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Traffic Engineering on Lambung Mangkurat Road, Samarinda City

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ABSTRACT

Samarinda City has a serious issue with traffic congestion, especially in the downtown and shopping districts. The Lambung Mangkurat road in Samarinda City is notorious for its heavy traffic. This stretch of road connects two popular public markets, Pasar Merdeka and Pasar Rahmad. This research aims to investigate whether traffic engineering can help ease the congestion problem. The results obtained are 1. Reducing roadside parking, particularly in traditional market areas, by creating level parking pockets in the Rahmad Market and Merdeka Market areas. 2. Trying to design and create the road from two directions to one direction, which can reduce congestion by 30% of the existing conditions or from LOS E (V/C = 0.889) to LOS C (V/C = 0.589); 3. Assigning traffic control officers to work during rush hours. Thus, It is expected that using traffic engineering techniques on these roads and reduces traffic congestion

INTRODUCTION

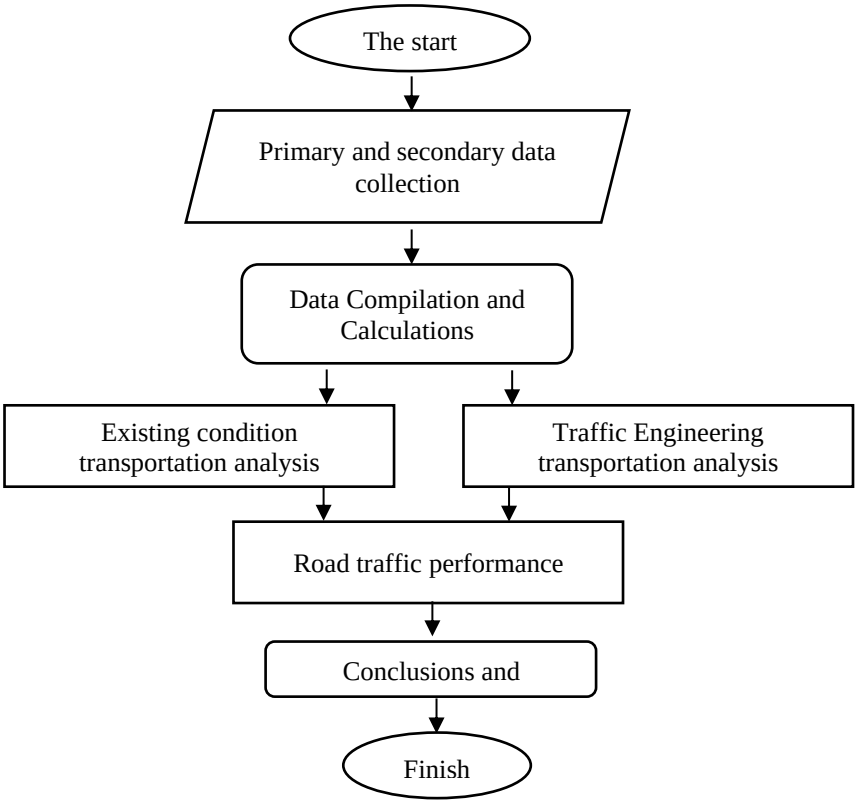
Traffic problems arise as a city grows into a Metropolitan City. These issues are caused by the city's growing population, increased demand for transportation facilities, an ineffective mass transportation management system, and an imbalance between traffic growth and the length of city roads.

Lambung Mangkurat road, citiy of Samarinda, is a major commercial and shopping district road. On Jalan Lambung Mangkurat, shopping areas are on both sides of the road for various trades ranging from culinary to clothing, furniture, and other household necessities. Furthermore, there are two traditional central markets, Merdeka Market and Rahmad Market, frequently visited by visitors looking for daily necessities. These areas frequently cause traffic congestion.

The Lambung Mangkurat road section is in a 2/4 UD condition. Vehicles attempting to enter the parking area or alleys along the road frequently collide. The conflict created a large side obstacle, which caused traffic delays. As a result, traffic engineering is required in this section to mitigate the impact of existing traffic.

RESEARCH METHODS

The method used is to conduct field traffic surveys to collect primary data and do literature reviews on similar studies. The MKJI 1997 method was used to calculate Volume (Q), Capacity (C), Degree of Saturation (DS), and Level of Road Service (Q/C) from the data. For more details, it can be seen in the following research flowchart:

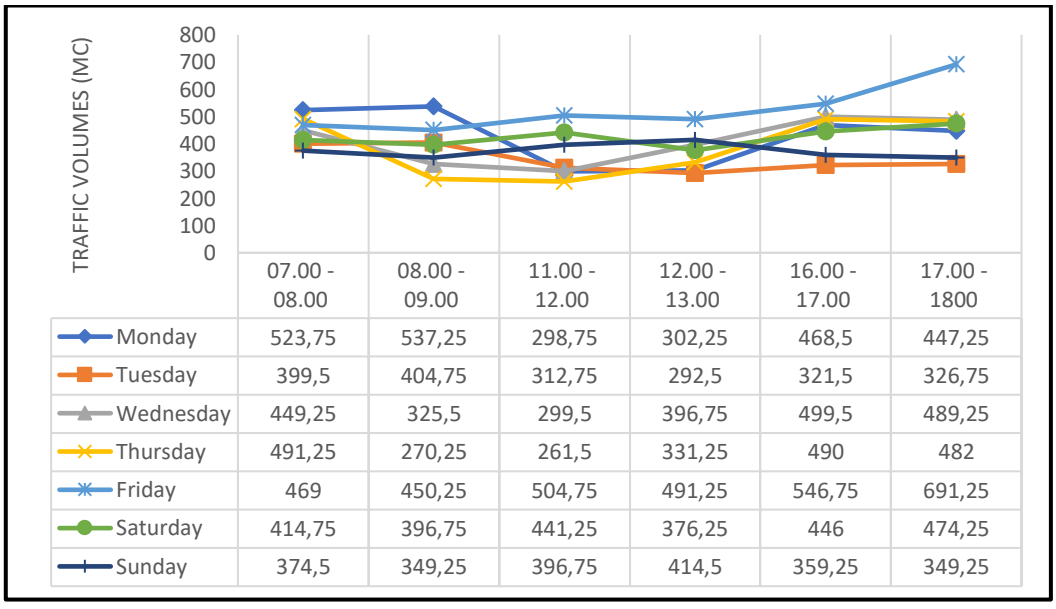


Picture 1. Research Flowchart

RESULTS AND DISCUSSION

A. Data Volume Lalu-Lintas

A traffic survey was conducted for 1 week to determine the current traffic conditions on the Mangkurat road section. The results of the motorcycle traffic survey (MC) are as follows:

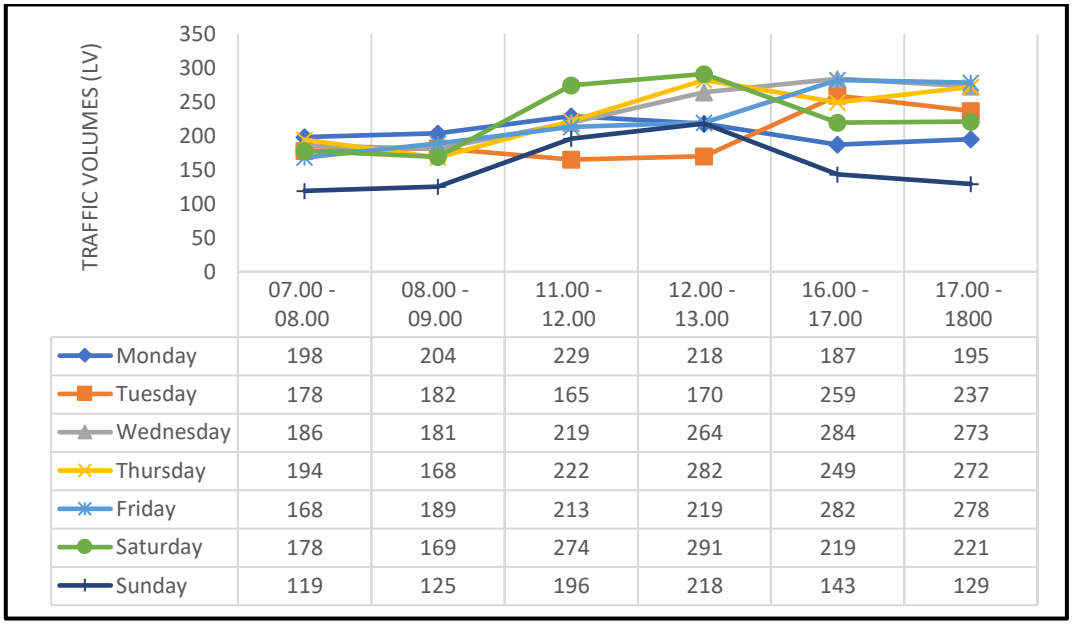


	07.00 - 08.00	08.00 - 09.00	11.00 - 12.00	12.00 - 13.00	16.00 - 17.00	17.00 - 1800
Monday	523,75	537,25	298,75	302,25	468,5	447,25
Tuesday	399,5	404,75	312,75	292,5	321,5	326,75
Wednesday	449,25	325,5	299,5	396,75	499,5	489,25
Thursday	491,25	270,25	261,5	331,25	490	482
Friday	469	450,25	504,75	491,25	546,75	691,25
Saturday	414,75	396,75	441,25	376,25	446	474,25
Sunday	374,5	349,25	396,75	414,5	359,25	349,25

Picture 2. Motorcycle Traffic Volume (MC)

From Figure 2. It can be seen that traffic conditions for motorbike vehicles (MC) fluctuate. The peak hours of traffic volume are in the morning from 8.00 to 11.00 and in the afternoon from 17.00 to

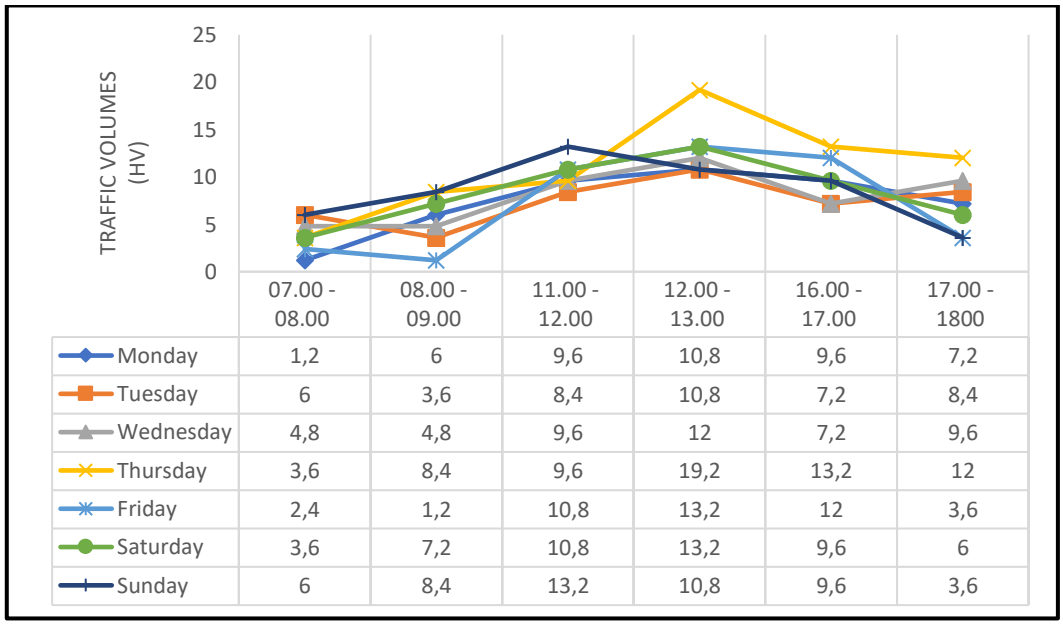
18.00, namely when going to work and shopping activities and in the afternoon when returning from work.



	07.00 - 08.00	08.00 - 09.00	11.00 - 12.00	12.00 - 13.00	16.00 - 17.00	17.00 - 1800
Monday	198	204	229	218	187	195
Tuesday	178	182	165	170	259	237
Wednesday	186	181	219	264	284	273
Thursday	194	168	222	282	249	272
Friday	168	189	213	219	282	278
Saturday	178	169	274	291	219	221
Sunday	119	125	196	218	143	129

Picture 3. Light Vehicle Traffic Volume (LV)

For light vehicles, the peak hour is at noon from 11.00 to 12.00 for holidays and for weekdays the peak hour for light vehicles is in the afternoon from 16.00 to 18.00.



	07.00 - 08.00	08.00 - 09.00	11.00 - 12.00	12.00 - 13.00	16.00 - 17.00	17.00 - 1800
Monday	1,2	6	9,6	10,8	9,6	7,2
Tuesday	6	3,6	8,4	10,8	7,2	8,4
Wednesday	4,8	4,8	9,6	12	7,2	9,6
Thursday	3,6	8,4	9,6	19,2	13,2	12
Friday	2,4	1,2	10,8	13,2	12	3,6
Saturday	3,6	7,2	10,8	13,2	9,6	6
Sunday	6	8,4	13,2	10,8	9,6	3,6

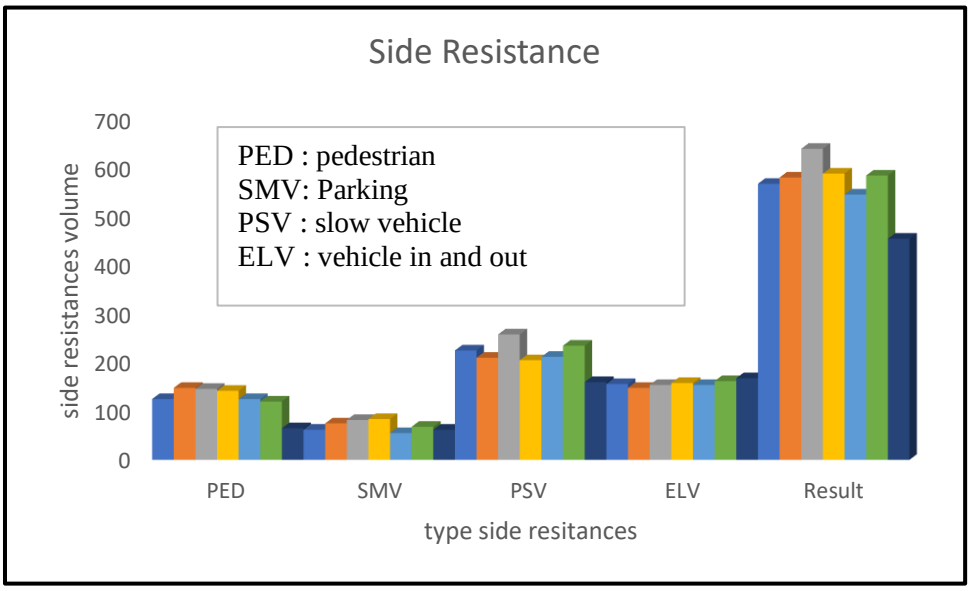
Picture 3. Light Vehicle Traffic Volume (LV)

According to the graph above, rush hours for heavy vehicles starts at 11.00 and ends at 16.00, after which there is a decrease in the activity of heavy vehicles passing through the Lambung Mangkurat road in Samarinda City.

B. Side Barrier Data

Pedestrians, public transportation and other vehicles that stop or park, slow vehicles, and vehicles entering or exiting the land adjacent to the road have the greatest impact on the capacity and performance of urban roads. To determine the side MKJI'97-based friction, it is necessary to know the

weighted frequency of occurrence. In order to survey side friction, events that affect the performance of the road section are recorded.



Transportation Analysis

Based on the results of a transportation study using the 1997 MKJI method with blanks UR.1 to UR.3, the resulting conditions are between 2-way roads (existing) and engineering results using 1-way and controlling roadside parking, resulting in the following analysis:

Table 1. Transportation Analysis

Type Of Way	Flows (Q) - Smp/hour	Capacity (C) -SMP/Hour	Degree of saturation (DS)	Speed (Km/Hour)	Level Of Service
Two Way	1339.70	1507.64	0.889	35	E
One Way	1339.70	2275.08	0.589	46	C

Source: Analysis results

According to the study's findings, implementing traffic engineering on Lambung Mangkurat road by switching the road's lanes from two-way to one-way and reducing the amount of illegal parking could reduce the congestion there. From the analysis results, congestion can be reduced by 30% under current conditions.

CONCLUSION

From the results of the analysis and study of traffic congesion on Lambung Mangkurat road, the several conclusions can be drawn,as follows:

1. Controlling illegal or roadside parking requires the creation of a parking area in the Rahmad market area or implementing digital parking management. Roadside parking may only be permitted on one side of the road to avoid reducing the capacity of the existing roads.
2. Conducting traffic engineering by changing directions from two to one-way (4/2UD to 4/1 UD) to reduce congestion by 30%. However, this must be coordinated with the circulation pattern of vehicle flow so that it has an impact on other road sections
3. Placing parking attendants in collaboration with the private sector or with trained parking attendants from related agencies at peak hours.

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