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TRAFFIC NOISE AT UITM SHAH ALAM CAMPUS: INITIAL STUDY

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Abstract
Traffic noise has been identified as a main source of urban noise that generated unhealthy environment in human life. Indeed, the increasing numbers of vehicle totally contributed to the noise pollution around the world. Even though there is standard rules and regulation towards noise limit standard around the world,they still exceed the required limit. Thus, the purpose of this study is to identify the level of noise created by traffic flow in UiTM Shah Alam and also to determine whether the noise level is follows the Department of Environment (D.o.E) Malaysia guidelines or not. The field measurements were carried out to determine A-weighted equivalent continuous sound pressure level LAeq of traffic flow during semester break and academic session. Certain point has been selected to measure the noise level using a sound level meter (SLM). The findings reveal that the overall noise level generated by traffic flow at UiTM Shah Alam was higher than D.o.E requirement which is up to 60 dB.

Keywords: Leq, Noise Environmental, Traffic Noise, Department of Environment (D.o.E) Malaysia.

1. Introduction

Since the development of transportation technology was rapidly growth around the world, there are variety types of vehicle in the market. In fact, the increasing density of population in the world has increased usage of vehicle on the road. On top of that, living style of people nowadays also contributed another factor of the increasing number of vehicle usage. According to Ouis (2001) the increasing density of traffic flow in urban area inevitably caused traffic noise to the environment. Thus, the issues towards traffic noise become prime concern. Noise is unwanted sound where the exposure of noise can manipulate how human behave. Traffic noise is one of the noise sources that contributed to the unhealthy environment in human life.

According to the D.o.E (2004), the acceptable noise level at urban area for traffic noise is between 60dB-65dB. If it goes higher than that, it might generate annoyances condition that can impede quality of human life. In Malaysia, the dominant noise pollution is due to traffic noise (Nor and Tamiri, 2002). Moreover, according to the Road Traffic Noise Management: Code of Practice (2008) report that there are seven factors that contributed to the traffic noise which depend on the) traffic volume, b) average traffic speed, c) traffic composition, d) road gradient, e) road pavement surface types and texture, f) driving condition and g) individual vehicle noise. Therefore, it shows that traffic noise inevitably caused many factors that contributed to the traffic noise.

Currently, UiTM campus Shah Alam statistically recorded 45,000 of students and 15,000 of staff, the highest numbers of people compared to the other universities in Malaysia. Majority of the staff and students' use the transportation to go to the destination. Due to the limitation of space and the increasing number of people in this institution there are several problems of campus transport such as parking issues, traffic congestion and air pollution (Razali, 2010). Based on the previous studies related to UiTM Shah Alam campus most of the researcher (Razali 2010; Daud and Rahman, 2008; and Saad 2009) merely focused on the traffic problem and air pollution. Therefore, this paper substantiates the notion of identify the level of traffic noise generated in UiTM Shah Alam campus.

2. Literature Review

Function of sound is to provide comfort hearing sense to the people where it used in daily people activities such as conversation between others. However, unwanted sound able to hinders people hearing sense which generated a nuisance to the surrounding area. According to Siedman and Standring (2010) unwanted sound is known as unpleasant sound that can give and negative effect in human life such as loss of hearing, physiological responses, annoyance, and sleep interference. There is a lot of environment pollution including noise and based from Saenz and Stephens, 1986 stated noise is pollution that is often overlooked as well as air and water pollution that can cause serious injury, which noise causes annoyance to most people. This fact also strengthen by Linster, 1990 declared that noise is a serious problem that causes disturbance of sleep, disrupts activities, being obstacles to do works, impedes learning and causes stress in many urban areas (Vallet. 2001). In Malaysia, a survey of several major cities shows a high percentage of urban public exposed to noise levels above 75dB (D.o.E, 1999; D.o.E, 2004).

Noise pollution is a major pollution source in the environment, particularly in urban areas and noise is deemed the highest pollution source, followed by air quality, affecting the urban population (D.o.E, 2004). According to Hoffmann, 2003 stated that Motor vehicles and aircraft are estimated to cause more urban and community noise than all other sources combined. The number of worker s exposed to hazardous noise in their daily work is estimated at between 5 and 15% of the population most of them are also exposed to the annoying, sleep-destroying general urban noise. Noise pollution from the roads mostly disturbs the surrounding area. Where ever the road, there always is noise pollution because of a lot of vehicles through the road and producing loud traffic noise. Traffic noise is expected to contribute a proportionately large share of the total societal noise pollution.

Even though D.o.E Malaysia (2004) has set a guideline for limiting sound level from road traffic standard. There are still has an issues towards traffic noise especially in urban area. Based on previous studies related to traffic noise they found that noise generated by traffic flow significantly produce a high level of noise and most of the noise measurement were exceed to the guideline limit (Yusoof and Ishak, 2005; Ismail et al, 2006; Nadaraja, Wei and Abdullah, 2010). Indeed, in the other countries also indicate the level of traffic noise exceed to the guidelines limits (Eelco and Arno, 2008; Ouis, 2001; Clark et al., 2005; Georgiadou, Kourtidis and Ziomas, 2004). Thus, effect if traffic noise becomes prime important issues that need to more investigates.

Noise generated by the traffic flow nowadays becomes the crucial issues of the noise problem in all countries. Thus, there are many guidelines of noise limit around the world as shown in Table 2.1 and indicating a different value on the noise limit. Differences in local climate condition, criteria, method assessment and technology advancement make vary in term of noise limit (Gottlob, 1995; Brüel & Kjær, 2001; NSW 2012). However, most of the finding on traffic noise measurement were exceeds 50dB. This finding concluded that people nowadays are more exposed to the traffic noise which generated various health problems in relation to hearing senses.

Table 2.1: Noise level guideline adopted form various countries

Country	*Index*	*Day-time criteria*	*Night-time criteria*
Malaysia	LAeq	60	65
Hong Kong	L_{A10}	65	
Greece	LAeq	70	
German	Lr	50	45
Australia	L10, 18h	60	55
Japan	LAeq	45	35
Italy	LAeq	55	
Austria	LAeq	60	50
Canada	LAeq	50	
Denmark	LAeq, 24h	55	
France	LAeq	60-65	55-57

3. Methodology

These studies were replicated and modified research method from a previous study which is field measurement on traffic noise (Yusoof and Ishak, 2005; Ismail et al, 2006; Nadaraja, Wei and Abdullah, 2010). Field measurements are used to measure the traffic noise generated by various types of vehicle during peak hour (morning, afternoon and evening). Normally this peak time hour is the busiest traffic flow activities. UiTM Shah Alam campuses were chosen as a sampling area.

Three points were selected which is point 1 - front main entrance gate, point 2 - back main entrance gate and point 3 - bus stop near civil engineering faculty to carry out the traffic noise measurement. Sound level

meter are used to determine A-weighted equivalent continuous sound pressure level LAeq of traffic flow during semester break and academic session. The equipment measurement that use is a sound level meter, microphone, amplifier, microphone protector, microphone cable and tripod. Microphone position is based on Tempest (1985) studies where the microphone was positioned 1.4m above the ground floor and 1m away from any reflecting surfaces. The types of vehicle that passed through front and back gate were also calculated. 01 dB trait software are used to analyses the data collection. Lastly comparisons are made between LAeq from field measurement and DoE guideline as shown in Table 3.1.

Table 3.1: Guidelines for Limiting Sound Level (LAeq) from Road Traffic

Receiving land use category	Day Time 7.00a.m – 10.00p.m	Night Time 10.00p.m – 7.00a.m
Noise sensitive areas Low density residential areas	55 dBA	50 dBA
Suburban residential (Medium Density)	60 dBA	55 dBA
Urban Residential (high Density)	65 dBA	60 dBA
Commercial, Business	70 dBA	60 dBA
Industrial	75 dBA	65 dBA

Sources: Planning Guidelines for Environmental Noise Limits and Control (2004) by the Malaysian Department of Environment.

4. Result and Analysis

4.1 Total numbers of vehicle

Table 4.1 indicates the total amount of various types of vehicle passed through at the front and back gate of UiTM during traffic noise measurement was conducted. It is visible that the total amount of vehicle during normal days is higher than semester break. The highest total of vehicle passed through in UiTM was recorded at the morning time where both of the gates recorded 959 and 1765 in semester break and 1674 and 2933 in normal days. This condition is due to the office hour and class start at 8a.m. The highest type of car passed through in UiTM in the morning time is a car which is up to 1000 cars during normal days and semester break up to 750 cars.

However, afternoon time was recorded as a less total of vehicle passed through the gate compare to the morning and afternoon time as shown in Table 4.1. This situation is due to the lunch hour time where there are a lot of cafeterias provided in UiTM, therefore most of the student and staff lunch in UiTM.

In the evening time, the numbers of vehicle enter into UiTM is less during semester break compare to normal day. It is because most of the student spent their semester break in their hometown.

Table 4.1: Total numbers of various types of vehicles passed through at the front and back gate UiTM.

Gate	Types of vehicle	Morning		Afternoon		Evening	
		Holiday	Normal	Holiday	Normal	Holiday	Normal
Front	Car	750	1012	370	419	195	534
	Motorcycle	199	722	105	205	56	213
	Lorries	1	4	3	10	6	3
	Buses	9	27	5	15	3	14
	Total	959	1765	483	649	260	764
Back	Car	1140	1641	329	477	495	415
	Motorcycle	524	1277	143	243	56	327
	Lorries	4	5	3	11	3	5
	Buses	6	10	5	14	1	18
	Total	1674	2933	480	745	555	765

4.2 Noise level measurement

The average of overall equivalent continuous noise level (Leq) in point 1, 2 and 3 on semester break and normal day were shown in Table 4.2. The overall equivalent continuous noise level (Leq) for point 1 during holiday and normal days is up to 70dB. Whereas, Point 2 and 3 recorded differ values of overall Leq level from 69dB to 80dB respectively.

Table 4.2: Overall equivalent continuous noise level (Leq) for every point of measurement

Point	Morning		Afternoon		Evening	
	Holiday	Normal	Holiday	Normal	Holiday	Normal
1	72.12	75.26	70.92	72.84	70.70	73.04
2	69.24	80.58	69.82	72.72	70.54	72.46
3	65.26	81.80	64.02	74.96	65.54	71.06

Comparison is made between traffic noise measurement and DoE requirement as shown in Table 4.3. The findings show that all the point that has been measured was exceed DoE noise limit requirement which is up to 65dB.

Table 4.3: Comparison of overall Leq with DoE requirement

Point	Morning		Afternoon		Evening		DoE Regulation	Findings
	Holiday	Normal	Holiday	Normal	Holiday	Normal		
1	72.12	75.26	70.92	72.84	70.70	73.04	65dB	Exceed DoE requirement
2	69.24	80.58	69.82	72.72	70.54	72.46	65dB	Exceed DoE requirement
3	65.26	81.80	64.02	74.96	65.54	71.06	65dB	Exceed DoE requirement

5. Discussion

The overall results for traffic noise generated at the point 1, 2 and 3 were increase the level of background noise to the surrounding area. Indeed, all the point that has been measurement was exceeds to the noise limit D.o.E requirement. Moreover, both of the entrances (P1 and P2) are located near to the traffic flow contributed to the noise limit. This exposure might give a serious hearing problem to the staff (guard) who is working at the both of the entrances (P1 and P2) where they are exposed to the Leq ranged from 69.24 dB to 81.80 dB. According to Bronzaft and Hagler (2010) level of noise that can be accepted by human hearing sense is between 55-60dB. Therefore, if it goes higher than that, it might generate nuisance condition which leads to annoyance and noise disturbance to the guard duty.

The highest types of vehicle enter into UiTM is between car and motorcycle. It is because due to the problem of inaccessibility around UiTM which encourage the student and staff to used private vehicle to go to the destination in convenience way. This supported by the comprehensive reviews done by Razali (2010) and Rahman (2008) noted that due to the inaccessibility problems in UiTM Shah Alam campus it convey to the encouragement of increasing the number of private vehicle in the campus such as car and motorcycle. Therefore, this finding indicates that the increasing number of private vehicle in UiTM Shah Alam campus influences the excessive range traffic noise produces at P1, P2 and P3.

6. Conclusion

Due to the increasing numbers of private vehicles around the world it make the issues towards traffic noise has become prime concern. Apart from that, the achievement of transportation technology clearly noted that noise traffic problems inevitable. Even there are many types of regulation, standard and policies but it still exceeds to the noise limit.

Therefore, the finding shows that sound generated by traffic flow significantly contributed to the unhealthy environment to the people which leads to annoyance and noise disturbance. Indeed the increasing number of the usage of private vehicle in UiTM Shah Alam campus drastically increases the level of traffic noise which can manipulate human hearing sense. Since the measurement research is not too detail, more over appropriate measurement of noise level in UiTM has to conduct to get noise level to all over the place in UiTM.

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