THE EFFECT OF STREET VENDORS ON TRAFFIC CHARACTERISTICS ON-ROAD SECTION WITH TYPE 2/2 UD (CASE STUDY OF JL. JENDRAL SUDIRMAN IN BANJARMASIN)

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ABSTRACT

The activities reviewed were street vendor activities in the Taman Siring 0 Km area of Banjarmasin, precisely on the edge of Jl. Jendral Sudirman with the length of the road used by street vendors along ±140 meters with a shoulder width of ±1 meter and a road body width of ±1 meter. The activities of street vendors are quite influential on the performance of traffic flow. As a result of the activities of street vendors in Taman Siring in the form of increasing traffic density and speed so that it can cause congestion. The purpose of this study was to determine the influence of street vendor activities on the traffic flow of Jl. Jendral Sudirman. The research conducted was a field survey to find volume and speed data on road sections. The survey was conducted on two conditions, namely conditions with the presence of street vendors and conditions of absence of street vendors. The point is to see the magnitude of the influence.

The calculation used is by conventional methods, and the best model relationship is obtained using the Greenshield model. From the calculation results, there was a slight decrease in the maximum volume of 2.41%, at the average speed there was a decrease of 6.64%, and the maximum density increased by 4.53%.

Keywords: Traffic Characteristics, Road Performance, Street Vendors

1. INTRODUCTION

Street vendors are often found in Siring Sungai Martapura, precisely in front of the Governor's Office (the former office of the Governor of South Kalimantan). It is called Taman Siring 0 Kilometers because here there is a monument point 0 Km Banjarmasin. Apart from being a place to relax, this place also provides beautiful views because it is located around the edge of the Martapura River. There is also a playground and stage for entertainment complete with long circular benches overlooking the stage and there is a river pier on the side of Taman Siring 0 Km Banjarmasin. Street vendors in Siring 0 km Banjarmasin on Jl. Jenderal Sudirman usually sell grilled foods, various fried foods, meatballs, noodles, and drinks and start to get busy from evening to night. While on holidays, many street vendors start selling from the morning.

The influence of street vendors is to eat a road body that is used for traffic movement, but is used as a place to sell street vendors, resulting in traffic flow obstruction

and road users becoming ineffective. Control of street vendors on the road is the most important thing to control traffic so that congestion, pollution and noise can be minimized. In the city of Banjarmasin, the existence of street vendors has become a dilemma that only causes pros and cons, demonstrations, clashes between residents and officials. And with the presence of these street vendors, the roads become narrow which will lead to congestion.

2. LITERATURE REVIEW

2.1   Traffic Flow Characteristics

Traffic flow characteristics are divided into three variables in the traffic flow character analysis process, namely volume, speed, and traffic flow density.

1.   Flow

Traffic flow is the number of vehicles passing a point or part of the road within a certain

period of time which can be expressed in annual, daily, hourly or sub-hourly units, usually

expressed in units of pcu/hour (IHCM, 1997)

2.   Speed

Speed is the distance traveled by vehicles on a certain road segment in units of time, usually

expressed in units of km/hour (Tamin, 2008).

3.   Density

Density is the number of vehicles occupying a length of road or lane, usually expressed in

units of pcu/km (Hendra and Purnawan, 1998).

2.2   Model of Relations Flow, Speed, and Density on Highway Traffic Flow

1.   Greenshields Model

Greenshields model that the relationship between speed and density is linear. This linear relationship between speed and density is a common relationship when examining the movement of traffic flows, considering the relationship function is the simplest and easiest to apply. Greenshields model found that the relationship

between speed and density is a linear curve This model can be written (Tamin, 2008):

$$S = Sf - \left(\frac{Sf}{Dj}\right) D$$

Where:

S   = Average speed (km/hour)

Sf   = Speed in free flow (km/hour)

D   = Average density (pcu/km)

Dj   = Density at traffic jams (pcu/km)

2.   Greenberg Model

Greenberg model assumes that traffic flow is similar to the fluid flow continuity equation or fluid motion equation. This model is not effective at low densities because the velocity is very high (infinity), when the density is close to zero. The mathematical relationship between density and velocity can be expressed in the form of a logarithmic curve. This model can be written (McShane and Roes, 1990):

$$S = Sc. \ln \frac{Dj}{D}$$

Where:

Sc   = Speed at maximum volume (km/hour)

Dj   = Density at traffic jam (pcu/hour)

3.   Underwood Model

Underwood model assumes that the relationship between speed and density is an exponential relationship negative. This model can produce the same speed value as the free-flow speed, so it can be applied to low-density traffic situations.model Underwood is invalid at high density conditions, because the velocity never reaches zero at high density. This model can be written (McShane and Roes, 1990):

$$S = Sf. \exp \frac{-D}{Dc}$$

Where:

Sf   = Speed at free flow conditions (km/hour)

Dj   = Density at maximum volume (pcu/hour)

2.3 Regression Analysis

According to Radam (2010), regression analysis is distinguished by two types of variables, namely the independent variable which is also called the X variable and the dependent variable which is also called the Y variable. The dependent variable is the variable that occurs due to the independent variable. According to Radam et al. (2015), the interpretation of the value of r on the strength of the correlation can be seen in Table 1.

Table 1. Interpretation of the R Value Based on the Correlation Coefficient

| R^2 Value	The absolute value of the correlation coefficient ($|r|$)	Interpretation
< 0.04	0.00 – 0.199	Slight correlation; almost negligible relationship
0.04	0.20 – 0.399	Low correlation; clear but small relationship
0.16	0.40 – 0.699	Medium correlation; substantial relationship
0.49	0.70 – 0.899	Strong correlation; marked relationship
0.81	0.90 – 1000	Very strong correlation; very reliable relationship

3. RESEARCH

The location for conducting this research is a street vendor area in the Siring 0 km area of Banjarmasin which is located on Jl. Jendral Sudirman, Banjarmasin, South Kalimantan. The length of the road used by street vendors is ±140 meters with a shoulder width of ±1 meter and a road body of ±1 meter.

The data taken is primary data, namely, traffic counting which was carried out on Thursday, March 31, 2022 in 12 hours of observation, i.e. 08.00-20.00 WITA, covering traffic volume and speed data with an interval of retrieval time of every 10 minutes with a total surveyor of 6 people.

4. RESULT AND DISCUSSION
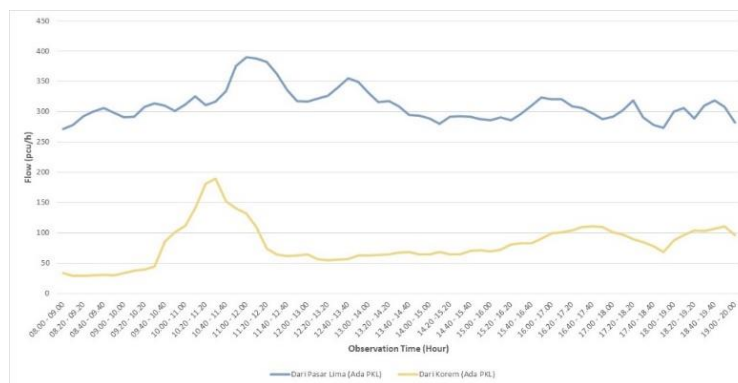
4.1 Traffic Flow Data

Graph of fluctuations in traffic flow when there are no street vendors can be seen in Figure 1.
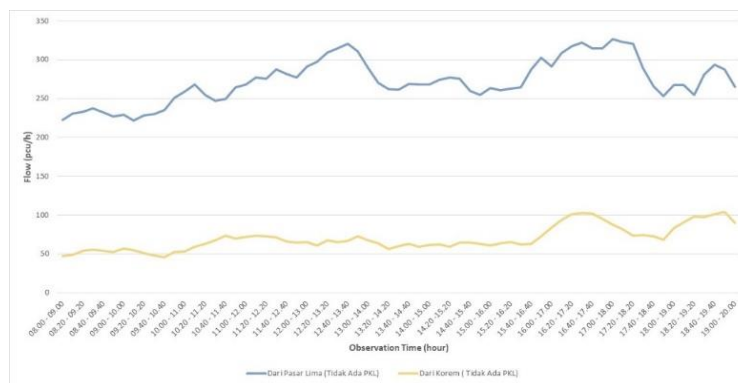
Figure 1. Graph of Traffic Flow Fluctuations in the Condition Without Street Vendors

From Figure 1. it is found that the largest traffic flow occurs at 17.00 – 18.00 WITA at 326.5 smp/hour.

While the graph of fluctuations in traffic flow in the condition of the presence of street vendors can be seen in Figure 2.
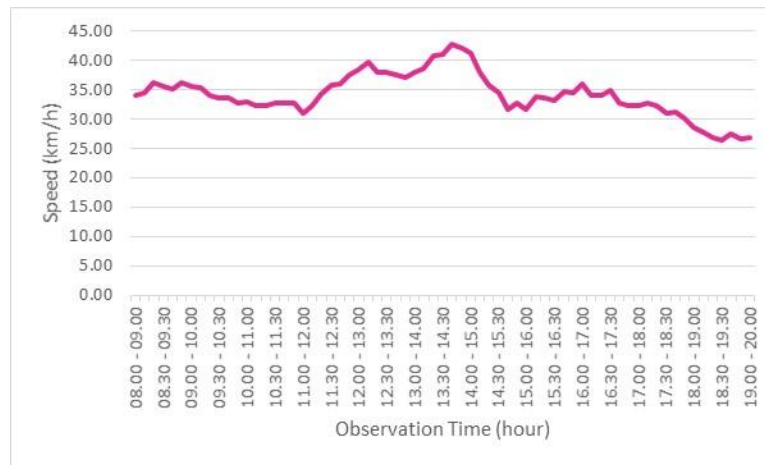

Figure 2. Graph of Traffic Flow Fluctuations in Condition of Street Vendors

From Figure 2, it can be seen that the largest traffic flow occurred at 11.00 – 12.00 WITA at 389.65 pcu/hour.
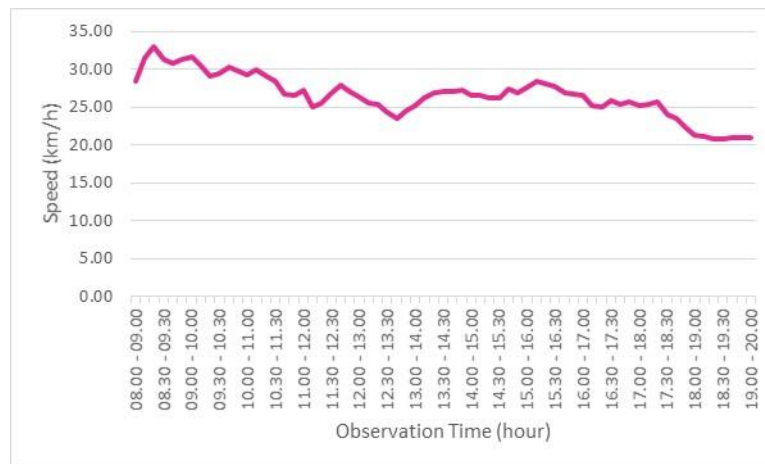
4.2 Traffic Speed Data

Graph of traffic speed fluctuations when there are no street vendors can be seen in Figure 3.

Figure 3. Graph of Traffic Speed Fluctuations in Condition Without Street Vendors

From Figure 3, it can be seen that the highest speed occurred at 13.40 – 14.40 WITA, namely 42.83 km/hour.

And the graph of fluctuations in traffic speed in conditions of street vendors can be seen in Figure 4.

Figure 4. Graph of Fluctuations in Traffic Speed Conditions with Street Vendors

From Figure 4 it can be seen that the highest speed occurred at 08.20 – 9.20 WITA, which was 32.94 km/hour.

4.3   Comparison of Conditions Without Street Vendors and with Street Vendors

Comparison of the value of traffic characteristics with conditions without street vendors for each model as a whole can be seen in Table 2.

Table 2. Comparison of Values of Traffic Characteristics Condition Without Street Vendors

CHARACTERISTICS	Model		
	Greenshields	Greenberg	Underwood
Sf (km/h)	52.118	110.50	57.062
Sm (km/h)	26.059	17.29	20.992
Dj (pcu/hour)	24.313	59.646	115
Dm (pcu/hour)	12.157	21.943	15.873
Fc (pcu/hour)	316.790	379.389	333.205
Correlation coefficient	0.811	0.806	0.818

While the comparison of the value of traffic characteristics with the condition of the presence of street vendors for each model as a whole can be seen in Table 3.

Table 3. Comparison of the Values of Traffic Characteristics of the Condition of Street Vendors

| CHARACTERISTICS	Model		
	Greenshields	Greenberg	Underwood
Sf (km/h)	48.659	131.58	61.866
Dj (pcu/hour)	25.415	38.013	100
Dm (pcu/hour)	12.707	13.984	13.514
Fc (pcu/hour)	309.164	309.749	307.557
Correlation coefficient	0.912	0.912	0.913

Based on the analysis of the comparison between conditions with the presence of street vendors and conditions without street vendors that the maximum flow value that occurs in conditions without street vendors is 316,790 pcu/hour with a maximum speed of 52,118 km/hour, and the condition with the presence of street vendors on Jl. Jendral Sudirman is 309,164 smp/hour with a maximum speed of 48,659 km/hour. Judging from the difference in flow and maximum speed obtained from the best relationship model chosen, namely the Greenshields for both conditions, this means that the activities of street vendors on Jl. Jendral Sudirman have quite an effect on road capacity.

The results of the estimated parameters of the Greenshields, the regression analysis technique obtained a relationship model between traffic speed (S) - Traffic density (D) so that the Flow (F) value was obtained as can be seen in Table 4.

Table 4. Comparison of Values between Conditions of Merchants Street Vendors and Without Street Vendors with the Selected Model

Scenario	Conditions Without Street Vendors	Conditions with Street Vendors	Percentage Decrease/Increase Due to Street Vendors
Sf (km/hour)	52,118	48,659	6.64%
Sm (km/hour)	26,059	24,3295	6.64%
Dj (pcu/hour)	24,313	25,415	4.53%
Dm (pcu/hour)	12.157	12.707	4.53%
Fc (pcu/hour)	316,790	309,164	2.41%
Correlation coefficient	0.811	0.912	12.45%

Based on Table 4. the results obtained are a decrease in road performance when there are street vendors at a speed of 6.64%. Then for the flow when there are street vendors there is a decrease of 2.41%. In density there was an increase of 4.53% after the presence of street vendors. Furthermore, the relationship equation model of Speed (S) – Density (D), Flow (F) – Density (D), and Flow (F) – Speed (S) is a combination of the two scenarios without the presence of street vendors and with the presence of street vendors such as which can be seen in Figure 5.
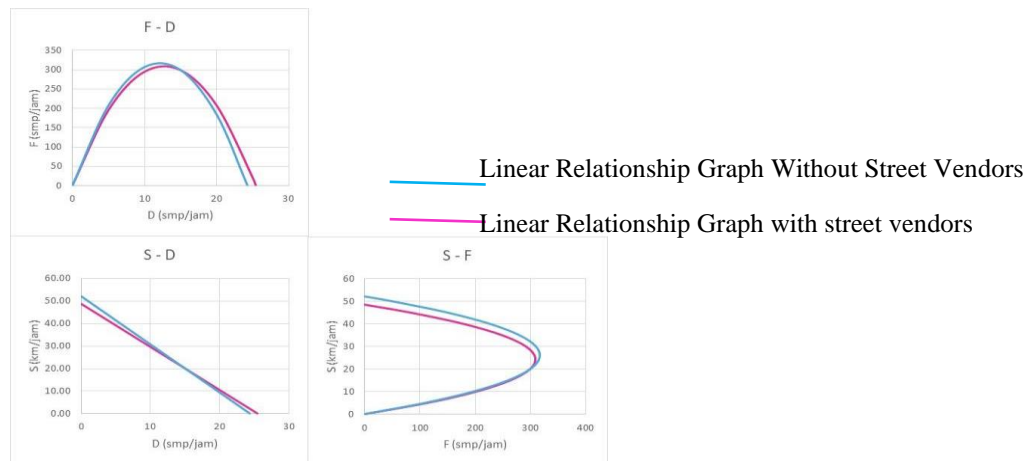
Figure 5. Graph of the Combined Relationship between Without Street Vendors and the Presence of Street Vendors with the Selected Model

5.CONCLUSIONS

Based on the results of data processing and work analysis on the Jl. Jendral Sudirman in Banjarmasin caused by the activities of street vendors with the length of the road used ±140 meters and the width of the road used ±1 meter, the following conclusions can be drawn:

1. There are no street vendors, the selected characteristic relationship model is the Greenshields model with a correlation coefficient of 0.811, a maximum flow of 316.79 pcu/hour and an average speed of 52.118 km/hour.

2. In the condition of the presence of street vendors, the selected characteristic relationship model is the Greenshields model with a correlation coefficient of 0.912, a maximum flow of 309.164 pcu/hour and an average speed of 48.659 km/hour.

3. The activities of street vendors on the Jl. Jendral Sudirman section have little effect on the performance of the road section. Based on observations that have been made there is a slight decrease with the maximum flow of 2.41%, and for density there is an increase of 4.53%.

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