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PASSENGER CAR SPEED ASSESSMENT RELATIONSHIP TO THE NOISE CAUSED

Syaiful Syaiful, Rendi Andana
Civil Engineering Departement, Ibn Khaldun University, INDONESIA
E-mail: syaiful@ft.uika-bogor.ac.id and afirfa14@gmail.com

ABSTRACT

Noise is defined as a human unwanted sound. The main sources of noise on toll roads are heavy vehicles and light vehicles. Noise pollution is often interpreted as unwanted sound or wrong sound at the wrong time. as heavy industry grows, traffic crowds, transportation facilities, and excessive use of audio technology. In addition there is generally noise strongly related to annoyance. Noise is everywhere and disturbance is one of the most common reactions to noise.. Speed is the size of a vector that shows how fast objects move. This research aims to find out the level of traffic noise and its distribution in front of SDN Cimahpar 01. The research method uses multiple linear analysis with the SPSS program by entering traffic data, vehicle speed and noise generated. The results were obtained that in SDN Cimahpar 01 area with the highest linear regression value between speed and noise that arises is 98% with linear regression equation y= 52,390+0.298x1+0.229x2+0.245x3+0.205x4. Based on the similarity, the noise level value generated by the speed of the vehicle is 52.39 dBA with the provision of no increase or decrease in vehicle speed, this noise level is very strong because above the raw value of the activity noise level set by the Decree of the Minister of Environment No. 48 of 1996 which is 80 dBA.

Keywords: passenger; noise; speed; deibel ampere; transportation.

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INTRODUCTION

The road is a source of noise, especially on the side of the road, there are schools for education when the noise pollution disturbs the concentration of the teaching and learning process at the school. This is due to the large number of motorized vehicles used, compared to other vehicles. In addition, the increase in the regional economy also causes the need for other means of transportation such as buses and trucks to increase (Buchary, 2007); (Ditjen Bina Marga, 1997); Djalante, Susantu, 2012). As a result, the number of traffic flows and the types of vehicles using road sections is increasing. This has an impact, one of which is the impact of noise or noise pollution caused by traffic.

By looking at this fact, it is only fitting that the noise on the road gets a special portion to be discussed separately. Like the surrounding SDN Cimahpar 01, it has a higher noise source than other schools so that the noise level is quite high.

The purpose of this study is to determine how much the relationship between motor vehicle speed and the noise generated and to provide alternative solutions in minimizing the noise level generated (H.S.Huboyo, S.Sumiyati, 2008).

Noise caused by motorized vehicles greatly affects the catch of the listeners. For public transport passengers, for example, if the sound of the vehicle being boarded experiences a high sound level it will cause hearing loss to the passenger (Syaiful and A. Lutfi, 2020); (Syaiful, 2015); (Thamrin and Syaiful, 2016). Hearing of passengers to noise will cause over time to become deaf in one side or permanent deafness. It is necessary to avoid hearing which results in noise in the ears. The government in this case must pay attention to and carry out periodic checks on the condition of operating public transport, whether it has met the noise threshold or not. The government's heavy duty is to curb public transportation that makes ear noise (S.Syaiful, A. Fadly, 2020); M.Mubarak, et.al, 2020); (S.Syaiful, S.W.Mudjanarko, 2020); S.Syaiful, Y.Elvira, 2017).

Noise

Noise can be defined as an unwelcome sound, an annoying sound or an irritating sound. Noise is something that is avoided by anyone, especially in carrying out a job, because the concentration of workers will be disturbed. With the disruption of this concentration, the work carried out will result in many mistakes or damage which will cause losses. The frequency of noise is also important in determining subjective feelings, but the danger in the noise area depends on the existing noise frequency (Menteri Negara Lingkungan Hidup,1996).

Noise can cause hearing loss, including acoustic trauma, temporary deafness, and permanent deafness. Acoustic trauma is hearing loss caused by single exposure due to very high noise intensity and occurs suddenly. Temporary deafness is hearing loss that is temporary in nature, hearing power can recover from a few minutes to several days (3-10 days).

Threshold value (NAB)

The noise threshold value refers to the Decree of the Minister of Manpower No. 51/KEPMEN/1999. This threshold value uses a standard of workplace noise that can be accepted by workers without causing illness or health problems in their daily work for a time not exceeding 8 hours a day or 40 hours a week. Intensity and Hours of Work are permitted, noise NAV is shown in table 1 below.

Table 1. Threshold Values

Exposure time a day	Time intensity of	Noise (NAB)
1	hour	3
8	hours	85
4	hours	88
2	hours	91
1	minute	94
30	minute	97
1.5	minute	100
7.5	minute	103
3.75	minute	106
1.88	minute	109
0.94	minute	112

Note: must not be exposed to more than 140 dBA even for a moment.

Roads

Road is a land transportation infrastructure which includes all parts of the road, including complementary buildings and equipment intended for traffic, which are on the ground surface, above the ground level, below the ground and / or water surface.

Speed

Velocity is a vector quantity that shows how fast an object is moving. The magnitude of this vector is called the velocity and is expressed in meters per second (m / s or ms − 1).

The formula for calculating speed (Ditjen Bina Marga 1997):

Us = d / t……..(1)

With :

Us = speed (km/hours, m/s)

d = mileage (km/m)

t = traveling time (hour/second)

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Research Data Analysis

Vehicle speed data and noise data in the field have been collected from each observation that has been processed, then the data is analyzed whether the speed of motorized vehicles affects the noise that occurs. Analysis of the research data used the assistance of the 23.00 SPSS program (Duwi Priyatno, 2010).

1. Regression Analysis

Regression is a measure of the relationship between two or more variables which is expressed in terms of a relationship or function. To determine the form of the relationship, it is necessary to separate the independent variables which are often given the symbol X, and the dependent variables with the symbol Y have the same thing.

2. Multiple linear regression analysis

Used to determine the relationship or influence between two or more independent variables (X) and one dependent variable (Y) which is displayed in the form of a regression equation, the multiple linear formula with four independent variables is:

$Y^1 = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4$……………………………………………..……………..(2)

With:

Y^1 = The dependent variable that is predicted

x1,x2,x3,x4 = Independent variable (independent)

a = Constant value

b1,b2,b3,b4 = Reressin coefficient

Correlation

Correlation is the relationship between two or more independent variables together and associated with the next variable, so that it can be seen how much the contribution of the independent variable that is the object of research to the following variables is shown in Table 2 below.

Table 2. Interpretation Relationship Value Coefficient Correlation (R)

Number	Correlation	Relationship
1	0.0-0.199	Very low
2	0.20-0.399	Low
3	0.40-0.599	Moderate
4	0.60-0.799	Strong
5	0.80-1000	Very strong

Hypotesis

Ha = There is a significant influence between the speed of motorbikes, passenger cars, public transport cars, and freight cars with noise.

Ho = There is no significant influence between the speed of motorbikes, passenger cars, public transportation cars, and freight cars with noise a = 5.00%

RESEARCH METHODS

Time and Place

At this stage the researchers studied the field conditions directly with the aim of obtaining complete initial information about the noise that occurred on the road to Cimahpar 01 which is addressed at Rd. Tumenggung Wiradiredja 105, Cimahpar Sub-District, North Bogor City, Bogor City, West Java. The time of the research was carried out for 4 (four) days starting on July 13-14 2020 and July 18-19 2020 can be seen in Figure 1 below.

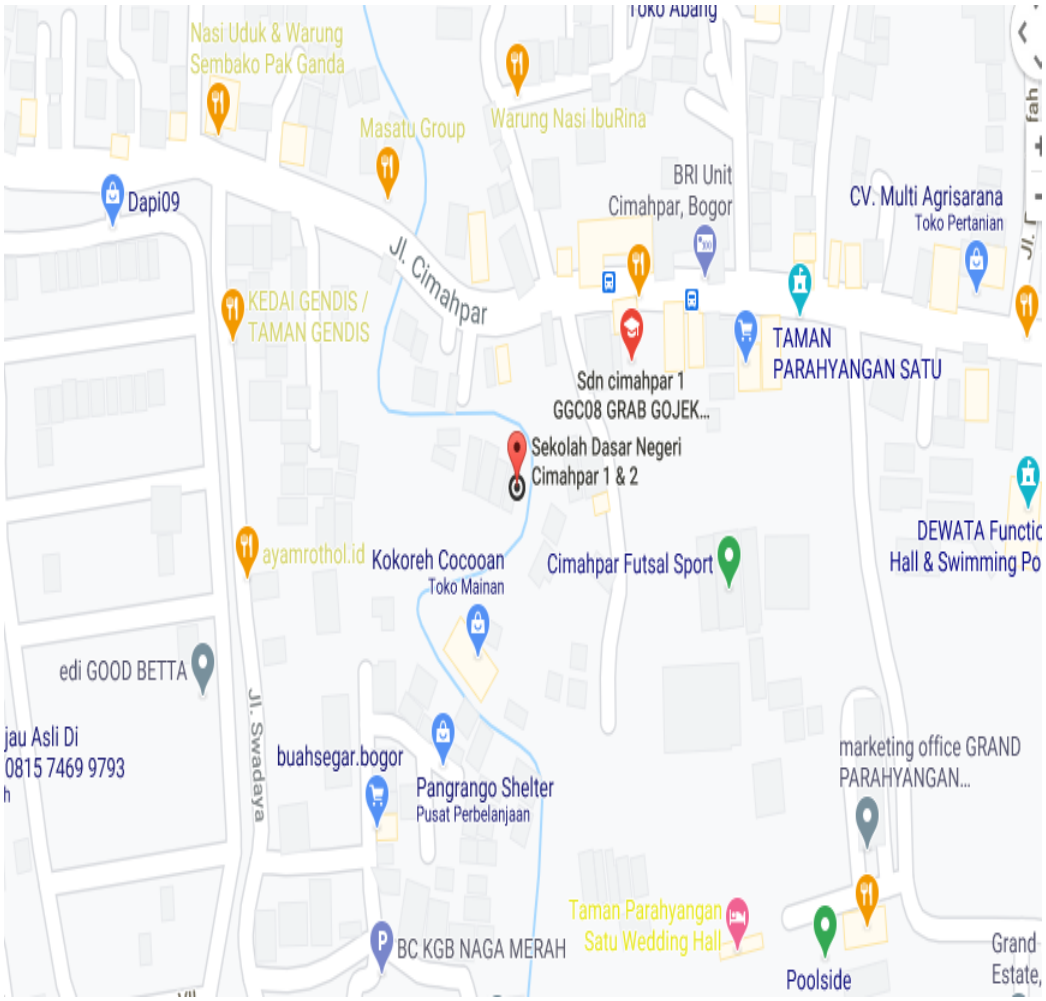

Figure 1. Location Map Source: Googlemap 2020

.Procedure

The way this research works is described based on the stages shown in the research flow diagram shown in Figure 2 below.

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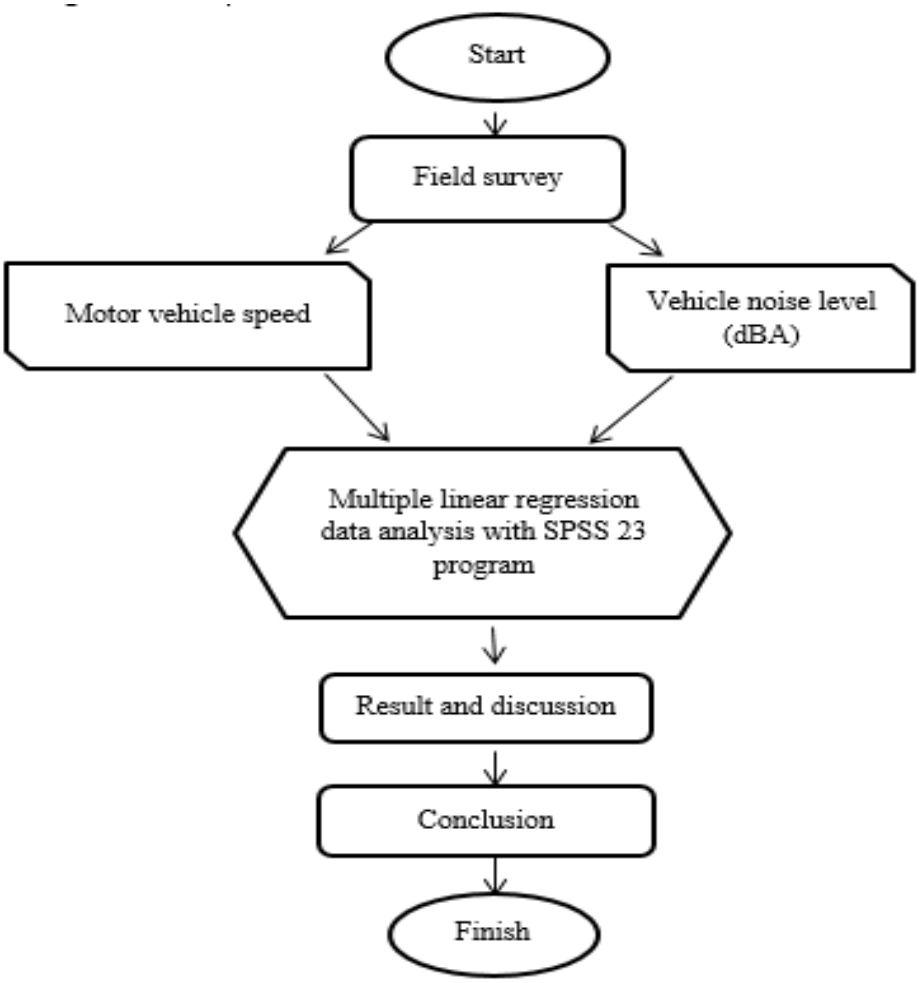

Figure 2. Research Methods

RESULTS AND DISCUSSION

The results of the speed calculation are as follows, where a sample of motorcycle data is taken for a span of 15 minutes with details U = d / t or distance divided by time. The distance taken is 30m.

Example calculation.

The time data required in the 60 m range is

Time taken (t) = 10.21 seconds

Observation distance (d) = 60 m

Number of vehicles / spm (s) = 672 vehicles

The results were obtained as below.

Speed (Us) = 60/1000

10,21/3600

= 21,15 km/hours

Based on the calculation results for each activity, the variations and fluctuations of each motorized vehicle speed were obtained. The results obtained indicate that there are peak hours which greatly affect the speed of motorized vehicles. These results are shown in table 3 below.

Table 3. Results of Maximum Motor Vehicle Speed

No	Vehicles	Maximum speed km/hours
1	Motorcycle	23,11
	Private car	26,62
	Public transport car	23,79
	Freight car	25,70
2	Motorcycle	23,04
	Private car	26,73
	Public transport car	23,81
	Freight car	26,64
3	Motorcycle	23,81
	Private car	26,22
	Public transport car	23,58
	Freight car	24,87
4	Motorcycle	26,67
	Private car	24,81
	Public transport car	24,58
	Freight car	23,57

The following shows the results of the SLM calculation obtained on the same day based on the same research day. The SLM calculation results obtained are shown in table 4 below.

Table 4. SLM Noise Level Calculation Results

No	SLM type based on distance	SLM dBA
1	SLM 1 distance 0,00 m	77,29
	SLM 2 distance 5,00 m	66,93
	SLM 3 distance 7,50 m	56,09
2	SLM 1 distance 0,00 m	76,77
	SLM 2 distance 5,00 m	66,46
	SLM 3 distance 7,50 m	56,10
3	SLM 1 distance 0,00 m	76,10
	SLM 2 distance 5,00 m	65,61
	SLM 3 distance 7,50 m	55,64
4	SLM 1 distance 0,00 m	77,23

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SLM 2 distance 5,00 m	66,40
SLM 3 distance 7,50 m	56,67

Discussion of the Results of the Research

The analysis discussion on the first day for a distance of 0.00 m 5.00 m and 7.50 m from the edge of the highway is the result of statistical tests carried out, it can be concluded that the relationship between motor vehicle speed and low noise and there is no significant effect between speed and Noise on SLM 1, SLM 2 and SLM Furthermore, the analysis discussion on the second day for a distance of 0.00 m from the edge of the highway is the result of statistical tests carried out, it can be concluded that the relationship between motor vehicle speed and low noise is not significant and there is no significant influence between speed and noise at SLM 1. However, for a distance of 5.00 m and 7.50 m the results of the hypothesis decision on the relationship between speed and noise are moderate and provide a significant influence between vehicle speed on noise on SLM 2 and SLM

The analysis discussion on the third day for a distance of 0.00 m, 5.00 m and 7.50 from the edge of the highway is the result of statistical tests carried out, it can be concluded that the relationship between motor vehicle speed and noise is low and there is no significant effect between speed. and noise on SLM 1, SLM 2 and SLM On the fourth day for a distance of 0.00 m, 5.00 m and 7.50 from the edge of the highway is the result of statistical tests carried out, it can be concluded that the relationship between motor vehicle speed and noise very high and there is no significant influence between speed and noise on SLM 1, SLM 2 and SLM 3. The following is shown in Table 5 the results of statistical tests and recapitulation of their calculations.

Table 5. Discussion of recapitulation results of the calculation of the noise level SLM

No	SLM	Value R	Equation	Relationship
1	1	0.966	y=63.948+0.228x1+0.124x2+0.153x3+0.045x4	**Very strong**
	2	0.667	y=63.672+0.127x1-0.045x2+0.058x3+0.095x4	**Strong**
	3	0.931	y=47.219+0.203x1+0.74x2+0.24x3+0.68x4	**Very strong**
2	1	0.980	y=52.390+0.298x1+0.229x2+0.245x3+0.205x4	**Very strong**
	2	0.946	y=50.764+0.386x1+0.279x2-0.052x3+0.031x4	**Very strong**
	3	0.836	y=45.798+0.175x1+0.396x2-0.095x3-0.075x4	**Very strong**
3	1	0.736	y=82.505-0.087x1+0.005x2-0.033x3-0.144x4.	**Strong**
	2	0.698	y=66.446+0.284x1-0.071x2-0.388x3+0.194x4	**Strong**
	3	0.974	y=68.446+0.288x1-0.002x2-0.566x3-0.211x4	**Very strong**
4	1	0.347	y=75.483+0.015x1-0.125x2+0.028x3-0.093x4.	**Low**
	2	0.036	y=63.660-0.017x1+0.127x2+0.110x3-0.103x4	**Low**
	3	0.787	y=270.232-1.541x1+336x2-4.419x3-2952x4	**Strong**

CONCLUSION

From the results and discussion, the highest linear regression value between the speed and noise that occurs is 98% with the linear regression equation, namely y = 52.390 + 0.298x1 + 0.229x2 + 0.245x3 + 0.205x4. Based on this equation the noise level value caused by vehicle speed is 52.39 dBA provided that there is no increase or decrease in vehicle speed. 48 of 1996, namely 80 dBA

Based on the above conclusions, the suggestion to be conveyed is that there is still a need for noise control efforts in the area around SDN CIMAHPAR 01 by informing them to choose another alternative road and the school can install a wall with the material used in the classroom to support the recommended reverberation time in the room. Study.

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