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ANALYSIS OF THE SERVICE LEVEL OF THE AHMAD YANI STREET KM. 32.5 DUE TO SCHOOL SAFE ZONE (ZOSS) AT SDN 1 LOKTABAT UTARA

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ABSTRACT

One of the schools in Banjarbaru equipped with a School Safety Zone (ZOSS) is SDN 1 Loktabat Utara. Pick-up and public transportation activities that reduce school students at the Location of the School Safety Zone have caused a reduction in the volume of road sections, causing traffic congestion. The purpose of this study is to determine the level of service of road sections before and precisely in the School Safety Zone area and the influence of the Existence of a School Safe Zone at the location of SDN 1 Loktabat Utara on the traffic flow performance of Ahmad Yani Street Km 32,5. The research carried out was in the form of a traffic volume survey (LHR) and a vehicle speed survey to see the level of density on-road sections, as well as a side obstacle survey to see the magnitude of the influence of disturbances. The calculation uses conventional methods, and the best model relationship is obtained using the Greenshield model. From the calculation results, there was a significant decrease in the maximum volume of 31.77%, at the average speed there was a decrease of 5.01%, and the maximum density increased by 28.13%. From the results of the calculation of the Service Level Index during the Operating hours of the School Safe Zone, ITP D was obtained in the Conditions Before the School Safe Zone. As for the conditions in front of the School Safe Zone, ITP E.

Keywords: *School Safe Zone, Traffic Flow Performance Analysis, Service Level Index.*

1. INTRODUCTION

Rain with moderate to high intensity caused flooding in mid-January 2021 in South Kalimantan Province. This wide-scale flood, triggered by high rainfall since January 9 2021, also inundated 11 regencies/cities in South Kalimantan. The Banjarmasin Campus I area of Lambung Mangkurat University (ULM Campus I) was inundated to a height of 50 cm. Floods caused by high tides coupled with several days of rain inundated most of the campus area which hindered access to learning and administration (Kanal Kalimantan, 2021). Furthermore, the inability of the drainage channel to drain rainwater that falls into the river has exacerbated the overflow of water that occurs, especially to the Campus I ULM road. (Apa Habar, 2021).

The city of Banjarmasin has a relatively flat topographical plain (often inundated by water) with an average height of 0.16 meters below sea level for the entire area.

Located close to the mouth of the Barito River and divided by the Martapura River. It has a soil slope of 0.13% with a geological composition dominated by clay, fine sand, and alluvial deposits and the soil surface is covered by gravel, gravel, sand, and clay that settles in rivers and swamps (BPK Banjarmasin, 2022).

One of the stages of flood control both structural and non-structural requires a good and precise hydrological analysis. The hydrological analysis of the planned flood discharge is shown to determine the estimated flood that can occur so that prevention can be planned. This study aims to analyze the planned flood volume with a certain return period using the Der Weduwen method in a study area of 3.98 km^2 on Campus I ULM.

2. THEORITICAL STUDY

A. School Safe Zone

According to the Regulation of the Director-General of Land Transportation (2018), The School Safety Zone is an activity to give priority to safety and comfort for pedestrians which is part of traffic management and engineering activities in the school area. All schools have the right to implement this school safety zone program, but in its implementation it is necessary to determine the priorities of the school that must come first, including:

1. Schools with surrounding traffic situations endanger pupils, such as high traffic volumes as well as high traffic flow speeds.
2. Schools with traffic jam situations that make it difficult for children to walk, cycle or reach public transport.
3. Schools with traffic jam situations that make it difficult for children to walk, cycle or reach public transport.

B. Degree of Saturation (DS)

The degree of saturation (DS) is defined as the ratio of road current to capacity used as the main factor in determining the level of performance of intersections and road segments (MKJI,1997). To show whether the road segment has a problematic capacity or not, it can be seen from the DS value. To determine the degree of saturation, the following equation is usually used.

$$DS = \frac{V}{C}$$

3. METHOD

The location for conducting this study was the School Safety Zone of SDN 1 Loktabat Utara which is located on the A.Yani Street Km. 32.5, Banjarbaru City, South Kalimantan. Recording traffic flow is carried out one day for 12 hours starting from 06.00-18.00 WITA with intervals per 10 minutes. Data collection is carried out on weekdays because on Sundays school students are off.

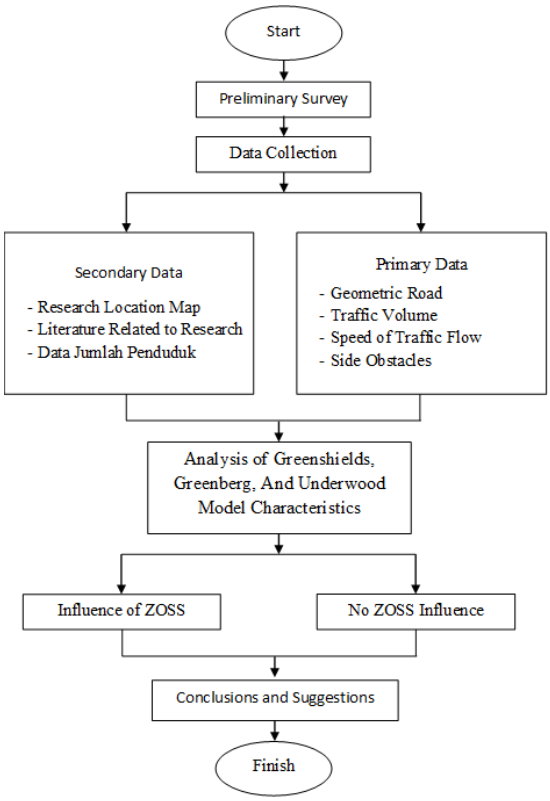

Figure 1 Research Flow Chart

4. RESULT AND DISCUSSION

A. Traffic Volume Data

The traffic volume during the conditions before the School Safety Zone can be seen in Figure 2, and the traffic volume during the conditions in front of the School Safe Zone can be seen in Figure 3.

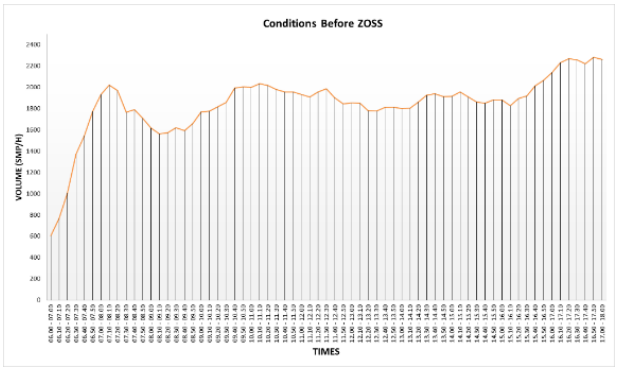

Figure 2 Traffic Volume Conditions before School Safe Zones

From the above, the largest traffic volume in the area before the School Safety Zone in the operational hours of the School Safety Zone occurred at 07.10-08.10 WITA of 2020,04 smp/h.

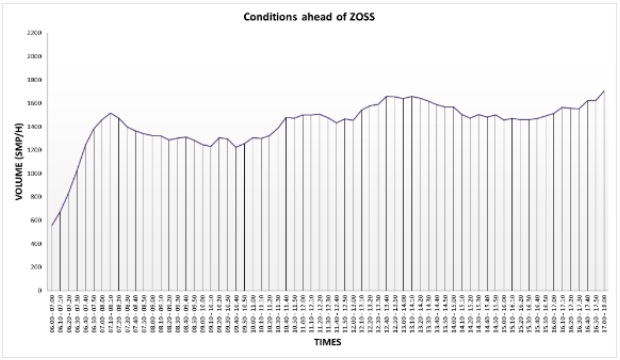

Figure 3 Traffic Volume Conditions In Front Of School Safe Zones

From the picture above, the largest traffic volume in the area in front of the School Safety Zone was obtained during the operational hours of the School Safe Zone occurring at 07.10 - 08.10 WITA of 1516,99 smp/h.

B. Traffic Speed Data

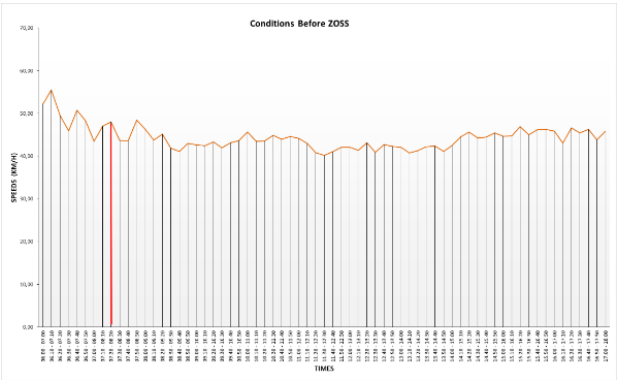

Figure 4 Graph Average Speed In Conditions Before School Safe Zone

It can be seen in Figure 4 that in the area before the School Safety Zone at 07.10-08.10, a speed of 47,02 km / h was obtained.

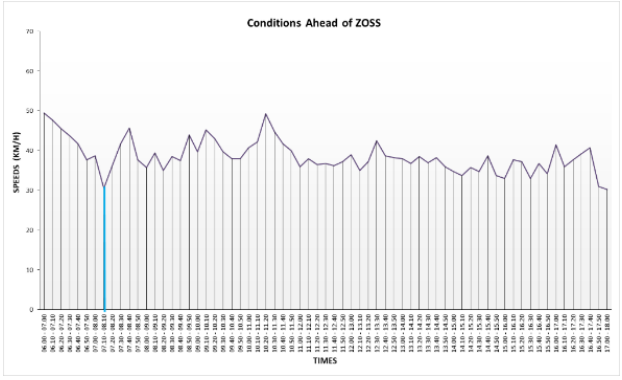

Figure 5 Graph of Average Speed In Front Of The School Safe Zone

It can be seen in Figure 5 that in the area of the School Safety Zone at 07.10-08.10 a speed of 30,50 km / h was obtained. From Figure 5 and Figure 6, it can be seen that the traffic speed in the School Safety Zone area is lower than the traffic in the area before the School Safety Zone. This can happen due to the influence of side obstacles in the School Safety Zone area.

C. Data Analysis Before School Safe Zones

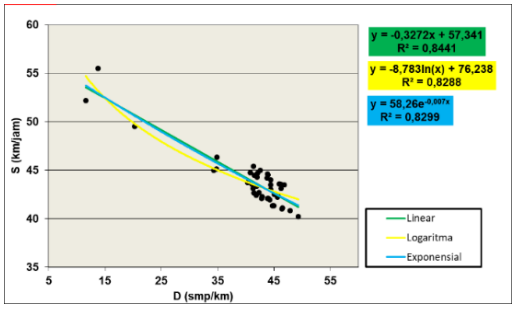

Figure 6 Graph Of Relationships of three equations of speed and density before the School Safe Zone

Table 1 Speed Equation Model – Density and Correlation Before School Safe Zone

Relationship	Equation Model	r^2	R	X	Information
Greenshield	$y = -0,327x + 57,341$	*0,844*	0,919	175,248	Very Strong
Greenberg	$y = -8,783\ln(x) + 76,238$	*0,823*	0,910	5886,406	Very Strong
Underwood	$y = 58,26e^{-0,007x}$	*0,829*	0,911	4064,908	Very Strong

Source: (Analysis Results, 2022)

From the Analysis of the Relationship between the speed and density of the three obtained equations of the model, a high coefficient value is taken with the consideration of a realistic value of x. From Table 1 above, the best model with the most realistic x

value is the Greenshield model which is r = 0,919 and the realistic X is 175,248. And from the equation of determination, it is known that only 84,4% of density affects speed, the rest is influenced by other factors.

From the model of the equation of the relationship between the characteristics of the traffic flow of the conditions before the School Safe Zone can be made a graph as in the following figure.

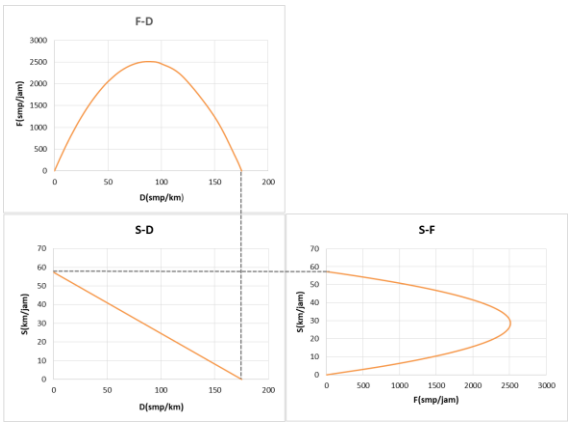

Figure 7 Graph of Relationship of Greenshield Volume, Speed, and Density in Conditions Before School Safe Zones

From the chart in Figure 7, it is obtained that the maximum speed value (Smax) on the road section under review is 57,34 km / h and the maximum volume value (Fc) is 2512 smp/h. The maximum volume value (Fc) obtained also describes the value of the road capacity.

D. Data Analysis of Road Conditions In Front of School Safe Zones

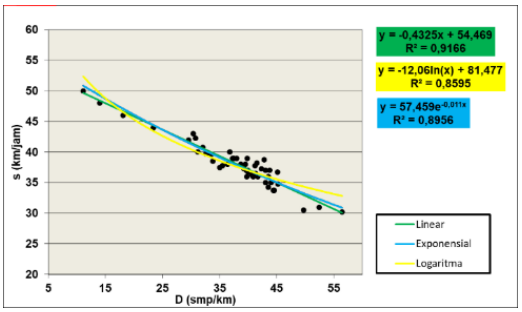

Figure 8 Graph of the Relationship of Three Equations of Speed – Density with the Presence of a School Safe Zone

Table 2 Speed Equation Model – Density and Correlation in Front of The School Safe Zone

Relationship	Equation Model	r^2	r	x	Information
Greenshield	$y = -0,433x + 54,469$	***0,917***	0,957	125,936	Sangat Kuat
Greenberg	$y = -12,06\ln(x) + 81,477$	***0,856***	0,927	858	Sangat Kuat
Underwood	$y = 57,459e^{-0,011x}$	***0,896***	0,946	4051,077	Sangat Kuat

Source: (Analysis Results, 2022)

From the Analysis of the Relationship between the speed and density of the three obtained model equations, a high value of the correlation coefficient is taken with the consideration of a realistic value of x. From Table 2 above the best models with x values, the most realistic is the Greenshield model which is r = 0,957 and the realistic X which is 125,936. And from the equation of determination, it is known that only 91,7% of density affects speed, the rest is influenced by other factors.

From the model of the equation of the relationship between the characteristics of traffic flow in the conditions in front of the School Safe Zone can be made a graph as in the following figure.

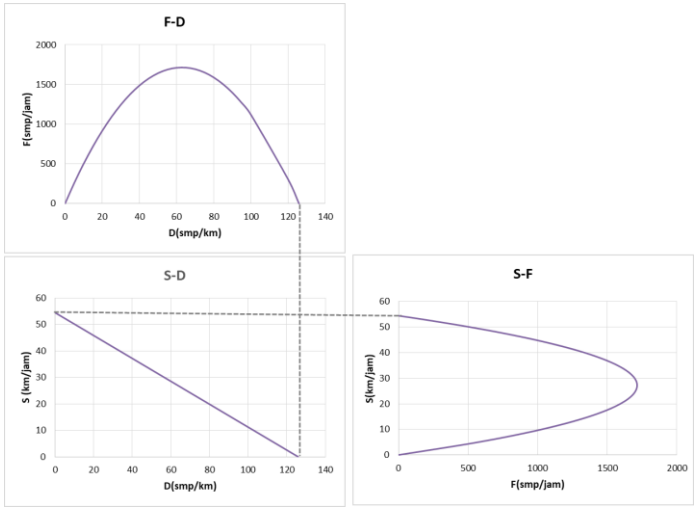

Figure 9 Graph of Greenshield's Relationship of Volume, Speed, and Density to Conditions in Front of the School Safe Zone

From the graph in Figure 9, it is obtained that the free speed value (Smax) on the road section under review is 54.47 km/h and the maximum volume value (Fc) is 1714 SMP / h. The maximum volume value (Fc) obtained also describes the value of the road capacity.

E. Comparison of Conditions Before and In Front of the School Safe Zone

Based on the analysis of the comparison of conditions before the School Safety Zone and in front of the School Safety Zone, the results of estimating the Greenshield

Model parameters obtained a regression analysis technique obtained a model of the relationship between traffic speed (S) - Traffic density (D) so that a Volume (F) value was obtained as can be seen in the following table.

Table 3 Maximum Volume, Speed, and Density Values

Scenario	Smax	Fmax	Dmax
Conditions before ZOSS	57,34 km/h	2512 SMP/jam	175,24 SMP/km
Conditions in front of ZOSS	54,47 km/h	1714 SMP/jam	125,94 SMP/km
Percentage Decrease Due to ZOSS	5,01 %	31,77 %	28,13 %

Source: (Analysis Results, 2022)

F. Calculation of Service Level Analysis and Degree of Saturation

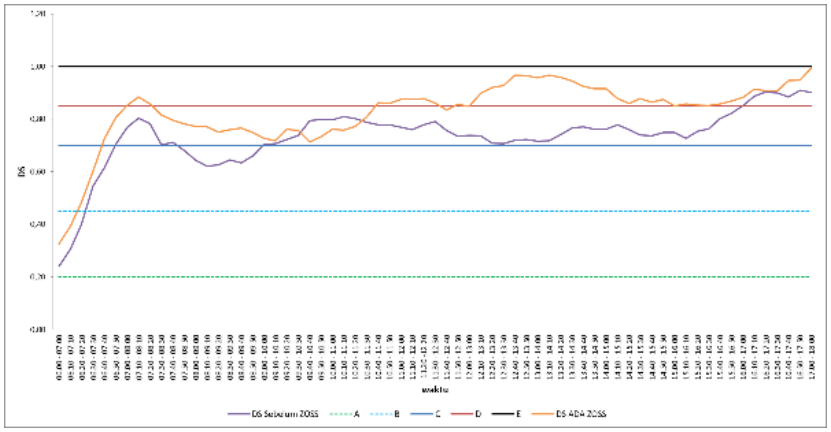

Figure 10 Service Level Index Graph

From Figure 10, it can be seen that in the School Safety Zone area, the degree of saturation is higher than in the area before the School Safety Zone. The level of service in front of the School Safety Zone at the time of operating hours of the School Safe Zone is at 0,88 with level E which according to the Regulation of the Minister of Transportation No. KM 14 2006 means that the traffic volume is close to capacity. Meanwhile, the level of service before the School Safety Zone during the operational hours of the School Safety Zone is at 0,80 with level D which according to the Regulation of the Minister of Transportation No. KM 14 2006 means that it has a near-unstable current condition.

5.CONCLUSIONS

From the analysis of calculations and discussions that have been carried out, various conclusions are obtained:

1. From the results of the study, traffic characteristics on Jalan Ahmad Yani Km 32.5 relationships of volume (V), speed (S), and density (D) obtained the value of the

correlation coefficient (R) with the Greenshield method with a value of 0.919 for conditions before the Safe Zone and amounting to 0,957 for conditions in front of the School Safe Zone.

2. Based on the results of the analysis of the performance level on Jalan Ahmad Yani Km 32.5, the level of service before the School Safety Zone during the operating hours of the School Safety Zone was at 0,80 with level D, which according to the Regulation of the Minister of Transportation No. KM 14 2006 means that the current condition is close to unstable. Meanwhile, the level of service in front of the School Safety Zone during the operating hours of the School Safety Zone is at 0,88 with level E which according to the Regulation of the Minister of Transportation No. KM 14 2006 means that it has a volume close to capacity.
3. The existence of the School Safe Zone of SDN 1 Loktabat Utara on the Ahmad Yani Km 32,5 Road section is quite influential on the performance of the road section. Based on the observations that have been made, there was a significant decrease with a maximum volume of 31,77%, for the average speed there was a decrease of 5,01%, and for the maximum density, there was a decrease of 28,13%.

6. CONCLUSION

The suggestions that can be given by the authors in this study are as follows:

1. It is necessary to anticipate to reduce the congestion on the Ahmad Yani Km 32,5 Road section, is by adding their parking lots and officers who arrange to park so that parents who drive and pick up their children do not park on the side of the road so as not to disturb road traffic, then for parents who will pick up their children can call their teachers first to convey to their children to prepare to be picked up so that parents do not have to wait for their children on the side of the road.
2. For future research, it is better to add a UM (Un Motorcycle) calculation because in conventional modeling UM (Un Motorcycle) enters into a mode that moves in that volume.

REFERENCES

Darat, K. P. D. J. P. 2018. Peraturan Direktur Jendral Perhubungan Darat No. SK. 3582/AJ. 403/DRDJ/2018 tentang Pedoman Teknis Pemberian Prioritas

Keselamatan dan Kenyamanan Pejalan Kaki Pada Kawasan Sekolah Melalui Penyediaan Zona Selamat Sekolah. Jakarta

Direktorat Jenderal Bina Marga. 1997. Manual Kapasitas Jalan Indonesia1997. Bina Karya. Jakarta.

Perhubungan, K. 2006. Peraturan Menteri Perhubungan Nomor: KM 14 Tahun 2006 tentang Manajemen dan Rekayasa Lalu Lintas di Jalan. Menteri Perhubungan. Jakarta.

Radam, I. F., Mulyono, A. T., & Setiadji, B. H. 2015. Influence of Service Factors in the Model of Public Transport Mode: A Banjarmasin–Banjarbaru Route Case Study. International Journal for Traffic and Transport Engineering, 5(2), 108–119.