EVALUATION OF ROAD SAFETY LEVEL OF FEDERAL ROUTE 3 (F3) AND STATE ROUTE C17 (C17): A CASE STUDY OF KUANTAN MAIN ENTRANCE ROAD FROM PEKAN

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A thesis submitted in fulfillment of the requirement for the award of the degree of Bachelor of Civil Engineering

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NOVEMBER 2010

ABSTRACT

Road accident is a critical problem which has to be prevented in Malaysia. Road accident has gives negative impact on the Malaysia's economy where the government spends a lot of money for road safety awareness campaign. There many factors cause road accident such as road user behavior, vehicle defect and environmental factor. The objectives of this study are to analyze on road accident statistic from Pekan to Kuantan as well as to evaluate road safety level of these two roads Federal Route 3 and State Route C17 that linked Pekan to Kuantan. In achieving these two objectives, first road accident data from year 2006 to 2009 were obtained from Traffic Branch Kuantan, Royal Malaysian Police, Pahang Contingent. The data was then sorted by using Microsoft Excel 2007 and analyzed using SPSS software to obtain statistic value. The data were sorted according year, months, location and by types of day. Tables, histograms, graphs and pie chart have derived to show the statistic pattern. The correlation analysis done to determine the critical period of time, period of month and type of days in F3 and C17 road. Based on the results, it shows the F3 road is not safe to be taken during weekend from 6.00 am to 11.59 pm from January to March. Meanwhile, road C17 should not be taken during weekday from 6.00 pm to 11.59 pm from October to December. In future, the analysis should be adjusted by using data by type of injuries, type of vehicles which involved in road accident and location by KM post. Since this type of data is too confidential to be given by traffic police, hence this study was done based on total number of accident occurred from Pekan to Kuantan. Furthermore, some details are not clearly mentioned in the data given by traffic police for example the location of the accident occurred. Therefore, some of the data have been eliminated from the analysis.

ABSTRAK

Kemalangan jalan raya adalah masalah kritikal yang harus dibendung di Malaysia. Kemalangan jalan telah memberi impak negatif pada ekonomi Malaysia di mana kerajaan membelanjakan pendapatan negara untuk kempen kesedaran keselamatan jalan. Terdapat beberapa faktor yang menyebabkan kemalangan jalan raya seperti sikap pemandu, masalah kerosakan kenderaan dan faktor persekitaran. Kemalangan jalan raya dapat dielakkan preancangan perjalanan yang baik sebelum menuju destinasi yang dikehendaki. Sebuah perjalanan yang gagal untuk dirancang maka ia adalah dirancang untuk gagal. Objektif kajian ini adalah untuk menganalisis statistik kemalangan jalan raya dari Pekan ke Kuantan serta membandingkan kemalangan jalan raya yang berlaku diantara dua jalan iaitu laluan Federal 3 dan State Route C17 dari Pekan ke Kuantan Dalam mencapai dua tujuan ini, data kemalangan jalan raya dari tahun 2006 hingga 2009 diperolehi dari Polis Trafik Cawangan Kuantan, Polis Diraja Malaysia,Kontinjensi Pahang. Data tersebut kemudian diaturkan dengan menggunakan Microsoft Excel 2007 dan dianalisis menggunakan SPSS untuk mendapatkan nilai statistik. Data diaturkan mengikut tahun, bulan, lokasi dan jenis hari berlaku kemalangan. Jadual, histogram, graf dan carta pai dihasilkan melalui analisis ini. Daripada hasil kajian didapati jalan F3 tidak selamat digunakan pada hari minggu dari pukul 6.00 pagi sampai 11.59 pagi dari bulan Januari hingga Mac. Manakala jalan C17 tidak selamat digunakan pada hari biasa dari pukul 6.00 petang hingga 11.59 malam dari bulan Oktober hingga Disember Data mengikut jenis kemalangan merupakan maklumat sulit daripada pihak polis. Oleh itu, hasil kajian ini hanya berdasarkan jumlah kemalangan jalan raya.Selain itu, terdapat juga maklumat kemalangan jalan raya yang tidak lengkap daripada data yang diperolehi. Oleh itu, data-data tersebut disingkirkan daripada hasil kajian.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In this modernized and fast moving world, road traffic accident fatalities and injuries have become a global issue. The rapid urbanization and motorization has resulted in worsening to atmosphere, traffic congestion and major road safety issues (Yunan Zheng, 2004). As reported by World Health Organization (2004), road crashes are the second leading cause of death globally. Road traffic accident also becomes a severe problem in Malaysia. A research by Fajaruddin Mustakim and his team (2008) updated that in the year 2006, 341,252 accidents were recorded and resulting in an average 18 deaths from road accidents every single day.

1.2 Background of Problem

Kuantan is the capital of Pahang, the largest state in Peninsular of Malaysia. Kuantan is a neighbour town to Pekan in South, Maran in East and Kemaman in North. There are two roads from Pekan entering Kuantan by Federal Route 3 (F3) which is from Kg Semangat and State Route C17 which is from Kg Ubai where it combines with Federal Route 183 (F183) which is from Kg Baharu to provide network to Kuantan. Kuantan is connected by two types of road where both roads contribute a high road accident cases to the overall number of cases throughout Pahang. A source from Royal Malaysian Police which were published in TheStar newspaper shows number of accidents is relatively high in Federal Road and State Road compare to highways. Table 1.1 shows road accident by type of road.

Type of Road	2002	2003	2004	2005	2006	2007	2008
Highway	21,549	24,953	27,257	27,511	30,107	33,613	35,261
Federal Road	70,400	72,988	78,550	84,965	81,923	90,476	93,550
State Road	45,826	47,641	56,066	56,153	57,214	60,202	61,994
Municipal Road	114,801	124,986	136,953	134,571	155,355	163,104	165,617
Others	27,135	28,085	27,989	25,064	16,653	15,924	16,649
Total	279,711	298,653	326,815	328,264	341,252	363,319	373,071

(Source: TheStar Newspaper, 2009)

Table 1.1: Accident Statistics by Type of Roads in Malaysia

Another study by Road Safety Department Malaysia in year 2006 stated the number of road accident cases in Pahang was 13,242 while in year 2007, the number of road accident cases was 13,982. The difference between year 2006 and 2007 was reported as 740 accident cases in Pahang which was relatively high.

1.3 Objectives of Research

The main goals of this research are:

i. To analyze road traffic accident pattern of accident from Pekan entering Kuantan based on road accident data from year 2006 to 2009.

ii. To evaluate road safety level between Federal Route 3 (F3) and State Road C17 that linked Pekan to Kuantan based on road traffic accident data from year 2006 to 2009.

1.4 Scopes of Research

The areas of the research are:

i. The road accidents data was collected within Pekan to Kuantan road which only focusing on Federal Route 3 (FR3) and State Route C17 (C17).

ii. The road accidents data was collected from Traffic Branch Kuantan, Royal Malaysian Police, Pahang Contingent which covers from the year 2006 to 2009. In conjunction to that, all analyses reported in this study were only applicable to that particular period of year.

iii. This research focus on statistic analysis from Pekan to Kuantan and comparing road accident between F3 road and C17 road from Pekan to Kuantan. The State Route C17 was linked with Federal Route 183 (F183) to Kuantan. Hence the road accident falls on F183 was added to the C17 road accident data for the statistic analysis.

iv. Statistical analyses done in this thesis were analyzed using Ms Excel 2007 and SPSS Version 17.0 software only. Any results that may come out differently when using different type of analysis software is not taken into consideration by the researcher.

1.5 Significance of Research

The important of this study is the results from the analysis can be implemented as an indicator for reducing number of road accident in Malaysia by Malaysian Government plan. This study also evaluate road safety level of the roads that have higher risk for road accident cases to be happen based on the statistic analysis.

1.6 Problem Statement

The number of accident cases increases day by day in our country. Reducing road traffic accidents is not an easy task. There are many factors that lead to road accident in Malaysia. However to justify the factors of road accident is sometimes impossible. Road accident also can occur if there is no proper planning on which road to travel in safe condition. A plan by Malaysian Road Safety Council (2002), have targeted for the reduction of the road accident death rate for the year 2010. Therefore, this study can be indicators for Malaysian Government in road accident reduction plan by determining highest number of accident cases based on location, types of day, period of month and time. At the end of this study, it is hope that road safety level of both roads connecting Pekan to Kuantan can be determined. Furthermore, this study can be used as a guideline to all road users travelled from Pekan to Kuantan to choose the safest road.

CHAPTER 2

LITERATURE REVIEW

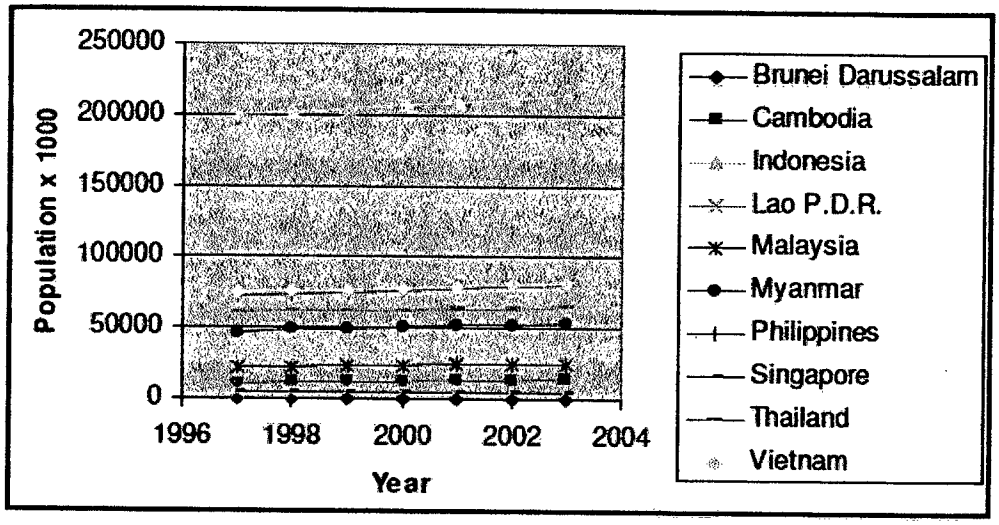
2.1 Definition of Road Traffic Accident

A road traffic accident usually involves one road vehicle colliding with, another vehicle, another road user, or a stationary roadside object, and which may result in injury or property damage, or possibly death. Although these events are rare in terms of the number of vehicles and drivers on the road, addressing the contributing factors can reduce the likelihood of collisions (R.J. Akarro, 2009).

Based on a research by Azree, UTM (2005) he stated that an accurate time of an accident occurred can never be predicted. Road traffic accident also is defined as any vehicle accident occurring on a public highway. It includes collisions between vehicles and animals, vehicles and pedestrians, or vehicles and fixed obstacles. Single vehicle accidents, which involve a single vehicle, that means without other road user, are also included (Safecarguide, 2004).

2.3 Road Accident in Malaysia

Road accident has becoming a severe problem in Malaysia. As mentioned earlier, there are many factors contributes to road accident such as human behavior, environmental factor, road defect and vehicle. In a study by ASEAN Region Road Safety Strategy and Action Plan, (2004) stated the growth of population also has leads to road accident. Figure 2.1 shows the growth of population in ASEAN country.



(Source of Data: ASEAN Region Road Safety Strategy and Action Plan, 2004)

Figure 2.1: Population Growth in ASEAN Countries

From Figure 2.1, Malaysia is the fifth country with high population among ASEAN country. When the population increased, it also leads on the increased of the vehicles and road accidents.

2.2 Causes of Road Traffic Accident

There are many factors contributing to road traffic accident. These accidents can be fatal, or just cause harm for the vehicles. According to H.E Ung Chun Hour (2007), road traffic accidents can be caused by three major factors which are human factors, road defect and vehicle defect. Based on his research in Cambodia, the statistic shows that 92% of road accident has been caused by road users who infringed the traffic law, for instance driving faster than limited speed, driving carelessly, getting drunk during driving etc. Road defect is one of the factors because it is not according with the appropriate safety to standard, for examples a pothole in the road. Meanwhile vehicles have caused road accident because their owners did not properly maintain and regularly inspect the vehicle during the operation.

A study by the Department of Road Safety, JKR, Malaysia (2009) also stated the same factors contributing to road accident which were human behavior, vehicle and road environment. In a research of Lazim and Nurnadiah (2010), based on a report by Highway Planning Unit, Road Safety Section, Malaysian Ministry of Works (2008), stated that road condition, population and number of registered vehicles have been associated with road accident. Rapid growth in population, economic development, industrialization and motorization also can be linked to causation of road accident in Malaysia.

Another research by Malaysia Institute of Road Safety Research, MIROS, (2009) stated that speeding is the highest repeated traffic regulation violation, and it is highly associated with fatal accidents. Weather is also another possible cause of road traffic accident. Andrey and Yagar (2003) had stated that environment factor is the most obvious aspects that can affect driving hence, contributes to road accident.

Another source from ASEAN Region Road Safety Strategy and Action Plan (2004) shows the distribution of road accident fatalities and injuries in ASEAN country. Table 2.1 shows the road accident fatalities and injuries in ASEAN countries. The result was quite worrying since the statistic shows Malaysia with highest number of injuries and fourth rank of road accident with fatalities.

Table 2.1: Record of Road Accident Fatalities and Injuries in ASEAN Countries

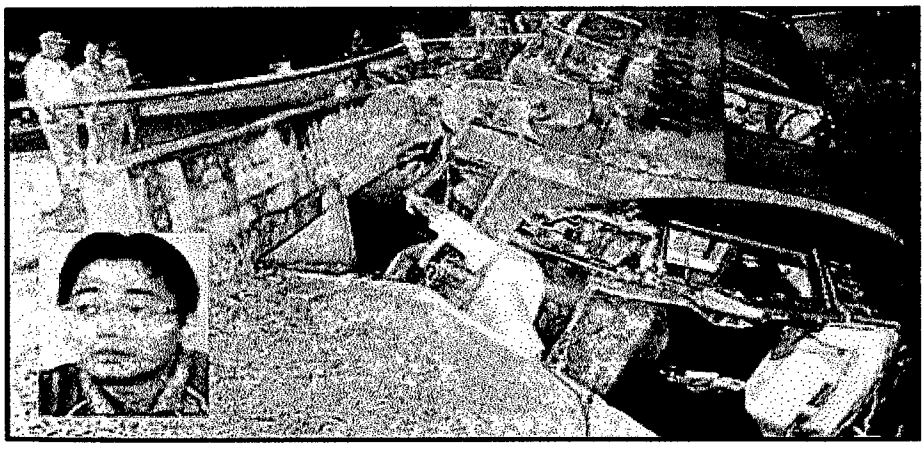
Country	Reported by Police		Estimated	
	Fatalities	Injuries	Fatalities	Injuries
Brunei	23	645	28	1,273
Cambodia	824	6,329	1,017	20,340
Indonesia	8,761	13,941	30,464	2,550,000
Laos	415	6,231	581	18,690
Malaysia	6,282	46,420	6,282	46,420
Myanmar	1,308	9,299	1,308	45,780
Philippines	995	6,790	9,500	774,000
Singapore	211	7,975	211	9,072
Thailand	13,116	69,313	13,186	1,529,034
Vietnam	11,319	20,400	13,186	31,000
Total	**43,259**	**187,343**	**75,763**	**5,025,609**

A research from Azree, UTM (2005) states that some of the issued with road traffic accident were types of location, types of road users, period of time and month. Based on his research, it was reported that the number of fatal accident on State and Municipal routes is about 40% greater than those on Federal roads.

2.4 Road Accident in Pahang

Pahang is the biggest state in Peninsular Malaysia. A case study by Ruslan Rainis and Noresah Mohd Shariff, UTM (2003) on population in Pahang states that in year 1980, 1991 and 2000 are 768,801 units, 1,045,003 units and 1,231,176 units respectively. It shows that growth of the population was increasing tremendously from earlier 80's until year 2000. As mentioned earlier, the rapid growth in population has caused an increase in the number of road traffic accident.

The police also reported that during Ops Sikap V, Pahang topped the State list of fatalities with 14 deaths, all victims of the three-vehicle crash (News Strait Times, 2003). According to Police record, the police have identified 48 accident-prone spots at State roads on the East Coast in Pahang. The Figure 2.2 shows road accident occurred in in Pekan in early of November, 2010.



(Sources: TheStar Newspaper, 2010)

Figure 2.2: Road Accident in Pekan, Pahang

2.5 Road Traffic Safety

2.5.1 Road Traffic Safety Definition

Generally, road safety is important to reduce accident causes on road for proper driving. According to "The Handbook of Road Safety Measure" by Rune Elvik, he stated that road safety is defined and evaluated in terms of the recorded number of accidents or the number of killed or injured road users.

2.5.2 Road Accident Safety Measure

There are many methods of determining accident rates. Many case studies have identified accident rates based on per vehicle kilometer or per person kilometer. In a research by L. Hakamies-Blomqvist (2002), he had developed a relationship between groups of age and accident per km. He also stated that the relationship between accident per km and km driven is not a linear but curvilinear. Figure 2.3 shows the relationship between accident per km and km driven was curvilinear between both age groups where accident per km decreasing when yearly mileage increases.

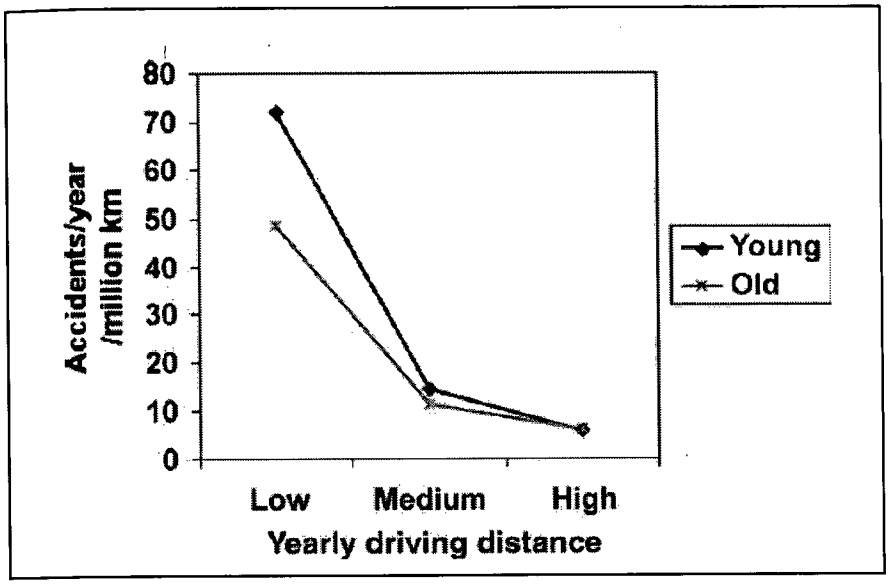


Figure 2.3: Yearly driving distance and accidents per km by age group

Figure 2.3 shows that there was existence of the formula of accident/year/km to measure road safety. This formula can give the approximate number of accident per km.

Correlation analysis is used to determine the relationship between any variables. In a study by Lazim Abdullah and Nurnadiah Zamri (2010), they have used correlation analysis to rank the factor that causes road accident. The three variables that they used to rank the road accident were by population, vehicle registered and road length. Based on their result, they found that registered vehicles achieved the highest positive correlation at 0.989428. The second highest positive correlation is the variable of population with 0.987049 correlation measure. The third place in correlation intensity is the variable of road length.

2.6 Statistic Software in Evaluating Road Safety Level

2.6.1 Microsoft Excel 2007 (Ms Excel 2007)

Microsoft Office Excel 2007 is a powerful and widely used tool that helps people analyze information as well makes more informed decisions. It features calculation, graphing tools and pivot tables. Figure 2.4 shows the spreadsheet Ms Excel 2007.

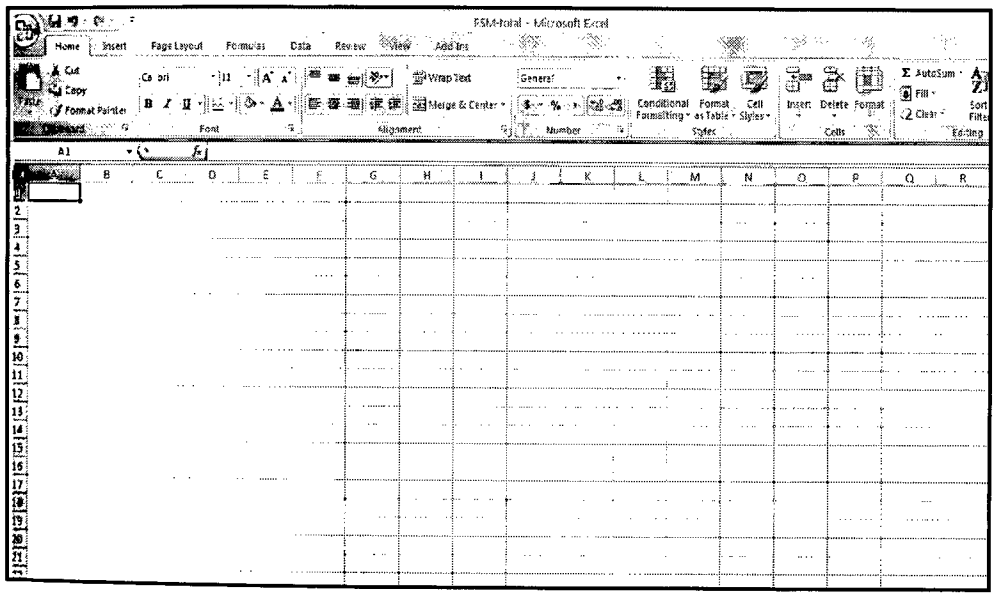


Figure 2.4: Spreadsheet Ms Excel 2007

Microsoft Excel has the basic features of all spreadsheets, using a grid of cells arranged in numbered rows and letter-named columns to organize data manipulations like arithmetic operations. It has a battery of supplied functions to answer statistical, engineering and financial needs. In addition, it can display data as line graphs, histograms and charts, and with a very limited three-dimensional graphical display. It allows sectioning of data to view its dependencies on various factors from different perspectives. A source from Window Microsoft states the following are some of the advantages of using Microsoft Excel 2007:

2.6.1.1 Results-oriented user interface
2.6.1.2 Easy sorting and filtering
2.6.1.3 Easy development of charts

2.6.1.1 Results-oriented user interface

The new results-oriented user interface makes it easy to work in Microsoft Office Excel. In Ms Excel 2007, commands and features in the toolbars are easier to find on task-oriented tabs that contain logical groups of commands and features. The commands and features can be easily accessed to arrange data and develop charts.

2.6.1.2 Easy sorting and filtering

In Office Excel 2007, the worksheet data can be arranged quickly to find the answers that required by filtering and sorting. The filtering and sorting makes any data to be adjusted easily without time consumption.