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ANALYSIS OF DELAY ENTRY AND PLANNING OF PARKING GATES QMALL BANJARBARU

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ABSTRACT

Qmall Banjarbaru is located at Jalan Ahmad Yani KM. 37. The existence of Qmall Banjarbaru caused the impact of increased traffic density and decreased speed in the surrounding road network. With the increasing movements that occur from Qmall Banjarbaru, it will potentially be the cause of congestion between vehicles that will enter the Qmall Banjarbaru with vehicles moving straight on Jalan Ahmad Yani KM. 37. The purpose of this research is to know the influence of delay entrance parking Qmall Banjarbaru against the performance of Jalan Ahmad Yani KM. 37.

This research conducted a field survey that aims to find volume data on the road, the time of parking door service, the number of vehicles that enter the parking, the time delay the parking door, and the length of the delay that occurs on the parking door. From the results of data analysis using the Calculation of field survey (realistic) data obtained the distance of the parking door previously 16.5 meters to be redated to 25 meters and the parking door that originally had two doors of parking service made into three doors parking service. This change was made to delay enter parking Qmall Banjarbaru does not reach Jalan Ahmad Yani Km. 37.

Keywords: Parking door, delay, Qmall, road performance.

1. INTRODUCTION

In terms of the city's development, the most prominent and rapidly growing is the shopping center. In the city of Banjarbaru several shopping centers are all almost inside the category of large shopping centers.

One of the shopping centers in downtown Banjarbaru is Qmall Banjarbaru. Qmall Banjarbaru is located at Jalan Ahmad Yani KM. 37. High movements due to the shopping center affect road traffic performance in the vicinity. Qmall Banjarbaru's Activity Center will cause traction caused because Qmall Banjarbaru offers a variety of activities such as complete shopping, family entertainment center, children's toy arena, fast food restaurants. Besides that, Qmall Banjarbaru also has a spacious and secure parking facility. The size of vehicles coming in at

Qmall Banjabaru will affect the performance of Jalan Ahmad Yani KM. 37, which is right in front of it. The impact is increasing traffic density and speed decreases in the surrounding road networks. This is due to an imbalance between the traffic volume and the existing road capacity and will eventually cause the congestion problem. With the increasing movements that occur from Qmall Banjarbaru, it will be potentially possible to cause traffic congestion between vehicles that will enter the vehicle that drove straight on Jalan Ahmad Yani KM. 37. Therefore, the author wants to research the influence of delay entrance parking Qmall Banjarbaru against the performance of Jalan Ahmad Yani KM. 37.

2. LITERATURE REVIEW

2.1 Parking Service Door

several parameter queues are calculated when planning the operation of parking doors, including:

- The number of vehicles arrived time unity (λ)
- Time unity service levels (μ)
- Traffic intensity (ρ)
- Average queue length - average (q)
- Average waiting time - average (w)

2.2 Parking Performance Analysis

Variables that must be determined to estimate the queue characteristics are as follows:

a) Long observation.
b) Number of vehicles.
c) Model structure and discipline queue

- The queue structure (*pangestu, 1985*) which is used is *Singel Channel – Single Phase*, where one line queue is handled by one service line.
- As for the discipline of the queue applied (*Subagyo Pangestu, 1985*) is *First Come – First Served* (FCFS), that is the first time that first come to serve, the next and so on.

d) The time of parking door service.
e) In the field to create the condition of the queue structure in the form of *single*

channel – single phase and discipline *first come – first served*, the door entry use the (lifting barrier-arm) that can be moved by a machine or manually, if at any time there is damage.

2.3 Traffic Performance

- Traffic Volume
- Traffic Speed
- Relationship model speed and density
    1. Model *Greenshield*
    2. Model *Greenberg*
    3. Model *Underwood*
- Degrees of saturation
- Service level

3. METHODOLOGY

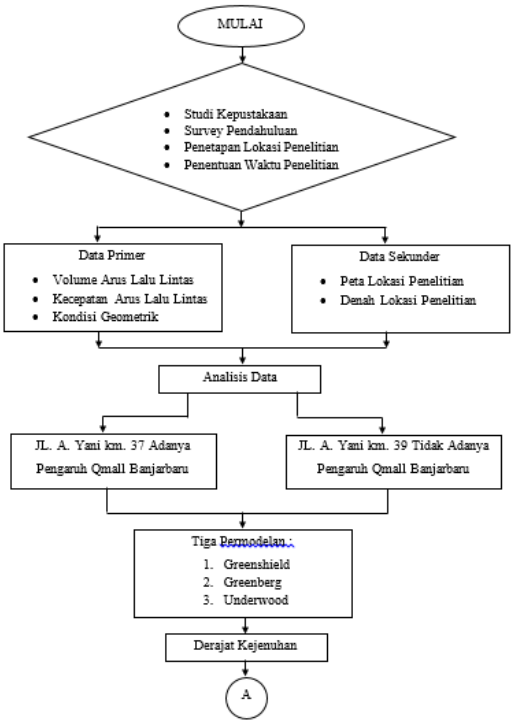

Figure 3.1 Planning Flow Chart

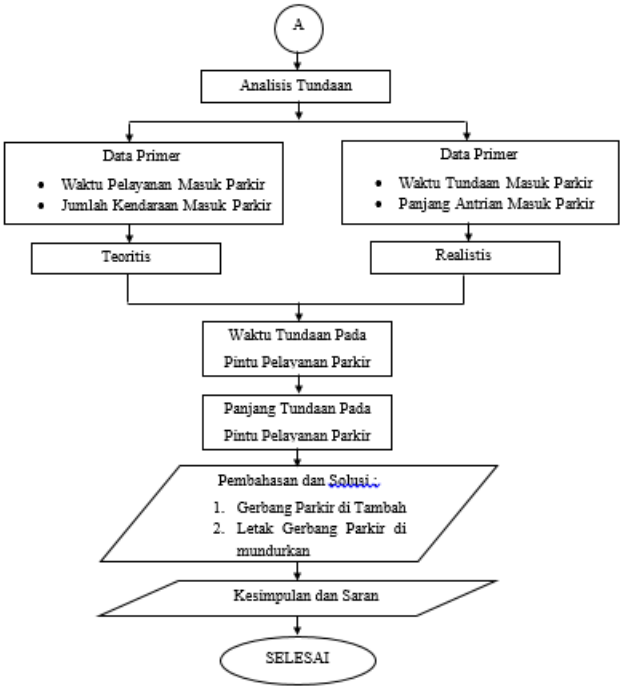

Figure 3.2 Planning Flow Chart

4. RESULTS & DISCUSSION

4.1 Traffic Volume Data

Based on traffic survey data on Jalan Ahmad Yani Km. 37 and Jalan Ahmad Yani Km. 39 on Saturdays, Sundays, and Tuesdays obtained traffic volume data as follows:

Table 4.1 Results of traffic volume calculations on reviewed sections

Streets	Day	Time (Wita)	Maximum Volume (smp/jam)
Jalan Ahmad Yani Km. 37	Wednesday	14.20 – 15.20	1386.5
	Sunday	14.00 – 15.00	1313.3
	Tuesday	11.50 – 12.50	1283.3
Jalan Ahmad Yani Km. 39	Wednesday	13.00 – 14.00	1687.65
	Sunday	16.30 – 17.30	1540.85
	Tuesday	11.10 – 12.10	1501.95

4.2 Traffic Speed Data

Based on traffic survey data on Jalan Ahmad Yani Km. 37 and Jalan Ahmad Yani Km. 39 on Saturdays, Sundays, and Tuesdays obtained traffic speed data as follows:

Table 4.2 Speed calculation results on reviewed sections

Streets	Sample	Day	Time (Wita)	Maximum Speed (km/jam)
Jalan Ahmad Yani Km. 37	Mobile	Wednesday	21.00– 22.00	36.95
		Sunday	10.50– 11.50	32.93
		Tuesday	12.40– 13.40	36.64
	Motorcycle	Wednesday	10.10– 11.10	35.45
		Sunday	11.00– 12.00	35.94
		Tuesday	10.00– 11.00	41.97
Jalan Ahmad Yani Km. 39	Mobile	Wednesday	21.00 – 22.00	36.95
		Sunday	18.30 – 19.30	41.57
		Tuesday	16.30 – 17.30	45.35
	Motorcycle	Wednesday	21.00 – 22.00	43.69
		Sunday	21.00 – 22.00	51.64
		Tuesday	20.30 – 21.30	54.00

4.3 Data Analysis

Relationship Volume, Speed, and Road Density Ahmad Yani Km. 37

The following are the calculation results to determine the modeling used:

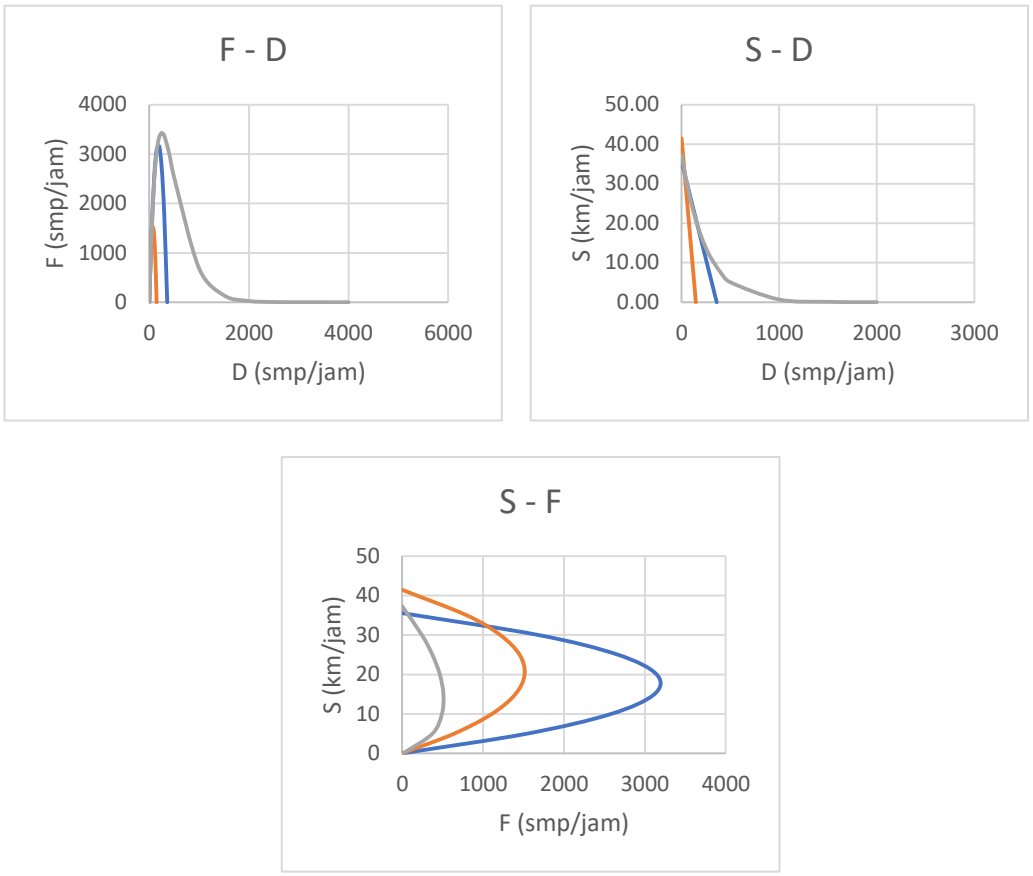

Figure 4.1 Volume, Speed and Density Relationship Models

From the obtained modeling charts used on Saturdays, Sundays, and Tuesdays as well as the maximum volume, maximum speed, and maximum density, the results can be seen in the 4.3 table

Table 4.3 calculation result of Volume, speed, density Jalan Ahmad Yani Km. 37

Hari	Hubungan	Model Persamaan	R^2	R	Volume Maksimum (smp/jam)	Kecepatan Maksimum (km/jam)	Kepadatan Maksimum (smp/jam)
Sabtu	Greenshield	y = (-0.0989x)+35.556	0.0638	0.253	3196	35.56	200
Minggu	Greenshield	y = (-0.2837x)+41.469	0.7024	0.838	1516	41.47	75
Selasa	Underwood	$y = 37.303e^{-0.004x}$	0.2627	0.513	3431	37.29	250

Relationship Volume, Speed, and Road Density Ahmad Yani Km. 39

The following are the calculation results to determine the modeling used:

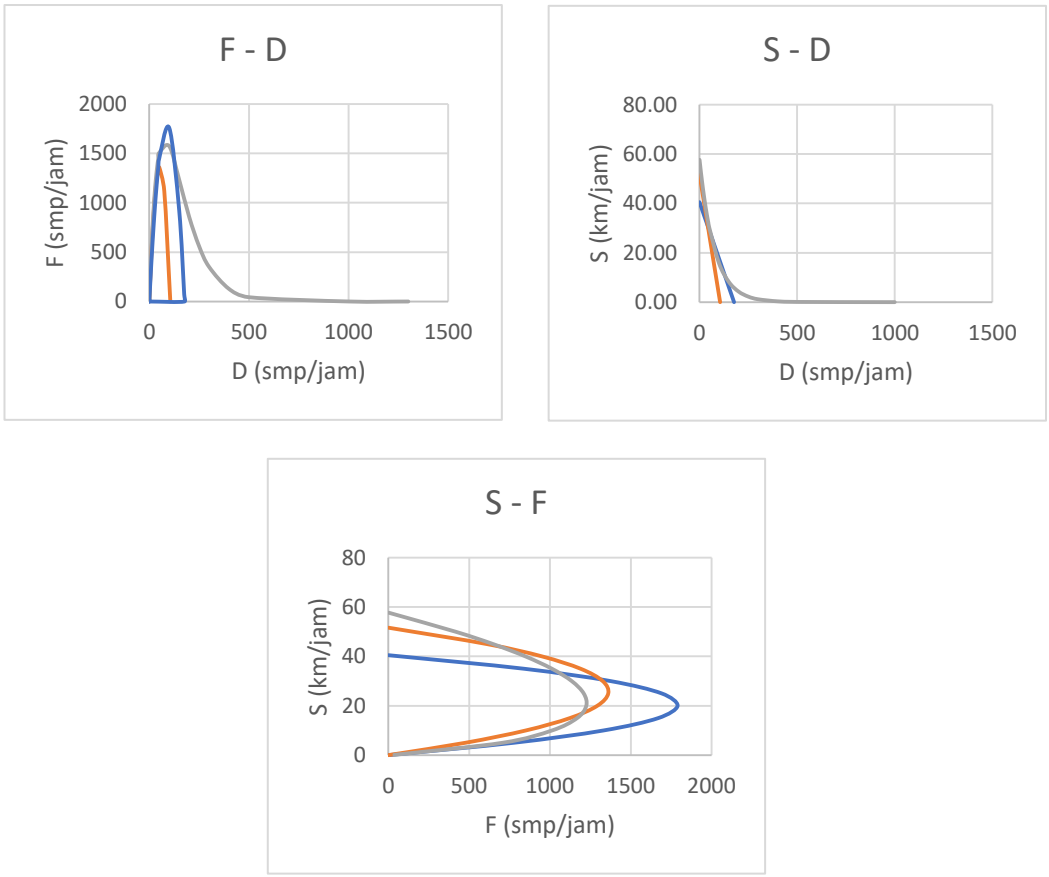

Figure 4.2 Volume, Speed and Density Relationship Models

From the obtained modeling charts used on Saturdays, Sundays, and Tuesdays as well as the maximum volume, maximum speed, and maximum density, the results can be seen in the 4.4 table:

Table 4.4 calculation result of Volume, speed, density Jalan Ahmad Yani Km. 39

Hari	Hubungan	Model Persamaan	R^2	R	Volume Maksimum (smp/jam)	Kecepatan Maksimum (km/jam)	Kepadatan Maksimum (smp/jam)
Sabtu	Greenshield	y = (-0.299x)+40.491	0.526	0.725	1790	40.49	100
Minggu	Greenshield	y = (-0.4894x)+51.631	0.875	0.935	1362	51.63	50
Selasa	Underwood	$y = 57.743e^{-0.013x}$	0.6228	0.789	1634	57.67	100

4.4 Service Level Index Calculation

Indices Rate of Service Level Saturday, Sunday, and Tuesday on Jalan Ahmad Yani Km. 37 and Jalan Ahmad Yani Km. 39

From the calculation of the modeling on Saturdays, Sundays, and Tuesday, there are modeling on each day – the modeling of *Greenshield, Greenshield,* and *Underwood* obtained the following service level index:

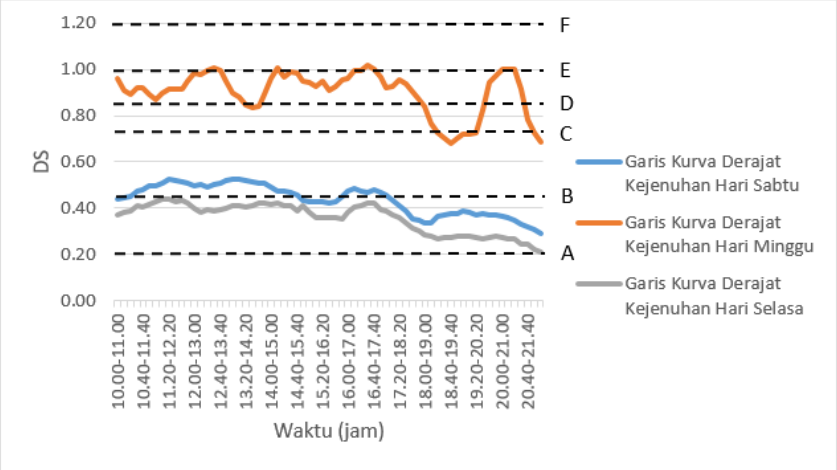

Figure 4.3 Service level index Jalan Ahmad Yani Km.37

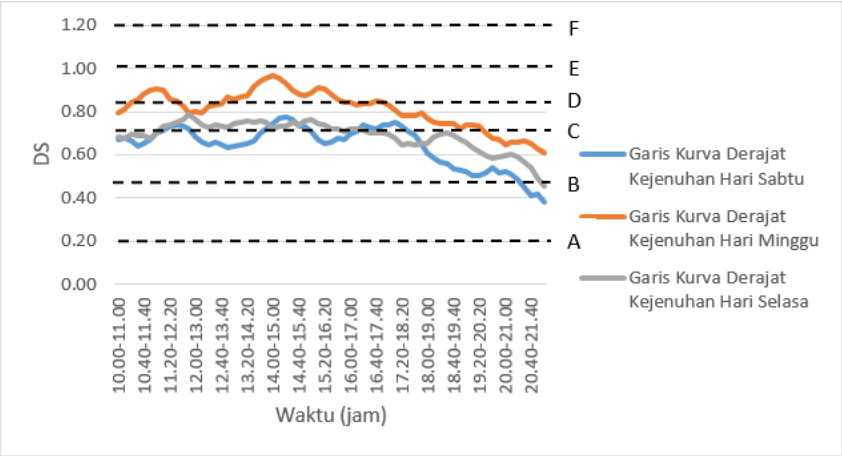

figure 4.4 Service level index Jalan Ahmad Yani Km. 39

From the service level index chart of Jalan Ahmad Yani Km. 37 was obtained the greatest degree of saturation on Saturdays of 0.53, 1.02 days, and 0.44 on Tuesday with the index value of the service level C, F and B. While Jalan Ahmad Yani Km. 39 was obtained the biggest saturation on Saturdays for 0.77, 0.96 Saturdays, and 0.79 Tuesdays with the value of service levels D , E and D.

4.5 Calculation of Performance Comparison of Realistic and Theoretical Parking Doors on Saturdays

From the results of planning the comparison of performance calculation of parking doors realistic and theoretical conditions as follows:

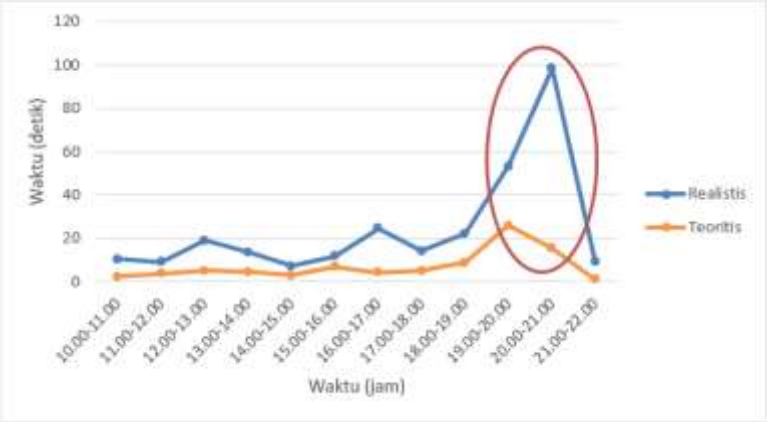

Figure 4.5 Average hourly time comparison delay passenger cars parking entry on each – each Saturday service door is realistic and theoretical

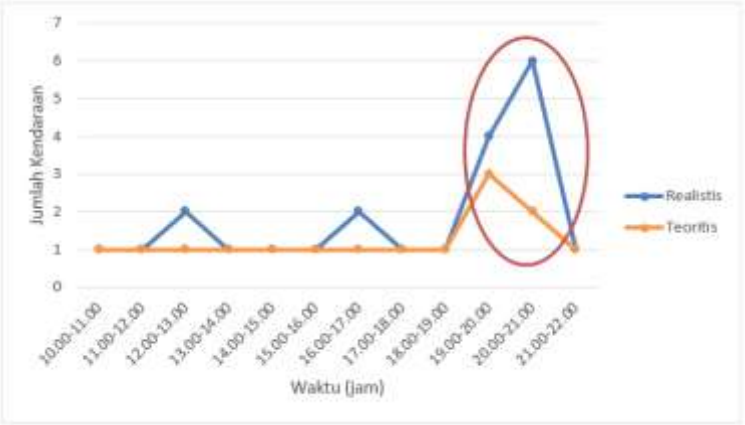

Figure 4.6 Average hourly delay passenger car parking entry at each – each Saturday service door realistic and theoretical

From the data above visible peak hours time delay car and the number of cars delayed on each parking service door of 98.39 seconds, six vehicles realistic conditions and 5.59 seconds, three vehicles theoretical condition at the Clock 20.00 – 21.00 Wita. At 19.00 – 21.00 Wita is happening event or event at Qmall Banjarbaru which caused the occurrence of delay time and the amount of delay becomes very large, this is temporary and temporary and not any time occurred.

In the planning it can not be used as a reference, so the time delay and the amount of delay that occurs in each-each door of the parking service is taken at the time of 16.00-17.00 Wita amounting to 24.68 seconds realistic conditions, 5.59 seconds theoretical conditions, two vehicles realistic condition and one vehicle theoretical condition.

4.6 Calculation of Performance Comparison of Realistic and Theoretical Parking Doors on Sundays

From the results of planning the comparison of performance calculation of parking doors realistic and theoretical conditions as follows:

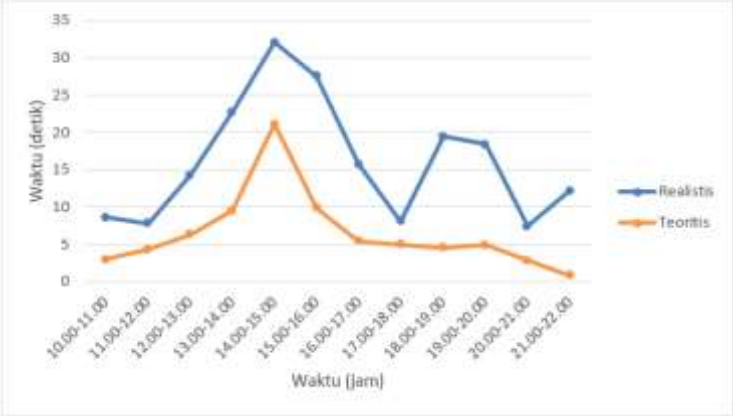

Figure 4.7 Average hourly time comparison delay passenger cars parking entry on each – each Saturday service door is realistic and theoretical

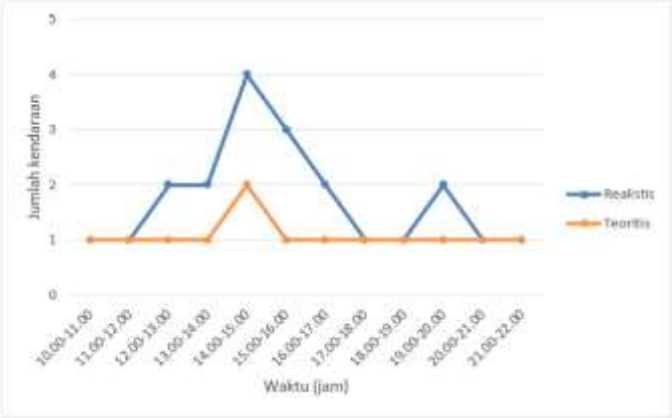

Figure 4.8 Average hourly delay passenger car parking entry at each – each Saturday service door realistic and theoretical

Peak hour time delay passenger car parking entrance occurred at 14.00 – 15.00 Wita for 64.16 seconds realistic condition and at 14.00 – 15.00 Wita amounted to 21.07 seconds theoretical condition. While the length of delay passenger cars enters the largest parking occurs at 14.00 – 15.00 Wita as many as four realistic vehicle conditions and at 14.00 – 15.00 Wita as many as two vehicles theoretical condition.

4.7 Calculation of Performance Comparison of Realistic and Theoretical Parking Doors on Tuesdays

From the results of planning the comparison of performance calculation of parking doors realistic and theoretical conditions as follows:

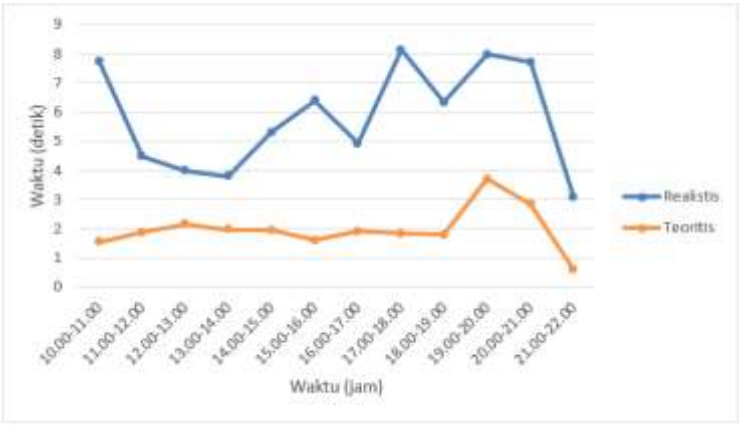

Figure 4.9 Average hourly time comparison delay passenger cars parking entry on the each – each Saturday service door is realistic and theoretical

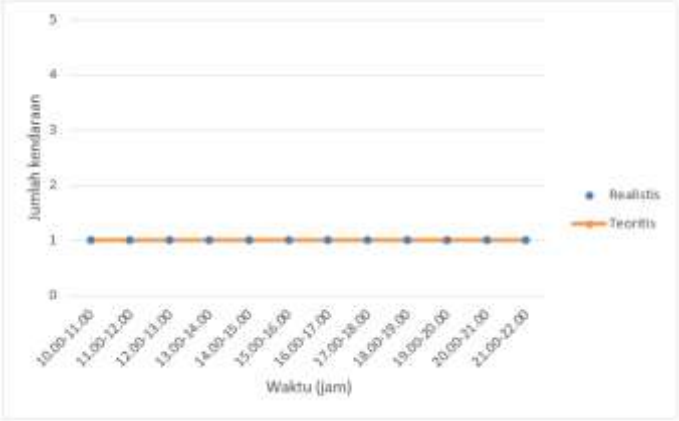

Figure 4.10 Average hourly delay passenger car parking entry at the each – each Saturday service door realistic and theoretical

Peak hour time delay passenger car parking entrance occurred at 19.00 – 20.00 Wita for 7.98 seconds realistic condition and at 19.00 – 20.00 Wita amounted to 3.71 seconds theoretical condition. While the length of delay passenger cars enter the largest parking time in 19.00 – 20.00 Wita as many as one vehicle realistic condition and at 19.00 – 20.00 Wita as many as one vehicle theoretical condition.

5. CONCLUSIONS AND SUGGESTIONS

5.1 Conclusions

From the results of the research and analysis of data can be concluded as follows:

1. On Jalan Ahmad Yani km. 37 obtained ITP C on Saturday, ITP F on Sunday, and ITP B on Tuesday. At Jalan Ahmad Yani km. 39 obtained ITP D on Saturday, ITP E on Sunday, and ITP D on Tuesday.
2. Of the two calculation methods conducted both theoretical and realistic obtained results with a percentage of the difference of 50%, 50%, and 0% on Saturdays, Sundays, and Tuesdays. Two striking differences that happen because of the different maneuvers of vehicles that will enter the parking gates. More suitable theoretical methods are applied to the analysis of the Delay entrance gate on the road that has a straight geometric example at the entrance gate of the toll, where visibility and queue can be seen clearly. Different from parking entrance Qmall Banjarbaru which has geometric conditions turn and obstructed visibility.
3. So for handling is taken based on calculation results of realistic methods. The solution is to rollback the parking service door originally 16.5 meters to 25 meters and the addition of parking service doors from the original two doors of parking service into three Doors parking service. So the queue length of vehicle entrance parking Qmall Banjarbaru does not reach Jalan Ahmad Yani km. 37.

5.2 Suggestions

The suggestions that can be given based on these planning results are as follows:

1. Party Qmall Banjarbaru should do the improvement to the service door of his special vehicle or cars so that when visitors who come to use the vehicle do

not happen long queues up to the street Ahmad Yani Km. 37 causing congestion.

2. After the improvement on the door of the parking service is expected to party Qmall Banjarbaru also takes into account the problems that occur in the park can still accommodate or not the vehicle that will come to no fault occur for the future.
3. Analyses of traffic characteristics with *Greenshield, Greenberg, and Underwood* methods produce a low correlation of equations so that the need for the addition of survey data.
4. For the performance analysis of parking entrance with theoretical methods need to pay attention to geometric road entry also.
5. Furthermore, if everything is done will be better if the survey continues whether it still affects the performance of Ahmad Yani Km. 37, so that the handling can be done continues.

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