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ACCIDENT PREDICTION BY CONFLICT STUDY

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ACCIDENT PREDICTION BY CONFLICT STUDY

By

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ESPECIALLY FOR:

**DEAREST FATHER AND MOTHER,
DEVOTED BROTHERS AND SISTERS,
AND TRULLY FRINDES**

**THANKS FOR CONSTANTLY PRAYING FOR MY
HEALTH AND SUCCESS.**

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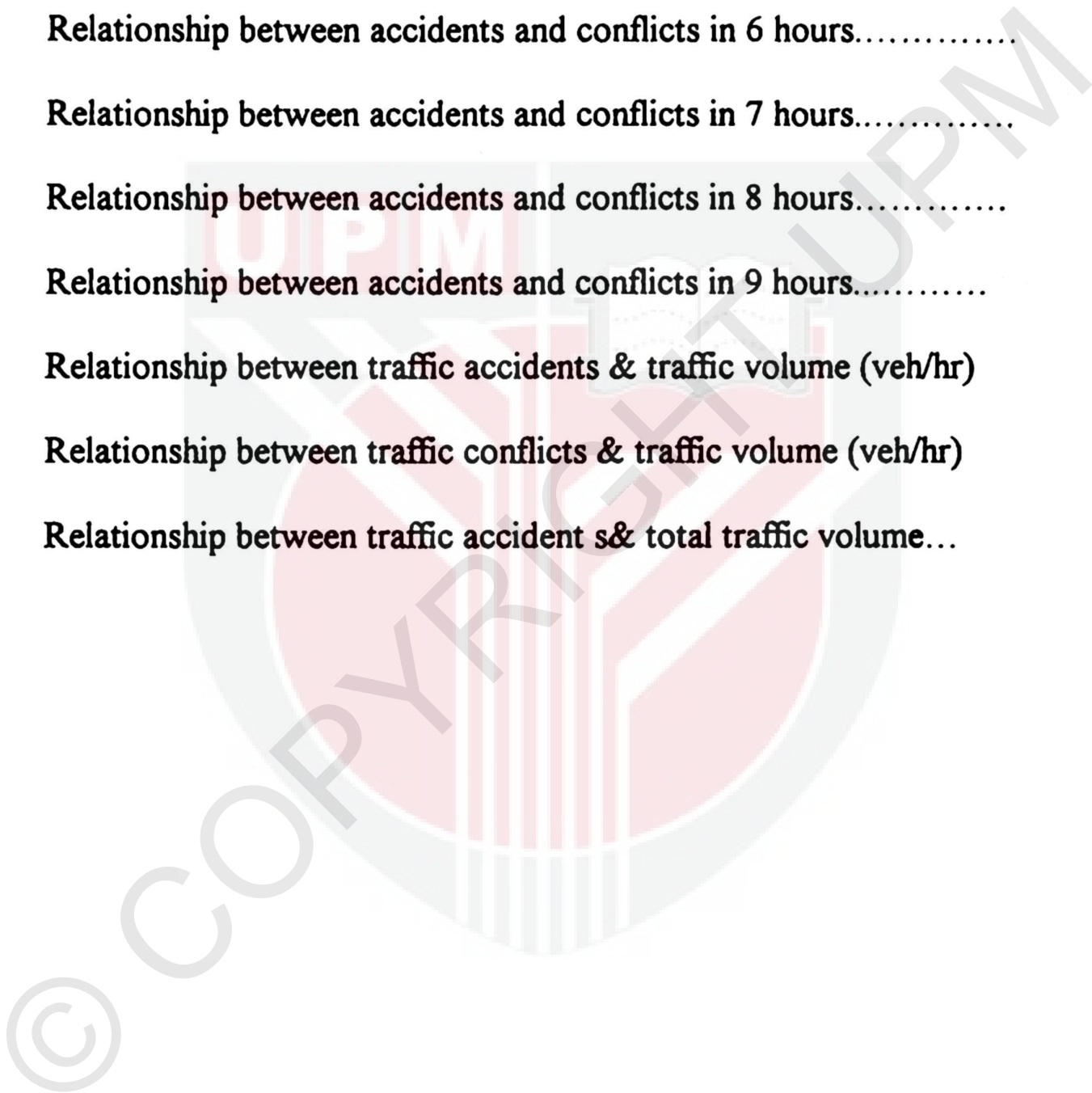
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LIST OF SYMBOLS AND ABBREVIATIONS

GMR	General Motor Research
Hr	Hour
Q	Total Traffic Volume
R ²	Determination Coefficient
TCT	Traffic Conflict Technique
V	Volume (veh/hr)
Veh	Vehicle
x	x- axis
y	y-axis



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirements for the degree of Master of Science

ACCIDENT PREDICTION BY CONFLICT STUDY

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Traffic conflict studies are used in diagnosis of safety and operational problems at a roadway location. The basic aim of the traffic conflict technique is to expand the range of safety research from accidents to potential accidents. Therefore the objective of this work is to study and design accident prediction models using the serious conflicts, and traffic volume, to predict potential accidents at unsignalized intersections (T junctions).

This study was carried out at ten unsignalized intersections (T junction) in the State of Selangor. Conflict and volume data was collected on weekdays. One day of data was collected for each site. Manual records supported by video method was used to capture the conflict data, and volume data over period of observation (from 7.00 to 13.00) and (from 15.00 to 18.00). Conflict and volume data were recorded within each hour of the study period.

Regression analysis using EXCEL, and SPSS software was used to obtain significant correlate between the variables. As in the earlier study which found accident data and serious conflict data well correlated, in this study the result obtained indicates that serious conflict and accident figures are well correlated and the types of vehicles involved in the conflicts correlated well with the types of vehicles involved in the accidents. The relationship between accidents and traffic volume (veh/hr), and between conflicts and traffic volume (veh/hr), indicates that the number of traffic accidents and conflicts increases when the amount of traffic volume increases. The result obtained from the relationship between traffic accident and total traffic volume over nine hours indicates that traffic accidents and total traffic volume correlate well. And it suggests that the total traffic volume can be used to predict accident potential for any similar junctions with the same layout characteristics.

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RAMALAN KEMALANGAN MELALUI KAJIAN KONFLIK

Oleh

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Pengerusi: Professor Madya Ir. Dr. Radin Umar Radin Sohadi

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Kajian konflik trafik digunakan bagi diagnosa masalah keselamatan dan operasi sesebuah jalan. Tujuan asas kajian konflik trafik adalah mengalihkan kajian keselamatan dari aspek kemalangan kepada aspek ramalan kemalangan. Dengan demikian, objektif utama kajian ini adalah bagi memahami dan merekabentuk model ramalan kemalangan menggunakan konflik dan isipadu trafik yang serius bagi meramal kemalangan di persimpangan jalan tanpa kawalan lampu isyarat (Persimpangan T).

Kajian telah dijalankan di sepuluh persimpanagn tanpa kawalan lampu isyarat di sekitar Selangor. Data isipadu dan konflik telah dikumpul pada hari kerja. Data bagi satu hari telah dikumpul bagi setiap persimpangan tersebut.

Penggambaran secara manual menggunakan penggambaran video telah digunakan bagi mendapatkan data konflik dan data isipadu trafik dalam jangkamasa pemerhatian (dari 0700 ke 1300) dan (dari 1500 ke 1800). Data

konflik dan isipadu telah direkodkan dalam masa setiap satu jam masa pemerhatian.

Analisa regrasi dengan menggunakan perisian komputer Excell, dan SPSS telah dilakukan bagi mendapatkan hubungan antara pembolehubah-pembolehubah yang terlibat. Kajian ini mengesahkan kajian terdahulu yang menyebabkan terdapat satu hubungan yang ketara antara data kemalangan dan data konflik kemalangan. Selain itu, kajian ini juga mendapati jenis kenderaan yang terlibat dalam kemalangan. Hubungan antara kemalangan dan isipadu trafik (kend/jam), dengan konflik dan isipadu trafik (kend/jam) menunjukkan berlakunya pertambahan kemalangan dan konflik apabila meningkatnya isipadu trafik. Keputusan yang diperolehi bagi kajian hubungan kemalangan dan jumlah isipadu trafik bagi sembilan jam menunjukkan ianya mempunyai suatu hubungan yang ketara.

Dengan ini, boleh dirumuskan bahawa jumlah isipadu trafik boleh digunakan untuk meramal kemalangan bagi sesuatu persimpangan yang mempunyai geometrik yang serupa dengan persimpangan yang terlibat dalam kajian ini.

CHAPTER I

INTRODUCTION

The growth of population, and increase in the number of vehicles lead to an increasing number of accidents occurring in Malaysia. Reports on road accident statistics in Malaysia, (1998) released by Polis Diraja Malaysia. Table 1 show that a total of 189,109 road accidents were reported in 1996, and this increased to 211,037 road accidents reported in 1998. In 1998, more than 5,740 persons were killed and 49,964 persons injured in Malaysia as a result of roadside crashes (PDRM Statistic 1998).

In order to over-come this problem, there is a need for further understanding of the roadside safety problem to help focus future efforts. Thus, traffic conflict studies are used in diagnosis of safety and operational problems at a roadway location. Traffic conflict counts can supplement routine field inspection of high accident locations or they can be conducted at suspected hazardous sites. Generally the basic aim of the traffic conflict technique is to expand the range of safety research from accidents to potential accidents.

In most countries, the most widely available database on road accidents is the police accident report. It is generally computerized, contains numerous data items on road traffic, driver and vehicle characteristics associated with the accident. The records of routinely police-reported accidents can form the basis for

statistical information, but are of little use in accident analysis due to their limitations, inaccuracies and incompleteness. To understand the complex nature of an accident, new techniques in accident investigation have evolved. One of these is the use of observation of conflict that may lead to near accidents or accidents (Grayson, 1984).

A traffic conflict study is useful for several purposes. In some cases, detailed accident information is unavailable. Conflict study can also be conducted to assist in the selection of safety-related countermeasures. For this application, traffic conflicts can provide valuable information in the study of hazardous locations, particularly at urban, unsignalized intersections where a significant number of conflicting movements normally occur in or near the intersection area. Countermeasures may be developed or selected to alleviate certain noticeable conflict types.

In the Evaluation Component of the Highway Safety Improvement Process, traffic conflicts can be used as a “measure of effectiveness” for a project. Their use in this way is favorable for intersections containing significant traffic volume and a variety of conflicting traffic movements.

Objective

The basic aim of the traffic conflict technique is to expand the range of safety research from accidents to potential accidents. Therefore the objective of

this work is to study and design accident prediction models using the serious conflicts, and traffic volume, to predict potential accidents at unsignalized intersections (T junctions).

Layout of Project

This project is organized into five chapters. The first chapter contains the introduction, the objective of the research, and project layout. Literature review is presented in Chapter II. Chapter III contains methodology, which includes the study location, data collection, and traffic volume record while Chapter IV represents the results. Discussion and Conclusions of overall research are presented in Chapter V.

Table 1: Report on the Road Accidents Statistics in Malaysia (1998)

Year	Population	Number of Registered Vehicles	Vehicles Involved in Road Crash	Total Road Length Km	Total Number of Road Crash	Casualties				Total Damage To Vehicles/ Properties (RM)
						Death	Serious	Minor	Total	
1989	17,376,800	**4,155,197	127,279	44,592	75,626	3,773	7,249	19,015	30,037	106,514,767,00
1990	17,812,000	**4,547,417	146,747	50,835	87,999	4,048	8,076	17,690	29,814	113,602,255,00
1991	18,178,100	**4,942,040	161,823	55,367	96,513	4,331	8,524	17,252	30,107	114,473,106,00
1992	18,606,000	**5,259,836	185,805	59,796	118,554	4,557	10,634	21,071	36,262	130,200,000,00
1993	19,050,000	**5,656,037	220,939	59,796	135,995	4,666	11,930	25,090	41,686	147,248,690,00
1994	19,494,000	**6,166,432	251,686	#60,734	148,801	5,159	13,387	29,957	48,503	164,297,380,00
1995	20,096,700	**6,802,375	275,430	#60,734	162,491	5,712	15,313	31,127	52,152	181,346,070,00
1996	21,169,000	**7,686,684	325,915	#60,734	189,109	6,304	14,218	32,953	53,475	N.A
1997	21,665,600	**8,550,469	373,526	*63,382	215,632	6,302	14,105	36,167	56,574	N.A
1998	22,179,500	**9,141,357	366,9	*63,382	211,037	5,740	12,068	37,896	55,704	N.A

NOTE 1 (*) Data for the states of Sabah and Sarawak were included since 1981.

NOTE 2 (**) The total number of registered vehicle were updated by Road Transport Department since 1986 based on active records.

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