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# An Overview of KMP. Gorare Route Tanjung Ru-Sadai Belitung, Bangka Belitung Province

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## Abstract

Belitung Regency is one of the regencies in Indonesia's Bangka Belitung Province where river crossing transportation plays a vital role in transportation activities and the region's economy. The Gorare Ferry Motor Boat is a ro-ro type motor boat serving the Tanjung Ru-Sadai route. This form of transportation is expected to be able to stimulate economic growth in the region's more remote areas, and the government is therefore providing subsidies to support the programme. Based on productivity data from 2010 to 2013, there was a significant increase in passenger volumes and vehicle productivity. However, the pricing rate does not cover the operating costs of the ship. This study seeks to ascertain when the service will reach breakeven and no longer require subsidies.

**Keywords:** Crossing; Transportation; Role.

## 1. Introduction

Belitung Regency is one of the regencies in Bangka Belitung Province where ferries and carriage transportation plays a very important role in transportation activities, besides being a moving bridge that connects roads cut off by water, it is also used as a means of distributing goods and services to support the economy in Belitung Regency.

The Gorare Ferries and Cariage Motor Boat is a ro-ro type motor boat serving the Tanjung Ru-Sadai route. This early transportation is expected to be able to encourage and advance remote areas economy therefore the government is responsible for implementing it out by providing subsidy to the management of KMP. services; Gorare, namely PT. ASDP Indonesia Ferry, Bangka Belitung Branch. Based on productivity data from 2010 to 2013, the result described that is an increasing passenger and vehicle productivity. However, the rate set still cannot be covered or cannot cover the operating

costs of the ship. Therefore, the authors will examine in more depth in what year the load factor and income to take the Break Even point or entry point, so that subsidy turn into commercial ships.

# 2. Research Methods

## 2.1. Passenger and Vehicle Growth Forecasting

To predict the number of users of this service, researchers used the Data Series method, it was possible to know the growth of passengers and vehicles that will come on the track. The predicted number of transports could be calculated using this following formula:

$$Y' = a + bx$$

Note:

Y '= the dependent variable (the predicted variable)

X = independent variable (day, month, year)

a and b = Kon Numbers

## 2.2. Ship Operational Cost Analysis

To calculate ship operational cost, the following calculation of ship operating costs is formulated based on the Decree of the Minister of Transportation Number 58 of 2003 concerning the mechanism for determining and formulating ferry transportation rates as follows:

### 2.2.1. Transportation Revenue Analysis

To calculate the amount of ship revenue per year, both the current prevailing tariff and the rates being studied, use the following formula:

Number of Passengers x Rates

Number of Vehicles x Rates

### 2.2.2. Load Factor Break Even Point

To calculate BEP load factor, two levels of ship load factors, where the position between the ship's operating costs and revenue is balanced, the formula used is as follows:

**LF BEP** = $\frac{BOK}{PDT}$ **x LF**

Note:

LF BEP = Load factor break event point

BOK = Ship operating costs

PDT = Income

LF = Ship's load factor in a year

## 3. Results and Discussions

### 3.1. Calculation of Load Factors for the coming year

The ship's load factor calculation can be determined using, the following formula.

TABLE 1: Passenger Load Factor Forecasting

| No | Year | Trip | Used Capacity(SUP) | Available capacity (SUP) | Load Factor% |
|----|------|------|--------------------|--------------------------|--------------|
| 1  | 2014 | 176  | 3650,6   | 14432 | 25,29518 |
| 2  | 2015 | 176  | 3932,25  | 14432 | 27,24674 |
| 3  | 2016 | 176  | 4213,9   | 14432 | 29,19831 |
| 4  | 2017 | 176  | 4495,55  | 14432 | 31,14988 |
| 5  | 2018 | 176  | 4777,2   | 14432 | 33,10144 |
| 6  | 2019 | 176  | 5058,85  | 14432 | 35,05301 |
| 7  | 2020 | 176  | 5340,5   | 14432 | 37,00457 |
| 8  | 2021 | 176  | 5622,15  | 14432 | 38,95614 |
| 9  | 2022 | 176  | 5903,8   | 14432 | 40,90771 |
| 10 | 2023 | 176  | 6185,45  | 14432 | 42,85927 |
| 11 | 2024 | 176  | 6467,1   | 14432 | 44,81084 |
| 12 | 2025 | 176  | 6748,75  | 14432 | 46,7624  |
| 13 | 2026 | 176  | 7030,4   | 14432 | 48,71397 |
| 14 | 2027 | 176  | 7312,05  | 14432 | 50,66553 |
| 15 | 2028 | 176  | 7593,7   | 14432 | 52,6171  |

*Source: Data Processed, 2020*

Table 2: Ship Load Factor Forecasting

| No | Year | Trip | Used Capacity (SUP) | Availabe (SUP) | Load Factor % |
|---|---|---|---|---|---|
| 1 | 2014 | 176 | 33071,0855 | 49174,4 | 67,2526467 |
| 2 | 2015 | 176 | 35405,5665 | 49174,4 | 71,99999695 |
| 3 | 2016 | 176 | 37740,0475 | 49174,4 | 76,7473472 |
| 4 | 2017 | 176 | 40074,5285 | 49174,4 | 81,49469744 |
| 5 | 2018 | 176 | 42409,0095 | 49174,4 | 86,24204769 |
| 6 | 2019 | 176 | 44753,9565 | 49174,4 | 91,01068137 |
| 7 | 2020 | 176 | 47077,9715 | 49174,4 | 95,73674819 |
| 8 | 2021 | 176 | 49412,4525 | 49174,4 | 100,4840984 |
| 9 | 2022 | 176 | 51746,9335 | 49174,4 | 105,2314487 |
| 10 | 2023 | 176 | 54081,4145 | 49174,4 | 109,9787989 |
| 11 | 2024 | 176 | 56415,8955 | 49174,4 | 114,7261492 |
| 12 | 2025 | 176 | 58415,8955 | 49174,4 | 118,7933061 |
| 13 | 2026 | 176 | 61084,8575 | 49174,4 | 124,2208497 |
| 14 | 2027 | 176 | 63419,3385 | 49174,4 | 128,9681999 |
| 15 | 2028 | 176 | 65753,8195 | 49174,4 | 133,7155502 |

Source: Data Processed, 2020

Table 3: Ship Load Factor Forecasting

| Tahun | Trip | Used Capacity | | Available Capacity | | Load Factor |
|---|---|---|---|---|---|---|
| | | Pnp | Kend | Pnp | Kend | Ship % |
| 2014 | 176 | 2219,75 | 33071,0855 | 14431 | 49174,4 | 55,48 |
| 2015 | 176 | 2343 | 35405,5665 | 14431 | 49174,4 | 59,34 |
| 2016 | 176 | 2465,95 | 37740,0475 | 14431 | 49174,4 | 63,21 |
| 2017 | 176 | 2588,9 | 40074,5285 | 14431 | 49174,4 | 67,07 |
| 2018 | 176 | 2711,85 | 42409,0095 | 14431 | 49174,4 | 70,94 |
| 2019 | 176 | 2834,8 | 44753,9565 | 14431 | 49174,4 | 74,82 |
| 2020 | 176 | 2957,75 | 47077,9715 | 14431 | 49174,4 | 78,67 |
| 2021 | 176 | 3080,7 | 49412,4525 | 14431 | 49174,4 | 82,53 |
| 2022 | 176 | 3203,65 | 51746,9335 | 14431 | 49174,4 | 86,40 |
| 2023 | 176 | 3326,6 | 54081,4145 | 14431 | 49174,4 | 90,25 |
| 2024 | 176 | 3449,55 | 56415,8955 | 14431 | 49174,4 | 94,12 |
| 2025 | 176 | 3572,5 | 58415,8955 | 14431 | 49174,4 | 97,46 |
| 2026 | 176 | 3695,45 | 61084,8575 | 14431 | 49174,4 | 101,71 |
| 2027 | 176 | 3818,4 | 63419,3385 | 14431 | 49174,4 | 105,71 |
| 2028 | 176 | 3941,35 | 65753,8195 | 14431 | 49174,4 | 104,46 |

Source: Data Processed, 2020

## 3.2. Ship Operational Cost Analysis (BOK)

Ship operating costs (BOK) for 2014 based on the author's analysis on the basis of calculations adjusted to the Decree of the Minister of Transportation Number 58 of 2003 concerning the Mechanism of Determination and Formulation of Ferry Transportation Rates, it was obtained Ship Operational Costs of **IDR. 4,599,037,984, -**

The following is the calculation of KMP. Ship Operational Costs (BOK). Gorare:

1. Direct cost

    (a) Fixed Costs

        Total Fixed Costs Per Year = IDR. 1,581,689,000, -

    (b) Variable Costs

        Total Variable Costs Per Year = IDR. 2,444,783,743, -

        Total variable Costs = IDR. 4,026,472,743,-per year

2. Indirect Costs

    (a) Fixed Costs

        Total Fixed Costs Per Year = IDR. 88,885,900, -

        Variable costs per year = IDR. 43,067,000, -

    (b) Total Indirect Cost Per Year = IDR. 131,952,900,-per year

        Total KMP. Operational Costs. Gorare per year that passes through Tanjung Ru-Sadai, namely:

    **Total Direct Costs + Total Indirect Costs**

    **= IDR. 4,026,472,743+ IDR. 131,952,900**

    **= IDR. 4,158,425,643, -**

## 3.3. Calculation of Future Ship Revenue

In relation the increase in passenger and vehicle productivity from year to year, operator revenues will also increase. To find out the income of KMP. operators. Gorare can use formula II.2, where the transport productivity predicted for 2014-2028 is multiplied by the assumption that the tariff is fixed. The results of the calculation of KMP. operator income. Gorare from 2014-2028 can be seen as follows:

TABLE 4: Incoming Forecasting Table in 2014-2028

| Year | Passenger | | Vehicles by Group | | | | | | | | | Income (Rp) | BOK (Rp) | Difference (Rp) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Adult | Child | Group I | Group II | Group IV A | Group IV B | Group V A | Group V B | Group VI B | Group VII | Group VIII | | | |
| 2014 | 3625,9 | 24,7 | 0,5 | 645,4 | 55,85 | 320,25 | 6,8 | 585,85 | 31,05 | 46,05 | 9,05 | 2.337.378.450 | 4.158.425.643 | -1.821.047.193 |
| 2015 | 3908 | 24,25 | 0 | 672,5 | 61,05 | 338,5 | 6,5 | 620 | 35,5 | 52,5 | 10 | 2.503.466.050 | 4.158.425.643 | -1.654.959.593 |
| 2016 | 4190,1 | 23,8 | -0,5 | 699,6 | 66,25 | 356,75 | 6,2 | 654,15 | 39,95 | 58,95 | 10,95 | 2.669.553.650 | 4.158.425.643 | -1.488.871.993 |
| 2017 | 4472,2 | 23,35 | -1 | 726,7 | 71,45 | 375 | 5,9 | 688,3 | 44,4 | 65,4 | 11,9 | 2.835.641.250 | 4.158.425.643 | -1.322.784.393 |
| 2018 | 4754,3 | 22,9 | -1,5 | 753,8 | 76,65 | 393,25 | 5,6 | 722,45 | 48,85 | 71,85 | 12,85 | 3.001.728.850 | 4.158.425.643 | -1.156.696.793 |
| 2019 | 5036,4 | 22,45 | -2 | 780,9 | 81,85 | 411,5 | 5,3 | 756,6 | 53,5 | 78,3 | 13,8 | 3.168.438.250 | 4.158.425.643 | -989.987.393 |
| 2020 | 5318,5 | 22 | -2,5 | 808 | 87,05 | 429,75 | 5 | 790,75 | 57,75 | 84,75 | 14,75 | 3.333.904.050 | 4.158.425.643 | -824.521.593 |
| 2021 | 5600,6 | 21,55 | -3 | 835,1 | 92,25 | 448 | 4,7 | 824,9 | 62,2 | 91,2 | 15,7 | 3.499.991.650 | 4.158.425.643 | -658.433.993 |
| 2022 | 5882,7 | 21,1 | -3,5 | 862,2 | 97,45 | 466,25 | 4,4 | 859,05 | 66,65 | 97,65 | 16,65 | 3.666.079.250 | 4.158.425.643 | -492.346.393 |
| 2023 | 6164,8 | 20,65 | -4 | 889,3 | 102,65 | 484,5 | 4,1 | 893,2 | 71,1 | 104,1 | 17,6 | 3.832.166.850 | 4.158.425.643 | -326.258.793 |
| 2024 | 6446,9 | 20,2 | -4,5 | 916,4 | 107,85 | 502,75 | 3,8 | 927,35 | 75,55 | 110,55 | 18,55 | 3.998.254.450 | 4.158.425.643 | -160.171.193 |
| 2025 | 6729 | 19,75 | -5 | 943,5 | 113,05 | 521 | 3,5 | 961,5 | 80 | 117 | 19,5 | 4.164.342.050 | 4.158.425.643 | (5.916.407) |
| 2026 | 7011,1 | 19,3 | -5,5 | 970,6 | 118,25 | 539,25 | 3,2 | 995,65 | 84,45 | 123,45 | 20,45 | 4.330.429.650 | 4.158.425.643 | 172.004.007 |
| 2027 | 7293,2 | 18,85 | -6 | 997,7 | 123,45 | 557,5 | 2,9 | 1029,8 | 88,9 | 129,9 | 21,4 | 4.496.517.250 | 4.158.425.643 | (338.091.607) |
| 2028 | 7575,3 | 18,4 | -6,5 | 1024,8 | 128,65 | 575,75 | 2,6 | 1063,95 | 93,35 | 136,35 | 22,35 | 4.662.604.850 | 4.158.425.643 | (504.179.207) |

### 3.4. Source: Data Processed, 2020Load Factor Break Even Point

To get the load factor break event point each year, it can be calculated based on the formula II.3, where the ship operating costs (BOK) forecast per year divided by the income per year multiplied by the ship load factor per year. The results of calculations from 2010 to 2028 can be seen in the table below:

TABLE 5: Forecasting Future Ship BEP Load Factors

| Year | Income (Rp) | BOK (Rp) | Difference (Rp) | LF Vessel (%) | LF BEP (%) |
|------|-------------|----------|-----------------|---------------|------------|
| 2014 | 2.337.378.450 | 4.158.425.643 | -1.821.047.193 | 55,48 | 98,70 |
| 2015 | 2.503.466.050 | 4.158.425.643 | -1.654.959.593 | 59,34 | 98,57 |
| 2016 | 2.669.553.650 | 4.158.425.643 | -1.488.871.993 | 63,21 | 98,46 |
| 2017 | 2.835.641.250 | 4.158.425.643 | -1.322.784.393 | 67,07 | 98,36 |
| 2018 | 3.001.728.850 | 4.158.425.643 | -1.156.696.793 | 45,49 | 63,02 |
| 2019 | 3.168.438.250 | 4.158.425.643 | -989.987.393 | 47,10 | 61,82 |
| 2020 | 3.333.904.050 | 4.158.425.643 | -824.521.593 | 48,70 | 60,74 |
| 2021 | 3.499.991.650 | 4.158.425.643 | -658.433.993 | 50,30 | 59,76 |
| 2022 | 3.666.079.250 | 4.158.425.643 | -492.346.393 | 51,90 | 58,87 |
| 2023 | 3.832.166.850 | 4.158.425.643 | -326.258.793 | 53,22 | 57,75 |
| 2024 | 3.998.254.450 | 4.158.425.643 | -160.171.193 | 94,12 | 97,89 |
| 2025 | 4.164.342.050 | 4.158.425.643 | (5.916.407) | 97,46 | 97,32 |
| 2026 | 4.330.429.650 | 4.158.425.643 | (172.004.007) | 101,71 | 97,67 |
| 2027 | 4.496.517.250 | 4.158.425.643 | (338.091.607) | 105,71 | 97,76 |
| 2028 | 4.662.604.850 | 4.158.425.643 | (504.179.207) | 104,46 | 93,16 |

*Source: Data Processed, 2020*

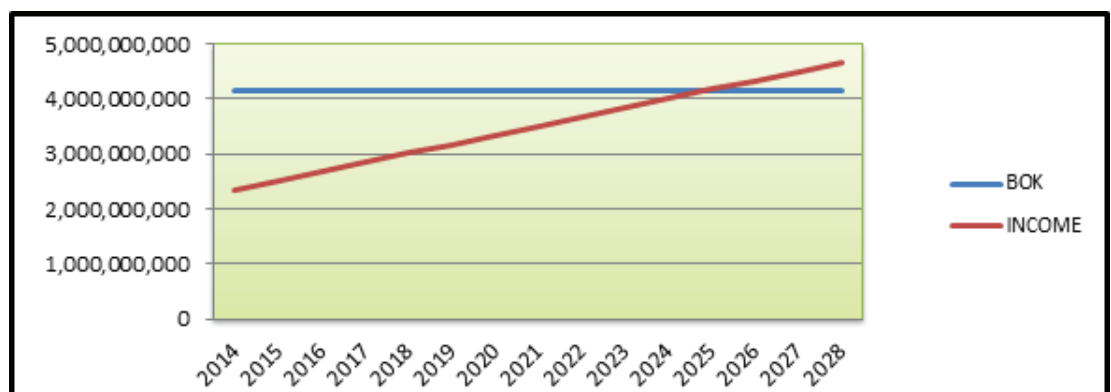The following is a graph of the balance between revenue and ship operating costs:



**Figure** 1: Graph Between Ship Operator Revenue and Ship Operational Costs from 2014-2028

### 3.5. Resolution

Based on the problem analysis in 2014, it was found that the operational conditions of the KMP. Gorare across Tanjung Ru-Sadai still suffered losses. This can be seen from:

(a) Current Ship Load Factor is 55.48% smaller than the Break Event Point (BEP) Load Factor, which is 98.70%

(b) The current ship revenue is IDR. 2,337,378,450, -

One solution to the problem so that ships continue to operate is the provision of subsidies to continue, until 2024 and 2025 there is no need to receive subsidies because they have reached BEP.

(a) Ship Load Factor in 2025 is 97.46% greater than the Break Event Point (BEP) Load Factor, which is 97.32%

3. Ship revenue in 2025 is IDR. 4,330,429,650,- greater than the operational cost of the ship, which is IDR. 4,158,425,643, -

## 4. Conclusion

Based on the results of data analysis and discussion, the following conclusions can be drawn that operation of KMP. Gorare is currently still eligible for assistance in the form of subsidies from the government and is still categorized as a pioneer crossing. And based on the analysis data, the current ship load factor **is 55.48%** smaller than the Break Event Point (BEP) load factor, which is **98.70%** with operating costs of ships operating at **IDR. 4,158,425,643**,-and transportation income of IDR. **2,337,378,450,-**so that in the KMP. operation. Gorare still suffered losses of and still need assistance from the government in the form of subsidies. Also the prediction data of ship load factor in 2025, which is **97.46%** greater than the load factor break even point (BEP), which is **97.32**% with an income of **IDR. 4,164,342,050,-**greater than the ship's operating costs of **IDR. 4,158,425,643** so it is estimated that by 2026 the crossing of the Tanjung Ru-Sadai route will have become a commercial route and no need for government assistance in the form of subsidies anymore.

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