

PERPUSTAKAAN UMP



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**CASE STUDY OF ROADWAY VISIBILITY AT JLU LANGAT- AMPANG  
ROAD.**

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**A report submitted in partial fulfillment of the  
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## ABSTRACT

Road accident is one of the crucial issues to be discussed currently. The reason is that it is increasing from years to years despite of many initiatives that had been by the government. This thesis deals with roadway visibility at Hulu Langat – Ampang road using several variable causal factors which related to the high number of accident at the road. The objectives of this thesis are to identify the road users' opinion about the road and also to determine the relationship between visibility and the number of accidents at the Hulu Langat – Ampang road. For the research, the information is gathered from Ampang Traffic Police Department and Kajang Municipal Council which is number of accidents and the road information. The road is dividing between several sections to detect which section is having the highest number of accidents. Besides, the thesis had uses questionnaire method and analysis by using SPSS software for the results analyzing. By using the questionnaire, the opinion of the road users' is known and conclusions were made based on several factors. Same goes for the analyzing by using SPSS software, the correlation is obtained by considering some causal factors such as the lighting, safety aspect, signage, and condition of the dark road to number of accidents. The causal factors is being analyze whether it is having significant relationship to the number of accidents or vice versa. From the results, it is observed that lighting and condition of the dark road is shows significantly relationship to the number of accidents that happened at Hulu Langat- Ampang road. Therefore, the lighting and darkness of the road is giving big impact to the number of accidents happened and thus, from the results also, showing that the most critical section that having highest accident is section 4. Thus, the authority should play their role of the visibility improvement at Hulu Langat- Ampang road for the sake of road users' safety.

## ABSTRAK

Kemalangan jalan raya adalah suatu perkara penting yang harus dibincangkan sekarang. Ini adalah kerana jumlah kemalangan semakin meningkat dari tahun ke tahun walaupun pelbagai inisiatif telah dilakukan oleh pihak kerajaan. Tesis ini menceritakan tentang pencahayaan jalan di Jalan Hulu Langat- Ampang menggunakan beberapa faktor penyebab kepada bilangan kemalangan yang tinggi di jalan tersebut. Objektif kajian ini adalah untuk mengetahui pendapat pengguna di jalanraya tersebut dan juga untuk mengkaji hubungan diantara faktor pencahayaan dengan jumlah kemalangan yang berlaku. Untuk kajian ini, maklumat yang dikumpulkan adalah daripada Bahagian Polis Trafik Ampang dan Majlis Perbandaran Kajang yang mengandungi data kemalangan jalanraya dan maklumat jalan tersebut. Jalan tersebut telah dibahagikan kepada beberapa bahagian untuk mengkaji bahagian jalan yang mana mempunyai jumlah kemalangan yang tertinggi. Selain itu, kajian ini juga telah menggunakan kaedah soal- jawab dan dianalisis menggunakan perisian SPSS. Daripada kaedah soal- jawab tersebut, pendapat pengguna jalanraya tersebut diketahui dan konklusi telah dibuat berdasarkan pelbagai factor penyebab seperti lampu jalan, aspek keselamatan, papan tanda, dan keadaan jalan yang sangat gelap kepada jumlah kemalangan jalan raya yang berlaku di jalan tersebut. Faktor penyebab tersebut telah dianalisis samaada mempunyai hubungan yang signifikan terhadap jumlah kemalangan jalan raya tersebut atau sebaliknya. Daripada keputusan yang diperolehi, adalah dibuktikan bahawa lampu jalan dan keadaan gelap jalan tersebut mempunyai hubungan yang signifikan terhadap bilangan kemalangan jalan raya yang terjadi di jalan Hulu Langat- Ampang. Oleh itu, factor pencahayaan dan kadar kegelapan jalan member impak yang besar terhadap bilangan kemalangan yang berlaku dan sehubungan dengan itu juga, bahagian jalan yang kritikal adalah di bahagian 4 iaitu yang mempunyai jumlah kemalangan yang tertinggi berbanding bahagian yang lain. Justeru, pihak yang berwajib seharusnya memainkan peranan mereka untuk memperbaiki pencahayaan di jalan Hulu Langat – Ampang bagi tujuan keselamatan pengguna jalan raya tersebut.

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**LIST OF SYMBOLS AND TERMINOLOGY**

<b>SPSS</b>	-	Statistical Package for the Social Sciences
<b>PDRM</b>	-	Royal Malaysian Police
<b>KM</b>	-	Kilometer
<b>MPKj</b>	-	Kajang Municipal Council

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 INTRODUCTION**

In Malaysia, the number of accident is increasing tremendously from day to day despite of many initiatives that have been done by the government to overcome it. Safety driving campaign which uses slogan like “remember your loved ones” seems nonetheless among the Malaysian driver. The tendency towards increases of the accident number has become disquiet. There are as much as 341,252 of accident number of 2006 that had been reported and increased to 363,319 numbers during year 2007 (Royal Malaysian Police, 2008). Road traffic accidents have become the major cause of death and disabilities. By looking at the number, it shows that this matter is rapid worsening and research need to be done so that the number of accident and death could be decreased.

However, regardless of day time or night, modern people tend to drive because it is a necessity in the modern cultures currently. It is not a serious matter regarding on driving during day but people need sufficient lighting while driving during night indeed. Driving during night with insufficient visibility of the road will lead to crashes. Derlofske (2004) stated that lighting and visibility are the elements enable safe, comfortable roadway travel

during night. In United States, Federal Highway Administration study (1990) reported that crashes during night is five times higher than day rates. However, the community must think in terms of 'roadway visibility system' compare to 'roadway lighting'.

As a matter of fact, roadway lighting or more accurately defines as roadway visibility is an element that consists of pole lighting, vehicle lighting, signals, road studs, and road markings. However, road lighting is insufficient to pleasing the safe aspects of the roadway (Derlofske, 2004). In this matter, roadway stakeholders shall have discussion about the appropriate visual information of the visibility to roadway users. For instance, retroflective signs and markers are the crucial elements that we shall consider reflects to the roadway visibility system. The ultimate objective of the roadway visibility system is simple which is to provide sufficient information with lighting and visibility components to roadway users.

Derlofske (2004) also stated that information to drivers through visibility is deniable as the most important factor at the road. It is arguable that driving at night is more dangerous. Apart from that, nighttime crashes were reduced by 45% after the implementation of roadway lighting to some intersection (Green, E, et al. 2003). Other country also shows the reduction of fatal crashes. There are Finland (20-30%), Norway (65%), and also Netherlands (18-23%). By this percentage, we can defined that driver is crucial in reducing accidents.

The publication entitled 'Road Lighting as An Accident Countermeasure' (1992), reported that in 85 percent of the 62 case studies, lighting was crucial to increase safety at the road. The drivers tend to get their vehicle speed increase and difficult to control their driving which later would cause accidents. This matter would confirm to cause during night (Atubi, 2009). The risk of driving during day is much lesser compare with night. According to statistics, the death crashes were occurred at night without street lighting are in 30% of

all total accidents. These numbers also were meant at the bend of slope which occupies 13% of the total car crashes. (Jia He et al. 2012). It has been recorded that serious traffic accident especially for the pedestrian is increasing during nights (Ericksen, 2012).

The mean effect of road lighting is 28% reduction in injury accidents, 60% reduction in fatal accidents, 45% reduction in injury accidents involving pedestrians, 35% reduction in injury accidents at rural junctions and 50% reduction in injury accidents on motorways (Wanvik, 2009).

## 1.2 BACKGROUND OF PROBLEM



Figure 1.2.1 Picture of Hulu Langat-Ampang road during night time.

In this paper, the area of research is Hulu Langat-Ampang road which is a major road situated in Selangor. It connects Taman Permai in Ampang with Pekan Batu 14 at Hulu Langat. This road is taken as the place of research due to the road condition which has low visibility to the driver especially during nights. The road also has many curves which

are hardly to be seen during night time because they are no street light and other roadway visibility elements.

Utusan (2010), stated that one of the users had complained about Hulu Langat-Ampang road is very dark and will produced risks to the road users. Figure of 1.2.2 shows the newspaper that discussed about the visibility at Hulu Langat- Ampang road. Observations had been done by the reporters after several complaints were made by the road users and nearest residential people. From the observation, there was no lighting at the roads and this make higher risk of accidents for people who want to go to the Ampang look-out point.

One of the road users, Juliana (2010) stated that she was not brave enough to drive at the road during night because the road is too dark and risky because they were no street lamps along 8 kilometers of the road to Pekan Batu 14 Hulu Langat.

According to Azhari (2010), he stated that the Hulu Langat-Ampang road is too dangerous and too darks plus the roads has many dangerous curves because it is hilly roads. In addition, the responsible authority had done nothing to improve the road visibility. Most analysis stated that good street lighting causes a 30% reduction in night time road casualties compare to poor or no lighting at all ( Crabb & Crinson , 2008).

## Gelap, berbukit undang risiko

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**KUALA LUMPUR 20 Julai**  
Ampang Lookout Point di Jalan  
Hulu Langat-Ampang  
merupakan destinasi yang  
menarik untuk dikunjungi  
terutama pada waktu malam.

Dari situ, orang ramai boleh  
menyaksikan pemandangan  
indah ibu negara sambil  
menikmati makanan enak yang  
disajikan di beberapa restoran  
di situ.

Namun, untuk ke situ, orang  
ramai perlu melalui jalan yang  
banyak selekoh dan menaiki bukit dari Taman Putra di Ampang atau Hulu Langat.

Apa yang menjadikan jalan itu menakutkan dan berbahaya ialah tiada lampu jalan di  
sepanjang laluan itu.

Keadaan gelap itu juga dikatakan mengundang kegiatan jenayah dan penagihan  
dadah untuk berlaku dan menjadikan kawasan itu antara tumpuan muda-mudi  
untuk memadu asmara.

Tinjauan Utusan Malaysia di jalan tersebut mendapati, jalan itu tidak sewajarnya  
dibiarkan tanpa kemudahan lampu jalan kerana ia boleh dikatakan agak sibuk  
terutama pada hujung minggu.

Ratusan kenderaan dilihat memanjat bukit di jalan itu dan pemandunya menjamu  
selera di situ sambil bersantai menyaksikan keindahan Kuala Lumpur pada waktu  
malam.

Seorang pengguna, Nora Juliana Mohd. Noor berkata, jalan tersebut memang  
berisiko untuk digunakan pada waktu malam, apatah lagi jika hari hujan.

Katanya, risiko untuk para penjenayah mengambil kesempatan di jalan yang gelap  
itu juga sangat tinggi dan tiada siapa yang berani berhenti untuk membantu jika  
anda dalam masalah di kawasan itu.

Dua minggu lepas kawan saya telah diragut semasa menggunakan jalan ini. Dia yang  
menaiki motosikal tiba-tiba didatangi sebuah motosikal lalu diragut tanpa dia  
mampu berbuat apa-apa, katanya.

Kata Nora, jika ada lampu di jalan tersebut, risiko untuk berlaku jenayah mungkin  
berkurangan.

Tambahnya, selain jenayah, maksiat juga sering berlaku di kawasan itu kerana  
keadaan yang gelap di situ membuka ruang untuk maksiat berlaku.

Malah, saya pernah nampak teksi berhenti di situ dan orang di dalamnya melakukan  
perkara yang tidak senonoh, katanya.

Dia berharap pihak bertanggungjawab menyediakan lampu di jalan tersebut agar  
perkara-perkara yang tidak diinginkan dapat dielakkan daripada berlaku.

Seorang penduduk yang sudah lama tinggal di Ampang, Azura Ismail, 32, berkata,  
dia tidak pernah menggunakan jalan tersebut pada waktu malam.

Alasannya, jalan itu sangat gelap dan bahaya kerana sepanjang lapan kilometer  
untuk sampai ke pekan Batu 14 Hulu Langat, tiada satu pun lampu jalan dipasang.

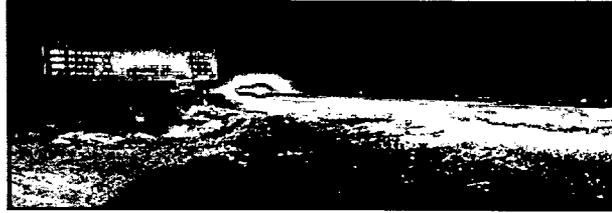
Saya tidak berani menggunakan jalan tersebut terutamanya pada waktu malam,  
walaupun ia lebih dekat untuk ke Hulu Langat atau Kajang.

Saya lebih rela menggunakan jalan lain yang jauh asalkan mempunyai lampu dan  
tidak banyak selekoh tajam kerana ia lebih selamat.

Lebih-lebih lagi, saya juga sering kali terdengar yang jalan tersebut selalu terjadi kes  
ragut, ia sangat membimbangkan saya, katanya.

Dia yakin jalan itu akan menjadi lebih selamat, lebih selesa dan digunakan lebih  
ramai orang jika pihak berkuasa memasang lampu di sepanjang jalan itu.

Azahari Ramli, 45, juga berpendapat, jalan tersebut sangat bahaya untuk digunakan  
kerana terlalu gelap sedangkan jajarannya berbukit dan banyak selekoh.



KEADAAN Jalan Ampang-Hulu Langat yang gelap mengundang  
risiko tinggi untuk berlaku kegiatan jenayah, maksiat dan  
kemalangan. utusan/Azzul A.Majid Nora Juliana Azura Azahari

Figure 1.2.2 Newspaper about Hulu Langat-Ampang road

### **1.3 OBJECTIVES OF RESEARCH**

- i) To identify road users' opinion from questionnaire.
- ii) To determine the relationship between visibility and the number of accidents at the road.

### **1.4 SCOPE OF RESEARCH**

In this paper, the focus of the research is about the visibility at the Hulu Langat-Ampang road and its relationship between several variables. First and foremost, at the early stage of research, data and information that related to the accident need to be collected. This is because the data of the accident is needed for the analysis.

Then, questionnaire is made in order to have the responds from the road user. This is major information gather as the road users is the best sample. For this research, relationship between the causal factor of visibility and the number of accident will be determined in the final stage whether the visibility does have the relationship with number of accident or vice versa.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

In this chapter of literature review, it is discussing of major issues such as accident, lighting, visibility which are related to the factors of accident. Besides that, analysis using SPSS software is also been discussed in this chapter.

#### **2.2 ROADWAY VISIBILITY**

Under night-time illumination, drivers suffer decreased acuity and contrast sensitivity (Sturgis and Osgood, 1982; Sturr et al., 1990; Andre, 1996). Road lighting is a most efficient road safety measure, especially on road sections with mixed traffic, but even on motorways. However, the need for energy savings demands more energy efficient solutions (Wanvik , 2009).

Factors such as fatigue and drinking habits are more suitable during nights, and also the variation of traffic flow may be important. However, the striking reduction in the nighttime accident rate due to illuminating highways argues for the importance of vision. Held (2012) stated that localization and mobility are dependent on the drivers ambient peripheral system. Dichgans and Brandt (2012) stated that peripheral system had shown that peripheral vision has great importance which is for body orientation and posture control.

Therefore, the performance of the driver would cause little or no loss of steering ability under low illumination and his confidence supposed to be high. Due to this, report says that drivers do not tend to reduce vehicle speed and neglect precautions during night. Hence, drivers are putting their life at risk for the accidents.

Sivak (1996) also stated that information that drivers obtained is 90% from their visual. Some stimuli contain crucial information like pavement markings, road signs, and other traffic usually easier to be seen under good weather condition. However in dimly condition, which later caused hazardous situation and affect the driver's vision and avoiding accidents has been impossible.

Precautions can be taken to overcome the problem which would be increasing the visibility of the roads by improving the roadway illumination and used highly reflective markings ( Leibowitz & Owens, 2012). Wanvik (2009) stated that the effect of road lighting is smallest during adverse weather conditions when darkness. The accident risk is highest and visibility measures are most needed.

### **2.3 GEOMETRY DESIGN OF ROADS**

Crash rates in road curves are about 1.5 to 4 times higher than in straight roads (Zegeer et al. 1992). In addition, Glennon (1985) also stated that the crash severity for curves road is also higher than the straight roads. So, it is believed that curves road is encouraging more fatal crashes compare with straight roads. According to Queensland (2005), speeding had contributed 16% of overall crashes which ranked the fifth ranked that related to the curves road.

Other than that, environmental factors such as wet or slippery road surfaces, poor lighting, narrow shoulder width, slide resistance, and unprotected roadside environment also contribute to road crashes. According to Seneviratne & Islam (1994), the risk is higher when a curve is after a long straight road or after a sequence of gentle curves. That is why it is important to propose the roadway visibility element so that the road geometry is clearly to be seen by drivers especially during night time. By roadway visibility elements such as roadway lighting or road studs, drivers could have early detection for the road condition like road curves. Therefore, they could easily control their driving at the road.

### **2.4 ROAD LIGHTING**

Road lightings system is to “provide adequate forward visibility” or “ maximize comfort” ( Bullogh & Derlofske, 2004). Nowadays, the technology of roads lighting is including light sources, control gear, luminaires and the electricity supply (Boyce et al., 2009). The road lighting could reduce the number of road accidents and the risk of road accidents in darkness (OECD, 1979, Fristrom et al., 1993; Elvik et al. 1995). In addition, some researchers also believe that lighting is directly proportional to vehicle speed.

However, Cornwell (1972) stated that some drivers tend to increase their speed and the other reducing it during darkness.

Inverse to this, the drivers are increasing the speed of their vehicle after the installation of road lighting (Assum et al. 1999). The speed is higher during nighttime compare to daytime. The possible reason for these findings maybe because of the number of vehicle that passes through the roads is different during these times.

Those who drive faster during the night are generally driving faster than others. They also likely to drive during night and speed compare to those drive in standard speed. The fact which shows the highest speed occurred during darkness after installation of lighting equipment measures by changes in lateral position, and can be indicates both in speed and concentration (Assum et al. 1999).

## **2.5 REDUCING ACCIDENTS**

According to Rodgers (2011) stated that “we are continually striving to reduce the number on roads worldwide by installing the intelligent solar road studs”. This shows that the main objective of the solar road studs as one of the roadway visibility element is to decrease the number of the accidents occurred all the time.

Wanvik (2009) stated that there is reduction of accidents number after implementation of road lighting. The reduction was 28% for injury accidents, 60% reduction in fatal accidents, 45 % reduction involving pedestrians, and 50 % reduction involving motorways. In the three years since the initial installation of the intelligent solar

road stud implemented to have 72% reduction in accidents on the road. Therefore, the objective of the studs is achieved.

The roadway visibility elements are proven to reduce accidents by providing sufficient information to drivers while driving. They could easily see the curves of the road, road surfaces, and other road users as well.

## **2.6 ANALYSIS USING SPSS SOFTWARE**

SPSS (Statistical Package for the Social Sciences) is a system of computer programs which intended for the manipulation and statistical analysis of many types of data and the strength of the program is its simplicity. It is versatile yet generating reliable information virtually. The resultant data that come out is straightforward and easy to interpret.

Therefore, in this research the software could print out the results by making many combinations of data comparisons. The SPSS program was initially written at Stanford University in 1965 through the research made by sciences researchers, computer scientist and statisticians.

The SPSS has wide range of statistical analysis procedures including descriptive and inferential, graphic and comparative features that enable researchers to manipulate the data that they used to have. (Nice NH et.al ,1975).

## **2.7 CONCLUSION**

Therefore, for this research, the factor that will be considered is the visibility, the geometry of roads, and the road lighting. Hence, the analysis will be using SPSS software as it is more straightforward, yet simplicity and easy to interpret.

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 INTRODUCTION**

Methodology is a way to systematically solve the research problem and be understood as a science of studying how research is done scientifically. In this study, the methodology is to collect all the data and information required from the Traffic Unit of the Royal Malaysian Police (PDRM). The data which has been taken is the accidents data that happened at Hulu Langat- Ampang road which starting from year 2010 until the year 2012.

The main objective of this chapter is to briefly discuss about the connection of road accidents and the road visibility. Firstly, the method that will be used must be discussed with the supervisor for the research. In this research, the methods that will be used are road users opinions based on the questionnaire and the raw data from the Traffic Unit of the Royal Malaysian Police (PDRM). Then, the research is been continue using Microsoft Excel and Statistical Package for Social Sciences (SPSS) for the analysis.

After that, the discussion must be made from the analysis and the results obtained. Lastly, conclusions and recommendations are done at the final stage to conclude the research.

## **3.2 DETAIL METHODOLOGY**

### **3.2.1 Survey to Road Users**

A survey to the road users will be conducted. Questionnaire would be given to the nearest residential area that is believed to be the Hulu Langat- Ampang road users. The questions will deal with the drivers comfort while driving, satisfaction of driving, and roadway visibility elements. Through the survey, analysis would give out based on their driving experiences. Thus, which roadway visibility element that is proposing as the best for the road can be determined. The questionnaire form is drafted as Figure 3.2.1.

This questionnaire is to investigate about users' opinion of Hulu Langat- Ampang road

		YES	NO
1	Do you drive at Hulu Langat-Ampang roads?	<input type="checkbox"/>	<input type="checkbox"/>
2	Do you think the road is safe?	<input type="checkbox"/>	<input type="checkbox"/>
3	Have you ever been in accident at the road?	<input type="checkbox"/>	<input type="checkbox"/>
4	Do you think the road has many dangerous curves?	<input type="checkbox"/>	<input type="checkbox"/>
5	Do you think the road is very dark during night?	<input type="checkbox"/>	<input type="checkbox"/>
6	Do you think the road is lack of signage?	<input type="checkbox"/>	<input type="checkbox"/>
7	Do you feel worry when you driving along the road?	<input type="checkbox"/>	<input type="checkbox"/>
8	Do you think the road will lead to accidents especially during night?	<input type="checkbox"/>	<input type="checkbox"/>
9	Do your passengers comment about the road?	<input type="checkbox"/>	<input type="checkbox"/>
10	Do you feel stress when driving along the road?	<input type="checkbox"/>	<input type="checkbox"/>
11	Do you feel more anxious when driving along the road during night?	<input type="checkbox"/>	<input type="checkbox"/>
12	Do you break the speed limit?	<input type="checkbox"/>	<input type="checkbox"/>
13	Do you know the speed limit at the road?	<input type="checkbox"/>	<input type="checkbox"/>
14	Have you ever become impatient and try to intimidate other drivers to get out of your way?	<input type="checkbox"/>	<input type="checkbox"/>
15	Do you feel sometimes the road is lack of information?	<input type="checkbox"/>	<input type="checkbox"/>
16	Do you think it is dangerous to drive at the road during night?	<input type="checkbox"/>	<input type="checkbox"/>
17	Do you think that the authority should maximize the safety aspects at the road?	<input type="checkbox"/>	<input type="checkbox"/>
18	Do you think the road should be complete with the lamp posts?	<input type="checkbox"/>	<input type="checkbox"/>
19	Do you know the road has involved with many accidents before?	<input type="checkbox"/>	<input type="checkbox"/>
20	Do you like to use the road during night?	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for your cooperation.

Figure 3.2.1 Sample of questionnaire.