THE IMPLEMENTATION OF MOTORCYCLE JUNCTION BOX TO REDUCE MOTORCYCLE ACCIDENT RATE IN MALAYSIA

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SCHOOL OF CIVIL ENGINEERING
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By

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ABSTRAK

Motosikal adalah antara punca utama kemalangan jalan raya di kebanyakan rangkaian jalan raya di negara Asia termasuk di Malaysia. Ini menunjukkan bahawa penunggang motosikal adalah antara pengguna jalan raya yang paling terdedah di seluruh rangkaian ini. Demi keselamatan penunggang motosikal di Malaysia, kertas penyelidikan ini memberi gambaran keseluruhan pelaksanaan kotak simpang motosikal di beberapa persimpangan jalan raya terpilih di Bandaraya Kuala Lumpur. Kertas penyelidikan ini menyiasat sama ada zon yang dilaksanakan boleh membantu dalam mengurangkan kadar kemalangan yang melibatkan motosikal dengan menganalisis kebolehcapaian zon, sama ada zon adalah berkesan dan apakah tahap kesedaran dan penerimaan orang ramai ke arah kewujudan zon ini. Kaedah pengumpulan data adalah dengan menggunakan borang soal selidik sebagai pengumpulan data primer dan data sekunder diperolehi daripada agensi-agensi kerajaan dan swasta yang berkaitan. Hasil analisis data menunjukkan pelaksanaan zon motosikal terbukti baik dalam mengurangkan kadar kemalangan motosikal dan keberkesanan zon juga dicapai. Kira-kira 42.7% daripada responden mengetahui mengenai kewujudan zon tersebut di beberapa lokasi terpilih dan hampir 90% daripada mereka menerima bahawa zon yang dilaksanakan boleh membantu dalam mengurangkan kadar kemalangan motosikal di Malaysia.

ABSTRACT

Motorcycles are among the major causes of road accidents in most Asian countries road networks including Malaysia. This indicates that motorcyclists are among the most vulnerable road users throughout these networks. For the sake of motorcycle safety in Malaysia, this paper provides an overview of the implementation of motorcycle junction box in selected few road junctions in Kuala Lumpur City. This research paper investigated the implemented zone helping to reduce accident rates involving motorcycles by analysing the accessibility of the zone, it effectiveness and what are the awareness and acceptance level of the public towards the implementation of the zone. The methods for data collection are by using questionnaires as the primary data collection and secondary data is obtained from related government and private agencies. The results of analysing data showed that the implementation of the motorcycle zone was proven to be effective in reducing the motorcycle accident rate and the effectiveness of the zone is also achieved. About 42.7% of respondent are aware about the existed zone in selected areas and nearly 90% of them accepted that the implemented zones can help in reducing motorcycle accident rates in Malaysia.

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LIST OF ABBREVIATIONS

AID   **A**utomatic **I**ncident **D**etection

ANOVA   **A**nalysis **o**f **V**ariance

ASL   **A**dvance **S**top **L**ine

ATCS   **A**daptive **T**raffic **C**ontrol **S**ystem

CC   **C**ommunication **C**abinet

CCTV   **C**losed-**C**ircuit **T**elevision

CHKL   **C**ity **H**all **K**uala **L**umpur

DBKL   **D**ewan **B**andaraya **K**uala **L**umpur

EMCL   **E**xclusive **M**otorcycle **L**ane

IS   **I**nformation **S**ystem

IT   **I**nformation **T**echnology

iRAP   **I**nternational **R**oad **A**ssessment **P**rogramme

JKJR   **J**abatan **K**eselamatan **J**alan **R**aya

MAA   **M**alaysian **A**utomotive **A**ssociation

MEL   **M**otorcycle **E**xclusive **L**ane

MIROS   **M**alaysian **I**nstitute **o**f **R**oad **S**afety Malaysia

MPLs   **M**otorcycle **P**riority **L**ane

MTLT   **M**otorcycle **T**wo-**S**tage **L**eft **T**urn

MWZ   **M**otorcycle **W**aiting **Z**one

NEMCL   **N**on-**E**xclusive **M**otorcycle **L**ane

PDRM   **P**olis **D**i-raja **M**alaysia

PSV   **P**ublic **S**ervice **T**ransport

RHK **R**uang **H**enti **K**husus

SPSS **S**tatistical **P**ackage **f**or the **S**ocial **S**ciences

VKT **V**ehicle-**K**ilometre **T**ravel

VMS **V**ariable **M**essage **S**ign

WHO **W**orld **H**ealth **O**rganisation

CHAPTER 1

INTRODUCTION

1.1 Introduction

The motorcycle zone was first introduced on 15th March 2017 by the Kuala Lumpur City Hall (DBKL) in several areas of traffic lights in the capital city of Kuala Lumpur namely at Jalan Raja Laut, Jalan Tuanku Abdul Rahman and Jalan Tun Perak. It is an effort from DBKL to implement a new traffic restructuring in the capital city of Kuala Lumpur. The zones are painted red and white and shown as a marker for every motorcyclist to stop in a special zone while waiting at the traffic light and will no longer be allowed to stop the motorcycle outside the zone, while other vehicles should stop behind the zone. This traffic restructuring is to ensure pedestrian safety to cross and facilitate motorists to stop safely. Besides, based on random observations made, the system is less welcomed from road users as few of them still do not follow the law that has been made. There are vehicle users who still have less respect for small vehicles such as motorcycles on the road. However, the effectiveness of the zone is still unproven as there is no detail study carried out to assess the effectiveness of the system.

Comprehensive and efficient transportation system networks with good inter and intra city linkages are essential enabling factors to ensure Kuala Lumpur's position as an international commercial and financial Centre. For the residents of Kuala Lumpur, the City must be able to provide an efficient and equitable city structure that, as far as possible, allows all members of the community equal accessibility to all areas and facilities so that everyone may enjoy the maximum benefits of city living. Under

Structure Plan Kuala Lumpur 2020 [27], the issues that relate to the motorcycle in chapter 10 under transportation issues, the main issues for motorcycle.

- About 52 percent of the total numbers of fatal and serious accidents in Kuala Lumpur involve motorcycles.

- Motorcycles are the major source of urban air and noise pollution. Noise emission from motorcycles in the City Centre exceeds permissible noise limits (Malaysia Environmental Quality Report 1996, DOE) [25].

- Motorcycles account for approximately 23 percent of all road users in Kuala Lumpur. Principally used by the young and lower income groups, they provide a fast, flexible and economical means of transportation around the City.

1.2 Research background

Malaysia has the highest road fatality risk (per 100,000 population) among the ASEAN countries and more than 50% of the road accident fatalities involve motorcyclists [1] . Motorcycle is an interesting mode of transportation, but has high rate of fatal accident in developed and developing countries [2] . In Malaysia, motorcycle is the most preferable mode of transportation used due to its convenience. A fact from WHO stated that nearly half of those dying on the world's roads are "vulnerable road users": pedestrians, cyclists, and motorcyclists. According to Police Statistics Data by the Royal Police Department of Malaysia, 4,484 motorcyclists were killed in 2016 in motor vehicle crashes out of a total of 7,152 death. In 2016, motorcyclist counted for 62.7 percent of all traffic fatalities. Selangor is the state that has the highest record of motorcycle fatalities in Malaysia [3] . From the study conducted by MIROS [26], it is predicted that the number of fatalities will continue to increase up to 8,760 (in the year

2015) and 10,716 (in the year 2020) [4]. Without sustained action, road traffic crashes are predicted to become the seventh leading cause of death by 2030 (WHO).

One of the possible reasons for road crashes and road injuries resulting from the road crashes is violating traffic rules such as speeding and beating traffic lights. Road crashes are reported by the Royal Malaysian Police and as per their classifications, and traffic light violation is one of the major causes of crashes, deaths, and injuries at signalized intersections [5]. Motorcyclists are also known to be vulnerable road users in terms of safety-risky exposure and instability compared to other vehicles [6] because they have a high risk of road accident due to lack of protection compared to other road users [7].

To improve overall traffic safety in the city of Kuala Lumpur, Kuala Lumpur City Hall has taken an initiative to introduce the motorcycle zones at the traffic lights in order to give the motorcyclists a comfortable zone for them to stop and also to reduce the motorcycle accident rate in Malaysia. Problems that may be faced are lacking the cooperation from other road users, themselves either cars, buses, Lorries, motorcycles or other types of vehicles. Respect and tolerance among road users are very important to be practiced by all users for the rate of accident to be reduced.

It is well known that motorcycles may be categorized as "small vehicles" on roads and motorcycle is also a vehicle that has less security features compared to other vehicles. The main reason for installing the motorcycle zone is to provide a comfortable place for motorcyclists to stop when the traffic light turns red. If the motorcycle box or motorcycle zone system gets its acceptance and cooperation amongst road users, many benefits can be obtained from its implementation. The importance and also benefits from this project study are to reduce the rate of road accidents especially involving motorcycles, to

improve the traffic management restructuring in Malaysia, to improve overall traffic safety and provide better facilities for motorcycles stop in a safe condition in Malaysia.

Table 1 showed the total road accidents according to states in Malaysia from year 2011 until 2016. From the table, Selangor stated the highest number of road accident with 151,253 accidents recorded by year 2017 and second highest followed by Johor state with 73,116 accidents. As both states are very developed and rapid in economic growth, it is not surprising that the high number of accidents occur in these two states due to the crowded human population in this area.

Table 1.1: Total Road Accidents by States, Malaysia (2011-2016)
Source: Royal Police Traffic Branch, Bukit Aman

NEGERI	2011	2012	2013	2014	2015	2016	Jan – Mei 2017
PERLIS	1,791	1,881	1,895	1,888	1,861	2,062	1,004
KEDAH	19,699	19,935	20,228	20,159	22,016	23,200	11,642
P. PINANG	37,158	37,851	39,408	38,747	39,856	42,244	20,958
PERAK	33,506	34,714	39,361	35,131	36,736	38,531	19,135
SELANGOR	128,876	129,106	135,024	137,809	140,957	151,253	76,058
K. LUMPUR	58,795	61,872	64,527	63,535	64,664	68,866	37,756
N. SEMBILAN	21,157	22,146	23,066	23,748	22,939	24,428	12,294
MELAKA	14,720	15,195	16,083	16,375	17,069	18,601	9,277
JOHOR	59,501	62,316	64,600	64,473	67,112	73,116	36,982
PAHANG	19,001	20,554	20,130	19,071	19,635	20,465	10,539
KELANTAN	9,603	9,968	10,996	9,383	9,960	10,544	5,414
TERENG-GANU	10,684	10,861	9,748	10,326	10,381	10,793	5,313
SABAH	16,585	17,446	18,700	17,693	17,290	17,298	8,100
SARAWAK	17,964	18,578	17,438	17,858	19,130	20,065	9,957

JUMLAH	449,040	462,426	477,204	476,196	489,606	521,466	264,429

Table 2 show the total casualties and damages cause by road accidents in Malaysia from year 2007 until 2017. The trend shows increasing number in road accident from year 2007 until 2016. It shows an increment of 158,147 accident cases for 10-year period. Table 1.2 below also show the number of victim that involve accident that have been recoded. The victim was classified according to their level of injury, whether death, serious injury or minor injury. However, the total casualties and damages show an increasing trend for the death cases but the data for victim who experience the serious and minor injury show a decreasing number.

Table 1.2: Total Casualties and Damages Caused by Road Accidents, Malaysia (2007-2016)
Source: Royal Police Traffic Branch, Bukit Aman

Year	Total number of accidents	Death	Serious	Minor	Total
2007	363,319	6,282	9,273	18,444	33,999
2008	373,071	6,527	8,868	16,879	32,274
2009	397,330	6,745	8,849	15,823	31,417
2010	414,421	6,872	7,781	13,616	28,269
2011	449,040	6,877	6,328	12,365	25,570
2012	462,423	6,917	5,868	11,654	24,439
2013	477,204	6,915	4,597	8,388	19,900
2014	476,196	6,674	4,432	8,598	19,704
2015	489,606	6,700	4,120	7,432	18,252
2016	521,466	7,152	4,506	7,415	19,073

1.3 Problem statements

According to the Kuala Lumpur Mayor, Datuk Seri Mohd Amin Nordin Abd Aziz, with this presence of motorcycle zone, it is able to improve the traffic restructuring which is to ensure pedestrian safety to pass through and provide convenience for motorists to stop safely. Datuk Seri Mohd Amin state that during the launching date of

the zone (15 March 2017). This is because with the presence of the motorcycle box, it gives the pedestrians a comfortable way to cross because the motorcycles must stop their vehicles inside the box area at traffic lights. In addition, it also enhances pedestrian safety while crossing the road and avoiding snatch theft crimes. Next, with the presence of this motorcycle box, it is hoped that it will enable motorcyclists to stop safely inside the box provided and avoid them be in between other vehicles. If the zone is not being implemented, the motorcycle is tend to stop at the zebra crossing which already reserved for the pedestrians to cross over like in figure 1 above.

Figure 1.1: Motorcycle stopping at the zebra crossing
Source: Google

The motorcycle zone that has being introduced by the Kuala Lumpur City Hall can also act as an exclusive motorcycle lane. The purpose of designing exclusive motorcycle lane is to separate or isolate the motorcycles from mixed traffic. It is expected to decrease conflicts between motorcyclists and other road users [8] . In Taiwan, the application of motorcycle waiting zone has demonstrated a decrease in the total time delay and increase the saturation flow rates of the signalized intersections [9]. In

Malaysia, the outcome of the research on this study is still less due to its new implementation. There still less research study regarding this zone because people more focusing on the traffic safety program and still no proper study to investigate the effectiveness of the zone.

In Malaysia, the implementation is still new and only at selected points and there are still lack of awareness from the road user and also from the motorcycle users themselves. They still do not comply with the stop rule implemented. The other vehicles like cars still have no respect for the small vehicles by giving them a way for small vehicles such as motorcycles to move ahead first. Drivers' attitudes toward motorcyclists may contribute to car–motorcycle collisions (Shahar et al, 2011) [10]. Previous studies have identified the negative attitudes of car drivers and less empathy towards motorcyclists as the possible factor in the collision of motorcycles [11].

Also, there is no ongoing monitoring by the authorities and there is no closed-circuit television (CCTV) installation at the zones. This causes the user not to care about the system and they are courageous to break the rules made. Based on the research that has been carried out, CCTV is useful in the investigation of crimes [12]. Installation of CCTV in the traffic light areas can not only reduce the accident rates but also helps the authorities to identify street offenders who do not follow the system that has being implemented. As world population increases, traffic control using CCTV is becoming a critical application. CCTV provides a way to monitor multiple cameras internally and analyze generated images to extract useful information [13].

Furthermore, there are no proper and organized guidelines that is applied to the installation of these zones and are very much different from those used in other countries. The Malaysian government introduces various programs to reduce accident rates involving motorcycles which include the introduction of the automated enforcement system, new driver training system, exclusive motorcycle lanes and international road assessment programmes (iRAP). In addition, there are some enforcement measures that must be re-visited to reduce accident rates. Such enforcement initiatives include motorcycle helmets, rear seat belt and community-based programs. But at present there is no specific standards that are available to assess the design criteria of motorcycle zone in Malaysia. But one research gap in this study is no clear guidelines applied to this implementation; thus, the implementation of this motorcycle junction box should be seriously enforced and included in the Malaysia Road Safety Plan (2011-2020).

1.4 Objectives

1. To reduce the accidents rates involving motorcycle by analysing the accessibility of the zone.
2. To evaluate the effectiveness of the implemented zone.
3. To identify the awareness and acceptance level of the public towards the implemented zone.

1.5 Scope of research

The scope of this project is to study the effectiveness of the implementation of motorcycle junction box or motorcycle zone around Kuala Lumpur. The effectiveness of this zone will be proven through a survey data and data collection from local authorities. The data obtained will be used as a comparison between "before the implementation of the zone and after the implementation of the zone"

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Motorcycle zones are not something new in the world. Previously, many countries have begun to implement this zone in their country. For example, in Indonesia, in Taiwan, in Barcelona and also in London. Only what distinguishes between these zones is just their nickname by locals. For example, in Indonesia the zone is called the Ruang Henti Khusus (RHK) in Bahasa or Advance Stop Lines (ASL). Meanwhile in Taiwan it is known as waiting zone or stop zone and for Barcelona, they called the zone by "Advanced Zone". In Malaysia this zone was newly introduced in the last 2017, and it shows that there is less research done to determine the effectiveness of this zone from the road users and motorist's perspective especially in reducing the accident rate

2.2 Motorcycle population in Malaysia

According to Malaysia Automotive Association (MAA) [14], 28,272,416 units of vehicles have been registered in our country until 30 June 2017. In 2010 the vehicle registration was only 20,188,565 units and increased by 8,083,851units for 7 years. Overall, 13,337,132 units are cars 12,971,820 units motorcycles and 184,993 units are public service vehicles (PSVs) including buses, taxis and others.

Motorcycle are more of a preferable mode by user because it is unexpansive, more flexible and has relatively high speed compared with car traffic. Besides it also more preferred by low income citizens and for them the most suitable choice for traffic mode mobility is motorcycle. Table 2.1 below show the registered vehicle until June 2017. From the table, the highest registered vehicles recorded are cars and followed by motorcycle, good vehicles, PSV and others. Focusing on motorcycle registration, Johor

stated the highest record with 1,873,005 record and followed by federal territories and Selangor state. The least number of registered vehicle is in Perlis with only 84,500 records. Therefore, it can be concluded that more developing state have more number of registered vehicle.

Table 2.1: Registered Vehicle until June 2017
Source: Malaysia Automotive Association (MAA)

Vehicle Type	No of Vehicle	Percentage (%)
Motorcycle	12,971,820	45.89
Car	13,337,132	47.18
Bus	60,733	0.21
Taxi	98,553	0.35
Rental Car	25,707	0.10
Goods Vehicle	1,208,499	4.27
Other	569,972	2.02
Total	28,272,416	100

Table 2.2 below show the general road accident data in Malaysia from year 1997 until year 2016. The record shows an increasing value throughout the year as the number of population increase. The data from MIROS [26] also showed that the road death and road injury data are increasing until 2016. The growth in motorcycle that accompanies economic growth usually brings an increase in road traffic accidents [15] (Kopits, E & Cropper, M). When the economy of an area increases, the rate of registered vehicles in the area will also increase and will indirectly increase the road crashes and road death.

Table 2.2: General Road Accident Data in Malaysia (1997 – 2016)
Source: Malaysian Institute of Road Safety Research (MIROS) [26]

Year	Registered Vehicles	Population	Road Crashes	Road Deaths	Serious Injury	Slight Injury	Index Per Billion VKT
1997	8,550,469	21,655,600	215,632	6,302	14,105	36,167	33.57
1998	9,141,357	22,179,500	211,037	5,740	12,068	37,896	28.75
1999	9,929,951	22,711,900	223,166	5,794	10,366	36,777	26.79
2000	10,598,804	23,263,600	250,429	6,035	9,790	34,375	26.25
2001	11,302,545	23,795,300	265,175	5,849	8,680	35,944	23.93
2002	12,068,144	24,526,500	279,711	5,891	8,425	35,236	22.71
2003	12,819,248	25,048,300	298,653	6,286	9,040	37,415	22.77
2004	13,828,889	25,580,000	326,815	6,228	9,218	38,645	21.10
2005	15,026,660	26,130,000	328,264	6,200	9,395	31,417	19.58
2006	15,790,732	26,640,000	341,252	6,287	9,253	19,885	18.69
2007	16,813,943	27,170,000	363,319	6,282	9,273	18,444	17.60
2008	17,971,907	27,730,000	373,071	6,527	8,868	16,879	17.65
2009	19,016,782	28,310,000	397,330	6,745	8,849	15,823	17.27
2010	20,188,565	28,910,000	414,421	6,872	7,781	13,616	16.21
2011	21,401,269	29,000,000	449,040	6,877	6,328	12,365	14.68
2012	22,702,221	29,300,000	462,423	6,917	5,868	11,654	13.35
2013	23,819,256	29,947,600	477,204	6,915	4,597	8,388	12.19
2014	25,101,192	30,300,000	476,196	6,674	4,432	8,598	10.64
2015	26,301,952	31,190,000	489,606	6,706	4,120	7,432	9.60
2016	27,613,120	31,660,000 e	521,466 a	7,152 a	TBP	TBP	10.70 a

From both table, the registered vehicle is increasing, and it used as an indication of traffic growth in a country. The problem that must be faced by the road user is traffic congestion for the area and indirectly will cause the fatal accident to increase. According

to a study made by Abdul Manan [1] in his thesis title "Motorcycle fatalities in Malaysia", it shows that more than 50% of the road accident fatalities involve motorcyclists and the analysis reveals that the highest numbers of motorcycle fatalities occur in rural location on primary roads.

2.3 Motorcycle accident in Malaysia

The popular mode for personal travel and formed as the major road user is motorcycle. The data from Malaysia Automotive Association [13] (MAA) the number of registered motorcycle continue to increase at least 0.88 % until June 2017. Although the percentage are small, but it is actually indicated high number of motorcycle. There is a reason why motorcycle was chosen as the most preferred transport in Malaysia. One of the reason is because motorcycle is an affordable mode of transport that are preferred by many road users due to its convenient.

From a research by (Azzuhana et al ,2018)[16] a motorcyclist is more at risk of being killed or injured in a road crashes than any other type of vehicle used. (Radin,1995) [17] stated that about 68% of road accidents in Malaysia are involving motorcycle and the risk for motorcycle to involve in accident are 20 time higher compared to a car. From a statical data from PDRM (2016), about 4484 motorcyclists killed in motor vehicle crashes out of 7152 deaths. A fact from World Health Organization (WHO) stated that nearly half of those dying on the world's roads are "vulnerable road users": pedestrians, cyclists, and motorcyclists.

Mannering et al (1995) [18] mentioned that motorcycle have a different characteristic than a passenger car, especially regarding their maneuverability and the levels of coordination and balance skills needed to control this vehicle type. The motorcyclist is more exposed to danger while they are riding due to lacking safety

protection. Motorcycle also required balancing when operating and it also not protected from weather. Result from field study and observation by (Hsu, T, P. et al) [19] reveal few characteristic of motorcycle that can be identified. Besides of small in size, motorcycle also have light weight and be able to move by driver. Motorcycle also have the ability to weave through the queues in congested area and sometimes the car didn't notice the presence of that motorcycle.

2.4 Motorcycle zone

To increase a motorcycle safety, an exclusive motorcycle lane was introduced. The main aim of the implementation is to segregate the motorcycle from interrupt with the other road user. Since the highest fatality in Malaysia are involving motorcycle, one of the initiative to reduce the number by 50 % by year 2020 is to introduced Exclusive Motorcycle Lane (EMCL) and Non-Exclusive Motorcycle Lane (NEMCL). Motorcycle lanes and motorcycle paths are provided to a certain extent in Malaysia. During the last 10 years the Government has made considerable efforts to reduce motorcycle crashes, examples, the National Motorcycle Safety Program (Program Keselamatan Motosikal Nasional).

According to (Law et al) [20], one of the effort made to reduce the conflict between the motorcycle and other road user is by segregate the motorcycle from other motorized traffic by providing them an exclusive lane that is restricted to motorcyclists with physical barriers and markings

2.5 Advance Stop Line (ASL)

2.5.1 Indonesia

The motorcycle zone has begun to be introduced in Indonesia and in Indonesia, the zone is known as Advanced Stop Line (ASL) or also known as Ruang Henti Khusus

(RHK). One of the main functions of ASL @ RHK is to avoid motorcycles from gathering at the traffic lights and causing the traffic flow to be weak and at the same time will cause traffic congestion (Idris 2007) [21]. This is because when a special zone for motorcycles was created, they gather at the zone provided and they will not interrupt between other vehicles. For an example when the lights turn green, motorcycles will move first and, causing the flow to be faster and reduce the congestion at the traffic lights intersection.

Among the roads that implemented the zone is the Bekati City road, which is in Jalan Chairil Anwar-Bekati Timur, besides the Bandung City at the intersection of Soekarno Hatta Road. In Bekati City road, ASL is less effective because there are public vans that act as public transportation that known as "angkot" by locals which does not follow the rules set out. In addition, emphasizes the function of ASL to society is still lacking and causes them to not follow the rules made. Different story in Kota Bandung, the users are more orderly and follow to the rules well. The benefits that can be seen are conflicts during peak hours for morning and afternoon sessions were reduced.

From what can be seen from within the picture in figure below, there are two lines separating motor vehicles with other vehicles and having a special space that act as a place for motorcycles to stop when the traffic light turns red. Additionally according to (Idris 2007) [21], there is also a linear path as shown in Figure 2.1 where it helps to facilitate motorcycles near the zone.

Figure 2.1: Illustration of the Advance Stop Line (ASL)
Source: Idris 2007 [21]

Figure 2.2: Advance Stop Line in Indonesian road
Source: Official website of the government city Banda Aceh, communication service

From the Figure 2.2 above, motorcycles are more organized when it is in the space provided and the presence of the zone also give a comfortable mode for the pedestrian to cross the road. The most important thing is when the traffic light starts to turn green, the motorcycle will start moving ahead first and will segregate themselves with the other vehicle and it will reduce the traffic congestion at the intersection.

2.5.2   Taiwan

In Taiwan, motorcycles are also the main mode of transportation in that country. Due to the high number of motorcycles, most of the roads in Taiwan are made up of motorcycles and other vehicles. In addition, there are increasing of registered motorcycles at that country make the condition worse. According to Wang, M.-H [22], motor scooters (called motorcycle in Taiwan) are the most common motorized vehicles and contribute the highest traffic fatalities on Taiwanese roads and to enhance the traffic safety in Taiwan, some motor scooter management strategies and regulation were implemented. Wang also stated that based on road segments, the implementation of motorcycle exclusive and priority lanes should consider the land use of the road side.

Most of management policies in Taiwan merely focusing and isolating the motorcycle from the mixed traffic to decrease usage and restrict the rights of motorcyclists. Taiwan also already implemented few control strategies and restrictions through road design and regulation measures, such as motorcycle two-stage left turns (MTLT) at Intersections, motorcycles priority lanes (MPLs) and exclusive lanes (MELs). In Taiwan, the motorcycle zone also was introduced, and it is known as motorcycle waiting/stop zones (MWZs). The zone was implemented since 2000 and was installed at the stop line at signalized intersection where the speed limit less than 60 km/hr in Taiwan.

The main function of MWZ is to allow and increase the vehicle discharging rate at signalized intersections. Based on research by (Lin C, -M,2002) [23], the implementation was proven to reduce the total delay and increase the saturation flow rates at signalized intersection and decrease the degree of the mix traffic condition. However same goes to Malaysian cases whereas the effectiveness of that zone before and after the MWZs implementation has not been studied.

Figure 2.3: Illustration of motorcycle waiting box in Taiwan

2.5.3 Malaysia

In Malaysia, the main function of the motorcycle zone is to implement a new traffic restructuring in the capital city of Kuala Lumpur. At first the zone was just marked with a white line and because the presence of the zone unnoticed by road users and indirectly make them to not comply the stop line rule. Dewan Bandaraya Kuala Lumpur (DBKL) began repainting the zone with red and white paint and it is a sign of motorcycles to stop when the traffic lights turn red at the intersection like in Figure 2.3

With the presence of this zone hopefully will reduce traffic congestion as all motorcycles will begin to move forward and wait the available zones. In addition, pedestrian safety are guarantees as well as providing the convenience of motorcyclists stop safely.

Figure 2.4: New implemented zone at Kuala Lumpur
Source: BERNAMA

2.6 Sizes of the zone

2.6.1 Indonesia

In Indonesia, RHK for motorcycles has been implemented at a crossroads on the Soekarno - Hatta road. Initially RHK was only made for 7 meters long from the available stop line but in order to accommodate the high number of motorcycles, the lines were painted to 14 meters long (Idris 2007) [21].

2.6.2 Taiwan

In Taiwan the guidelines for design of MWZs already exists. The design was based on "Regulation and Design of Motorized and Non-Motorized Two-and-Three-Wheelers in Urban Traffic". According to (Hook et al) [24], the MWZs must be designed with a minimum width of 0.8 meters and with length of 2.3 for every turning.

2.6.3 Malaysia

So far, only three districts in the capital city of Kuala Lumpur have implemented this zone, it is including the junction of Jalan Raja Laut, Jalan Tunku Abdul Rahman and Jalan Tun Perak. The DBKL authorities still in the discussion to further increase the number of zones in the area of high number of motorcycle. The zone is 6,096 meters long and can be fulfilled with 20 motorcycles at a time. The trial for this zone is the first 3 months from the date of inauguration so users can familiarize themselves with the latest traffic restructuring and road users who fail to comply with the instructions will be charged compound between RM50 to RM100.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter discusses on the methodology of the study to be implemented to achieve the objectives set. The method of study focusses on both qualitative and quantitative data so as to achieve the objectives of the study. Through the combination of both methods will help to make the evaluation of the study more accurate. This focusses on the study of the effectiveness of the implementation of motorcycle junction box to reduce the rate of motorcycle accidents in Malaysia. From this study, the effectiveness of the motorcycle box can be obtained by comparing the available data before the implementation of the zone and after the implementation of the zone. The qualitative data will be the data obtained from various authorities such as the Malaysian Institute of Road safety research (MIROS) [26], Malaysian Automotive Association (MAA) [13] and the Polis di-Raja Malaysia (PDRM).

3.2 Research design

It is important to develop a good research design because this will lead to good research outputs. An appropriate research design would facilitate a robust research process and ensure that all the research questionnaires and data were answered / addressed by the research findings.

3.3 Research method

A research can be described as systematic and organized efforts to investigate a specific problem that need a solution (Sekaran, 2000) [28]. Research is also an activity of solving problems with the aim of adding new knowledge, developing theories, as well as gathering evidence to prove generalization. According to Burns (1994) [30], a research is a systematic investigation to find solutions of a specific problem. The same goes in this study by focusing on the acceptance level of people towards the implemented motorcycle zones / boxes in Kuala Lumpur and what are their acceptances if the zone is implied in their areas.

The survey form (questionnaires) was used as a research instrument to collect data and obtain information from the respondents. For a data comparison, data from various sources such as Malaysian Institute of Road and Safety Research (MIROS) and from Malaysian Royal Police Department were gathered. The instruments were in the form of questionnaires and were uploaded online by using Google Forms and made accessible to everyone using the current link. The questionnaires were prepared as closed-ended questions. The respondents were given a list of predetermined responses to choose the answers for the survey. The results obtained were used as feedbacks from the motorists about the effectiveness of the zone. The questionnaires were structured such that the data gathered can be analysed quantitatively, and this is preferred so as to allow feedbacks from many participants.
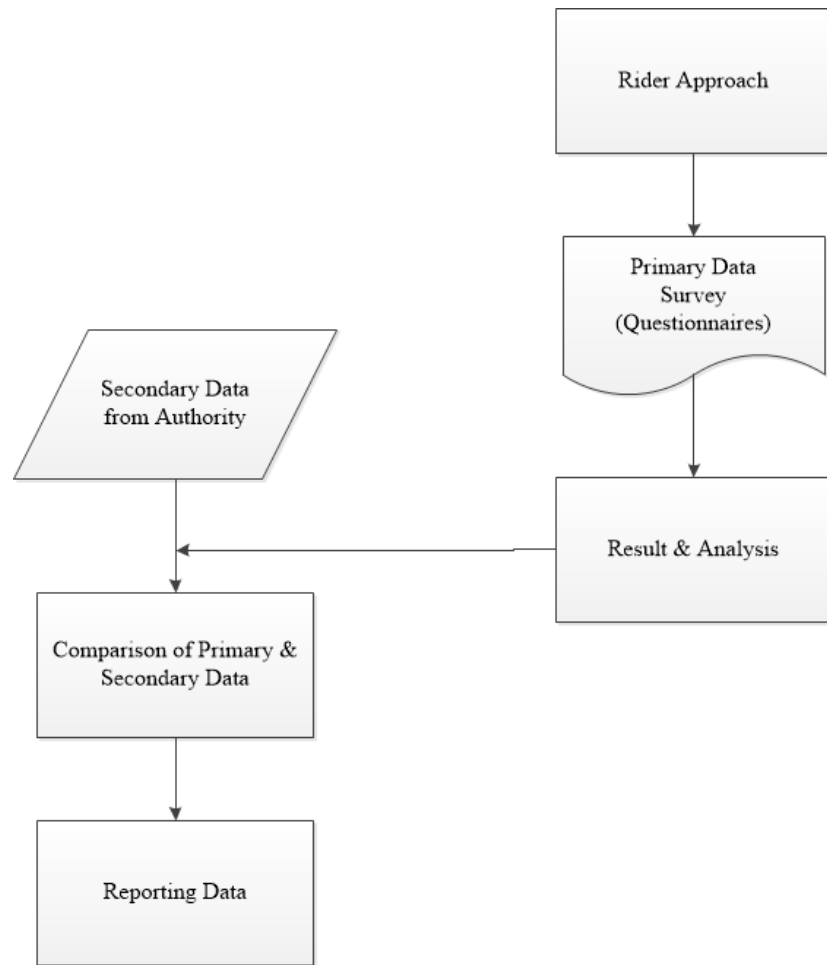
Figure 3.1: Methodology adapted

In this study, questionnaires which consist of structured unstructured questions were distributed online. The targeted respondent population for this survey is motorcyclist who owns a motorcycle license in Malaysia. The research method was divided in 4 stages and the details of the stages are as follows:
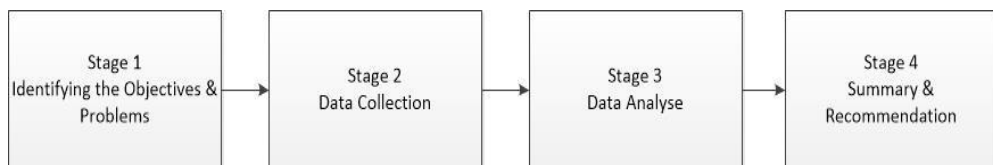

Figure 3.2: Research stage

Stage 1 - Identifying the objectives and problems of the study.

The important thing in this stage is to identify the problems and to set the objectives for this study. The actions to be taken in this stage are to identify the rate of road accidents before and after the installation of the motorcycle zone around Kuala Lumpur area.

Stage 2 – Data collection

In this stage, the data play an important role in the flow of the study because through the data obtained, the study can be continued according to the goals and methods that have been set. Data collection networks are acquired through records of previous roadways cases obtained by the authorities.

Stage 3 – Data analyse

This stage is the final solution to the whole question of the study. Data analysis was done using statistical calculations through SPSS software to analyse the data obtained from various sources and authorities. The results obtained are presented in the form of tables and graphs to facilitate the assessment of the goals and objectives of the study; whether they are achieving goals or otherwise.

Stage 4 – Summary and recommendation

This stage explains the conclusions that can be made from the results of the study and suggest the recommendations and suggestions that can be taken to address the problems of the study.

3.3.1 The questionnaires

Questionnaires are one of the data collection types used in this study. The questions were prepared especially for motorists. The questionnaires for this study were suited to be used for approaching for the motorist socially. The goal of this survey is to investigate the level of acceptance of people about the implementation of motorcycle zone and to investigate whether the zone can help to reduce the accident rates in Malaysia.

The reason why questionnaires was chosen is because it allows feedbacks from many respondents as it is impractical to collect feedbacks using other resource intensive methods. By using questionnaires, it allows each motorcycle rider the opportunity to provide anonymous feedbacks based on their experience. Structured questionnaires allow for the exploration of patterns and trends which can help to describe what is happening and provide a measure of respondents' opinions, attitudes, feelings and perceptions about issues of concern to the evaluator. This can be used to identify the patterns and trends that merit further exploration using qualitative methods.

The use of questionnaires can reduce bias as the researcher's own opinions cannot affect the answers from respondents. According to Walonick (2004) [31], questionnaires do not have significant effect on the general perception of respondents that might influence their responses, aside from the fact that they are familiar to most of the people. Besides, questionnaires were used because based on the study made by Walonick (2004) [31], it supported that those questionnaires were less intrusive on respondents compared to telephone or face-to-face surveys because it is less embarrassed to answer questionnaires compared to face-to-face or telephone surveys.