Crossing Feasibility Study Between Sea Freight Vehicles Port-Port of Sheet Anchor Situbondo lombok.we

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ABSTRACT

Sea Crossing feasibility Study for goods transport Vehicles of All Sheet Anchor, intends to assess the feasibility of the economic aspects, in order to be an attraction for employers to transport equipment whether or not to divert the route. Anchors Port Development crossing so be crossing ferry port with direct destination Lombok West Nusa Tenggara. And the continuous movement of interest NTB-NTT through the island of Bali, which is an icon of Indonesian tourism is no longer burdened with freight vehicles. So relevant to the national program by the Indonesian government Toll Marine present.

By calculating the operating costs of freight vehicles will be known to the costs actually incurred by the transport of goods between Asembugas effort Situbondo - Sheet Harbor NTB through these crossings Ketapang - Gilimanuk, Bali continued crossing padangbai - Sheet Harbor Rp. 5,380,338, -. While crossing rates crossings between Surabaya - Lombok through the port of Tanjung Perak port towards sheets of Rp 4.574 million, - for class freight vehicles of the same.

So if held crossings of freight from the Port Anchors in Situbondo Asembagus toward Sheet Harbor lombok.we or otherwise will be much more economically feasible to be realized. This study could be the basis of information from public policy to support the national development program.

Keywords: Feasibility Study, Route Freight Vehicles Land-Sea, Vehicle Operating Costs

I. INTRODUCTION

Background

Seaport Crossing Ketapang in Banyuwangi airport ferry boat carrying passengers vehicles also carry passengers or goods route Ketapang-Gilimanuk, Bali. The purpose vehicle that ferried berpenumpang or goods not only to the island of Bali, but also there will continue to travel to Lombok Island or other islands in the province of West Nusa Tenggara. The island of Bali is a tourist destination both domestic and foreign. So during the holidays, national holidays and religious, surely Ketapang port crowded with vehicles that will cross to Gilimanuk. Density that occurs should be reduced if the vehicle is about to cross the goal is not to Bali can obtain through other ports using the direct ferry boat to the islands purpose. So that the continuous movement on the island which is an icon of tourism in Indonesia as a result of these vehicles can be eliminated. (Mudjarnako, Sulistio, Djakfar, & Wicaksono, 2013), (Sulistio & Mudjanarko, 2011), (Sholikhin & Mudjanarko, 2017) Problem motorized parking requirement will be reduced if the developing sea transportation. (Kurniawan, Mudjanarko, and Ogunlana, 2015) Development of a building can be done through public-private partnerships. One port can be developed to reduce congestion at the Port of Ketapang is the Port Crossing Crossing Anchor, in Situbondo. It lies on the North Coast of Java Island benefit from the safety aspect of the cruise because the sea on the northern island of Java is

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relatively bumpy calm. It lies west of Port of Ketapang benefit from aspects of transport, because of the distance and travel time on land vehicles coming from the west port of Ketapang shorter. The port currently crossing only serves passenger ships and small goods route Anchors - Kalianget - Kangean and Anchors - Sapudi - Kalianget. The movement of freight from Java who will be heading to the islands in the East of Bali such as NTT and NTB, wade through the port of Banyuwangi to Ketapang-Gilimanuk, Bali and then use a landline. Continue to cross again from the port of Padang Bai, Bali-Lombok to Sheet Harbor. This causes the density of traffic on the streets on the island of Bali, and can be reduced if the vehicle is about to cross the goal is not to Bali could through other ports go directly to the islands objectives by using the ferry boat from Port Anchors in Situbondo, identification of a problem that occurs is how the costs incurred for these goods transportation business Java-Bali-NTB / NTT through most of the land and plan the opening of a new pedestrian pathway economically viable compared to existing routes.

II. REFERENCE LIBRARY

2.1 Vehicle Operating Cost

Vehicle Operating Cost (VOC) is a value that states the costs incurred for the operation of a vehicle. BOK consists of several components, namely:

a. Variable costs (Running Cost)
   - Cost of Fuel Costs Oil / Lubricants
   - Tires Usage Fee
   - Maintenance Fee (Servis small / large, General Overhaul)
   - Cost Over Head (unexpected costs)

b. Fixed Cost
   - Insurance
   - Flower Capital
   - Depreciation (Depreciation vehicle) Time Value

2.1.1 Calculation Formula BOK with PCI Model

Vehicle Operating Cost (VOC) is a function of speed. BOK is used for calculating the formula PCI models, assuming a relatively hilly road conditions and types of modes that use the output of 2007, consisting of:

Formulas for Calculating of freight trucks BOK

a. Equation fuel consumption.
   
   For trucks: \( Y = 0.21557 \times S^2 + 224.17699 \times S + 947.80882 \times S + \)
   
   \( Y = \text{Fuel consumption (liters / 1000 km)} \)
   
   \( S = \text{speed (km / h)} \)

b. engine oil consumption equation.

   For trucks: \( Y = 0.00186 \times S^2 + 20.22035 \times S + 12.06486 \)
   
   \( Y = \text{Consumption (liters / 1000 km)} \)
   
   \( S = \text{speed (km / h)} \)

c. Equation of tire usage.

   For trucks: \( Y = 0.0015553 \times S - 0.005933 \)
   
   \( Y = \text{use of tire / 1000km} \)
   
   \( S = \text{speed (km / h)} \)

d. The equation of the maintenance costs

   - Cost of spare parts
     - for trucks: \( Y = 0.0000191 \times S + 0.0015400 \)
     
     \( Y = \text{Cost of spare parts multiplied by the price of the vehicle that depreciates / 1000 km} \)
   
   - Cost mechanics
     - for trucks: \( Y = 0.0 \times S + 1.21200 \times 1511 \)
Y = hours mechanical work multiplied by wage / hour / 1000km
S = speed (km / h)

e. **the equation of depreciation (depreciation)**
   for trucks: \( Y = \frac{1}{6 \times S + 210} \)
   Y = depreciation multiplied by half the price of the vehicle depreciates / 1000 km.
   S = speed (km / h)

f. **The equation of interest**
   for trucks: \( Y = \frac{150}{1714.28571 \times S} \)
   Y = Cost of interest rate multiplied by half the price of the vehicle depreciates / 1000 km
   S = speed (km / h)

g. **from the equation insurance**
   for trucks: \( Y = \frac{61}{1714.28571 \times S} \)
   Y = insurance multiplied by the price of new vehicles / 1000 km.
   S = speed (km / h)

h. **The equation of travel time**
   S Gol IIB (Truck): \( Y = \frac{1000}{S} \)
   Average - The average number of vehicle crew.
   Gol IIB (Truck): driver 1; kernet 1
   Y = hour drive multiplied by wage / hour / 1000 km.

i. **Overhead (unexpected expenses)**
   Gol IIB (truck): 10% of the sub-total

2.1.2 **Calculation of BOK Developed by ITB LAPI**

BOK truck components on non-toll roads.

a. **Fuel Consumption (KBB)**
   Fuel consumption = basic fuel \((I + (kk + kl + kr))\)
   Where: basic fuel in liters / 1000 km
   Kk = corrections due to the flatness of the road
   Kl = corrections due to traffic conditions
   Kr = correction due to the roughness of the road (roughness)
   fuel consumption TRUCK = \(0.21557 V^2 - V + 24.17699 947.80862\)
   fuel consumption correction factor shown in Table 2.1. and Table 2.2. below:

<table>
<thead>
<tr>
<th>Correction Negative Slope (kk)</th>
<th>g &lt; -5%</th>
<th>-0.337</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5% ≤ g ≤ 0%</td>
<td></td>
<td>-0.158</td>
</tr>
<tr>
<td>Positive Slope Correction (kk)</td>
<td>≤ g ≤ 0% -5%</td>
<td>0.400</td>
</tr>
<tr>
<td></td>
<td>g ≥ 5%</td>
<td>0.820</td>
</tr>
</tbody>
</table>

Source: LAPl-ITB (1997)

Table 2.2. Due Roughness Factor Correction (v / c)

<table>
<thead>
<tr>
<th>Correction Traffic (kl)</th>
<th>0 ≤ v / c &lt; 0.6</th>
<th>0.050</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.6 ≤ v / c &lt; 0.8</td>
<td>0.185</td>
</tr>
<tr>
<td></td>
<td>v / c ≥ 0.8</td>
<td>0.253</td>
</tr>
<tr>
<td>Roughness Correction (kr)</td>
<td>&lt; 3 m / km</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>≥ 3 m / km</td>
<td>0.085</td>
</tr>
</tbody>
</table>

Source: LAPl-ITB (1997)

b. **Lubricating Oil Consumption**

Based on literature survey, with criteria to easily implement the model, then the selected specification model developed in GENMERRI, ie the model used by DGH for the
feasibility study. These models pay attention to the influence of the traveling speed and road surface roughness (roughness) on the consumption of lubricating oil.

In Table 2.3, can be seen in the lubricating oil base consumption (liters / km) to the motorway modified from this model. This basic consumption and then corrected again according to the level of roughness as shown in Table 2.4.

Table 2.3. Basic Lubricant Consumption (liters / km)

<table>
<thead>
<tr>
<th>Speed (km / h)</th>
<th>Type of Vehicle</th>
<th>Group I</th>
<th>Group IIA</th>
<th>Group IIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-20</td>
<td>Group I</td>
<td>0.0032</td>
<td>0.0060</td>
<td>0.0049</td>
</tr>
<tr>
<td>20-30</td>
<td>Group I</td>
<td>0.0030</td>
<td>0.0057</td>
<td>0.0046</td>
</tr>
<tr>
<td>30-40</td>
<td>Group I</td>
<td>0.0028</td>
<td>0.0055</td>
<td>0.0044</td>
</tr>
<tr>
<td>40-50</td>
<td>Group I</td>
<td>0.0027</td>
<td>0.0054</td>
<td>0.0043</td>
</tr>
<tr>
<td>50-60</td>
<td>Group I</td>
<td>0.0027</td>
<td>0.0054</td>
<td>0.0043</td>
</tr>
<tr>
<td>60-70</td>
<td>Group I</td>
<td>0.0029</td>
<td>0.0055</td>
<td>0.0044</td>
</tr>
<tr>
<td>70-80</td>
<td>Group I</td>
<td>0.0031</td>
<td>0.0057</td>
<td>0.0046</td>
</tr>
<tr>
<td>80-90</td>
<td>Group I</td>
<td>0.0033</td>
<td>0.0060</td>
<td>0.0049</td>
</tr>
<tr>
<td>90-100</td>
<td>Group I</td>
<td>0.0035</td>
<td>0.0064</td>
<td>0.0053</td>
</tr>
<tr>
<td>100-110</td>
<td>Group I</td>
<td>0.0038</td>
<td>0.0070</td>
<td>0.0059</td>
</tr>
</tbody>
</table>

Source: LAPI-ITB (1997)

c. Consumption Ban

There are three factors that can affect the condition or age of the tire, namely:
1. Rolling Friction, namely geseken between the tire with the road surface
2. friction due Driving Force, which is due to air pressure that occurs when vehicles do incline or speed reduction.
3. Style longitudinal and transversal cause friction on the surface portion of the tire. The style is due to braking, acceleration and twists.

By paying attention to the criteria of simplicity and ease in implementing the model, then used the model PCI as follows:

Group Trucks: Y = 0.0015553 V - 0.0059333
Where:
Y = The use of tires per 1000 km
V = Free running (running Speed)

Table 2.4. Oil consumption factor Correction lubricating

<table>
<thead>
<tr>
<th>Roughness Value</th>
<th>factor correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3 m / km</td>
<td>1.00</td>
</tr>
<tr>
<td>3 m / km</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Source: LAPI-ITB (1997)

d. Maintenance

Maintenance costs consist of the cost of spare parts and wages mechanic / labor force for the calculation of the BOK on toll roads and non-toll road, while according to the PCI equation as follows:

1. Parts
   Group Trucks Y = 0.0000191 V + 0.0015400
   Where:
   Y = Maintenance tribe Parts per 1000 km
   V = Free running (running Speed)
2. mechanic
   Group V truck Y = 0.01511 + 0.21200
   Where:
   Y = clock mechanic per1000 km
   V = Free running (running Speed)

e. Depreciation
   Depreciation charges apply for the calculation of the BOK on toll roads and non-toll
   roads. The equation is as follows:
   Group Truck: Y = 1 / (6.0 V + 300)
   Where:
   Y = Depreciation per1000 km multiplied by ½ the depreciated value of the vehicle.

f. Flower Capital
   Cost of capital interest per vehicle-km denoted by INT and expressed as a fraction of the
   new vehicle are given in the following equation:
   INT = Aint / AKM
   Where:
   Aint = average interest rate on annual capital from a vehicle that is expressed as a fraction
   of a new vehicle. 0.01 (AINV / 2)
   AINV = annual capital interest of a new vehicle.
   AKM = average annual mileage (kilometers) of the vehicle.

g. Insurance
   Insurance costs applicable to the calculation of the BOK.
   Truck class Y = 61 / (1714.28571 V)
   Where:
   Y = Insurance per1000 km
   V = Free running (Running Speed)

h. The equation of travel time
   a truck Group: Y = 1000 / S
   Where: Y = hour drive multiplied by wage / hour / 1000 km.
   S = speed (km / h) Average - The average number of vehicle crew.
   Gol truck: the driver 1; kernet 1

i. overhead (Unexpected expenses)
   truck Group: 10% of the sub-total

2.3 Value ItemTime
   Value goods time is a risk factor for the value of lost items that can be due to the lower
   or rusakannya utility value of goods or loss of a number of goods in transit. The time value of
   goods is influenced by the value of the goods themselves and the shrinkage factor due to the
   characteristics of the goods and the treatment he received (Tavasszy).
   The time value of goods is calculated by the following equation:
   \[ a_g = V_g (p_g + z_g + i) \]
   Where:
   \( a_g \) = the time value of goods
   \( V_g \) = the value of goods (USD / MT)
   \( p_g \) = damage factor (l / t )
   \( z_g \) = risk factor (l / t )
   \( i \) = discounting factor (l / t)
   for the transport of type General Cargo time value of goods is calculated by the following
equation:
\[ a_g = v_g - (v_g (1 - s)^T / 96))US \$ / MT \]
Where:
- \( a_g \) = the time value of goods
- \( v_g \) = the value of goods (USD / MT)
- \( s \) = the value of depreciation
- \( T \) = travel time (hours)

2.4 Rates Crossing the Sea And BOK

Rates the crossing is the large amount of money paid for the use of crossings between the port anchor Asembagus Situbondo to Sheet harbor, Lombok NTB. While the Vehicle Operating Costs (VOC) is a cost economically possible with the operation of a vehicle under normal conditions for a particular purpose.

The relationship of both of the above is, in accordance with the sea crossings tariff-SheetAnchorequal to 90% of the value of the BOK added at the rate of crossing Ketapang-Gilimanuk and Padangbai-Sheet. BOK also taken into account the savings, if the BOK road Asembagus-Ketapang-Gilimanuk and Padangbai very high eg due to road geometric conditions and the traffic jams.

III. RESEARCH METHODOLOGY

3.1 Study Completion Flowchart

Sea Crossing Feasibility Study for Goods Transport Vehicles from Sheet anchors to be resolved by the framework as described in the flow diagram in figure 3.1.
3.2 Activity Survey-Survey and Data Collection

The core of this activity is done to obtain data and information from studies that relate directly or indirectly, in connection with the study to be performed. These data will be obtained from the relevant authorities, such as the Department of Highways, Department of Transportation, and the survey enumeration freight traffic, origin destination survey of freight movement, interview survey of employers or principals transportation of goods.

3.3 Stage Compilation and Analysis of Data

Compilation of data is processing the data that has been collected good data from the survey results instantalional (secondary data) and field survey (primary data) in accordance with the purpose of this study to be used as input data analysis to be used to calculate how big Operating Costs Vehicle and travel time.

3.4 Feasibility Analysis Social Economic

Feasibility analysis of socioeconomic intended to assess the economic feasibility of the development of the Port of anchors into the harbor ferry or sea port for input forecasting the needs and benefits of the development of ferry services freight transport between islands with regard to social benefits and economic benefits through the perception of the local community and the driver transport of goods between islands to the development of ferry services freight transport between islands in Anchor Situbondo especially those relating to economic benefits (consumer surplus and producer surplus) and social benefits (social Cost and benefit Analysis).

one of the important elements in a feasibility study to be undertaken is counting the costs and feasibility elements of the feasibility of the time element. Sea Crossing Feasibility Study for Goods Transport Vehicles from Anchors Into this sheet survey conducted feasibility of cost and time through a survey of existing conditions in the field compared to the assumption of port boat tickets Anchor-NTB later. The anchor of the Port of Situbondo as an alternative pathway to the NTB (Sheet Harbor) rather than through the port in Banyuwangi and Bali. Which will be also developed Situbondo route from the Port anchor as an alternative pathway to Sumbawa or NTT (Sape Harbor) rather than through the port in Banyuwangi, Bali and Lombok.

Based on the results of existing field survey on vehicle operating costs (VOC) and mileage is usually done by the driver of freight vehicles that depart from the tamarindo nice in Situbondo heading, West Nusa Tenggara and East Nusa Tenggara through Gilimanuk port, harbor Sheet, which then adjusted assuming the costs of boat tickets from the port anchor and assumptions are correlated with the time travel speed ferry later. Can be described as a calculation that the cost of the feasibility assumptions and assuming the feasibility of the time, Sea Crossing Feasibility Study for Goods Transport Vehicles of Sheet Anchor All is well worth it, because it has a level of cost efficiency and time-definite and measurable.

IV. SURVEY RESULTS AND DISCUSSION

4.1 Travel Time

Vehicle from Java who will be heading to the island of Lombok are using boats crossing through the port of Ketapang to Gilimanuk then by road to the port to the next Padangbai using the ferry to Sheet Harbor. The distance between Ketapang to Gilimanuk harbor is 3 nautical miles which can be reached within 45 minutes. Gilimanuk road from the Port of Padangbai can be reached via the Denpasar with a distance of 158.6 km with a travel waktu for 5-6 hours. While the distance to the sheet Padangbai port is 38 nautical miles which can be reached within 4-5 hours. Total travel vehicle from Ketapang port to the Port of Sheet as far as 235 km with an average travel time of 10-12 hours.

To determine the actual travel time of goods vehicles from Ketapang port heading to the port of origin destination Sheet done with survey. License Plate Matching This method is very simple, surveyors charting / recording of part / whole plate number and the time the vehicle is crossing the observation post. For this study the observations made in Gilimanuk
and Padangbai Harbor. Observations were made on freight vehicles. The survey results can be seen in Table 4.1. and Table 4.2.

Table 4.1 Data Origin Destination Survey These results Gilimanuk - Padangbai

<table>
<thead>
<tr>
<th>Vehicle Plate No</th>
<th>Depart</th>
<th>Arrive</th>
<th>Travel Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD 8710 JL</td>
<td>9:28</td>
<td>16:40</td>
<td>7:12</td>
</tr>
<tr>
<td>UZ B 9095</td>
<td>16:17</td>
<td>21:11</td>
<td>4:54</td>
</tr>
<tr>
<td>B 9905 Tyu</td>
<td>11:44</td>
<td>17:35</td>
<td>5:51</td>
</tr>
<tr>
<td>AA DR 8506</td>
<td>15:18</td>
<td>21:18</td>
<td>6:00</td>
</tr>
<tr>
<td>DR 8827AA</td>
<td>0:24</td>
<td>4:42</td>
<td>4:18</td>
</tr>
<tr>
<td>DRAD 8862</td>
<td>13:16</td>
<td>21:16</td>
<td>8:00</td>
</tr>
<tr>
<td>EA 8621 UZ</td>
<td>10:56</td>
<td>17:50</td>
<td>6:54</td>
</tr>
<tr>
<td>EA 8877 A</td>
<td>10:56</td>
<td>18:53</td>
<td>7:57</td>
</tr>
<tr>
<td>UC L 8503</td>
<td>9:36</td>
<td>19:02</td>
<td>9:26</td>
</tr>
<tr>
<td>N 9923 UY</td>
<td>0:01</td>
<td>5:10</td>
<td>5:09</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>6:34</td>
</tr>
</tbody>
</table>

Table 4.2 Data Origin Survey results These destination Padangbai - Gilimanuk

<table>
<thead>
<tr>
<th>Vehicle Plate No</th>
<th>Depart</th>
<th>Arrive</th>
<th>Travel time</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK EXW 9351</td>
<td>16:00</td>
<td>20:25</td>
<td>4:25</td>
</tr>
<tr>
<td>VA DR 8553</td>
<td>15:47</td>
<td>21:05</td>
<td>5:18</td>
</tr>
<tr>
<td>DR 8857AA</td>
<td>15:56</td>
<td>22:03</td>
<td>6:07</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>5:16</td>
</tr>
</tbody>
</table>

Based on observations, the average travel time by road from Gilimanuk to Port Padangbai is 6 hours 34 minutes. In contrast the average time from Padangbai harbor to Gilimanuk is 5 hours 16 minutes.

While longer average travel time of a trip from Ketapang Harbor Asembagus Situbondo heading for freight vehicles is 2 hours.

Based on the interviews the average crossing time between the Port of Ketapang - Gilimanuk 1.5 hours, while for the travel time crossing from the Port Padangbai - Sheet Harbor on average for 4.5 hours. So that the average travel time of freight from the Port of Situbondo Asembagus NTB Sheets or vice versa for 14 hours.

4.2 Vehicle Operating Costs (VOC)

To determine the vehicle operating costs incurred by the company / owner interview survey of freight carried to the goods vehicle driver. Data obtained from this interview survey include:

a. The ownership status of the vehicle.
b. The travel time from the area of origin.
c. The average travel time from Gilimanuk Harbor - Port Padangbai travel frequency.
d. Cost of fuel per trip.
e. Administrative costs per year (vehicle registration and KIR)
f. The frequency of vehicle maintenance.
g. Vehicle maintenance costs.
h. The cost of lubricating oil
i. replacement spare parts costs.
j. Cost of replacement tires.
k. Cost of travel levy.

Vehicle Operating Costs survey results can be seen in Table 4.3.
Table 4.3. Interview Survey Data Results

<table>
<thead>
<tr>
<th>No</th>
<th>Origin-purposes</th>
<th>Ownership Status</th>
<th>vehicle Lease</th>
<th>Origin Travel Time - Gilimanuk</th>
<th>Travel Time Gili - Padangbai</th>
<th>Travel time Total</th>
<th>Fuel</th>
<th>Cost Administration</th>
<th>Frequency Vehicle Maintenance</th>
<th>Maintenance Cost</th>
<th>Cost Oil Lubricants</th>
<th>Cost Parts</th>
<th>Tires Cost</th>
<th>Levies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sumbawa</td>
<td>Property of others (deposit)</td>
<td>Rp. 12,000,000 / week</td>
<td>60-90 min&gt;10 hours</td>
<td>Rp. 400,000 / ± 72 liter&gt;Rp 400,000</td>
<td>2 times</td>
<td>Rp 300,000 - Rp 1,000,000</td>
<td>to Rp 1,000,000 - Rp 2,000,000</td>
<td>to Rp 2,000,000 - Rp 4,000,000</td>
<td>to Rp 4,000,000 - Rp 10 million</td>
<td>to Rp 10 million</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Lombok - Surabaya</td>
<td>Property of others (deposit)</td>
<td>Rp. 6,000,000 / PP</td>
<td>120-150 min 9 hours 1x / week ± 300-400 liters</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>of Rp 4,000,000 - Rp 10 million</td>
<td>to Rp 10 million</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>East Lombok</td>
<td>Property of others (deposit)</td>
<td>Rp. 5,000,000 / PP</td>
<td>90-120 min 7 hours 1x / week ≤ 100 liters</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>USD 3,400,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sumbawa - Surabaya</td>
<td>Property of others (deposit)</td>
<td>Rp. 6,000,000</td>
<td>60-90 min 10 hours 1x / week ± 150 liters</td>
<td>Borne Company</td>
<td>more than 4 times&gt;USD $ 2,000,000&gt;2,000,000 USD&gt;USD</td>
<td>4,000,000&gt;Rs 10 million</td>
<td>to Rp 2,000,000</td>
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<td></td>
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<tr>
<td>5</td>
<td>Lombok - Surabaya</td>
<td>Property of others (deposit)</td>
<td>Rp. 1,000,000</td>
<td>120-150 min&gt;10 hours 2x / month ± 120 liter</td>
<td>Borne Company</td>
<td>more than 4 times&gt;USD $ 2,000,000&gt;2,000,000 USD&gt;USD</td>
<td>4,000,000&gt;Rs 10 million</td>
<td>to Rp 2,000,000</td>
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<tr>
<td>6</td>
<td>Lombok - Surabaya</td>
<td>Property of others (deposit)</td>
<td>Rp. 1,000,000</td>
<td>120-150 min 10 hours 2x / week ± 100 liters - 120 liters</td>
<td>f, erratic</td>
<td>3 times</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>to Rp 2,000,000 - Rp 4,000,000</td>
<td>to Rp 2,000,000 - Rp 4,000,000</td>
<td>to Rp 4,000,000 - Rp 10 million</td>
<td>to Rp 1,600,000</td>
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<tr>
<td>7</td>
<td>Bima - Surabaya</td>
<td>Property of others (deposit)</td>
<td>Rp. 500,000 / Target</td>
<td>90-120 min&lt;6 hours 1x / week 300 liter Borne The company</td>
<td>more than 4 times the Covered</td>
<td>Company&gt;Rs 2,000,000</td>
<td>Corporate Borne</td>
<td>Rp 4,000,000 - Rp 10 million</td>
<td>to Rp 500,000 - Rp 600,000</td>
<td>to Rp 1,500,000 - Rp 300,000</td>
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<tr>
<td>8</td>
<td>Sumbawa - Jakarta</td>
<td>Property of others (deposit)</td>
<td>Rp. 6,300,000 / Target</td>
<td>60-90 min 7 hours 1x / week 400 liter Borne The company</td>
<td>more than 4 times the Covered</td>
<td>Company&gt;Rs 2,000,000</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>Paid by the Company</td>
<td>of Rp 3,000,000</td>
<td>to Rp 2,000,000</td>
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<tr>
<td>9</td>
<td>Lombok - Property of others</td>
<td>Makers</td>
<td>90-120 min 7 hours 3x / month 80 liter</td>
<td>to Rp 300,000 - Rp 400,000</td>
<td>more than 4 times</td>
<td>Rp 1,000,000 - Rp to Rp 2,000,000 - Rp 4,000,000</td>
<td>to Rp 2,000,000 - Rp 4,000,000</td>
<td>to Rp 2,000,000</td>
<td>to Rp 2,000,000</td>
<td>to Rp 2,000,000</td>
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<tr>
<td>No.</td>
<td>Origin</td>
<td>Destination</td>
<td>Property Details</td>
<td>Duration</td>
<td>Frequency</td>
<td>Capacity/Liter</td>
<td>Rates</td>
<td>Delivery Period</td>
<td>Deposit</td>
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<td>10</td>
<td>Surabaya</td>
<td>Lombok</td>
<td>Makers</td>
<td>90-120 min</td>
<td>2x/week</td>
<td>100 liters -&gt; Rp 400,000</td>
<td>2x/week</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
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<tr>
<td>11</td>
<td>Lombok</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>60-90 min</td>
<td>2x/week</td>
<td>USD 200,000 - Rp 300,000</td>
<td>erratic</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
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<tr>
<td>12</td>
<td>Lombok</td>
<td>Surabaya</td>
<td>Makers</td>
<td>90-120 min</td>
<td>2x/week</td>
<td>USD 300,000 - Rp 400,000</td>
<td>4 times</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>Rp 2,000,000 - Rp 4,000,000</td>
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<td></td>
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<tr>
<td>13</td>
<td>Milky</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>90-120 min</td>
<td>4x/month</td>
<td>Rp 400,000</td>
<td>USD 5,000,000</td>
<td>more than 4 times</td>
<td>Rp 300,000 - Rp 1,000,000</td>
<td></td>
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<tr>
<td>14</td>
<td>Lombok</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>60-90 min</td>
<td>1x/week</td>
<td>USD 300,000 - Rp 400,000</td>
<td>1x</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
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<tr>
<td>15</td>
<td>Lombok</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>120-150 min</td>
<td>2x/week</td>
<td>&gt; Rp 400,000</td>
<td>more than 4 times</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
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<tr>
<td>16</td>
<td>Lombok</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>60-90 min</td>
<td>1x/week</td>
<td>USD 400,000 - Rp 5,000,000</td>
<td>more than 4 times</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>Rp 500,000 - Rp 1,000,000</td>
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<td></td>
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</tr>
<tr>
<td>17</td>
<td>Lombok</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>90-120 min</td>
<td>3x/week</td>
<td>Rp 300,000 - Rp 400,000</td>
<td>3 times</td>
<td>Rp 200,000 - Rp 1,000,000</td>
<td>Rp 2,000,000 - Rp 4,000,000</td>
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<tr>
<td>18</td>
<td>Sumbawa</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>60-90 min</td>
<td>2x/week</td>
<td>Rp 200,000 - Rp 300,000</td>
<td>more than 4 times</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>Rp 2,000,000 - Rp 4,000,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Lombok</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>90-120 min</td>
<td>4x/month</td>
<td>Rp 400,000 - Rp 5,000,000</td>
<td>more than 4 times</td>
<td>Rp 300,000 - Rp 1,000,000</td>
<td>Rp 2,000,000 - Rp 4,000,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Lombok</td>
<td>Property of others (deposit)</td>
<td>Makers</td>
<td>90-120 min</td>
<td>2x/week</td>
<td>Rp 300,000 - Rp 1,000,000</td>
<td>4 times</td>
<td>Rp 1,000,000 - Rp 2,000,000</td>
<td>Rp 500,000 - Rp 1,000,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Bima</td>
<td>Property of others (deposit)</td>
<td>USD 500,000 / Target</td>
<td>90-120 min</td>
<td>1x/week</td>
<td>300 liters</td>
<td>Borne The company</td>
<td>more than 4 times the Covered Company</td>
<td>Rp 2,000,000</td>
<td>Corporate Borne</td>
<td>Rp 4,000,000 - Rp 10 million</td>
<td>Rp 500,000 - Rp 600,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23
4.3 Characteristics of Freight Vehicles

were reviewed in this study are goods vehicles consisting of a truck moderate to large trucks. Characteristics of the goods being simulated vehicle can be seen in Table 4.4. Vehicle Characteristics Data Freight

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>GVW (kg)</th>
<th>Engine Capacity (cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck Medium</td>
<td>7,000</td>
<td>3,200</td>
</tr>
<tr>
<td>Truck Big</td>
<td>14000-16000</td>
<td>7,400</td>
</tr>
<tr>
<td>Truck Tronton</td>
<td>18000-22000</td>
<td>7400-9000</td>
</tr>
</tbody>
</table>

Source: Interview Results

4.4 Characteristics of Road Infrastructure

On the connecting road between the harbor anchor in Asembagus Situbondo to Ketapang Harbor is a national road through the mountains Baluran national Park. While the road between the port of Gilimanuk harbor Padangbai is a national road with an asphalt road through the district of Tabanan and Denpasar. In the presence of freight traffic increase the burden of so many causes congestion, so that the Bali provincial government appealed for freight transport operate at night. Padangbai harbor condition now only have two dock crossings. This often causes long queues of vehicles. While the sheet harbor has three docks. Unbalanced condition is exacerbated by weather conditions often change so rapidly that the crossing substandard.

4.5 Biya Calculation of Operational Vehicles

With an average kecepetan vehicle 20 km / h (interview survey results), then the corresponding calculation formula Baya Vehicle Operations at Reader Review Chapter BOK concerning calculation is as follows:

Table 4.5. Recapitulation calculation Vehicle Operating Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>BOK Component</th>
<th>Unit Price</th>
<th>Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of fuel</td>
<td>433.42</td>
<td>USD 5,150</td>
<td>USD 2,232,091</td>
</tr>
<tr>
<td>Cost of lubricating oil</td>
<td>8.4</td>
<td>Rp 1,500,000</td>
<td>to Rp 840,186</td>
</tr>
<tr>
<td>Consumption of tires</td>
<td>0.025</td>
<td>Rp 500,000</td>
<td>to Rp 37,759</td>
</tr>
<tr>
<td>Cost of spare parts</td>
<td>0.0019</td>
<td>USD 1,000,000</td>
<td>USD 1,922</td>
</tr>
<tr>
<td>maintenance costs</td>
<td>1.5</td>
<td>USD 1,000,000</td>
<td>Rp1,514,200</td>
</tr>
<tr>
<td>Depreciation</td>
<td>0.0024</td>
<td>Rp700,000,000</td>
<td>Rp1,666,667</td>
</tr>
<tr>
<td>Flower Capital</td>
<td>0.0034</td>
<td>Rp700,000,000</td>
<td>Rp2,400,000</td>
</tr>
<tr>
<td>Insurance</td>
<td>0.0018</td>
<td>Rp700,000,000</td>
<td>Rp1,245,417</td>
</tr>
<tr>
<td>Price / 1000 km</td>
<td></td>
<td></td>
<td>Rp9,938,242</td>
</tr>
<tr>
<td>Price / km</td>
<td></td>
<td></td>
<td>USD 9938</td>
</tr>
<tr>
<td>unexpected costs</td>
<td></td>
<td></td>
<td>Rp 994</td>
</tr>
<tr>
<td>cost / km</td>
<td></td>
<td></td>
<td>US $ 10,932</td>
</tr>
</tbody>
</table>

the distance between Gilimanuk towards Padangbai far as 158.6 km, the operational costs to be incurred is Rp. 1,733,826, -.

Whereas the distance between Asembagus towards Ketapang as far as 66 km, the operational costs to be incurred amounted to Rp. 721,512, -.

4.6 Ticket Costs Crossings Between Ketapang - Gilimanuk and Padangbai - Sheet.

Ticket costs crossings between Ketapang - Gilimanuk and Padangbai - Sheets can be seen in Table 4.6.

Table 4.6. Crossings costs

<table>
<thead>
<tr>
<th>These</th>
<th>Ticket prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketapang - Gilimanuk</td>
<td>Rp. 395,000, -</td>
</tr>
<tr>
<td>Padangbai - Sheet</td>
<td>Rp. 2,400,000, -</td>
</tr>
</tbody>
</table>
4.7 Total Operating Costs

Total cost of the trip is obtained from Total Operational Vehicle and pedestrian ticket costs. So we get the total cost of travel by land from Situbondo Asembagus toward Sheet Harbor Lombok as follows:

Total Expense = BOK + ticket crossings
= (1,733,826 + 721,512) + (505,000)
= Rp. 5,380,338.

So the total cost of goods vehicles traveling from the Port Anchors in Situbondo Asembagus toward Sheet Harbor NTB is Rp. 5,380,338, - / trip.

4.8 TRIP FERRY SHIP FROM PORT TO PORT OF TANJUNG PERAK SHEET.

Starting on December 1, 2017 PT ASDP Indonesia Ferry (Persero) serves crossing distance between Surabaya - Lombok through the port of Tanjung Perak port towards sheets with KMP Legundi. This cruise taken within 21 hours and is expected to reduce logistics costs and increase tourism to the area of Lombok. Rates crossings from the port of Tanjung Perak port Sheets can be seen in Table 4.6.

Table 4.7. Crossing rates Tanjung Perak - Sheet

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>tariff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods Group IV</td>
<td>Rp 1.252 million</td>
</tr>
<tr>
<td>Group V Goods</td>
<td>Rp 2.194 million</td>
</tr>
<tr>
<td>Group VI Goods</td>
<td>USD 3.629 million</td>
</tr>
<tr>
<td>Group VII</td>
<td>Rp 4.574 million</td>
</tr>
<tr>
<td>Group VIII</td>
<td>Rp 6.829 million</td>
</tr>
<tr>
<td>Class IX</td>
<td>Rp 10.234 million</td>
</tr>
</tbody>
</table>

4.9 CALCULATION TIME VALUE OF GOODS

The time value of the goods is a risk factor for the value of lost items can be caused by the decline or destruction of utility value of goods due to the travel time. The time value of goods is influenced by the value of the goods themselves and the shrinkage factor due to the characteristics of the goods and the treatment he received (Tavasszy).

For the transport of type General Cargo time value of goods is calculated by the following equation:

\[
a_g = v_g - (v_g (1 - s)^T / 96))USD / MT
\]

Where:

- \(a_g\) = the time value of goods
- \(v_g\) = the value of the goods (USD / MT)
- \(s\) = the value of depreciation
- \(T\) = time of travel (h)

Transportation of general cargo items are assumed to be diversified general merchandise. The average value of goods used is Rp. 8.15 million, - / MT and the depreciation value of 10% (Source: Final Alfa-Dody, ITB, 2003).

\[
a_g = 8.15 \text{ million} - (8.15 \text{ million} (1 - 0.10)^T / 96))USD / MT
\]

Table 4.8 Value Time Freight

<table>
<thead>
<tr>
<th>These</th>
<th>Travel Time (hrs)</th>
<th>Time Value of Goods USD / MT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor - Sheets (landline)</td>
<td>14</td>
<td>11936.49</td>
</tr>
<tr>
<td>Anchor - Sheets</td>
<td>22</td>
<td>18749.50</td>
</tr>
<tr>
<td>Surabaya - Sheets (sea)</td>
<td>21</td>
<td>17898.18</td>
</tr>
<tr>
<td>Surabaya - Sheets (land and includes a 2x8 hour break)</td>
<td>14 + 7 + 16 = 37</td>
<td>31508.51</td>
</tr>
</tbody>
</table>

Source: results of calculations

So the difference time value of freight (31 508, 51-17.898,18) /31.508,51 = 43.2%.
V. CONCLUSIONS AND SUGGESTIONS

5.1 Conclusions
a. Actual cost incurred by the freight business between Asembagus Situbondo - NTB Sheet port through Ketapang - Gilimanuk crossing route, Bali Island followed by PadangBai - Port of Sheet crossing Rp. 5,380,338, --.
b. While the tariff ferry crossing distance between Surabaya - Lombok through the port of Tanjung Perak to the port Sheet Rp 4,574,000, - for the same class of freight vehicles. So if the freight crossing is carried out from the Port of Anchor in Asembagus Situbondo to the Port of Sheet or otherwise will be much more economical so it is worth to be realized.
c. Benefits to be gained in freight transport route Java - Bali - NTB / NTT:
   ➢ Operational cost savings on operational costs of vehicles so as to promote the transportation of goods.
   ➢ Reduce road and congestion burden on the island of Bali as a result of the movement of freight transport only passing through the island of Bali, the ultimate destination of NTB / NTT.
   ➢ Shorten the travel time of freight travel so as to improve the quality of transportation services, reduce the risk of overland travel, convenience for drivers, save on road operations, and make freight costs cheaper.

5.1 Suggestions
a. In terms of time and cost of distribution and freight, as well as increased government services for the convenience of freight business actors, as well as improving the quality of national roads on the island of Bali as a world tourist icon of congestion, discomfort due to pollution. So the government should develop the Anchor Anchorage in Asembagus Situbondo as a ferry port to the Sheet Port of NTB.
b. The government should also socialize the national Toll Sea program to the inter-island freight forwarders, especially the Java-NTB / NTT distribution routes.
c. Due to time and cost constraints, this study has many shortcomings. So it can be calculated also the estimate of sea ferry tariff between the Port of Situbondo Anchor - Lombok NTB Port of Lombok. And still can also developed follow-up study for example about influence of connection speed, distribution to disparity of inter island goods price.
VI. BIBLIOGRAPHY


Department of Transportation Government of East Java Province. Year 2007. Feasibility Study Development of Inter-island Goods Crossing Service Crossing In Kabupaten Situbondo,


