vehicles and boats so that necessary repairs to existing facilities on land at The Port of Kolaka Ferries. The Port of Kolaka Ferries facilities on the land side in the form of a passenger waiting room, gangway, and a weighbridge. But the facilities available at this time are Numbert used optimally because such facilities are Numbert functioning or damaged.

Keywords: passengers; the lounge; Port; Facilities.

1. Introduction

The existence of The Port of Kolaka Ferries has strategic value because of a terminal connecting point Kolaka (Southeast Celebes) and Bone County (South Celebes). With a track distance of about 85 miles and takes about 8 hours, crosswalk Kolaka-Bajoe expected to shorten the travel time traffic, people and goods from mainland Southeast Celebes regency to the Bone. Provision vessels operating served by 4 (four) shipping companies are: PT. Afta Trans Mandiri, PT. Bridges Nusantara, PT. Sea Bridge Ferry, and PT. Rahayu July. The number of vessels operating in The Port of Kolaka Ferries 6 units.

In an effort to improve ferry transport service required adequate port facilities in order to create security, comfort, safety and order for passengers, vehicles and boats so that necessary repairs to existing facilities on land at The Port of Kolaka Ferries. The Port of Kolaka Ferries facilities on the land side in the form of a passenger waiting room, gangway, and weigh. the existing facility land is Numbert currently provide optimal service to the users of services such as the reception area, weighbri...
port, the government set standards relating to facilities and infrastructure at the port stipulated in Decree Number 52 of 2004 on the Implementation of Port Ferries and Decrees DGLT Number: SK.2681 / AP.005 / DrJD / 2006 About Operation Port Ferries.

2. Research Method
   a. Primary Data (Data Direct)
      Is data that can be directly from the source or based on direct observation in the field, in obtaining primary data the author uses the method of observation are carried out systematically and then do the recording. This method writer conducting data collection by means of observations of the harbor and conducting surveys. Thus it can be seen directly how much the trip vessels operating in the day, the productivity of arrival and departure of passengers for 15 days, and the facility data mainland.
   b. Secondary Data (Data Processed)
      Supporting data is obtained based on the observations of others and in the form of a written report. In the secondary data obtained using the following authors:
      a. method Literature
         Library method is an effort to collect data and information based on reference books and regulations in connection with the study. This study used the literature or books in the Library of the Polytechnic Transport River Lake Crossing or others associated with this research.
      b. Institutional methods
         Is collecting data by conducting visits to agencies to obtain secondary data. The author uses this method to collect data from various agencies such as:
         a. Office PT. ASDP Indonesia Ferry (Persero) Branch Kolaka;
         b. Service Unit of Transportation Center Business wil.XVIII Prov. Southeast Celebes To find out Layout harbor, vessel characteristics and data Annual productivity.
   c. Results and Troubleshooting
      In doing research for solving the problems, the writer uses the reference by Ministerial Decree Number 52 of 2004 on the Implementation of Port Ferries and Decrees DGLT Number: SK.2681 / AP.005 / DrJD / 2006 About Operation Port Ferries as a reference in solving the problem as follows:

3. Results and Discussion
   a. Passenger Growth Analysis
      In this calculation is based on the realization of the predicted growth in passenger transport productivity over the last 3 years. To find passengers used method of exponential growth. Before analyzing the number of passengers over the next 3 years, first calculate the rate of growth each year by using the following formula:

      \[ r = \frac{1}{t} \ln \left( \frac{P_t}{P_0} \right) \]
Information:
\( r = \) Rate of population growth
\( t = \) Duration
\( Pt = \) Total population in year \( t \)
\( Po = \) Total population in the base year

To analyze passenger growth next 3 years is to calculate the growth rate of passengers every year, in analyzing the data used passenger growth last 3 years. Below is a table of productivity Port Kolaka last 3 years:

<table>
<thead>
<tr>
<th>Number</th>
<th>Year</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2016</td>
<td>226 968</td>
</tr>
<tr>
<td>2</td>
<td>2017</td>
<td>181 333</td>
</tr>
<tr>
<td>3</td>
<td>2018</td>
<td>173 910</td>
</tr>
</tbody>
</table>

Source: Service Unit of Transportation Center Busines wil.XVIII Hall business Prov. Southeast Celebes, 2019

The calculation of population growth rate is as follows:

\[
\frac{1}{t} \ln\left(\frac{P_t}{P_0}\right)
\]

\[
\frac{1}{t} \ln\left(\frac{173910}{181333}\right)
\]

\[
r = -0.05
\]

Note: If the value of \( r > 0 \), meaning a positive population growth or increase the amount of population from the previous year. If \( r < 0 \), it means negative population growth or a reduction in the number of residents over the previous year. If \( r = 0 \), it means a change in the number of residents over the previous year.

After getting the growth rate annually, can be obtained forecast during the next 3 years by using the following formula:

\[
Pt = Po e^{rt}
\]

Information:
\( Pt = \) Total population in year \( t \)
\( e \) Numbers exponential magnitude = 2.718281828
\( r = \) Rate of population growth
\( t = \) Duration

\[
P_{2019} = P_{2019} e^{-0.05t}
\]
From the above calculation in getting the passenger growth in 2019 which amounted to 165,428.3 person

The results of the productivity predictions of passengers from 2019 until 2021 can be seen in the following table:

**Table 2**

<table>
<thead>
<tr>
<th>Year</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>165 428</td>
</tr>
<tr>
<td>2020</td>
<td>148 885</td>
</tr>
<tr>
<td>2021</td>
<td>110 175</td>
</tr>
</tbody>
</table>

*Source: results of the survey, in 2019*

**b. Analysis Principal Port Facility**

To find out can use the following formula:

\[
A_1 = a \cdot n \cdot N \cdot x \cdot y
\]

Information:
- \( A_1 \) = Area lounge area (m²)
- \( a \) = The area required for one person (1.2 m² / person)
- \( n \) = The number of passengers in the ship
- \( N \) = The number of boats coming / leaving at the same time
- \( x \) = The ratio of concentrations (1.0 to 1.6)
- \( y \) = Fluctuation Ratio = (1,2)

The following data on the number of passengers to 15 days at the port of Kolaka

**Table 3**

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>DATE</th>
<th>TRIP</th>
<th>PASSENGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>April 9, 2019</td>
<td>3</td>
<td>406</td>
</tr>
<tr>
<td>2</td>
<td>10 April 2019</td>
<td>3</td>
<td>437</td>
</tr>
<tr>
<td>3</td>
<td>11 April 2019</td>
<td>3</td>
<td>401</td>
</tr>
</tbody>
</table>
From the data above, the number of passengers during the 15 days as many as 4978 people with a number of operations 45 trips for 15 days. So, to calculate the concentration ratio can be taken the average passenger for 15 days at 332 members, namely:

\[
\text{The concentration ratio} = \frac{\text{number of PNP during the survey productivity}}{\text{The average number of PNP during the survey x the total trip / 15 days}} = 0.3
\]

From the data above, the number of passengers predicted in 2019 amounted to 165,428 people by the number of trips per day as much as 3 trips per day, it can be predicted number of trips per year as much as 3 trips / day x 365 days = 1080 trips / year. So, to calculate the concentration ratio can be taken aboard passenger capacity on average as many as 325 persons, namely:

\[
\text{The concentration ratio} = \frac{\text{Prediction passengers in 2019}}{\text{Average PNP capacity inboard x total trip/year}}
\]

Source: Survey, 2019

<table>
<thead>
<tr>
<th>Predicted Passengers 2019</th>
<th>Year</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2019</td>
<td>165,428</td>
</tr>
</tbody>
</table>

Source: The results of the analysis, 2019

Concentration Ratio : Prediction passengers in 2019

Average PNP capacity inboard x total trip/year

From the data above, the number of passengers predicted in 2019 amounted to 165,428 people by the number of operations 45 trips for 15 days. So, to calculate the concentration ratio can be taken the average passenger for 15 days at 332 members, namely:

\[
\text{The concentration ratio} = \frac{\text{Prediction passengers in 2019}}{\text{Average PNP capacity inboard x total trip/year}}
\]
The average capacity of PNP inboard x total trip / year

\[
\frac{165428}{325 \times 1080} = 0.47
\]

With the writer take the concentration ratio in 2019 due to the opinion of the author of the productivity predictions cover 2019 more passengers to come. Thus, the operation of the port can plan the necessary requirements.

To determine the number of passengers in the boat, taken from the characteristics data of vessels operating in the Port of Kolaka. Determination of the number of passengers is taken based on the average passenger capacity is 325 people. While the determination of the number of ships coming and going simultaneously set to 1 (one) because the dock available/used only for the amount of 1 (one) unit.

Then we will get the results of the calculation to the reception area in 2019 were as follows:

\[
A_1 = a \times n \times N \times x \times y
\]

\[
A_1 = 1.2 \times 325 \times 1 \times 0.47 \times 1.2
\]

\[
A_1 = 219.96 \text{ m}^2
\]

To calculate the need for a chair in the waiting room then calculated in advance for a special area of the seat in the waiting room, can be calculated with the following formula:

Needs a chair in the waiting room:

\[
= 184 \text{ seats}
\]

From the analysis, the total area lounge area obtained at 219.96 m2

c. Analysis Weighing Vehicle Weight (Weigh)

Conditions that existed at this time in the port of Kolaka weighbridge but which are Numbert used. Weighbridge is used to determine the capacity of the vehicle in order to adjust the weights that can pivot by a movable bridge (MB) and set the pattern for loading on board. In addition, Numbert all vehicles are loaded items are weighed. In accordance with the Regulation of the Minister of Transportation Number 103 of 2017 About Settings and Control Vehicle Transport Services That Use Cross walk that any mandatory ferry port weighbridge facilities. At this time there is a facility in The Kolaka Ferry Port weighbridge but Numbert used.

d. Analysis of Passenger Road Exit / Entrance Ships (Gangway)

To improve existing services at the port of Kolaka and to ensure the safety of passengers on the ship when passengers enter the necessary way for passengers to enter and exit to and from ships that gangway. Kolaka port at this time own facility as an access gangway of separation between pedestrians and vehicles passenger toward Pier MB. However gangway in Kolaka port disconnected so frequent occurrence of the meeting in front of the vehicle and passenger ships rampdoor thus endangering the passengers who boarded the ship and hamper vehicles coming into the boat. The solution is to optimize the functions of gangway which since its construction has not
been used optimally because it does Numbert directly connect the gangway to side ramp. With the proper functioning optimally again gangway it will reduce the meetings between the vehicle and the front passenger ship ramp door.

Source: The results of the survey, in 2019

Picture 1

Existing Condition Gangway


Below are the current patterns of passengers and vehicles in ferry ports Kolaka at this time are:

Flow patterns Passenger and Vehicle At the Port
1) The current pattern of current conditions in The Kolaka Ferry Port
   a. The current conditions for passengers (existing condition) Passengers enter through the gate and directly toward the passenger counter;
      a) After the passengers to buy tickets at the counter of passengers. Passengers heading to the terminal building waiting room contained therein in order to wait for the ship that has Numbert yet arrived;
      b) After arriving passenger ship to the dock using the gangway but when the passengers to the boat passengers walk through ramp door mixed with a vehicle with it injurious passenger safety. The current conditions are:
   b. Vehicle entrance and waited in the parking lot for boats coming and unloading.
      1) overloaded vehicles do Numbert perform the process of weighing the cargo and height measurements;
      2) The vehicles will cross over to buy tickets on the counter contained in the terminal building, and then wait their turn loading up the boat in the parking lot ready for loading.
4/ Furthermore, the vehicle toward the boat ramp (ramp door) to get into the ship
Table 6

Vehicle Load Factor at Kolaka Ferry Port

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>DATE</th>
<th>UNUSED CAPACITY</th>
<th>CAPACITY AVAILABLE</th>
<th>load factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>09, April 19</td>
<td>1985.32</td>
<td>3113.44</td>
<td>63.76</td>
</tr>
<tr>
<td>2</td>
<td>10, April 19</td>
<td>1952.13</td>
<td>2961.96</td>
<td>65.90</td>
</tr>
<tr>
<td>3</td>
<td>11, April 19</td>
<td>2174.28</td>
<td>3113.44</td>
<td>69.83</td>
</tr>
<tr>
<td>4</td>
<td>12, April 19</td>
<td>1852.28</td>
<td>2961.96</td>
<td>62.53</td>
</tr>
<tr>
<td>5</td>
<td>13, April 19</td>
<td>2111.27</td>
<td>3113.44</td>
<td>67.81</td>
</tr>
<tr>
<td>6</td>
<td>14, April 19</td>
<td>1825.63</td>
<td>2961.96</td>
<td>61.63</td>
</tr>
<tr>
<td>7</td>
<td>15, April 19</td>
<td>1558.11</td>
<td>3113.44</td>
<td>50.04</td>
</tr>
<tr>
<td>8</td>
<td>16, April 19</td>
<td>1303.51</td>
<td>2961.96</td>
<td>44.00</td>
</tr>
<tr>
<td>9</td>
<td>17, April 19</td>
<td>1533.79</td>
<td>3113.44</td>
<td>49.26</td>
</tr>
<tr>
<td>10</td>
<td>18, April 19</td>
<td>2112.89</td>
<td>2961.96</td>
<td>71.33</td>
</tr>
<tr>
<td>11</td>
<td>19, April 19</td>
<td>1948.47</td>
<td>3113.44</td>
<td>62.58</td>
</tr>
<tr>
<td>12</td>
<td>20, April 19</td>
<td>1999.8</td>
<td>2961.96</td>
<td>67.51</td>
</tr>
</tbody>
</table>
Source: Survey Results, 2019

Load Factor from the table above can be known that the departure port average load factor of 61.35 Kolaka port.

**e. What’s New Electoral System**

1) Passenger Waiting Room
   According to the analysis results have been obtained that the effective area of the lounge at The Port of Kolaka Ferries of 219.96 m² and the area is in need of facilities for a total seating 184 seats.

2) Weighing conditions Vehicle Weight (Weigh) and portal
   From the analysis that every ferry ports shall provide facilities weighbridge and portals. At Kolaka port weighbridge should be operated again to vehicles carrying loads can be weighed first. As for setting the positioning facilities suitable portal inflow of vehicles at the port correct and in accordance with the Regulation of the Minister of Transportation Number 103 of 2017 on Regulation and Control of Vehicles Using Transport Services Crossings is placed before the ticket window of the vehicle.

<table>
<thead>
<tr>
<th>Date</th>
<th>Number</th>
<th>Weight</th>
<th>Load Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>21, April 19</td>
<td>2074.94</td>
<td>3113.44 66.64</td>
</tr>
<tr>
<td>14</td>
<td>22, April 19</td>
<td>1086.22</td>
<td>2961.96 36.67</td>
</tr>
<tr>
<td>15</td>
<td>23, April 19</td>
<td>2517.79</td>
<td>3113.44 80.86</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>61.35</td>
</tr>
</tbody>
</table>

Source: Analysis Report, 2019

**Picture 3**
Portal layout plan
3) Passenger Road Condition Exit / Entrance Ships (Gangway)

From the analysis that used pedestrian gangway to the ship should have been connected to side ramp ship. Therefore, the authors suggest that the gangway at The Kolaka Ferry Port be added in order to connect to the side ramp and uninterrupted on Movable Bridge which caused the pedestrian exit or entrance to the ship passed ramp door.

Source: analysis, 2019

Picture 4
Gangway plan

Below is a plan pattern of flow of passengers and vehicles in ferry ports Kolaka namely:

Flow patterns Passenger and Vehicle At the Port

1. Flow Pattern conditions Planned at Port Kolaka
   a. Conditions in the plan for passenger
      1) Passengers enter through the gate;
      2) Then the passengers to buy tickets at the counter of passengers who have Passengers wait in the waiting room;
      3) Passengers pass and passenger gangway to the boat through sideramp planned.
   b. Conditions are planned for vehicles
      1)Vehicles entering through the gate
      2)Vehicles carrying the goods must be made weighing at the weighbridge to lose weight the vehicle can be known so that the vehicle can adjust to the moveable bridge (MB);
      3)Vehicles that have passed through the weighbridge then buy tickets at the counter of vehicles which have been planned;
      4)Vehicles that have purchased tickets for subsequent wait on the pitch ready for loading that have been separated by an introductory field of the pickup and the vehicle toward the ship.introductory field of the pickup and the vehicle toward the ship.
4. Closing

a. Conclusion

1) Seating facilities as well as add as much as 184 chairs in the waiting room to keep passengers waiting outside the room and can facilitate a lounge area with facilities that could make the passengers comfortable.

2) Need to add side ramp gangway to the ship. Weigh and should be used as a weighing device and portals laden vehicle with a layout that comes before the counter vehicle.

b. Suggestion

1) Results of analysis of the extent of the waiting room current exceeds the ideal breadth and advised to land in excess of the waiting room was built canteen or health post in Port Kolaka which itself does Numbert have a health post or canteen.

2) added support facilities at the lounge like seating facilities with sufficient need Number addition to the number of service users. As well as facilitating a lounge area with entertainment facilities such as TV and AC charger boxing as well as facilities for the convenience of passengers.

3) Gangway provided is Numbert up to the deck of the ship, therefore passengers during boarding or disembarked still mingled with the vehicle. With this can be very dangerous to the safety of passengers. On the Regulation of Director General of Land Number SK.2681 / AP.005 / DrJD / 2006 About Operation Port Ferries.

5. References


4) [http://digilib.unila.ac.id/8919/12/BAB%20II.pdf](http://digilib.unila.ac.id/8919/12/BAB%20II.pdf), Accessed on: Monday, May 5th, 2019


6) Act No. 17 of 2008 on The Voyage

7) Government Regulation Number 64 of 2015 on Harbour

8) The Regulation of the Minister of Transportation Number 103 of 2017 On Regulation and Control of Vehicles That Use Freight Crossing

9) The Minister of Transportation Decree Number 52 of 2004 on the Implementation of the Ferry Port

10) Decree of the Director General of Land Transportation Number. 2001. SK.2681 About Operation Port Ferries
11) The Director General of Land Transportation Regulation Number SK.242 About Technical Guidelines Crossing Traffic Management