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Operational Management Marine Transportation on Shipping Lanes Wangiwangi – Kaledupa, Wakatobi - Indonesia

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Abstract

Marine transportation is important role in the island regions for inter-island travel needs using marine freight transportation. The purpose of this study was to analyse the cost of sea transport services between islands by Ship Operating Costs (SOC). From the analysis of Ship Operating Costs (SOC) on every ship operating on the route service ship Wangiwangi - Kaledupa the differences from the existing cost per passenger per trip. It is influenced by the size of the ship as well as the cost of production GT different ships, as well as level adjustment local conditions.

Keywords: marine transportation; motor boats; ship operating costs; operating; inter-island travel

1. Introduction

A system of ocean freight costs on a shipping route has significance in the transportation service business management system, particularly motor boats. In addition, the adjustment amount of the applicable rates often lead to things that are not desirable, for example, the public reaction if the prescribed rate is not considered appropriate. Determination of appropriate cost needs to be done so that the motor boat rates are set jointly by local authorities, employers marine transportation services and transportation agencies Wakatobi district will provide justice for the providers and users of these services.

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Motor boat has high flexibility in both time and place. But with a high level of flexibility, providing high impact operating costs so that the cost / freight costs to be incurred to be higher. Especially with the economic conditions of the last few years is uncertain, due to changes in the exchange rate against foreign currencies is causing prices of goods to be high which of course affects the operating costs to be incurred operator, such as the purchase of ship spare parts, ship maintenance services etc. The increase in world oil prices which have an impact on the increase in price of fuel oil provides a very large impact on the rates of motor boats, even in the worst conditions can lead to the tendency of marine transportation services businesses into bankruptcy.

The purpose of this study was to answer the question of the above background that is to determine the magnitude of the motor ship rates based ship operating expenses (SOC).

2. Literature Review

2.1. Ship Operating Costs (SOC)

Ship Operating Costs are costs incurred in connection with the operation of the ship on a voyage, which are grouped on component costs during the ship is in port and the cost of the ship during cruise ship activities. In analyzing the ship operating expenses in the Ministry of Transportation to use the method, both for direct operating costs (fixed costs and Costs Variable) and indirect operating costs. (Muslihati, 2012).

2.1.1. Motor Ship Operating Cost Calculation

2.1.1.1. Direct Operating Cost

Direct costs are obvious costs that can be charged directly to companies or concerned. Direct costs are costs that can be easily and convincingly traced to a particular cost object.

- Fixed costs

  Fixed costs are costs incurred due to the use of fixed resources in the production process. According to the decision of the Minister of Transportation No. 58 in 2003, the fixed cost consist of:

  $$Fixed\ costs = depreciation\ cost + interest\ cost\ of\ capital + crew \qquad (1)$$

  Cost Depreciation is the ratio between the difference between the vessel and the residual value (10% of the price of the ship) with a depreciation period (20 years). Interest cost of capital can be calculated using the formula:

  $$Interest\ cost\ of\ capital = rate\ per\ year \times \left[65\% \times ship\ prices \times \left(\frac{\frac{N+1}{2}}{economical\ age} \right) \right] \qquad (2)$$

  Meanwhile, costs the crew can be calculated using the formula:

  $$costs\ the\ crew = crew\ salaries\ per\ month \times number\ of\ crew \times 12\ month \qquad (3)$$

- Variable costs

  Variable costs are costs that change in proportion to the total number of changes in the volume of activity. The variable cost per unit constant (fixed) with the change in the volume of activity. In another definition, a variable

fee or often called the total variable costs (TVC) is the sum of production costs (freight) which changes according to the level of the amount of output that will be generated. The greater output to be produced, the greater the variable costs to be incurred. The formula of variable costs is:

$$variable\ cost = cost\ of\ fuel + lubricants\ cost + ship\ maintenance\ cost + harbour\ cost \qquad (4)$$

2.1.1.2. Indirect Cost

Indirect costs are costs that occur not only caused by something that is financed, in conjunction with the product (freight shipping). Indirect costs are also known as overhead costs are costs that cannot be easily and convincingly traced to a particular cost object.

2.1.1.3. Total Operating Cost Per Year

Total operating cost per year is the accumulation of the total amount of direct costs and the total amount of indirect costs.

2.2. Rate Analysis

According to the decision of the Minister of Transportation No. KM 57 of 2006, freight rates in domestic sea passenger transport services is the price that must be paid by the service user in a sea passenger transport service in the country.

Calculation cost of the basic rate, based on the following principles:

- The cost of goods obtained from the calculation of the total cost divided by the total production
- The total cost is calculated based on the full cost (full costing)
- Principal cost component consists of direct and indirect costs as well as fixed costs and Costs Variable

2.2.1. Cost of basic rates per trip

The formula is:

$$cost\ of\ basic\ rates\ per\ trip = \left({total\ cost\ per\ year}\big/{total\ production\ per\ year} \right) \qquad (5)$$

Which:

$$total\ production\ per\ year = passenger\ capacity \times total\ frequency\ per\ year \qquad (6)$$

2.2.2. Basic rate passenger rates per trip

Basic rate obtained from the calculation of basic costs per passenger per trip plus a profit margin of 10%. The formula is:

$$basic\ rate\ passenger\ rates\ per\ trip = cost\ of\ passenger \times 10\%\ profit\ margin \qquad (7)$$

2.2.3. Rates based load factor analysis

Cost determined by specific load factor is calculated using the following formula:

$$rates\ per\ load\ factor = \left({cost\ of\ goods\ passenger\ per\ trip}\Big/{load\ factor} \right) \qquad (8)$$

Basic rate obtained from the calculation of rates per load factor (LF. 60% - 70%) plus 10% profit margin.

3. Methodology

The method in this research is the method of direct field research and interviews. Data obtained from field studies such the components of costs related to the operating the ship. Sources of data obtained from the respondents, in this case, passenger ships and ship operators who performed in two places, namely at Wangiwangi Port and Kaledupa Port. Distance shipping lines adopted by operating motor boats on this route as far as ± 37.8 km or 23.5 miles. Sea transportation service for this route served by each of two (2) ships daily in the two islands and regularly scheduled, namely at 05.30 pm the ship departs from Kaledupa to Wangiwangi then returned to Kaledupa or departing from Wangiwangi at round 09:00 pm vice versa.
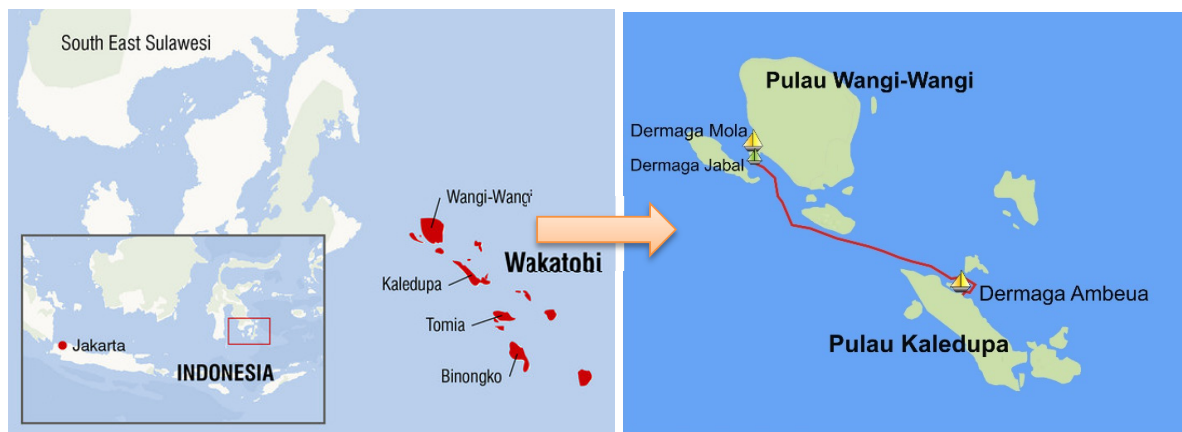

Fig. 1. Research Site

4. Results

4.1. Analysis rate

According to the decision of the Minister of Transportation No. KM 57 of 2006, freight rates in domestic sea passenger transport services is the price that must be paid by the service user in a sea passenger transport service in the country.

Calculation of the cost of the basic rate, based on the following principles: (a) cost of goods obtained from the calculation of the total cost divided by the total production; (b) the total cost is calculated based on the full cost; (c) principal cost component consists of direct and indirect costs as well as fixed costs and variable costs.

4.2. Cost of on basic rates per trip

Based on the results of a survey on four the ship serving the route Wangiwangi - Kaledupa, was obtained cost of the basic fare per trip as shown in the table below:

Table 1. Cost of per passenger per trip motor ship.

Ship Name	Basic Cost (Rp)
KM. Nur Rizki (5 GT)	24,575.06
KM. Wande-Wande III (7 GT)	21,046.23
KM. Kasuwari (4 GT)	21,362.29
KM. Putri Tunggal (6 GT)	25,375.85
Average	23,088.86

Source: results data processing in 2014

The average cost of per passenger per trip for a couple of boat on the route Wangiwangi - Kaledupa obtained Rp. 23,088.86 per passenger.

4.3. Basic rate per passenger per trip

Basic rate obtained from the calculation of basic costs per passenger per trip plus a profit margin of 10%. The results of the analysis of the basic rate per passenger per trip on ships serving passengers on the route Wangiwangi - Kaledupa can be seen in the following table:

Table 2. Basic rate per passenger per trip.

Ship Name	Basic Rate (Rp)
KM. Nur Rizki (5 GT)	27,032.57
KM. Wande-Wande III (7 GT)	23,146.45
KM. Kasuwari (4 GT)	23,498.52
KM. Putri Tunggal (6 GT)	27,913.44
Average	25,397.75

Source: results data processing in 2014

The average basic rate per passenger per trip motor ship on the route Wangiwangi to Kaledupa obtained Rp. 25,397.75 per passenger.

4.4. Rates based load factor analysis

From the above calculation is made on the assumption of full load factors, or 100%, then the cost determined by specific load factor is calculated using the formula (8), and the results can be seen on the table below:

Table 3. Rate based load factor analysis

Load Factor	Rate (Rp)
100%	25,397.75
90%	28,219.72
80%	31,747.18
70%)	36,282.49
60%	42,329.58

Source: results data processing in 2014

Cost at the level of load factor among the 60% to 70%, according to the condition of area. Basic rate obtained from the calculation of cost of passengers per trip on load factor of at least 70% plus a profit margin of 10%.

Table 4. Rate per passenger per trip based on 70% of load factor

Ship Name	Ship Size	Capacity (passenger)	Basic Rate (Rp)
KM. Nur Rizki	5 GT	40	38,617.95
KM. Wande-Wande III	7 GT	60	33,066.36
KM. Kasuwari	4 GT	30	33,569.32
KM. Putri Tunggal (6 GT)	6 GT	50	39,876.34
Average			36,282.49

Source: results data processing in 2014

The average rate passenger per trip with a load factor of 70% for several motor boats on route Wangiwangi - Kaledupa obtained Rp. 36,282.49 per passenger.

5. Discussion

From the analysis of the calculation of Ship Operating Costs (SOC) earned total operating cost per year of Rp. 346,016,875.00 for KM. Nur Rizki; Rp. 444,411,875.00 for KM. Wande Wande-III; Rp. 334,961,250.00 for KM. Putri Tunggal; Rp. 169,189,375.00 for KM. Kasuwari. And gained an average total operating cost per year of some ships operating on this route which amounted to Rp. 323,644,843.75.

Based on the calculation analysis cost of per trip per passenger acquired basic costs Rp. 24,575.06 for KM. Nur Rizki; Rp. 21,046.23 for KM. Wande – Wande III; Rp. 21,362.29 for KM. Putri Tunggal; Rp. 25,375.85 for KM. Kasuwari. And gained an average cost of passengers per person per trip for ships operating on this route which amounted to Rp. 23,088.86.

After doing the calculations Ship Operating Costs (SOC) on every ship with different GT sizes earned different production costs as described above. But the difference in the cost of production of each ship showed little difference to the acquisition cost of passengers per passenger per trip when adjusted for the level of difficulty of local conditions.

Based on the analysis of passenger fare calculation obtained basic passenger fare per person per trip plus a profit margin of 10% is obtained for Rp.27,032.57 for KM. Nur Rizki; Rp. 23,146.45 for KM. Wande Wande-III; Rp. 27,913.44 for KM. Putri Tunggal; Rp. 23,498.52 for KM. Kasuwari. And gained an average base rate of passengers per person per trip based on a profit margin of 10% for ships operating on this route which amounted to Rp. 25,397.75.

The average passenger fare per person per trip based on factors unloading / load factor for some ships operating on this route which amounted to Rp. 25,397.75 at 100% load factor; Rp. 28,219.72 on load factor of 90%; Rp. 31,747.18 on load factor of 80%; Rp. 36,282.49 on load factor of 70%; and Rp. 42,329.58 at 60% load factor.

According to the Regulation of the Transportation Minister No. KM. 57 of 2006 on the mechanism for the determination and formulation of calculation of passenger sea transport fares in the State explained that the average charge was 70%, so that the passenger rate per person per trip on route Wangiwangi - Kaledupa can be determined from the average passenger fare for some ships operating Rp. 36,282.49 per trip.

Based on a primary survey data, determination of rate on the route Wangiwangi - Kaledupa determined based on the result of a joint decision between employers sea freight transportation services provider which was facilitated by the local government in this case Wakatobi government through the Department of Transportation and the Ministry of Transportation and Information Republic Indonesia. Rates passenger motor ship per trip is applicable in the field on this route is based on an agreement which amounted to Rp. 50,000.00 after the increase in fuel prices in 2014 and Rp. 40,000.00 before rising fuel prices.

Motor boat rates applicable on the route Wangiwangi - Kaledupa in Wakatobi is currently Rp. 50,000.00 considered to have fulfilled by the community of users and operators, although not in accordance with the calculation of Ship Operating Costs (SOC) Rp. 36,282.49 per passenger per trip. The advantages of the calculation of the rates applicable to the acquisition amounting to Rp. 13,717.51 an adjustment of ship operating costs given the characteristics of the region that is quite difficult.

6. Conclusion

Marine transportation became the main transportation that connects the island Wangiwangi and Kaledupa. Analysis of fare determination was conducted to compare the feasibility of the current rate after the fuel price increases, which lead to increased operational costs. Based on the results of the reviews rate motor boats between islands in Wakatobi on the route Wangiwangi - Kaledupa, it can be concluded that the average rate of a motor boat rates for some ships operating on this route by ship operating costs (SOC) according to the decision of the Minister of Transportation No. KM 57 of 2006, which amounted to Rp. 36,282.49 per trip per passenger with a difference of Rp. 13,717.51 of the current rate. On further research, it is advisable to examine the feasibility of this rate by another method. In addition, research on willingness to pay and ability to pay be crucial to assess the difference in the applicable rates with rates based on the results of the analysis.

References

Decree No. KM 58. 2003. (2003). *Formulation and Calculation Determination Mechanism Ferryboat transport Rates*. Jakarta.

Director General of Marine Transport Ministry of the Republic of Indonesia. (2003). *Regulation on Environmental Data Association Director General of Sea Transportation*, Publisher of Legal and Public Relations Director General of Marine Transportation, Jakarta.

Government Regulation of Republic of Indonesia No. 7 .Tahun 1988. (1988). *Implementation and utilization Sea Transport*. Jakarta.

Jinca, MY. (1997). *Transport Economics*, set Material Class. Ujung Pandang.

Kramadibrata, S. (2002). *Port Planning*. Publisher ITB. Bandung.

Ministry of Research and Technology of the Republic of Indonesia. (2006*). Indonesia from 2005 to 2025 Transport White Paper*. Jakarta.

Nasution, H.M.N. (2004). *Transportation Management*. Ghalia Indonesia. Jakarta.

Regulation of the Minister of Transportation No. KM 57. 2006. (2006). *Determination Mechanism and Formulation Calculation Rates of Domestic Passenger Sea Transport*. Jakarta.

Salim Abbas. (1993). *Transportation Management*, Publisher PT. Raja Grafindo Persada, Jakarta.

Subaganata.B. (2012). Analysis Sailing Motor Transport Rates in Kuala Pembuang Seaport Seruyan (Case Study Ships 34 GT). *Research Journal of Faculty of Engineering*, University of Darwan Ali.

Thuesen, H.G., W.J. Fabrycky & G.J. Thuesen. (1981). *Engineering Economy*, Fifth Edition, Prentice Hall, India.