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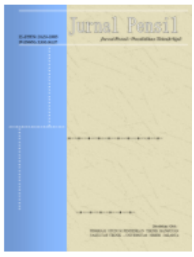

ANALYSIS OF THE IMPACT OF ATTRACTION AND GENERATION ON THE PERFORMANCE OF JALANKAPTEN A. BAKARUDIN, JAMBI CITY

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Abstract

One of the supports for the economy in Jambi province is the Shopping Center Development of shopping centers. Jambi Town Square Mall is one of the shopping centers in the City of Jambid with the Jambi Town Square Mall resulting in an additional volume of traffic on Jalan Kapten A. Bakarrudin No 88 Sipin Jambi City which causes a decrease in the performance of Jalan Kapten A. Bakarrudin No 88 Sipin. From the results of a field survey carried out for four days, the peak of the vehicle attraction at Jambi Town Square Mall on Monday 12 August 2020 at 19.00 WIB - 20.00 WIB was 415 vehicles / hour, Saturday 15 August 2020 at 19.00 WIB - 20.00 WIB as many as 421 vehicles / hour, Sunday, August 16 2020 at 19.00 WIB - 20.00 WIB, 596 vehicles / hour, Tuesday 375 vehicles / hour. The peak of the Jambi Town Square Mall Vehicle awakening is on Wednesday 12 August 2020 at 20.00 WIB - 21.00 WIB with a total of 411 vehicles / hour. Saturday 15 August 2020 at 20.00 WIB - 21.00 WIB with a total of 475 vehicles / hour, Sunday 16 August 2020 at 17.00 WIB - 18.00 WIB with a total of 521 vehicles / hour, Tuesday, August 18 2020 at 20.00 WIB - 21.00 WIB with a total of 469 vehicles / hour, the highest DS value is 1.028 at 17.00 WIB - 18.00 WIB.

Keywords: Attraction, Generation, Degree of Saturation (DS)

Introduction

Jambi City is the capital city of Jambi Province with an administrative area of 205.43 km2 (SAFITRI et al., 2019). With a population of 598,103 or 16.75% of the total population in Jambi Province (Fauzan et al., 2021). Jambi City is the center of economy and education in Jambi Province (Damarsari et al., 2015), (Zasriati, 2022). In terms of urban development, the most prominent and rapidly developing is the shopping center (Jinata et al., 2018; Lumbantoruan et al., 2021). As for what supports the economy in Jambi City, there are several shopping centers which in their category are large shopping centers, one of which is the Jambi Town Square Mall (Dahmiri et al., 2015; Putri & Triana, 2022). Where urban areas are often considered a source of additional traffic volume (Ben-Edigbe & Ramli, 2012; Grigonis et al., 2020).

Jambi Town Square which is located at Jalan Captain A. Bakarrudin No. 88 Sipin Jambi City (Sahera et al., 2022). Jambi Town Square is a shopping center that was established on August 29, 2010, Jambi Town Square has four floors (Putra et al., 2020). Jambi Town Square is equipped with various facilities starting from daily necessities, clothing and household (Saputri et al., 2020). The establishment of Jambi Town Square caused changes in traffic activity.

Infrastructure and means of transportation are a medium of interaction and communication between places, which ensures the continuity of economic, social and cultural life (Mouratidis et al., 2021; PEREIRA, 2014). The more vehicles that are used as a means of moving, the infrastructure needed must also be more adequate (Joubert & Axhausen, 2013; Pratiwi, 2020). The addition of volume and traffic generation pull is one of the causes of the decline in road performance (Saprykin et al., 2020; Setijadji, 2006). This also happened around the Jambi Town Square Mall.

This is due to the movement of vehicles in and out of shopping centers (sustainable)(Sozen, 2021). The distance between the traffic lights at the Mayang intersection and the STM intersection is close together, there is parking on the road and there is no Zebra Croos in front of Jambi Town Square.

This situation certainly affects the traction, generation and performance of the road section (Gonzalez-Calderon et al., 2022). Travel pull is one of the calculations used in calculating the generation of the road segment (Amijaya & Suprayitno, 2018; NAKKASH, 1969). Road segment generation is defined as a function of socioeconomic activities, user socioeconomic characteristics, and transportation system performance (Ali Safwat & Magnanti, 1988). Meanwhile, road performance is an indicator of whether the road serves human movement well or not (Chen et al., 2019).

With the above problems, it is necessary to know the impact of towing, generation and performance of the Captain A (da Costa et al., 2021) road section. Bakarudin, Jambi City.

The formulation of the problem in this study is how much vehicle generation and towing at the Jambi Town Square Mall is. How is the traffic performance on the Captain A. Bakarudin road, Jambi City.

Research Methods

The research methodology was carried out in several stages. After formulating the problem, the next step is to conduct a literature review and collect data.

The data collected consists of primary data and secondary data. The primary data

consisted of the number of incoming vehicles (Zhao et al., 2021) and the traffic volume survey (CHIKARAISHI et al., 2021; Wang et al., 2017). While secondary data is the number of residents (Suárez & Delgado, 2009) in the city, which is the city of Jambi. The data is taken at certain hours, including *rush hour* (Yang et al., 2020).

Furthermore, the data obtained were analyzed to define:

1. Withdrawal and generation of the number of vehicles in and out of Jambi Town Square Mall
2. Road Capacity (Agustin & Waloeya, 2018), (Hobbs, 1995)
3. Degree of saturation (Li et al., 2009), (Morlok, 1995)

Road capacity is defined as the maximum design capacity of a certain highway (Force, 2013; Tamin, 2000). While the degree of saturation is defined as the maximum traffic flow that can be handled by the intersection (DfT traffic signs manual of United Kingdom).

The stages of the research to be carried out are illustrated in the following chart:

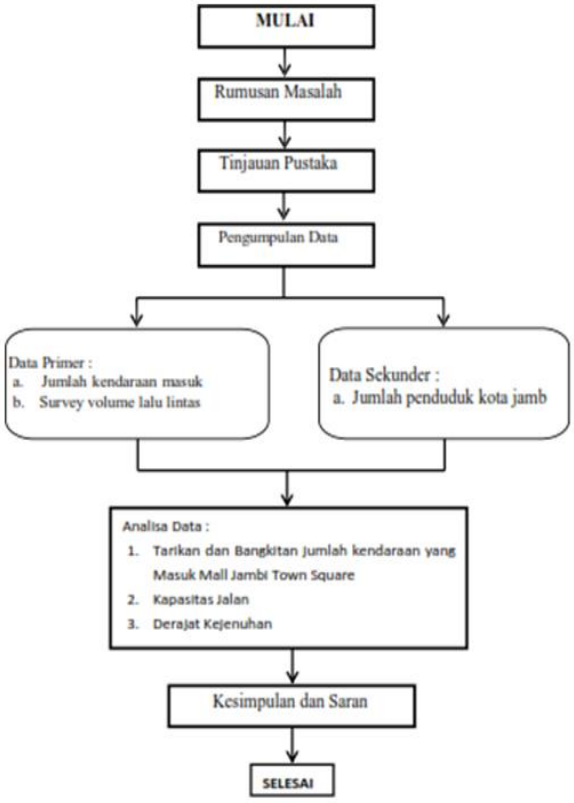

Figure 1. Research Methodology

Results and Discussion

Tabel 1. Road capacity

Co	FCw	FCsp	FCsf	FCcs	C
3000	0.96	1	0.93	0.9	2651.,6

Traffic for Wednesday, August 12, 2020

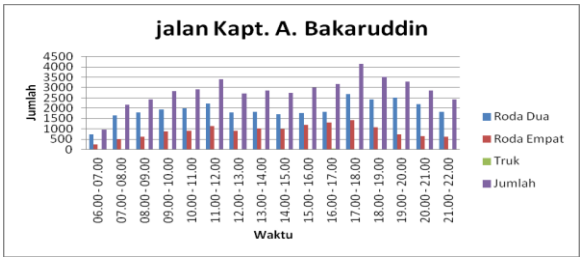

Figure 2. Shows the amount of traffic flow every hour on the Captain A Bakarudin section which passes through the Jambi Town

Square Mall on Wednesday 12 August 2020. The high traffic flow value is at 17.00 WIB - 18.00 WIB with the number of vehicles 4138 vehicles/hour

Traffic on Saturday 15 August 2020

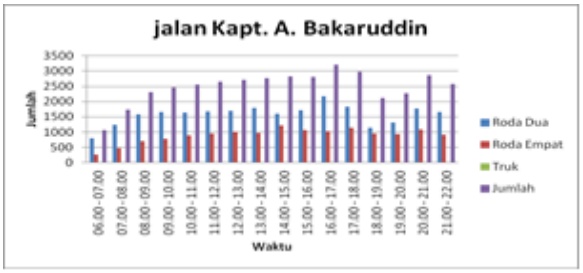

Figure 3. Shows the amount of traffic flow every hour on the Jalan Captain A. Bakarudin section which passes through the Jambi Town Square Mall on Saturday August 15, 2020, the highest traffic flow is at 16.00 WIB - 17.00 WIB with the number of vehicles 3203 vehicles/hour

Traffic on Sunday August 16, 2020

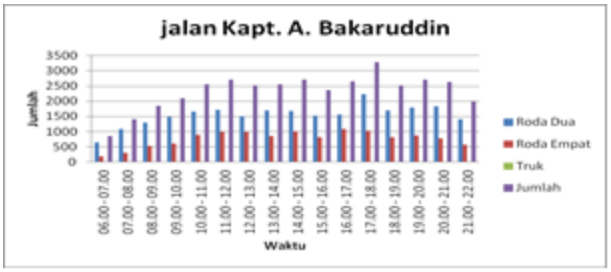

Figure 4. Shows the amount of traffic flow every hour on the Jalan Captain A. Bakarudin section which passes through the Jambi Town Square Mall on Sunday, August 16, 2020, the highest traffic flow is at 17.00 WIB - 18.00 WIB with the number of vehicles 3278 vehicles/hour.

Traffic Tuesday 18th August 2020

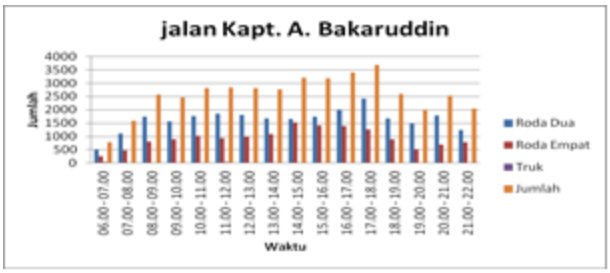

Figure 5. Shows the amount of traffic flow every hour on the Jalan Captain A. Bakarudin section which passes through the Jambi Town Square Mall on Sunday, August 18 2020. The highest traffic flow is at 17.00 WIB - 18.00 WIB with the number of vehicles 3682 vehicles/hour. Vehicle to Jambi Town Square Mall on Wednesday 12 August 2020

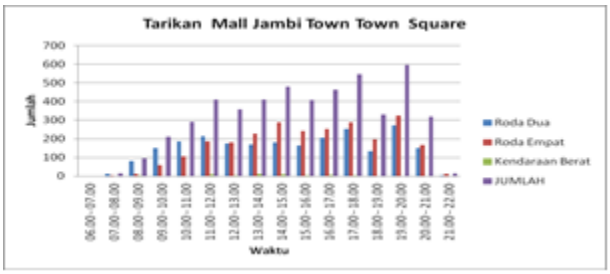

Figure 6. Showing the attraction of vehicles for visitors to the Jambi Town Square Mall on Wednesday, August 12, 2020. At 19.00 WIB - 20.00 WIB is the peak of vehicle towing with a total of 415 vehicles/hour. With details of two-wheeled vehicles 257 vehicles/hour and four-wheeled vehicles 158 vehicles/hour

Vehicle towing to Jambi Town Square Mall on Saturday 15 August 2020

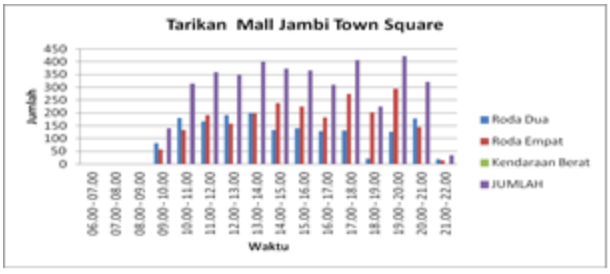

Figure 7. shows the attraction of vehicles for visitors to the Jambi Town Square Mall on Saturday, August 15, 2020, at 19.00 WIB -

20.00 WIB is the peak of vehicle towing with a total of 421 vehicles/hour. With details of two wheels 127 vehicles / hour and four wheels 294

vehicles / hour Vehicle attraction to Jambi Town Square Mall on Sunday 16 August 2020

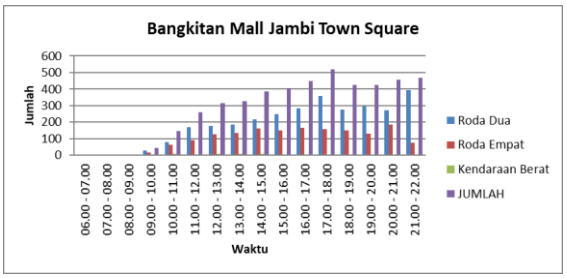

Figure 8. Showing the attraction of vehicles for visitors to the Jambi Town Square Mall on Sunday, August 16, 2020. At 19.00 WIB - 20.00 WIB is the peak of vehicle towing with a total of 596 vehicles/hour. With details of two-wheeled vehicles 272 vehicles/hour and four-wheeled vehicles 324 vehicles/hour.

Figure 9. Showing the attraction of vehicles for visitors to the Jambi Town Square Mall on Sunday, August 16, 2020. At 19.00 WIB - 20.00 WIB is the peak of vehicle towing with a total of 596 vehicles/hour. With details of two-wheeled vehicles 272 vehicles/hour and four-wheeled vehicles 324 vehicles/hour.

Wake up the vehicle to Jambi Town Square Mall on Wednesday 12 August 2020

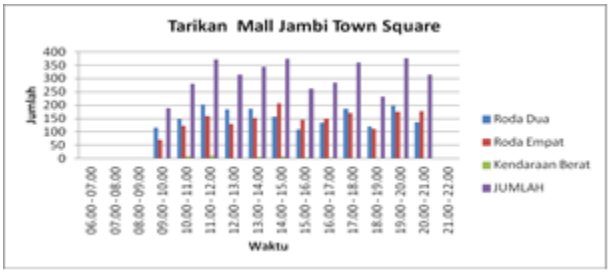

Figure 10. Showing the vehicle generation for Jambi Town Square Mall visitors on Wednesday, August 12, 2020 at. 20.00 WIB - 21.00 WIB is the peak of vehicle generation with a total of 411 vehicles/hour. With details of two-wheeled vehicles 289 vehicles/hour and four-wheeled vehicles 122 vehicles/hour

Trip generation vehicles to Jambi Town Square Mall on Saturday 15 August 2020

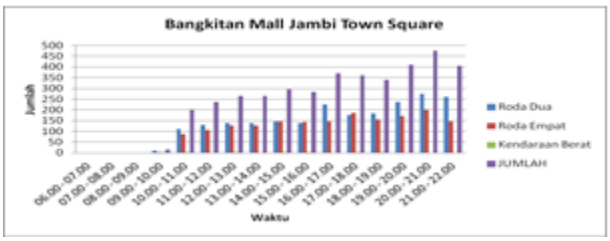

Figure 11. Showing the vehicle generation for Jambi Town Square Mall visitors on Wednesday, August 15, 2020. 20.00 WIB - 21.00 WIB is the peak of vehicle generation with a total of 475 vehicles/hour. With details of two-wheeled vehicles 275 vehicles/hour and four-wheeled vehicles 200 vehicles/hour.

Wake up the vehicle to Jambi Town Square Mall on Sunday 16 August 2020

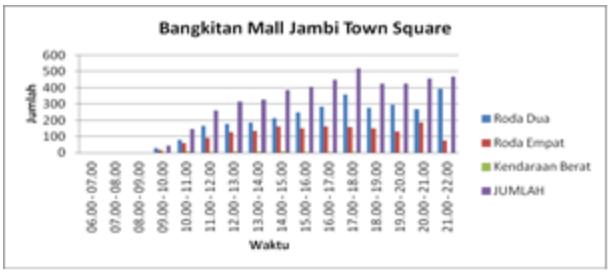

Figure 12. Showing the vehicle generation for Jambi Town Square Mall visitors on Wednesday, August 16, 2020. 17.00 WIB - 18.00 WIB is the peak of vehicle generation with a total of 521 vehicles/hour. With details of two-wheeled vehicles 360 vehicles/hour and four-wheeled vehicles 161 vehicles/hour

Wake up the vehicle to Jambi Town Square Mall on Tuesday 18 August 2020

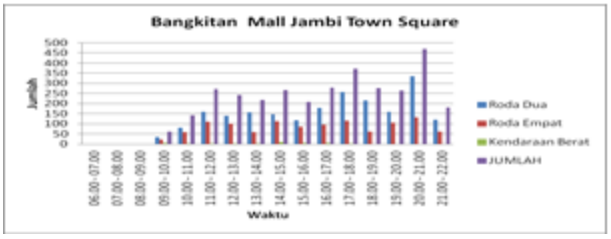

Figure 13. Tuesday, August 18, 2020. 20.00 WIB - 21.00 WIB is the peak of vehicle generation with a total of 469 vehicles/hour. With details of two-wheeled vehicles 336 vehicles/hour and four-wheeled vehicles 133 vehicles/hour

Table 2 . The degree of saturation on August 12, 2020

Waktu	Roda Dua		Roda Empat	Kendaraan Berat		Jumlah	Jumlah Kendaraan Masuk Jamtos	[5]-[6]	Kapasitas [C]	DS ada Jamtos	DS tanpa Jamtos
	0,35		1	1,2							
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
06.00 - 07.00	722	252,7	249	2	2,4	504,1	1	503,1	2410,56	0,209	0,209
07.00 - 08.00	1655	579,25	504	2	2,4	1085,65	12	1073,65	2410,56	0,450	0,445
08.00 - 09.00	1799	629,65	616	14	16,8	1262,45	210	1052,45	2410,56	0,524	0,437
09.00 - 10.00	1946	681,1	869	15	18	1568,1	230	1338,1	2410,56	0,651	0,555
10.00 - 11.00	1988	695,8	905	23	27,6	1628,4	288	1340,4	2410,56	0,676	0,556
11.00 - 12.00	2234	781,9	1149	11	13,2	1944,1	364	1580,1	2410,56	0,806	0,655
12.00 - 13.00	1801	630,35	904	18	21,6	1555,95	295	1260,95	2410,56	0,645	0,523
13.00 - 14.00	1818	636,3	1012	29	34,8	1683,1	323	1360,1	2410,56	0,698	0,564
14.00 - 15.00	1704	596,4	1004	24	28,8	1629,2	289	1340,2	2410,56	0,676	0,556
15.00 - 16.00	1777	621,95	1197	27	32,4	1851,35	268	1583,35	2410,56	0,768	0,657
16.00 - 17.00	1825	638,75	1318	35	42	1998,75	303	1695,75	2410,56	0,829	0,703
17.00 - 18.00	2695	943,25	1433	10	12	2388,25	350	2038,25	2410,56	0,991	0,846
18.00 - 19.00	2425	848,75	1084	6	7,2	1939,95	261	1678,95	2410,56	0,805	0,696
19.00 - 20.00	2515	880,25	747	10	12	1639,25	415	1224,25	2410,56	0,680	0,508
20.00 - 21.00	2210	773,5	635	15	18	1426,5	187	1239,5	2410,56	0,592	0,514
21.00 - 22.00	1812	634,2	612	10	12	1258,2	0	1258,2	2410,56	0,522	0,522

From the results of the above calculation, it can be seen that the value of the degree of saturation (DS) of traffic on Jalan Captain A. Bakarudin , the highest peak occurred at 17.00 WIB - 18.00 WIB, namely the value of Ds = 0.991, influenced by vehicles leaving Enter Jambi Town Square Mall.

Table 3 . Degree of saturation on August 15, 2020

Waktu	Roda Dua		Roda Empat	Kendaraan Berat		Jumlah	Jumlah Kendaraan Masuk Jamtos	[5]-[6]	Kapasitas [C]	DS ada Jamtos	DS tanpa Jamtos
	0,35		1	1,2							
[1]	[2]	[3]	[4]	[5]	[6]	[5]	[6]	[7]	[8]	[9]	[10]
06.00 - 07.00	796	278,6	267	13	15,6	561,2	0	561,2	2410,56	0,233	0,233
07.00 - 08.00	1237	432,95	482	10	12	926,95	0	926,95	2410,56	0,385	0,385
08.00 - 09.00	1583	554,05	702	15	18	1274,05	0	1274,05	2410,56	0,529	0,529
09.00 - 10.00	1655	579,25	788	15	18	1385,25	140	1245,25	2410,56	0,575	0,517
10.00 - 11.00	1637	572,95	901	16	19,2	1493,15	314	1179,15	2410,56	0,619	0,489
11.00 - 12.00	1669	584,15	960	23	27,6	1571,75	359	1212,75	2410,56	0,652	0,503
12.00 - 13.00	1699	594,65	1003	16	19,2	1616,85	348	1268,85	2410,56	0,671	0,526
13.00 - 14.00	1784	624,4	970	11	13,2	1607,6	399	1208,6	2410,56	0,667	0,501
14.00 - 15.00	1601	560,35	1222	7	8,4	1790,75	373	1417,75	2410,56	0,743	0,588
15.00 - 16.00	1722	602,7	1070	9	10,8	1683,5	367	1316,5	2410,56	0,698	0,546
16.00 - 17.00	2169	759,15	1020	14	16,8	1795,95	311	1484,95	2410,56	0,745	0,616
17.00 - 18.00	1836	642,6	1138	12	14,4	1795	406	1389	2410,56	0,745	0,576
18.00 - 19.00	1153	403,55	949	10	12	1364,55	224	1140,55	2410,56	0,566	0,473
19.00 - 20.00	1316	460,6	942	9	10,8	1413,4	421	992,4	2410,56	0,586	0,412
20.00 - 21.00	1766	618,1	1081	11	13,2	1712,3	321	1391,3	2410,56	0,710	0,577
21.00 - 22.00	1668	583,8	908	9	10,8	1502,6	35	1467,6	2410,56	0,623	0,609

The results of the survey on Sunday, August 15, 2020, DS value <.75

Table 4 . Degree of saturation on August 16, 2020

Waktu	Roda Dua		Roda Empat	Kendaraan Berat		Jumlah	Jumlah Kendaraan Masuk Jamtos	[5]-[6]	Kapasitas [C]	DS ada Jamtos	DS tanpa Jamtos
	0,35		1	1,2							
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
06.00 - 07.00	652	228,2	182	20	24	434,2	0	434,2	2410,56	0,180	0,180
07.00 - 08.00	1094	382,9	312	8	9,6	704,5	14	690,5	2410,56	0,292	0,286
08.00 - 09.00	1291	451,85	541	16	19,2	1012,05	95	917,05	2410,56	0,420	0,380
09.00 - 10.00	1491	521,85	605	9	10,8	1137,65	210	927,65	2410,56	0,472	0,385
10.00 - 11.00	1661	581,35	890	14	16,8	1488,15	292	1196,15	2410,56	0,617	0,496
11.00 - 12.00	1708	597,8	983	11	13,2	1594	410	1184	2410,56	0,661	0,491
12.00 - 13.00	1513	529,55	998	11	13,2	1540,75	358	1182,75	2410,56	0,639	0,491
13.00 - 14.00	1700	595	852	5	6	1453	411	1042	2410,56	0,603	0,432
14.00 - 15.00	1688	590,8	1018	3	3,6	1612,4	479	1133,4	2410,56	0,669	0,470
15.00 - 16.00	1529	535,15	826	7	8,4	1369,55	409	960,55	2410,56	0,568	0,398
16.00 - 17.00	1562	546,7	1083	4	4,8	1634,5	464	1170,5	2410,56	0,678	0,486
17.00 - 18.00	2241	784,35	1032	5	6	1822,35	545	1277,35	2410,56	0,756	0,530
18.00 - 19.00	1692	592,2	814	11	13,2	1419,4	331	1088,4	2410,56	0,589	0,452
19.00 - 20.00	1802	630,7	878	23	27,6	1536,3	596	940,3	2410,56	0,637	0,390
20.00 - 21.00	1839	643,65	776	18	21,6	1441,25	319	1122,25	2410,56	0,598	0,466
21.00 - 22.00	1410	493,5	562	14	16,8	1072,3	16	1056,3	2410,56	0,445	0,438

From the calculation results above, it can be seen that the value of the degree of saturation (DS) of traffic on Jalan Captain A. Bakarudin , the highest peak occurred at 17.00 WIB - 18.00 WIB, namely the value of Ds = 0.756 influenced by vehicles entering and leaving the Jambi Town Square Mall. If no vehicles enter the Jambi Town Square Mall, the value of the degree of saturation (DS) = 0.53

Table 5 . Degree of saturation on August 18, 2020

Waktu	Roda Dua		Roda Empat	Kendaraan Berat		Jumlah	Jumlah Kendaraan Masuk Jamtos	[5]-[6]	Kapasitas [C]	DS ada Jamtos	DS tanpa Jamtos
	0,5		1	1,2							
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
06.00 - 07.00	500	250	251	32	38,4	539,4	0	539,4	2410,56	0,224	0,224
07.00 - 08.00	1102	551	467	16	19,2	1037,2	0	1037,2	2410,56	0,430	0,430
08.00 - 09.00	1737	868,5	812	16	19,2	1699,7	0	1699,7	2410,56	0,705	0,705
09.00 - 10.00	1559	779,5	889	20	24	1692,5	189	1503,5	2410,56	0,702	0,624
10.00 - 11.00	1776	888	1018	17	20,4	1926,4	279	1647,4	2410,56	0,799	0,683
11.00 - 12.00	1858	929	929	49	58,8	1916,8	372	1544,8	2410,56	0,795	0,641
12.00 - 13.00	1812	906	999	12	14,4	1919,4	314	1605,4	2410,56	0,796	0,666
13.00 - 14.00	1668	834	1088	21	25,2	1947,2	345	1602,2	2410,56	0,808	0,665
14.00 - 15.00	1654	827	1528	19	22,8	2377,8	374	2003,8	2410,56	0,986	0,831
15.00 - 16.00	1733	866,5	1426	16	19,2	2311,7	361	1950,7	2410,56	0,959	0,809
16.00 - 17.00	2006	1003	1403	2	2,4	2408,4	285	2123,4	2410,56	0,999	0,881
17.00 - 18.00	2412	1206	1262	8	9,6	2477,6	360	2117,6	2410,56	1,028	0,878
18.00 - 19.00	1684	842	894	7	8,4	1744,4	233	1511,4	2410,56	0,724	0,627
19.00 - 20.00	1472	736	521	13	15,6	1272,6	375	897,6	2410,56	0,528	0,372
20.00 - 21.00	1797	898,5	704	28	33,6	1636,1	315	1321,1	2410,56	0,679	0,548
21.00 - 22.00	1248	624	792	17	20,4	1436,4	2	1434,4	2410,56	0,596	0,595

From the results of the above calculation, it can be seen that the value of the degree of saturation (DS) of traffic on Jalan Captain A. Bakarudin at 14.00 WIB - 18.00 WIB, namely the Ds value above 0.75, with the highest DS value at 17.00 WIB - 18.00 WIB. DS = 1.028

The survey results on Wednesday, Saturday, Sunday and Tuesday show that DS values > 0.75 are found on weekdays. With the highest degree of saturation (DS) on Wednesday, August 18, 2020 at 17.00 WIB - 18.00 WIB, the degree of saturation (DS) = 1.028

Based on the results of the study, it can be concluded that:

1. The peak of vehicle pull to Jambi Town Square Mall occurred on Sunday August 16, 2020 at 19.00 WIB - 20.00 WIB with a total of 596 vehicles/hour.

2. The peak of Jambi Town Square Mall vehicle generation occurred on Sunday, August 16, 2020 at 17.00 WIB - 18.00 WIB with a total of 521 vehicles/hour.

3. The highest degree of saturation (DS) value of traffic on the Captain A. Bakarudin occurred on Tuesday, August 18, 2020 at 17.00 WIB - 18.00 WIB with a DS value = 1.028.

4. Judging from the value of the highest degree of saturation, the generation and towing factors of the Jambi Town Square Mall greatly affect the performance of the Jalan Captain A. Bakarudin Jambi City.

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