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GREEN TRANSPORTATION IN REVIEW FROM THE ASPECT OF NOISE

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Abstract. *Study This aims to produce Green Transportation under review from aspect noise . analyze level noise consequence activity transportation with raw quality level noise in accordance area allotment or environment based on Decree of the Minister of State for the Environment Life No KEP 48/MENLH/11/1996. Study This is studies case Where focus the problem only on the level calculation prediction consequence Then cross with the Calculation of Road Traffic Noise (CoRTN) formula and measurements noise with Sound Level Meter (SLM) as well data collection using questionnaire. Data analysis used are normality test, univariate and independent sample test. Based on results survey noise and calculations CoRTN got level noise Then cross on the road General Sudirman, on the day thursday and monday obtained level noise average Lowest with SLM is 71.30 dB ie located at the location of Jalan Jenderal Sudirman on the day Thursday 16.30 – 17.30. while the highest generated at the location of Jalan Jenderal Sudirman on the day Thursday at 07.00 - 08.00 at 75.52 dB. Based on results from questionnaire with testing independent Test sample obtained level noise Then the average traffic at the location of Jalan Jenderal Sudirman is 51.45 dB and general mark intensity the resulting noise Good with Sound Level Meter tool as well with calculation equality empirical , has exceed standard raw quality that has set in the Decree of the State Minister for the Environment Life No. KEP.48/MENLH/11/1996. Based on results questionnaire with testing Independent Sample Test on the SPSS 17 application, obtained level noise Then the average traffic at Jalan Jenderal Sudirman is 51.45 dB*

Keywords*: Quality Standards, Calculation of Road Traffic Noise (CoRTN), Noise, Sound Level Meter (SLM).*

1. INTRODUCTION

Noise is an unwanted sound because it is not in accordance with the context of space and time so that it can cause interference with human comfort and health [1], [2]. The frequency of sound that can be heard by humans is between 20 to 20000 Hz. The frequency of speech is in the range of 500-2000 Hz. In accordance with the Decree of the State Minister of Environment No KEP 48 / MENLH / 11/1996, the standard noise level should not exceed 55 dB, and for environmental areas, office and trade areas should not exceed 65 dB [3], [4]. Along Jalan Jendral Sudirman is a section of road adjacent to many public facilities, residential areas, educational, office and health facilities as well as places of worship directly facing the road. Jalan Jendral Sudirman is a road with a fairly dense traffic volume as well as various vehicle speeds, especially when entering rush hours which causes an increase in noise pollution intensity. Land transport contributes significantly to half of SPM10's total emissions, for most lead, CO, HC, and NOx in urban areas, with the main concentration occurring in heavy traffic areas, where air pollution levels have and/or are close to exceeding ambient air quality standards [5]–[7] . on Jalan Jendral Sudirman. In addition, it can also compare the noise level due to transportation activities with the quality standards of noise levels according to the designation of the area or environment based on the decree of the State Minister of Environment No KEP 48 / MENLH / 11/1996. This research is expected to provide solutions for controlling or handling noise due to transportation activities.

2. LITERATURE REVIEW

2.1 Transportation

Transportation is the activity of moving goods and people from the place of origin to the destination. Transportation serves as a supporting factor for development and service providers for economic development (Sani, 2010). Estimates from a 1994 World Bank study (Indonesia Environment and Development) show that vehicles in Jakarta (estimated to be the same condition in other big cities) contribute 100% lead, 42% SPM10, 89% hydrocarbons, 64% nitrogen oxides and almost all carbon monoxide [8]. The purpose of this study is to determine the level of noise due to transportation activities Based on the Decree of the Minister of Environment what is meant by noise is unwanted noise from businesses or activities at a certain level and time that can cause disruption to human health and environmental comfort or all unwanted sounds originating from production process tools and / or work tools at a certain level can cause hearing loss (Kep.Men48/MEN. LH/11/1996). Transportation is divided into three types, namely: land transportation, water transportation, air transportation. Land transportation cannot be separated from the activities of motorized vehicles, the increasing ownership of motorized vehicles, both privately owned and used for business, further increases the density of traffic flow on the highway. Transportation can reduce environmental quality caused by dense traffic flow, among others: noise, air pollution and vibration (Zaini, 2013).

2.2 Impact of noise on health

Noise level monitoring can be done with a sound level meter. The main impact of noise is damage to the senses of the listener. At first the effects of noise on hearing are temporary and recovery occurs quickly after exposure is stopped. But continuous exposure causes permanent damage to the senses of hearing. The impact of noise depends on the size of the noise level. This is due to the large use of motorized vehicles and other types of vehicles. Noise level is a measure of sound energy expressed in units of deciBell (dB). Noise level monitoring can be done with the Sound Level Meter tool.

2.3 Noise Handling

Based on Pd T-16-2005-B on "Mitigation of the Impact of Noise Due to Road Traffic", handling noise at noise sources can be done through the following:

- Traffic Management is intended to reduce the volume of vehicular traffic passing through a road. This can be done by carrying out traffic engineering and ring road construction to reduce the burden on the urban road network. Good traffic management can reduce noise levels by 2 to 5 dB.
- Heavy Vehicle Restrictions Heavy vehicles have a major influence on the noise level due to road traffic. Restrictions on the type of heavy vehicle can be done to reduce the impact of noise on existing sensitive areas. Limiting heavy vehicles by 10% can reduce noise levels by up to 3.5 dB.
- Speed Setting Traffic speed settings in the speed range of 30 - 60 km/h can reduce noise levels by 1 - 5 dB.
- Road Slope Improvement Road slope has a direct effect on noise levels. A 1% reduction in flatness can reduce noise levels by 0.3 dB.
- At speeds above 80 km/h, replacing solid concrete asphalt pavement (non-uniform grained) with open asphalt pavement (uniformly grained) can reduce traffic noise levels by up to 4 dB

3. RESEARCH METHODS

This research was conducted on Jendral Sudirman street in Pekanbaru City. The research materials and tools needed in this study are as follows:

1. Sound Level meter (GM type 1352) Is a major tool in noise research. SLM is used to measure noise intensity. The SLM used is a digital SLM that is able to measure the level of effective sound pressure in decibels (dB). It measures noise on a scale between 30-130 dB and a frequency of 20-20,000 Hz.

2. Stopwatch Used to calculate vehicle travel time and in reading sound level meter numbers based on a random sample of vehicle types.
3. Roll Meter Used to measure vehicle mileage to be used as a benchmark for observing vehicle speed.
   Tripod: Used for support for more stable measurements [9]

3.1 Secondary Data

Secondary data is research data obtained indirectly: for example through books, archives / journals both published and not published in general. Secondary data collection is obtained from:

1. Pekanbaru Number of inhabitants [10]
2. Indonesian Road Capacity Manual (MKJI) 1997 [11].

3.2 Primary Data

Field research, which is to obtain data directly from the field to obtain the data needed. Field research is carried out by survey method. The data collected are vehicle volume data, vehicle speed data, field noise level measurement data with Sound Level Meter (GM 1352) and Questionnaire tools.

1. Traffic volume data retrieval

Data collection to determine the level of noise on the road is carried out simultaneously at predetermined times, namely morning, afternoon, and evening at each sample point [12], [13]. However, before data collection is carried out, it is necessary to give some explanation to the surveyor so that in carrying out the surveyor's duties know his duties and responsibilities in accordance with what has been given. The traffic survey conducted was one-way road [14]. The survey is conducted for 2 (two) days and selected on certain days, then it is chosen, namely on the working day of the survey starting at 07.00 WIB and ending at 17.30 WIB. The time interval used at each point/location is + 1 (one) hour. For time at Point I (first) located in front of the Great Mosque AR-Rahman Jenderal Sudirman street. In the morning it starts at 07.00 WIB to 08.00 WIB, during the day starts at 11.30 WIB to 12.30 WIB, in the afternoon it starts at 16.30 WIB to 17.30 WIB. Traffic volume data obtained by enumerating all vehicles passing through the road section studied. The types of vehicles in the field are distinguished in motorcycles, light vehicles (LV) and heavy vehicles (HV), which will later be used also to find the percentage of heavy vehicles. Vehicle volume data retrieval every 15-minute interval [15], [16]. The number of surveyors needed is 1 (one) observer. For vehicle speed, speed data collection is obtained by measuring the amount of travel time needed to pass a road segment, then recorded in the survey form provided.

4. RESULTS AND DISCUSSION

The speed of the vehicle greatly affects the high and low noise levels. The faster the vehicle, the higher the noise level produced

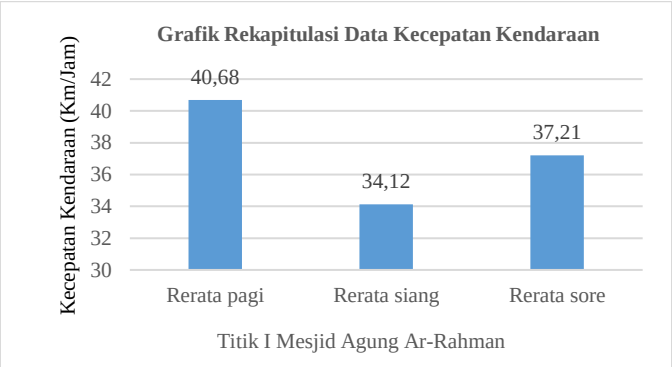

Figure 1. Thursday's vehicle speed data recapitulation graph

The results of enumerating vehicle volumes produce fluctuating data. The magnitude of the volume of vehicles on Thursday and Monday is shown in the graph

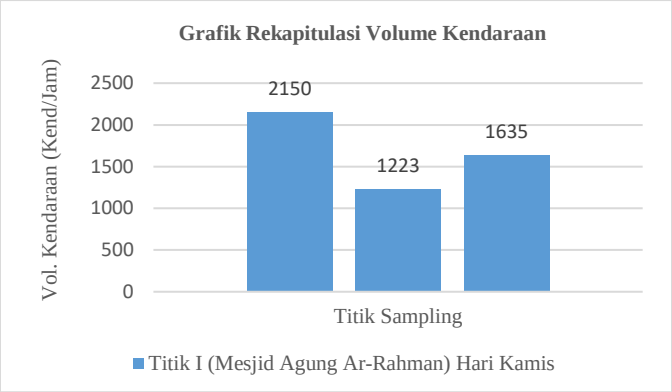

Figure 3. Vehicle volume recapitulation graph

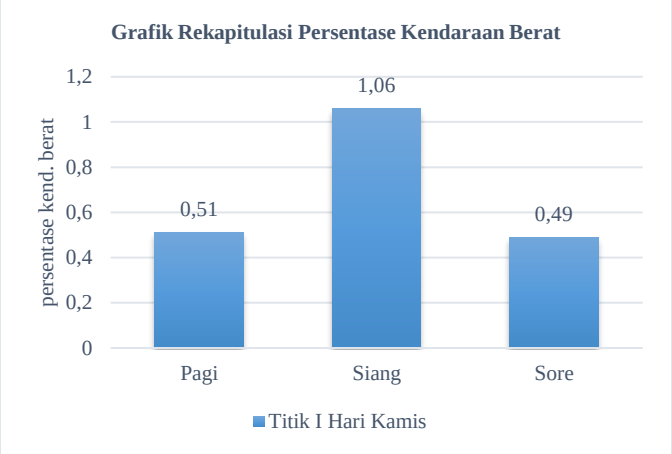

Figure 4. Heavy vehicle percentage graph

Results of noise level measurement with Sound Level Meter (GM 1352) sampling point on Thursday. The calculation of the basic noise level is above the threshold quality standard. is produced at point I on Thursday at 07.00-08.00 at 75.52 dB. In addition, there is a difference in numbers between the results of the basic noise level calculation and the Sound Level Meter number reading. If the basic noise level calculation value with the Sound Level Meter measurement is not identical, the highest value should be used. Based on the description above, the results of the noise level are obtained which are all above the established quality standards. However, the noise level that exceeds this quality standard is the noise level measured and calculated for outside the building

Based on the output results in the Group Statistics table, the average traffic noise level at the location on Jalan Jenderal Sudirman was 51.45 dB. So the noise level of traffic on General Sudirman road = 51.45. Furthermore, to find out whether or not the difference in traffic noise levels is significant can be seen in the output table of the Independent Sample Test.

In the Equal variances not assumed column, a calculated t value of 40.412 was obtained with df = 36.109, so test = 40.412 > t0.025 = 20.206. Therefore, in accordance with the above decision-making guidelines, it can be concluded that the alternative hypothesis (Ha) is accepted or in other words, the level of traffic noise at the location of the Great Mosque of Ar-Rahman is greater. As well as exceeding the limit of quality standards set in the Decree of the State Minister of Environment Number KEP.48 / MENLH / 11/1996.

CONCLUSION

From the results of the analysis and discussion, conclusions can be drawn; Based on the results of a direct noise survey and empirical calculations (Calculation Of Road Trafic Noise) obtained the level of traffic noise on Jenderal Sudirman street, on Thursday and Monday the lowest average noise level with Sound Level Meter was 71.87 dB, which is located at the location of the Great Mosque of Ar-Rahman on Thursday at 16.30 – 17.30. The highest average noise level is 75.02 dB, which is located at the location of Syafira Hospital on Monday at 16.30 – 17.30. The highest Basic Noise Level was produced at the location of the Great Mosque of Ar-Rahman on Thursday at 07.00 – 08.00 amounting to 75.52 dB. In general, the noise intensity value obtained both with the Sound Level Meter tool and with the calculation of empirical equations, has exceeded the quality standard set in the Decree of the State Minister of Environment Number KEP.48 / MENLH / 11/1996 which is 55 dB and based on the Regulation of the Minister of Health No. 718 of 1987 is in Zone D, which is a zone for industrial environments, train station. Based on the results of a questionnaire with Independent Sample Test testing on the SPSS 17 application, the average traffic noise level at the location of the Great Mosque of Ar-Rahman was 51.45 dB

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