

Rapid Transit (BRT) Public Transport Service Corridor I: Alang Lebar to Dempo During the Covid 19 Pandemic in the City of Palembang

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ABSTRACT

The Palembang city government has implemented Bus Rapid Transit (BRT) since 2010 until now, in order to carry out the replacement/renewal of the City Bus. The BRT in the city of Palembang called "BRT Trans Musi" consists of two business entities, namely BRT owned by BUMD SP2J (Palembang Jaya Development Facilities) and owned by the Ministry of Land Transportation, namely PT. TMPJ (Trans Musi Palembang Jaya). PT. TMPJ operates in Palembang on June 2, 2020, during the "Covid 19 Pandemic" in progress. With its relatively recent operation, it is very necessary to conduct a study of BRT services at TMPJ, especially the Alang-Alang Lebar to Dempo corridor in order to be able to continue its operations. The method used in this study is direct traffic observation on the corridors traversed by BRT buses. From data analysis obtained: mean headway = 8 minutes; service time = 29 seconds; travel time = 1 hour 56 minutes 15 seconds; operational speed = 20.85 km/hour and load factor = 50.02 %. This load factor if calculated based on the vehicle seat capacity = 0.261 %

Keywords: *Bus, Traverser, load factor, vehicle*

1. INTRODUCTION

The definition of public transportation in the Decree of the Minister of Transportation No. KM.35 of 2003 concerning the Implementation of People Transportation on the road by Public Vehicle is the transfer of people/goods from one place to another using a vehicle. The purpose of public transport services is to provide safe, fast, comfortable, inexpensive services to people whose mobility is increasing, especially for workers in carrying out their activities [1-2].

The government continues to strive to improve services in the transportation sector for urban communities by carrying out renewals from City Bus to Bus Rapid Transit (BRT). BRT is a bus system that is fast, convenient, safe, and on-time from infrastructure, vehicles and schedules. Use the bus to serve service of better quality than other bus services. The BRT system certainly uses a different improvised system, although the improvised sharing with other BRT systems. The result of the system was to approach rail transit if it still enjoyed the safety of bus fares [3-4].

The Palembang city government has implemented it since 2010 until now. BRT operating in the city of Palembang is based on semi BRT. Semi BRT is a mass transportation service that has the characteristics of bus stops, special buses, special ticket systems, frequent and regular service frequencies throughout the day, but does not yet have a special route due to several factors, namely narrow roads and urban development that is too close to the road [5]. Based on Government Regulations, according to the Decree of the Minister of Transportation number Km.35 of 2003 dated August 23, 2003 in article 6 paragraph (1), verse (20), verse (3) concerning the operation of public transportation on the road by public transportation, that the addition of the transport fleet (open tray) in a route is possible if the average Load Factor (LF) exceeds 0.70 or 70% [6 -10].

The BRT in the city of Palembang called "BRT Trans Musi" consists of two business entities, namely BRT owned by BUMD SP2J (Palembang Jaya Development Facilities) and owned by the Ministry of Land Transportation, namely PT. TMPJ (Trans Musi Palembang Jaya). PT. TMPJ operates in Palembang on

June 2, 2020, during the "Covid 19 Pandemic" in progress taking into account the COVID-19 handling PROKES (Health Requirement) and its relatively recent operation, it is imperative to conduct a study of BRT Services at TMPJ, especially the Alang-Alang Lebar to Dempo corridor, in order to be able to continue its operations.

The purpose of this study is "How is the performance of the Transmusi BRT bus corridor service during the Covid 19 Pandemic to serve the public transportation in the Palembang city.

2. METHODOLOGY

The research location is in Palembang City in corridor I Alang-Alang Lebar - Dempo. While the observation points are at the bus stop and on the Trans Musi BRT bus (on board survey) is shown in figure 1 and 2.

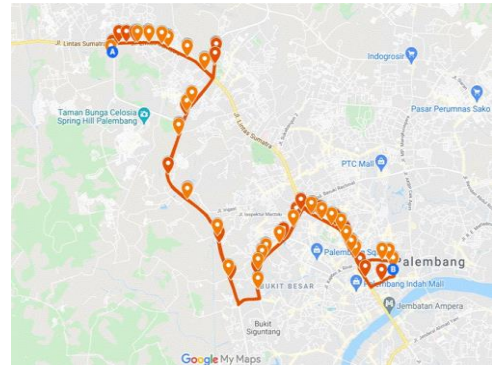


Figure 2. BRT Trans Musi PT.TMPJ Corridor 1

The research flow chart and data collection methods in this study consisted of two types, namely field, and institutional surveys can be seen in figure 3.

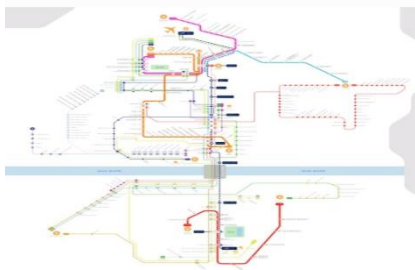


Figure 1. BRT Trans Musi PT.TMPJ

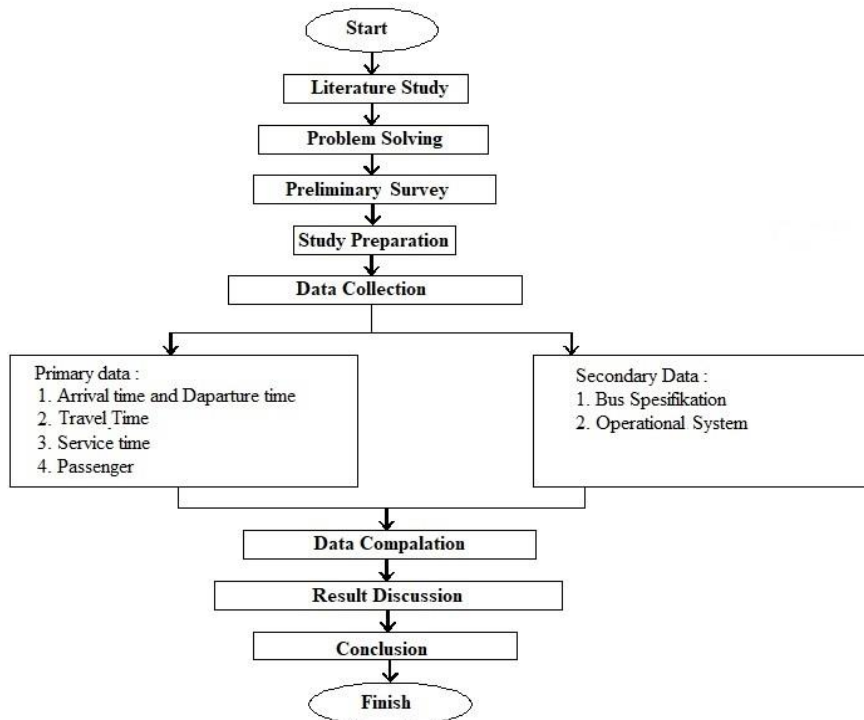


Figure 3. Research Flow Chart

3. RESULT DISCUSSION

Observations were made on busy days based on Secondary data for June 2021 from Operational Management of PT. TMPJ (Trans Musi Palembang Jaya), which is on Wednesday. Traffic observations were carried out on June 23, 2020 from 06.00 - 17.00 WIB. Observation of this traffic during the covid 19 pandemic by implementing health protocols. Wear a mask, keep your distance and wash your hands (hand sanitizer) Traffic observations are carried out on:

- a) Along the corridor traversed by BRT, its use is to determine the performance of bus services in corridor I “Alang-Alang Lebar – Dempo”
- b) Bus stop in front of Cinde Market (direction Ampera) because this place has a lot of activities urban service and service centers include: Cinde market, shops, Mall and Station LRT. This observation is used to find out how the BRT bus service at the point prone to traffic jams.

The population of passenger of the first week of June 2021 can be seen in figure 4. The highest population passenger is Wednesday, the amount of passenger is 1854 people.

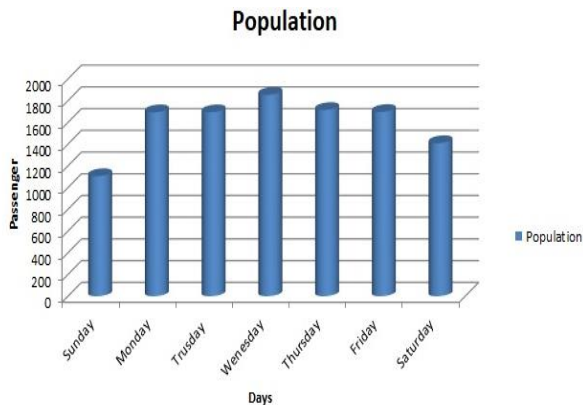


Figure 4. The Passenger population of the first week of June 2021

The headway is the time difference between the arrival of a vehicle with the next vehicle at the same place, for example at bus stops, terminals and so on. The results of headway observations in the morning, afternoon and evening rush hours at the Cinde market stop are obtained as shown in the following table:

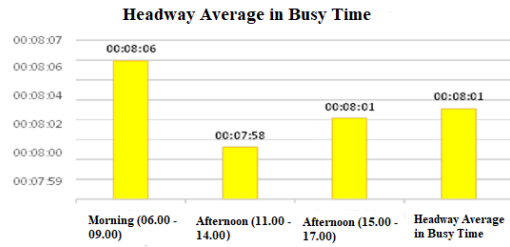


Figure 5. The Headway Average Busy Time at Cinde Station to Ampera

It can be seen in figure 5, the average of headway at the Cinde Station on 00: 08: 01, it means the average of headway is smaller than the required PT. PMPJ = 10 minutes, so, it is not to be resetting.

The service time is the time required to serve passengers to pick up and or drop off passengers at the bus stop. This service time is often also called fill time, which means the time it takes to load/unload passengers. The figure 7 shows the average service time of a bus at Cinde station.

It shown the peak of service time is on afternoon. Because, on that time the workers/employees and student back to home. The average service time is 29 seconds, However, it is still smaller than the standard PT. TMPJ by 0.5 to 1.0 minutes,

Travel time is the time of the Bus from the starting point to the end of destination. The observation result, the travel time is calculated at the time the Bus departs from Alang-Alang Lebar to Dempo and from Dempo to Alang-Alang Lebar.

This travel time is greatly influenced by traffic conditions through which the corridor passes, such as busy conditions, road widths and traffic barriers such as intersections. From the observation of the longest travel time, the peak hour is 01:56:15. While the standard from PT. TMPJ is more than 01:30:00. This shows that the travel time does not meet the maximum service time requirements, it need to be reset so that the travel time according to the standard allowed.

The time table for corridor I is shown in the following Table 1.

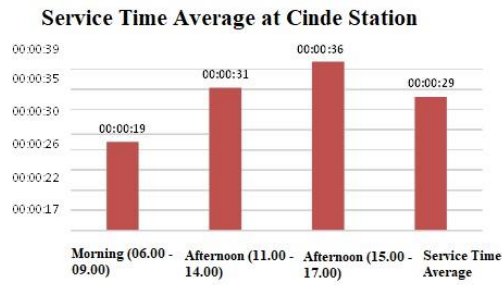


Figure 6. The Service Time Average of Trans Musi Buses at Cinde Station

Table 1. Travel time of the Trans Musi Bus Corridor I Alang-Alang Lebar – Dempo

No.	Bus Number	Bus Stop				Journey Time		
		Albar Departure	Dempo Arrival	Dempo Departure	Albar Arrival	Journey Time ALBAR – DEMPO	Journey Time DEMPO - ALBAR	Journey Time ALBAR – DEMPO – DEMPO -ALBAR
(1)	(2)	(3)	(4)	(5)	(6)	(4)-(3)=(7)	(6)-(5)=(8)	(7)+(8)=(9)
1	TB1.03	05.15.50	06.04.35	06.04.42	06.45.50	00.48.45	00.41.08	01.29.53
2	TB1.04	05.23.47	06.11.07	06.11.17	06.53.46	00.47.20	00.42.29	01.29.49
3	TB1.05	05.33.20	06.28.15	06.28.22	07.18.15	00.54.55	00.49.53	01.44.48
4	TB1.06	05.39.45	06.32.23	06.32.30	07.22.25	00.52.38	00.49.55	01.42.33
5	TB1.07	05.47.42	06.36.27	06.36.34	07.26.42	00.48.45	00.50.08	01.38.53
6	TB1.03	07.30.27	08.33.20	08.33.25	09.26.55	01.02.53	00.53.30	01.56.23
7	TB1.04	07.38.37	08.51.00	08.51.05	09.41.40	01.12.23	00.50.35	02.02.58
8	TB1.05	07.47.38	08.59.30	08.59.36	09.52.15	01.11.52	00.52.39	02.04.31
9	TB1.06	07.52.18	09.05.01	09.05.09	10.00.21	01.12.43	00.55.12	02.07.55
10	TB1.07	08.02.19	09.07.12	09.07.17	10.07.47	01.04.53	01.00.30	02.05.23
11	TB1.03	10.02.00	11.08.27	11.08.35	12.01.05	01.06.27	00.52.30	01.58.57
12	TB1.04	10.09.20	11.24.23	11.24.55	12.15.11	01.15.03	00.50.16	02.05.19
13	TB1.05	10.17.03	11.29.01	11.29.07	12.23.29	01.11.58	00.54.22	02.06.20
14	TB1.06	10.24.24	11.34.29	11.34.39	12.28.20	01.10.05	00.53.41	02.03.46
15	TB1.07	10.33.52	11.40.19	11.40.27	12.41.57	01.06.27	01.01.30	02.07.57
16	TB1.03	12.30.40	13.31.00	13.31.05	14.24.42	01.00.20	00.53.37	01.53.57
17	TB1.04	12.39.40	13.41.48	13.41.53	14.44.17	01.02.08	01.02.24	02.04.32
18	TB1.05	12.48.50	13.50.06	13.50.12	14.48.02	01.01.16	00.57.50	01.59.06
19	TB1.06	12.54.40	13.55.19	13.55.24	14.53.38	01.00.39	00.58.14	01.58.53
20	TB1.07	13.02.32	14.02.52	14.02.57	15.05.34	01.00.20	01.02.37	02.02.57
21	TB1.03	15.04.10	16.01.40	16.01.45	17.04.21	00.57.30	01.02.36	02.00.06
22	TB1.04	15.12.49	16.11.59	16.12.04	17.18.02	00.59.10	01.05.58	02.05.08
23	TB1.05	15.20.51	16.18.37	16.18.41	17.20.32	00.57.46	01.01.51	01.59.37
24	TB1.06	15.30.12	16.25.28	16.25.33	17.26.12	00.55.16	01.00.39	01.55.55
25	TB1.07	15.36.02	16.33.32	16.33.37	17.45.13	00.57.30	01.11.36	02.09.06
Average Journey Time								01.56.15

$$\text{Travel Time Average} = \frac{\text{+ Travel Time One Ship}}{\text{A mount of data}}$$

= 01:56:15 (1 jam 56 menit 15 detik)

The load factor is the ratio between the number of passengers and the available bus capacity on one trip expressed in percent. The results of the average load factor is shown in table 2:

Table 2. The Average Load Factor of Trans Musi Bus Corridor I

Load Factor Average Trans Musi Bus Corridor I (Alang – Alang Lebar – Dempo)				
No.	Albar – Dempo (%)	Dempo – Albar (%)	Rata – Rata (%)	
[1]	[3]	[4]	([3]+[4])/2=[5]	
1	13,6	0,0	13,6	
2	31,8	4,5	34,1	
3	31,8	18,2	40,9	
4	13,6	27,3	27,3	
5	50,0	27,3	63,6	
6	18,2	0,0	18,2	
7	95,5	0,0	95,5	
8	59,1	9,1	63,6	
9	40,9	9,1	45,5	
10	59,1	4,5	61,4	
11	59,1	4,5	61,4	
12	40,9	63,6	72,7	
13	45,5	9,1	50,0	
14	36,4	18,2	45,5	
15	36,4	13,6	43,2	
16	63,6	36,4	81,8	
17	31,8	27,3	45,5	
18	22,7	18,2	31,8	
19	22,7	27,3	36,4	
20	31,8	27,3	45,5	
21	22,7	27,3	36,4	
22	40,9	63,6	72,7	
23	18,2	18,2	27,3	
24	72,7	59,1	102,3	
25	31,8	13,6	38,6	
		Total	1254,5	
		Average	50,2	

The average load factor (LF) is 50.2%. This relatively slightly exceeds the set standard of 50%. This means that it is not too significant if there are additional buses. Notes: This Load Factor Value in Pandemic conditions Covid 19 with health protocol only take into account only 22 seats. Load Factor if based on a minimum capacity of 50% (Operational policy), obtained: $(40/22) \times 50.2 = 27.61 \approx 28\%$

The average operating speed of Trans Musi BRT vehicles is obtained by dividing the length of the corridor path (from Alang-Alang Lebar to Dempo and

from Dempo to Alang Alang Lebar) by the average bus travel time in the corridor traversed. From the results of measuring the length of the track = $22.30 + 18.10 = 40.40$ km. Travel time in one cycle corridor = 01:56:15 (1 hour 56 minutes 15 seconds) 1, 93 hours The average operational speed = $40.40 \text{ km} / 1.93 \text{ hours} = 20.85 \approx 21$ km/hour. The speed is still within the permitted standard, which is 20-40 km/hour.

The results are obtained as shown in the following table 3:

Table 3. Results of Analysis of Corridor I Parameters: Alang-Alang Lebar – Dempo

No	Focus of Research	Realtime in the field	Operational	
			Requirement PT.TMPJ	Remarks
1.	Headway	00:08:00	5 – 10 minutes	Fulfill
2.	Service Time	0:00: 29	0,5 – 1 minutes	Fulfill
3.	Travel Time	01:56:15	1-2 Jam	Fulfill
4.	Load Factor	50,2 %	50 %	Fulfill not optimal
5.	BRT Speed	20,85 km/hours	20-40 km/hours	Fulfill
6.	Corridor Distance			
	a. Alang-Alang Lebar to Dempo	14.29 km + 18, 01		
	b. Dempo to Alang-Alang Lebar	km = 33,3 km		

As can be seen on table 4, all service performance parameters meet, it's just that the Load Factor (load factor) is not optimal on the PT, TMPJ BRT Bus

4. CONCLUSION

It can be concluded that the Trans Musi Teman Bus BRT for the Alang-Alang Lebar - Dempo corridor I with policies during the COVID-19 Pandemic;

1. Overall performance of the Trans Musi Teman Bus BRT from the company PT. TMPJ, meet the Operational Management Standards of PT.PMPJ
2. Load Factor (LF) BRT bus average = 0.502
3. Service time (loading/unloading) the average vehicle passenger at the point observation of transit stops is relatively small at: 00:00:29 (29 seconds), compared to the maximum time allowed is 0.5-1 second.

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