

Evaluation of the Operational Performance of the Telaga Punggur Ferry Port in Riau Islands Province

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ABSTRACT

Telaga Punggur Ferry Port, as a class I port in the Riau Islands Province, plays a strategic role in passenger and vehicle mobility. This study aims to evaluate the port's operational performance based on five indicators in accordance with the Decree of the Director General of Land Transportation Number KP-DRJD 539 of 2022. The method used is descriptive quantitative through surveys and observations for 10 days in March 2025. The results show an average ship maneuvering time of 8.17 minutes (sufficient category), vehicle boarding time of 1.21 minutes and disembarking time of 2.06 minutes (good), and vehicle queuing time of 76 minutes 44 seconds (very poor) with the longest queue of 4 hours 30 minutes. The Berth Occupancy Ratio value shows that pier 1 (sufficient) and pier 2 (very good). It is concluded that operational performance still needs to be improved, especially in vehicle queue management and pier utilization. Recommendations include increasing operator supervision, improving infrastructure, adjusting ship frequencies, and optimizing the ticketing system and ship schedule coordination.

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1. INTRODUCTION

Based on the Decree of the Minister of Transportation of the Republic of Indonesia Number 432 of 2017 concerning the National Port Master Plan, Telaga Punggur Ferry Port is categorized as a Class I Ferry Port. Service indicators start from when the ship will dock, carry out loading and unloading, until undocking from the port. The level of service is considered good if the service indicator time is shorter than the predetermined schedule. However, there are problems that cause port management to be ineffective, including the frequent long queues to board ships due to the high intensity of port transportation, less than optimal loading and unloading of vehicles at the port and varying ship maneuvering times.

Based on these conditions, an evaluation of the operational performance of the Telaga Punggur Ferry Port is required in accordance with the Decree of the Director General of Land Transportation Number KP-DRJD 539 of 2022 concerning Guidelines for Planning, Development, and Performance Evaluation of River, Lake, and Ferry Ports. Therefore, the author compiled a Mandatory Working Paper (KKW) entitled "Operational Performance Evaluation of Telaga Punggur Port, Riau Islands Province" to obtain evaluation results in accordance with these guidelines.

2. RESEARCH METHODOLOGY

This study uses a descriptive quantitative approach to evaluate port operational performance. This approach is used to obtain data on maneuver time, average vehicle boarding time, average vehicle disembarking time, queue time for boarding, and the level of berth occupancy (BOR). Data collection is carried out through direct observation of vessel and vehicle activity at the port, as well as documentation of available operational data. Data analysis uses descriptive statistics, a method that aims to describe or illustrate the data obtained without generalizing or drawing general conclusions.

3. RESULTS AND DISCUSSION

3.1. Analysis of Ship Operational Indicators

Analysis of ship operational service performance is conducted by measuring the duration of ship service while in the port's work area. One of the indicators analyzed is maneuver time, which is the total time required for a ship to move from its anchorage to its mooring (Tmt). The results of the analysis of ship maneuver time at Telaga Punggur Ferry Port are presented as follows:

Table 1. Results of the Ship Maneuvering Time Survey

No	Date	Average Maneuver Time (Minutes)
1	01/03/2025	7.55 Minutes
2	02/03/2025	7.96 Minutes
3	03/03/2025	7.16 Minutes
4	04/03/2025	9.16 Minutes
5	05/03/2025	8.5 Minutes
6	06/03/2025	8.18 Minutes
7	07/03/2025	8.38 Minutes
8		
9		
10	10/03/2025	8.83 Minutes
Average		8.17 Minutes

Based on observations, the average maneuver time at Telaga Punggur Ferry Port is 8.17 minutes. According to the assessment criteria for KP-DRJD 539 in 2022, Telaga Punggur Ferry Port received a score of 60, which is considered adequate. This indicates that ship operational services at the port are still at a sufficient level, but not yet optimal.

3.2. Analysis of Loading and Unloading Indicators

Loading and unloading indicators include boarding time, disembarkation time, and queuing time. All aspects of loading and unloading were conducted over a 10-day period at the Telaga Punggur Ferry Port in the Riau Islands Province.

3.2.1. Boarding Time

The average vehicle boarding time indicator is the average time required for vehicles to board the ship (vehicles/minute), from the time the vehicle queues until the vehicle enters the ship. The results of the calculation of the average vehicle boarding time are as follows:

Table 2. Boarding Time

No	Date	Average Vehicle Boarding Time (Vehicles/Minute)
1	01/03/2025	1.57
2	02/03/2025	1.21
3	03/03/2025	1.53
4	04/03/2025	1.00
5	05/03/2025	1.07
6	06/03/2025	1.06
7	07/03/2025	1.12
8	03/08/2025	1.15
9	09/03/2025	1.19
10	10/03/2025	1.27
Overall Average		1.21

Referring to the aspect of assessing the average time for vehicles to board ships in accordance with the Decree of the Director General of Land Transportation Number KP-DRJD 539 of 2022, the

Telaga Punggur Ferry Port received a score of 80 with the criteria of the average time for vehicles to board ships (Ttk) of more than 1 minute to 2 minutes with a good indicator value.

3.2.2. Disembarkation Time

The average time for vehicles to disembark from a ship is the average time required for vehicles to disembark from the ship (vehicles/minute), from the time the vehicle queues up on the ship until the vehicle disembarks. The results of the calculation of the time for vehicles to board the ship at the Telaga Punggur Ferry Port are as follows:

Table 3. Disembarkation time

No	Date	Rata – Average Vehicle Disembarkation Time (Vehicles/Minute)
1	01/03/2025	2.68
2	02/03/2025	2.37
3	03/03/2025	2.70
4	04/03/2025	2.30
5	05/03/2025	2.16
6	06/03/2025	2.13
7	07/03/2025	2.29
8	03/08/2025	2.24
9	09/03/2025	2.20
10	10/03/2025	2.25
Overall Average		2.06

Referring to the aspect of assessing the average time for vehicles to disembark from the ship in accordance with the Decree of the Director General of Land Transportation Number KP-DRJD 539 of 2022, the Telaga Punggur Ferry Port received a score of 80 with the criteria of the average time for vehicles to disembark from the ship (Ttk) of more than 2 minutes to 3 minutes with a good indicator value.

3.2.3. Queue Time to Board the Ship

The vehicle boarding time indicator (Tak) is the longest queue time required for a vehicle to board a particular ship. The calculation of the vehicle boarding time (Tak) is carried out by conducting direct calculations at the Port that is the target of the evaluation, during the Port performance evaluation survey. The results of the calculation of the vehicle boarding time at the Telaga Punggur Ferry Port are as follows:

Table 4. Waiting Time to Board the Ship

No	Date	Rata – Average Time Queue to Board the Ship (Minute)
1	01/03/2025	102.45
2	02/03/2025	104.83
3	03/03/2025	85.12
4	04/03/2025	62.25
5	05/03/2025	58.00
6	06/03/2025	52.50
7	07/03/2025	42.30
8	03/08/2025	87.00
9	09/03/2025	57.27
10	10/03/2025	112.77
Overall Average		76.44

Referring to the assessment aspect of the average queue time for boarding ships in accordance with the Decree of the Director General of Land Transportation Number KP-DRJD 539 of 2022, the Telaga Punggur Ferry Port received a score of 20 with the criteria of an average queue time for boarding ships (No) more than 30 minutes with a very poor indicator value. Some of the reasons for the very poor queue time indicator for boarding ships are bunkering activities and fresh water filling

and vehicles can print tickets up to 2 hours before departure which causes congestion in the loading area.

3.3. Analysis of Facility Utilization Indicators

3.3.1. Use of the Pier

The facility utility indicator (Berth Occupancy Ratio/BOR) is the ratio between the time the pier is used and the time available (the pier is ready for operation) within a certain time period expressed as a percentage. The BOR value is calculated using data from the port being surveyed. The data used includes the length of time the pier is operational per day (in hours) and the number of days the pier is ready to operate each month for one year, excluding time for maintenance and repairs. Telaga Punggur Ferry Port starts operations from 07.00 WIB to 19.00 WIB (Regular). So the pier is active for 12 hours.

Active dock operations are also calculated based on idle time to calculate the BOR. Idle time, also known as the time when no ships are docked and no loading or unloading is taking place, is calculated. The idle time calculation for each dock at Telaga Punggur Ferry Port is as follows.

Pier I

Idle Time= Free Time per Trip × Number of Trips per Day

Idle Time= 38 Minutes × 8 Trips per Day

Idle Time= 416 Minutes = 6.93 Hours

$$BOR = \frac{\text{Jumlah total jam penggunaan dermaga per tahun}}{\text{Lama waktu operasi yang tersedia}(\frac{\text{jam}}{\text{tahun}})} \times 100\%$$

$$BOR = \frac{(12 - 6,93) \times 365 \text{ Hari}}{12 \times 365} \times 100\%$$

$$BOR = \frac{5,07 - 9 \times 365 \text{ Hari}}{4380 \frac{\text{jam}}{\text{tahun}}} \times 100\%$$

$$BOR = \frac{1850,55 \frac{\text{jam}}{\text{tahun}}}{4380 \frac{\text{jam}}{\text{tahun}}} \times 100\%$$

$$BOR = 42,25\%$$

Pier II

Idle Time= Free Time per Trip × Number of Trips per Day

Idle Time= 60 Minutes × 3 Trips per Day

Idle Time= 180 Minutes = 3 Hours

$$BOR = \frac{\text{Jumlah total jam penggunaan dermaga per tahun}}{\text{Lama waktu operasi yang tersedia}(\frac{\text{jam}}{\text{tahun}})} \times 100\%$$

$$BOR = \frac{(12 - 3) \times 365 \text{ Hari}}{12 \times 365} \times 100\%$$

$$BOR = \frac{9 \times 365 \text{ Hari}}{4380 \frac{\text{jam}}{\text{tahun}}} \times 100\%$$

$$BOR = \frac{3285 \frac{\text{jam}}{\text{tahun}}}{4380 \frac{\text{jam}}{\text{tahun}}} \times 100\%$$

$$BOR = 75\%$$

Based on the calculations above, the results of the calculations determine that the BOR value for pier I is 42.25% and the BOR value for pier II is 75%. The results of the calculation analysis indicate a difference in the BOR values between pier I and pier II.

Referring to the BOR assessment criteria in the Decree of the Director General of Land Transportation Number KP-DRJD 539 of 2022, Pier I is categorized as sufficient, while Pier II is classified as very good.

3.4. Discussion

The analysis conducted shows how the assessment of Telaga Punggur Ferry Port relates to its port operational performance. Port operational service performance consists of several indicators, including ship operational service indicators (maneuver time), loading and unloading operational service indicators (vehicle boarding time, vehicle disembarking time, and vehicle queue time), and operational service indicators regarding facility utilization (BOR). Each indicator is analyzed against the assessment criteria of each indicator to determine the results of the assessment of Telaga Punggur Ferry Port's operational performance. The operational performance indicators analyzed are as follows:

1. Ship Operational Service Performance

a. Ship Maneuver Time

Vessel maneuvering time is calculated from the moment the vessel enters the harbor basin until it docks at the pier. The average vessel maneuvering time obtained from a survey at Telaga Punggur Ferry Port is 8.17 minutes, with the longest time reaching 11 minutes. Based on legal references, vessel maneuvering time at this port is considered adequate. However, maximum efforts are needed to improve the efficiency and effectiveness of vessel operational services at Telaga Punggur Ferry Port in the future.

2. Loading and Unloading Operational Service Performance

a. Vehicle Boarding Time

The vehicle boarding time was calculated on ships engaged in loading activities by measuring the number of vehicles boarding and the duration of time from the ship being ready to serve the first vehicle until the last vehicle successfully boarded the ship. The average vehicle boarding time was 1.21 minutes, with the longest time reaching 0.5 vehicles per minute. Based on legal references, it was found that the average vehicle boarding time at the Telaga Punggur Ferry Port was categorized as good.

b. Vehicle Disembarkation Time from Ship

The disembarkation time for vessels engaged in disembarkation is calculated by measuring the number of disembarked vessels and the time from the time the vessel is ready to disembark the first vehicle to the time the last vehicle disembarks. The average disembarkation time is 2.06 minutes, with the longest disembarkation time reaching one vehicle per minute. Based on legal references, this average time is considered good for the Telaga Punggur Ferry Port.

c. Time to Queue for Vehicles to Board the Ship

The vehicle boarding time indicator measures the longest queue time experienced by vehicles, by calculating the queue time from the front vehicle or the one closest to the ship to be boarded. The average vehicle boarding time was 76 minutes and 44 seconds, while the longest queue time reached 4 hours and 30 minutes. Based on legal references, the vehicle boarding time at the Telaga Punggur Ferry Port is categorized as very poor.

3. Service Performance Against Facility Utilization

The Berth Occupancy Ratio was calculated using secondary data available at the Telaga Punggur Ferry Port. This data includes the daily operating hours of the pier and the number of operating days per year. Based on legal standards, pier 1 is considered adequate, while pier 2 is considered excellent.

4. Port Performance Assessment

The ferry port performance score is calculated by multiplying the value of each performance indicator by the weight assigned to each indicator. The total ferry port operational performance score includes the five main indicators listed in Table 6.

Table 6. Criteria for Assessing Port Operational Performance

No	Indicator	Indicator Value	Weight
		(1)	(2)
1	Ship maneuver time	60	0.238
2	Average time for vehicles to board the ship	80	0.059
3	Average time for vehicles to disembark from the ship	80	0.059
4	Time to queue for vehicles to board the ship	20	0.119
5	Dock usage time (BOR)	80	0.238
Total		$\sum Y$	0.713

Source: KP-DRJD 539 (2022)

Because the calculated performance weighting only covers the operational performance of ferry ports, adjustments were made to the operational performance weighting compared to the previous one. The total weighting of the five indicators above is 0.713, so the total weighting for the five categories is adjusted to 1. The following steps are then followed.

Adjustment Weight
$$= \frac{\text{Bobot per Indikator}}{\text{Total Bobot 5 Indikator}}$$

Calculation Example
$$= \frac{\text{Bobot Indikator Waktu Olah Gerak Kapal}}{\text{Total Bobot Indikator}}$$

$$= \frac{0,234}{0,713}$$

$$= 0,333$$

By doing this, an adjusted value is obtained for each indicator. The adjusted operational performance assessment of the ferry port is as follows.

Table 7. Adjusted Operational Performance Criteria for Ferry Ports

No.	Indicator	Indicator Value	Adjustment Weight	Performance Value
		(1)	(2)	(1) x (2)
1.	Ship maneuver time	60	0.333	19.98
2.	Average time for vehicles to board ships	80	0.083	6.64
3.	Average time for vehicles to disembark from the ship	80	0.083	6.64
4.	Vehicle queue time to board the ship	20	0.166	3.32
5.	Berth Occupancy Ratio (BOR)	80	0.333	26.64
		$\sum Y$	1	63.22

The operational performance value of the Telaga Punggur Ferry Port, calculated by the author, taking into account every aspect and adjustments, was 63.22. This value was then classified according to the port performance value categories based on Decree of the Director General of Land Transportation Number KP-DRJD 539 of 2022.

Table 8. Port Operational Performance Interval

Mark	Category
> 80 – 100	Very good
> 60 – 80	Good
> 40 – 60	Enough
> 20 – 40	Bad
> 0 – 20	Very bad

Source: KP-DRJD 539 (2022)

Based on the table, it can be seen that the performance assessment category for Telaga Punggur Ferry Port is good.

4. CLOSING

4.1. Conclusion

1. The Telaga Punggur Ferry Port's performance level, related to ship operational service factors, has an average ship maneuver time of 8.17 minutes. This indicator score, when viewed from 60, is categorized as sufficient.
2. The performance level of Telaga Punggur Ferry Port related to the vehicle loading and unloading process at Telaga Punggur Ferry Port shows an indicator value of 80 with each category being assessed as "good." Meanwhile, the indicator for vehicle queuing time to board the ship shows very poor performance with an average queuing time of 76.44 minutes and an indicator value of only 20.
3. The performance level of Telaga Punggur Ferry Port, as seen from the operational service performance indicator regarding facility utilization, is 42.25%, which is categorized as sufficient at Pier I, and 75%, which is categorized as very good at Pier II. This difference reflects the imbalance in the level of utilization between the two piers.
4. Based on the calculation of five port operational performance indicators, with adjusted weightings, the total operational performance score for Telaga Punggur Ferry Port was 63.22. According to the assessment categories in Decree of the Director General of Land Transportation Number KP-DRJD 539 of 2022, this score falls into the "good" category.

4.2. Suggestions

1. Increasing the Efficiency of Exercise Time
It is recommended that port authorities adjust ship maneuvering procedures by taking local hydrodynamic conditions into account.
2. Optimization of Vehicle Loading and Unloading Process
Enforcing standard operating procedures for vehicle loading methods will prevent ships from using the reverse method, which prolongs loading times. Furthermore, passenger circulation arrangements should be improved to avoid crossing the vehicle trestle. This will improve efficiency and safety during loading and unloading.
3. Queue System Arrangement
When queuing for vehicles to board a ship, an electronic ticket-based queuing system and digital scheduling must be implemented. Ship departure scheduling must also be adjusted to vehicle arrival patterns, and water and bunker filling processes must be optimized to avoid disrupting loading times.
4. To improve port operational performance comprehensively, ongoing evaluative and strategic measures are required. Periodic evaluations of five key indicators: vessel maneuvering time, vehicle embarkation and disembarkation time, vehicle queue time, and dock utilization rate are necessary to systematically identify weaknesses and potential improvements.

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