The Performance Evaluation of Passenger Terminal: A Case Study of Type B Terminal in Sigli, Aceh Province

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Abstract. This research was conducted to determine the performance of the facilities and operations of the terminal using a direct survey method in the field. The primary data was collected by recording the number plate, entrance and departure time, number of passengers, vehicles entering and leaving, number of passengers getting on and off as well as the parking and vehicle number for visitors to the terminal. The survey was conducted for a duration of 9 hours daily starting from 8.00 am to 5.00 pm for a week. The results showed some facilities are not available at the terminal such as the administration room, supervisor room, platform, user fees, information room, first aid room, service room, restroom, warehouse, and spare parking space. Moreover, some facilities were observed not to be up to the required standard such as the office space, vehicle circulation, waiting room, and the toilet. Concerning the transportation characteristics, it was discovered that the highest number of passengers embarking and disembarking at the terminal per day was 8 and 4 while the highest number of those entering and leaving was recorded to be 361 and 367 respectively. Furthermore, the highest number of transportations was found to be 94 vehicles while the highest average headway time of arrival and departure was 8.81 minutes and 10.34 minutes and the values for load factor for arrival and departure of transportation was 38.33% and 39.47% respectively. The highest average waiting time was observed to be 7.62 minutes and the parking number and space requirements were found to be 72 for two-wheeled, 6 for three-wheeled, and 15 for four-wheeled vehicles with the highest average duration recorded to be 55.23, 56, and 58.58 minutes, respectively.

1. Introduction
Transportation is the movement of goods and people from one place to another. According to Saleh et al. [1] people in Aceh significantly dependent to auto mode and consequently has substantial contribution to the traffic impact such as congestion and its externalities [2]. The passenger terminal as a function as transit, the terminal could be over a movement of passengers or goods from one type of transportation to another type of transportation mode as the result the demand for the efficiency of movement could efficiently achieved [3]. Furthermore, measuring of transit performance represents an especially useful tool for ensuring continuous increase of the quality of the delivered transit services, and for allocating resources among competing transit agencies [4]. Considering public bus ridership, Government has several efforts to promote public transport as it could reduce the auto dependency through switching mode by users [5]-[6]. The promotion to use public transport could make easy for passenger to conduct several activities such as working, distributing food and clothing, visiting family members. According to Litman [7] There are three general types of performance indicators for terminal, namely (1) measures of service quality, which reflect the quality of service experienced by users; (2) indicators of outcomes, which reflect outcomes or outputs; indicators of cost efficiency; (3) which reflect the ratio of inputs (costs) to outputs (desired benefits).
One of the types of terminal which operated by provincial department of transportation (DoT) is type B terminals. This terminal serves the passenger and good movement within the Aceh province. One of the is the Sigli Type B Terminal which is in district of Pidie. It is managed by the Aceh Transportation Agency through the Regional Technical Implementation Unit (UPTD) for Type B Terminals and serves the Inter-Provincial City Transportation (AKAP). The terminal is also equipped with facilities to support its operation such as the shopping complex which is widely used to provide different kinds of businesses. This, therefore, led to the high visitation of local people, thereby, causing the flow of vehicles parking in the terminal area. There is, however, the need to provide adequate operational performance services to the terminal due to its status as the only Type B in Pidie Regency to ensure the smooth operation of the transportation service network. Therefore, this research aimed to investigate and analyze the operations of the Sigli Type B Terminal to determine its performance.

2. Research Sites

This research was conducted at Sigli Type B Terminal in the capital of Pidie Regency. The terminal is located in a strategic area usually traversed by the dense national road of Lintas Timur Sumatra which connects Banda Aceh and Medan City.

3. Methodology

The procedure involves data collection, research implementation, and data processing. The data collection aspect was the initial step used to obtain information related to the characteristics of the terminal based on both primary and secondary data.

- The primary data consists of the number of passengers, number and time of transportation, and the number of visitors’ vehicles parked in the terminal area
- Secondary data consists of the information retrieved on terminal facilities and the surrounding area.

The data were collected at the Sigli Type B Terminal using research tools such as survey forms on passenger, transportation, and parking data formulas and time of flow for the transportation while cameras were used to obtain direct documentation in the field. The implementation steps are stated as follows:

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Figure 1. Map of the research area
a. Determination of the time and location to collect the data: The entrance, exit, and parking area of the terminal were used and the observations were made for a week from 8.00 am to 5.00 pm according to the terminal service time by the regulator.

b. Field survey implementation consist of (1) Survey of the number of passengers: this was used to retrieve data on passengers embarking and disembarking and those entering and leaving the terminal through the placement of the surveyors at the counters or places where passengers were dropped off; (2) Transport survey: this was used to determine the number and time of transportation in and out of the terminal by placing the surveyors at the entrance and exit of the terminal; (3) Parking survey: this was conducted by recording the number of parked vehicles as well as those entering and exiting the terminal. The vehicles reviewed include two, three, and four-wheeled vehicles, and the process was implemented by placing surveyors in the parking area, terminal entrances, and exits, and (4) Lounge user survey: this was used to determine the number of waiting room users in the terminal.

The data collected on transportation, passengers, and parking were later processed using statistical calculations based on the existing formula to determine the (a) Terminal facilities area; (b) Passenger number; (c) Transport number; (d) Time headway; (e) Load factor; (f) Waiting time; (g) Parking number; (h) Parking duration; (i) Parking space requirements.

4. Results and Discussion

4.1. Number of Passenger
The results from the field observations showed the highest number of passengers taking transportation was on Thursday with 8 people while the lowest was on Tuesday and Friday with just 2 people. Meanwhile, the highest number of passengers disembarking was observed to be on Monday and Sunday with 4 people while the lowest was on Wednesday due to the absence of passengers. The highest number of passengers entering the terminal was discovered to be on Wednesday with 361 while the lowest was on Friday with 128. Meanwhile, the highest number of passengers leaving the terminal was on Wednesday with 367 and the lowest was recorded on Friday with 128. The result of the survey and analysis can be seen in Table 1.

4.2. Transport Number
Based on the results of the field survey which describes in Table 2, the highest number of transports arrivals and departures is on Wednesday with 94 vehicles. This number includes 76 non-air-conditioned and 18 air-conditioned shuttles. The lowest number of arrivals and departures is on Friday with 54 including 39 non-air-conditioned and 15 air-conditioned shuttles.

4.3. Time Headway and Load Factor
Table 3 summarize the data collected and analyzed that shows the highest arrival headway time per day was recorded on Monday with an average of 8.81 minutes while the lowest was on Wednesday with 5.70 minutes. Meanwhile, the highest departure headway time per day was discovered to be on Tuesday with an average value of 10.34 minutes while the lowest was on Wednesday with 5.69 minutes. These headway times are, therefore, classified as ideal based on the Decree of the Director-General of Land Transportation No SK.687/AJ.206/DRJD/2002 [8]. Table 4 shows the highest load factor for passenger arrivals was recorded on Wednesday to be 38.83% which is the average of the 41.58%, and 27.22% obtained for non-AC and AC transports, respectively. Meanwhile, the highest for departure was found on Wednesday with 39.47% which is the average for the 42.24% and 27.78% recorded for the non-AC and AC transports, respectively. These values are, however, not ideal according to the Decree of the Director-General of Land Transportation [8] because they are below 70%.

4.4. Waiting Time
Table 5 shows the results showed the highest waiting time for transportation was on Monday with 7.62 minutes while the lowest was on Saturday with 5.68 minutes and this was observed not to be in line with the 5-10 minutes required by the Decree of the Director-General of Land Transportation [7].
Table 6 further illustrates the results showed the highest parking number for two-wheeled vehicles was recorded on Saturday with 72 vehicles while the lowest was on Friday with 40 vehicles. Moreover, three-wheeled vehicles had 6 on Monday, Tuesday, Wednesday, and Sunday and 4 on Thursday and Friday while the highest recorded for four-wheeled was on Thursday with 15 and the lowest was discovered to be on Friday with 7 vehicles.

Table 1. Number of passengers of Sigli type B terminal

| No | Day       | Date               | Passenger Number (person) | Entering | Leaving | Embarking | Disembarking |
|----|-----------|--------------------|---------------------------|----------|---------|-----------|--------------|
| 1  | Monday    | November 9, 2020   | 189                       | 191      | 6       | 4         |
| 2  | Tuesday   | November 10, 2020  | 178                       | 178      | 2       | 2         |
| 3  | Wednesday | November 11, 2020  | 361                       | 367      | 6       | 0         |
| 4  | Thursday  | November 12, 2020  | 304                       | 310      | 8       | 2         |
| 5  | Friday    | November 13, 2020  | 128                       | 128      | 2       | 2         |
| 6  | Saturday  | November 14, 2020  | 265                       | 267      | 4       | 2         |
| 7  | Sunday    | November 15, 2020  | 229                       | 229      | 4       | 4         |

Table 2. Transport number of Sigli type B terminal

| No | Day       | Date               | Transport Number (Vehicle) | Arrival | Departure |
|----|-----------|--------------------|----------------------------|---------|-----------|
|    |           |                    | Non-AC | AC | Total | Non-AC | AC | Total |
| 1  | Monday    | November 9, 2020   | 46     | 14 | 60 | 46     | 14 | 60 |
| 2  | Tuesday   | November 10, 2020  | 41     | 20 | 61 | 41     | 20 | 61 |
| 3  | Wednesday | November 11, 2020  | 76     | 18 | 94 | 76     | 18 | 94 |
| 4  | Thursday  | November 12, 2020  | 77     | 12 | 89 | 77     | 12 | 89 |
| 5  | Friday    | November 13, 2020  | 39     | 15 | 54 | 39     | 15 | 54 |
| 6  | Saturday  | November 14, 2020  | 65     | 23 | 88 | 55     | 33 | 88 |
| 7  | Sunday    | November 15, 2020  | 54     | 26 | 80 | 54     | 26 | 80 |

Table 3. Transport time Headway of Sigli type B terminal

| No | Day       | Date               | Time Headway (Minute) | Arrival | Departure |
|----|-----------|--------------------|-----------------------|---------|-----------|
| 1  | Monday    | November 9, 2020   | 8,81                  | 8,90    |
| 2  | Tuesday   | November 10, 2020  | 8,76                  | 10,34   |
| 3  | Wednesday | November 11, 2020  | 5,70                  | 5,69    |
| 4  | Thursday  | November 12, 2020  | 6,00                  | 6,10    |
| 5  | Friday    | November 13, 2020  | 7,94                  | 8,62    |
| 6  | Saturday  | November 14, 2020  | 6,00                  | 6,01    |
| 7  | Sunday    | November 15, 2020  | 6,58                  | 6,90    |

Table 4. Transport load factor of Sigli type B terminal

| No | Day       | Date               | Load Factor (%) | Arrival | Departure |
|----|-----------|--------------------|-----------------|---------|-----------|
|    |           |                    | Non-AC | AC | Average | Non-AC | AC | Average |
| 1  | Monday    | November 9, 2020   | 33,48  | 22,14 | 30,83 | 33,91 | 22,86 | 31,33 |
| 2  | Tuesday   | November 10, 2020  | 30,49  | 28,00 | 29,67 | 30,49 | 28,00 | 29,67 |
| 3  | Wednesday | November 11, 2020  | 41,58  | 27,22 | 38,83 | 42,24 | 27,78 | 39,47 |
| 4  | Thursday  | November 12, 2020  | 34,94  | 29,17 | 34,16 | 35,97 | 27,50 | 34,83 |
| 5  | Friday    | November 13, 2020  | 26,41  | 16,67 | 23,70 | 26,41 | 16,67 | 23,70 |
| 6  | Saturday  | November 14, 2020  | 30,62  | 28,70 | 30,11 | 32,18 | 27,27 | 30,34 |
| 7  | Sunday    | November 15, 2020  | 28,89  | 28,08 | 28,63 | 32,18 | 27,27 | 28,63 |
be up to the required standard such as the office space, vehicle circulation, waiting room, and the number of passengers embarking and disembarking at the terminal per day was 8 and 4 while the toilet. Concerning the transportation characteristics, findings further discovered that the highest average waiting time was observed to be 7.62 minutes and the parking number and space load factor for arrival and departure of transportation was 38.33% and 39.47% respectively. The highest number of transportations was found to be 94 vehicles while the highest average headway time of arrival and departure was 8.81 minutes and 10.34 minutes and the values for SRP 4.5. Parking Duration and Parking Space Requirements

Table 6 further describes the results further showed the highest parking duration for two-wheeled vehicles was observed on Wednesday with a value of 55.23 minutes while the lowest was on Friday with 53.88 minutes. The three-wheeled vehicles had the highest on Monday with 56.90 minutes and lowest on Thursday with 52.31 minutes while four-wheeled vehicles had the highest on Sunday with 57.89 minutes and lowest on Wednesday with 57.2 minutes. Table 7 further shows that 72 parking spaces were required for two-wheeled vehicles, 6 for three-wheeled vehicles, and 16 for four-wheeled vehicles.

Table 7. Transport parking space requirements of Sigli type B terminal

| No | Day       | Date               | Parking Space Requirement (SRP) |
|----|-----------|--------------------|---------------------------------|
| 1  | Monday    | November 9, 2020   | Two-wheeled: 59, Three-wheeled: 6, Four-wheeled: 13 |
| 2  | Tuesday   | November 10, 2020  | Two-wheeled: 68, Three-wheeled: 6, Four-wheeled: 13 |
| 3  | Wednesday | November 11, 2020  | Two-wheeled: 57, Three-wheeled: 6, Four-wheeled: 13 |
| 4  | Thursday  | November 12, 2020  | Two-wheeled: 64, Three-wheeled: 4, Four-wheeled: 15 |
| 5  | Friday    | November 13, 2020  | Two-wheeled: 40, Three-wheeled: 4, Four-wheeled: 7 |
| 6  | Saturday  | November 14, 2020  | Two-wheeled: 72, Three-wheeled: 5, Four-wheeled: 14 |
| 7  | Sunday    | November 15, 2020  | Two-wheeled: 68, Three-wheeled: 6, Four-wheeled: 11 |
|    | Maximum   |                    | Two-wheeled: 72, Three-wheeled: 6, Four-wheeled: 15 |

5. Conclusion

The analysis results depicts that some facilities are not available at the terminal such as the administration room, supervisor room, platform, user fees, information room, first aid room, service room, restroom, warehouse, and spare parking space. Moreover, some facilities were observed not to be up to the required standard such as the office space, vehicle circulation, waiting room, and the toilet. Concerning the transportation characteristics, findings further discovered that the highest number of passengers embarking and disembarking at the terminal per day was 8 and 4 while the highest number of those entering and leaving was recorded to be 361 and 367, respectively. Furthermore, the highest number of transportations was found to be 94 vehicles while the highest average headway time of arrival and departure was 8.81 minutes and 10.34 minutes and the values for load factor for arrival and departure of transportation was 38.33% and 39.47% respectively. The highest average waiting time was observed to be 7.62 minutes and the parking number and space...
requirements were found to be 72 for two-wheeled, 6 for three-wheeled, and 15 for four-wheeled vehicles with the highest average duration recorded to be 55.23, 56, and 58.58 minutes of waiting time during manifested in terminal.

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