Faculty of Cognitive Sciences and Human Development

ROAD ACCIDENTS AT BLACKSPOT AREA: A HUMAN FACTOR APPROACH AND SOLUTION

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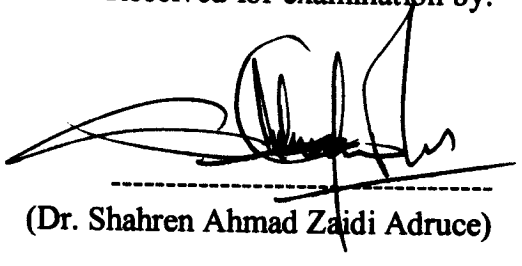

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ABSTRACT

ROAD ACCIDENTS AT BLACKSPOT AREA: A HUMAN FACTOR APPROACH AND SOLUTIONS

Noor Hazirah Binti Abu Bakar

The road accidents are serious social and economic problems in Malaysia. On average, seven fatalities are recorded each day. Previous research has found that human factors play the chief role in contributing to road accidents, and driver behaviours, are the specific contributors of these factors. However the study to investigate road accidents at the blackspot area using human factor approach is still new. This study aims to identify the blackspot area at Kota Samarahan. In addition, it also identify possible elements of human factors related issues that possibly contributed to road accidents at the blackspot area. Among the elements to be studied are the road users, road, vehicles, environment and signage. Lastly, the informants give their opinion on how the problems above to be solved from information. This study methodology was is a qualitative research which used in-depth interview. Nine informants consist of road users and authorities. The findings indicate support of

results found in previous studies. The major finding is human is still major contribution to road accidents even at the blackspot area.

ABSTRAK

KEMALANGAN JALAN RAYA DI KAWASAN HITAM: PENDEKATAN DAN PENYELESAIAN DARI FAKTOR MANUSIA

Noor Hazirah binti Abu Bakar

Kemalangan jalan adalah masalah sosial dan ekonomi yang serius di Malaysia. Rata-rata, tujuh korban direkodkan setiap hari. Penyelidikan sebelum ini telah menemui bahawa faktor manusia memainkan peranan utama dalam memberikan sumbangan terhadap kemalangan di jalan raya, dan perilaku pemandu, adalah penyumbang tertentu faktor ini. Namun kajian ini untuk menyiasat kemalangan jalan di kawasan hitam menggunakan pendekatan faktor manusia masih baru. Penyelidikan ini bertujuan untuk mengenal pasti kawasan hitam di Kota Samarahan. Selain itu, juga mengenal pasti unsur-unsur yang mungkin timbul berkaitan dari faktor manusia yang mungkin memberikan sumbangan terhadap kemalangan jalan di kawasan hitam. Di antara elemen yang akan diteliti adalah pengguna jalan, jalan, kenderaan, persekitaran dan papan tanda. Terakhir, para informan memberikan pendapat mereka tentang bagaimana permasalahan diatas harus diselesaikan dari maklumat yang ada. Metodologi kajian ini adalah kajian kualitatif yang

menggunakan wawancara mendalam. Sembilan informan terdiri dari pengguna jalan dan penguatkuasa. Penemuan menunjukkan sokongan keputusan dijumpai dalam kajian sebelumnya. Penemuan utama adalah manusia masih member sumbangan besar untuk kemalangan jalan raya walaupun di kawasan hitam.

CHAPTER 1
INTRODUCTION

1.0 Overview

This chapter gives an introduction and outline of the whole research. The research, entitled "Road Accidents at Blackspot Area: A Human Factors Approach and Solutions", is basically to find the factors that can prevent humans from being involved in road accidents at the hazardous area. This research is made in order to find out the problem of road accidents from its root according to human factor point of view.

1.1 Introduction

This research objective is to find blackspot areas in Kota Samarahan. From those several blackspots, only three will be examined and involved in this study. The three blackspot areas then will be investigated further which aims to know the major factors that cause that contributing it to be became blackspot road area. There are five elements involved in this investigation. The elements are road users, vehicle, road, environment and also signage. Those elements mention are listed in previous literature as the major factors of road accidents causation. The different between this

study with previous studies is, it is focusing more on the human factor component itself. Finally, the objective is to give suggestion to prevent or at least reduce the number of road accidents in Kota Samarahan. The suggestion provides information for road users especially those who are frequent users of the three blackspots road. This study is basically from perspective of human factor approach and solutions.

A human factor is a body of knowledge about human abilities, human limitations and other human characteristics that are relevant to design (Chapanis, 1994). Human factor research applies knowledge about human strengths and limitations to the design of interactive systems of people, equipment, and their environment to ensure their effectiveness, safety, and ease of use. Chapanis also elaborate that ergonomic or human factors design is the application of ergonomic information to the design of tools, machines, system, tasks, job and environment for safe, comfortable and effective human use. Ergonomics is concerned with the application of scientific information concerning human beings to the design of objects, the design of working system where human interact with machines and the science of matching the job to the worker and the products to the user.

'Ergonomics' derived from a Greek word which is known as 'ergon' (work) and 'nomos' (laws) to denote the science of work, ergonomics is a system-oriented discipline which now extends across all aspects of human activity (Galer,1987). The science of ergonomics formed on the time of World War 2. It was founded by a group of British scientist who had been working on various projects concerned with the efficiency of the fighting man for the armed forces. The group of anatomists, physiologists, psychologists and engineers believe that a multidisciplinary scientific approach to the study of working efficiency could be equally relevant to the industry in future.

In August 2000, the International Ergonomics Association Council (IEA) adopted an official definition of ergonomics. It says that ergonomics is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.

In the traffic system, the human element has a specific role. Both are component and the principal actor. The road user is the element that drives the system which has specific task to regulate their activity and adjust it to the problems arising from the interactions between different components including road users itself. To negotiate those difficulties, road users (drivers) perform a number of functions, especially cognitive ones. Usually the usage of this function allows road users to succeed in compensating from driving system drawbacks. The drivers are at the basis of the driving system functioning. But the very functions that usually enable the driver to regulate his activity may fail if he encounters major malfunctions within the system that prevent those functions from attaining their regulating objective. This results in a functional failure, commonly called 'human error'.

1.2 Background of Study

With an estimated 1.2 million deaths in motor vehicle crashes worldwide (Peden, Scurfield, Sleet, Mohan & Hyder, 2004), the quest for a better understanding of the causality and prevention of roadway mishaps has become an urgent task for safety researchers, policy-makers, highway engineers and automotive design specialists. Even after decades of study, scholars still search to identify the relative effects of vehicle, road, environment and human characteristics on the risk of accidental events and fatalities. This is particularly salient in developing countries, such as Malaysia, where rates of roadway accidents and deaths have been consistently higher than in other parts of the world (Peden & Hyder, 2002).

Every year, millions are killed on the roads of developing countries, and other millions are seriously injured. The most dominant factor in understanding the chain of events leading to an accident is the human factor, and understanding driver's perceptions of the issue are necessary for interventions to be effective. Some countries have provided creative methods of educating people. In Malaysia, road accidents are one of the major causes of death and injuries. From the increasing number of road accidents in Malaysia generally and Sarawak especially, it is crucial to investigate the factor of road accidents from the human factor approaches so that the prevention of the accidents could be taken. Previous studies have been done in order to solve this problem, but still the number of road accidents keep on increasing. From the literature showed various methods of road accident studies from various points of view.

Brijs Tom et al. (2007) provided a Bayesian Model for ranking hazardous road sites. They discussed the importance of identifying the sites that are more dangerous than others in order to help in better scheduling road safety policies. The research proposed a methodology for ranking sites according to their level of hazard. The model made use of all relevant information per accident location, including the total number of accidents and the number of fatalities, as well as the number of slight and serious injuries.

In a research paper from Iran, they come out with the results that human factor is considered as the most important influencing factor of the accident compared with other factors including vehicle, road and environment or weather condition. In most previous studies around the world, it was mentioned that human factors are the major problem in the causation of road accident. However it depends on the location itself. In Malaysia there is not much information on the blackspot accident causation and the

purpose of this research is to explore more on the accident causation in the blackspot areas in Kota Samarahan, Sarawak.

Malaysia Road Accident Statistic Year 2000 - 2009

YEAR		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
ACCIDENT INJURY TYPE	Fatal Accidents	5,440	5,230	5,378	5,634	5,674	5,604	5,711	5,672	5,952	6,218
	Serious Injury	8,067	6,942	6,696	7,163	7,444	7,600	7,375	7,384	7,020	6,978
	Minor Injury	28,778	30,684	30,259	31,357	33,413	25,928	15,596	13,979	12,893	12,072
TOTAL ACCIDENT INJURY		**42,285**	**42,856**	**42,333**	**44,154**	**46,531**	**39,132**	**28,682**	**27,035**	**25,865**	**25,268**
TOTAL ACCIDENT WITHOUT INJURY		208,144	222,319	237,378	254,499	280,283	289,136	312,550	336,284	347,182	371,926
TOTAL ACCIDENT		250,429	265,175	279,711	298,653	326,814	328,268	341,232	363,319	373,047	397,194
Injury Type	Fatal	6,035	5,854	5,891	6,286	6,228	6,188	6,287	6,282	6,527	6,745
	Serious Injury	9,790	8,689	8,425	9,040	9,229	9,397	9,254	9,273	8,866	8,849
	Minor Injury	34,375	35,974	35,236	37,415	38,631	31,429	19,884	18,444	16,901	15,823
TOTAL INJURY		**50,200**	**50,517**	**49,552**	**52,741**	**54,088**	**47,014**	**35,425**	**33,999**	**32,294**	**31,417**
FATALITIES INDEX	10 000 registration vehicle	**5.70**	**5.17**	**4.88**	**4.88**	**4.51**	**4.18**	**3.98**	**3.73**	**3.63**	**3.55**
	Every 1 Billion VKT	**26.25**	**23.93**	**22.71**	**22.77**	**21.1**	**19.58**	**18.69**	**17.6**	**17.2**	**17.28**

Table 1.1: Total number of road accidents in Malaysia from 2000 to 2009
(Data required from Royal Malaysian Police)

The table above shows the number of road accidents in Malaysia from 2000 until 2009. In the year 2007, the total number of road accident was 363,319 cases, an increase of 22,087 cases from the previous year. In the year 2008, the total number of accidents was 373,047 cases an increase of 9728 cases compared to 2007. In 2009, the total number of accidents was 397,194 cases, an increase of 24,147 cases comparing to the year of 2008.

Fatality Comparison between 2008 and 2009

STATE	2008	2009	DIFFERENT	%
PERLIS	69	90	21	30.4
KEDAH	496	550	54	10.9
P.PINANG	354	395	41	11.6
PERAK	829	829	0	0.0
SELANGOR	1083	976	-107	-9.9
K.LUMPUR	237	230	-7	-3.0
N.SEMBILAN	389	377	-12	-3.1
MELAKA	243	248	5	2.1
JOHOR	1065	1060	-5	-0.5
PAHANG	446	512	66	14.8
KELANTAN	380	453	73	19.2
TERENGGANU	293	348	55	18.8
SABAH	325	345	20	6.2
SARAWAK	318	332	14	4.4
TOTAL	6527	6745	218	3.3

Table 1.2: Fatality comparison between states in Malaysia
(Data required from Royal Malaysian Police)

The table above shows fatality comparison between states in Malaysia. From the statistic of state fatality comparison between 2008 and 2009, Sarawak shows the increasing of 4.4% which were 318 cases of fatality. For the state road accident comparison, Sarawak has the increase of 1167 cases from 373,047 cases on 2008. Table 1.1, 1.2 and 1.3 shows the accident statistics in Malaysia and Kota Samarahan (RMP, 2010).

Statistics of Road Accidents in Year 2010, Kota Samarahan

NO.	ROAD NAME	ROAD CODE	KM	NO OF ACCIDENTS			STATE/FEDERAL
				DEATH	SEVERE	MINOR	
1.	KUCHING-SERIAN ROAD	1-15	KM 8 - KM 9	3	3	4	Federal
		1-15	KM39-42			1	
		1-15	KM43-KM44		-	2	
		1-15	KM50-KM56		1		
		1-15	KM60-KM62				
2.	SERIAN-TEBEDU ROAD	21	KM27	-	-	1	Federal
			KM83				
3.	TANGGA BY PASS ROAD	21	KM1				Federal
4.	DATO MOHD MUSA ROAD		KM5				Federal
		802-1					
		802-1	KM18				
5.	SERIAN-MONGKOS ROAD	802-2	KM33				State
6.	SIMUNJAN-SEBANGAN ROAD	Q154					State
7.	KPG BAJONG-SEBANGAN ROAD	Q157					State
8.	SIMUNJAN ROAD	Q2016	KM26	1	-	-	State
9.	MENTUNG/MERAU-PAON LIMAU ROAD	Q157					State
10.	OUTER RING ROAD	Q155					State
11.	EXPRESSWAY SAMARAHAN – MAMBONG	Q13					*Defect Liability Period*
		-					
		-					
12.	KPG SEBINTIN,MONGKOS ROAD	-					State
13.	KPG TAEE,SERIAN ROAD	-	*Jalan dalam kampung*				*Road under maintenance*
14.	SEBANGAN-SEBUYAU ROAD	-	*Jalan dalam kampung*				*Road under maintenance*
15.	SAMARAHAN-ASAJAYA *(ferry)* ROAD	Q2016	*Jalan dalam kampung*				*Road under maintenance*
		-					State
16.	SAMARAHAN/SADONG JAYA(FERI) ROAD		KM16-KM17				State

17.	TJG BUNDUNG ROAD	Q142					State
18.	GEDONG ROAD	Q147Y					State
		Q156					
19.	SERIAN(PASAR) ROAD						*Road under maintenance*
20.	ENSENGEI ROAD	-					State
21.	BAKI RIIH ROAD		KM0-KM2	-	1	-	
	UPDATED:16/03/2010		TOTAL:	*5*	*7*	*15*	

Table 1.3: Statistic of road accidents in year 2010 at Kota Samarahan (Data required from Royal Malaysian Police)

Table 1.3 shows statistic of road accidents in year 2010 at Kota Samarahan, Sarawak. The highest death and injury is at Kuching-Serian road which is 3 deaths. Kuching-Serian road is divided into several partitions. The partition made is according to mile. Mile 8-9 recorded the highest number of road accidents. Another road accident is at Simunjan road which involved only one death. It is clear here that the study have to be more focus on Kuching-Serian road.

1.3 Problem Statements

Given widespread awareness about the high rates of death and injury resulting from motor vehicle crashes worldwide and in Malaysia, drivers still operate automobiles and motorcycles in ways that reduce the likelihood of safe arrival at destinations. Speeding, externally-focused frustration, loss of attention and the deliberate usurpation of right-of-way are frequent behaviours in traffic, with resulting outcomes often involving crash and injury.

The most effective way to reduce road accident is to better understand the cause of the accidents hence to find corrective mean to prevent the occurrence of road accidents. Past studies emphasized on identification of blackspot. Accidents are rarely caused because of one single factor. Thus, a multi-disciplinary approach is required to help understand the problems and providing better and appropriate solutions.

A study in Pakistan showed that the most dominant factor in understanding the chain of events leading to an accident is the human factors; therefore, understanding driver's perceptions of the issue are necessary for effective interventions. Kilpeläinen et al. (2007) study the effect of slippery roads during winter in Canada, Finland, and Sweden. Weather conditions are considered as one of the risk factor which leads to road accidents. However, study on accidents related to rain and weather conditions in tropical climate are not common.

Lessons learned through the developed countries have made it evident that a blackspot treatment program is an effective, reactive means for dealing with the occurrence of accidents. In fact other country like Thailand has introduced blackspot treatment program in order to help reducing road accidents in their country (Kowtanapanich, 2006). It is stated that in order to implement such program, the basic crucial step is to identify the site which means blackspot for safety improvement. However, they found out that lack of in-depth study and detailed information on traffic accidents causation is widely acknowledged.

It can be noted that in South Africa "vehicles conditions" as compared to the road environment factors contributed more to accidents (South Africa Department of Transport, 2010). This contradicts research works done in Australia and America. There seems to be many problems that led to road accidents. Therefore, it would be interesting to understand the various factors that led to road accident at the hazardous areas also known as blackspot in Kota Samarahan using a qualitative research methodology.