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TELEOLOGICAL FACTORS CONTRIBUTING TOWARDS WORK COMMUTING ACCIDENTS AMONG MOTORCYCLISTS

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TELEOLOGICAL FACTORS CONTRIBUTING TOWARDS WORK COMMUTING ACCIDENTS AMONG MOTORCYCLISTS

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ABSTRACT

The purpose of this study was to investigate teleological factor contributing towards commuting accident to or return from workplace among motorcyclist workers of COMPANY XYZ Center. A set of questionnaire was formulated based on the research model and has been used in data collection through paper based survey. One hundred and thirty–three (133) workers who are participate to do a survey excluding thirty (30) workers who are involved in pilot study. The workers are consist of male (71 workers) and female (62 workers) in the private sector participated in this study. Major finding this study revealed that majority of female workers, degree holder and environmental factor in COMPANY XYZ possess with significant value towards commuting accident. Finally, this study includes several recommendations and suggestions which useful to provide wider perspective to subsequent research.

ABSTRAK

Kertas pernyelidikan ini dilakukan bertujuan untuk menyiasat faktor–faktor teleologik yang menyumbang kepada kemalangan perjalanan semasa pergi dan balik dari tempat kerja dalam kalangan penunggang motorsikal yang bekerja di syarikat XYZ. Borang soal–selidik telah direka berdasarkan model penyelidikan bagi pengumpulan maklumat melalui kertas borang soal–selidik. Sebanyak satu ratus dan tiga puluh tiga (133) pekerja yang terlibat dalam soal–selidik dan tidak termasuk tiga puluh pekerja (30) yang telah terlibat dalam "pilot study". Pekerja–pekerja yang terlibat dari segi jantina adalah sebanyak tujuh puluh satu (71) pekerja lelaki dan enam puluh dua (62) pekerja wanita. Akhir sekali, penyelidikan ini juga termasuk beberapa cadangan yang boleh digunakan bagi menghasilkan mutu penyelidikan yang dapat diperluaskan.

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"In the name of Allah, Most Gracious, Most Merciful"

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CHAPTER 1

Introduction

1.1 Background of the Study

The International Labor Organization (ILO) defines commuting accident as "an accident occurring on the habitual route, in either direction which is between the place of departure to work or work–related training such as the worker's principle or secondary residence, the place where the worker is usually takes his or her meals or the place where he or she routinely receives his or her remuneration which can contribute as a result in death or personal injury.

The ILO stated that safety risks can be resulting to work accidents which are diminishing, work related to commuting are on the rise which can be proved that 2.2 million work–related deaths occurred every year in which 350, 000 deaths were from accidents at work while 1.7 million due to occupational diseases and 158, 000 due to commuting accidents. Thus, the number of commuting accident at less than accident at work and occupational disease but the number flow keep rising which is compulsory to take into consideration as main priority in safety awareness or prevention.

The Chairman of National Institute Occupational Safety and Health (NIOSH), Tan Sri Lee Lam Thye (Lam, 2012) mentioned that the world is varying dramatically with major impact on workers' safety and health and new obstacles happened due to globalization, demographic change, migration, growing family structures and the impact of worldwide economic and financial crisis.

The industrial accidents are on the decline in Malaysia but commuting accidents have increased almost 40 percent in the past six years from 17, 704 cases in 2006 to 24, 809 in 2011 (Industrial accidents down in Malaysia but commuting ones up, 2012). The commuting accidents are encompassing of the workforce which has been on the increase every year since 2006. The number of road fatalities in Malaysia is terrifying because there are more than 6,000 fatalities every year for the last few years and can be calculated approximately into 18–20 people killed every day especially motorcyclists and pillion riders make up about 60% of the fatalities and most of them are young and in the prime of their lives.

According to Social Security Organization (SOCSO) in Malaysia that there were three work–related deaths every day in the year 2011 such as two out of the three deaths were due to commuting accidents indicating a serious situation in the country. Thus the impact is far greater than the industrial accidents as commuting accidents which are normally involve multiple injuries and the injuries sustained during these accidents are far worse and traumatizing when compared to the workplace accidents.

The commuting accidents are large extent such as road traffic accidents since the majority of workers travel by road to work. In other countries, the railway transportation is another important alternative for people to commute to their workplaces (Nordin, 2014). The low income or developing nations which are the majority of road users are pedestrians, cyclists, and motorcyclists. Nonetheless, with the new and improved economy, many have decided for the four–wheel drive to go to work. Consequently, the risk of road traffic accidents has increased in motorized transportation, placing pedestrians, cyclists, and especially motorcyclists in the vulnerable road of the user group.

Based on Road Safety Department of Malaysia, 2008, private vehicle such as motorcycle has gradually increase the number of registered between 1997 and 2007 from 4, 328, 117 to 9, 433, 640 (Oxley, Yuen, Ravi, & Hoareau, 2013). The increasing number of motorcycle year by year in Malaysia because the motorcycle is observed as an important mode of daily transport especially in Asian countries, and mostly used for commuting and running daily errands.

1.2 Problem Statement

This study will be conducting at the COMPANY XYZ and will be involving the administration and technical workers such as engineer. COMPANY XYZ Center COMPANY XYZ Center now is going on board in various advanced research projects in positioning COMPANY XYZ Center to be early adopters of promising technologies.

According to (Social Security Organization (SOCSO) report, 2015), COMPANY XYZ has taking in 1st place out of top 100 employers in commuting accidents in the year 2015 which is 228 workers are involved in the commuting accidents to the workplace especially workers are working at COMPANY XYZ Center.

Table 1.0
Accident Reported among Workers (Retrieved from Sustainability Report of COMPANY XYZ, 2015).

Total workforce (total employees plus supervised workers)

	Types of Injury	Rates of Injury (%)	Occupational diseases (%)	Lost days	Number of work related fatalities (%)	Absenteeism (%)
Region	LTI Cases					
- Peninsular Malaysia	3	2.84	NIL	44	NIL	-
- Sabah	-		NIL	-	NIL	-
- Sarawak	1		NIL	7	NIL	-
Gender						
- Male	4	0.04	NIL	51	NIL	-
- Female	-		NIL	-	NIL	-

Table 1.0 explained that rates of injury 2.84% in Peninsular Malaysia. This region especially in COMPANY XYZ Center are consider as busy place and the number of workers are higher than other region. Thus, the number of chances for workers involved in accident are high especially workers are commute accident to or return from workplace.

The number of accidents reported based on (SOSCO Annual Report, 2015) from the year 2012 to 2015 can be explained as reflected on Figure 1.0.

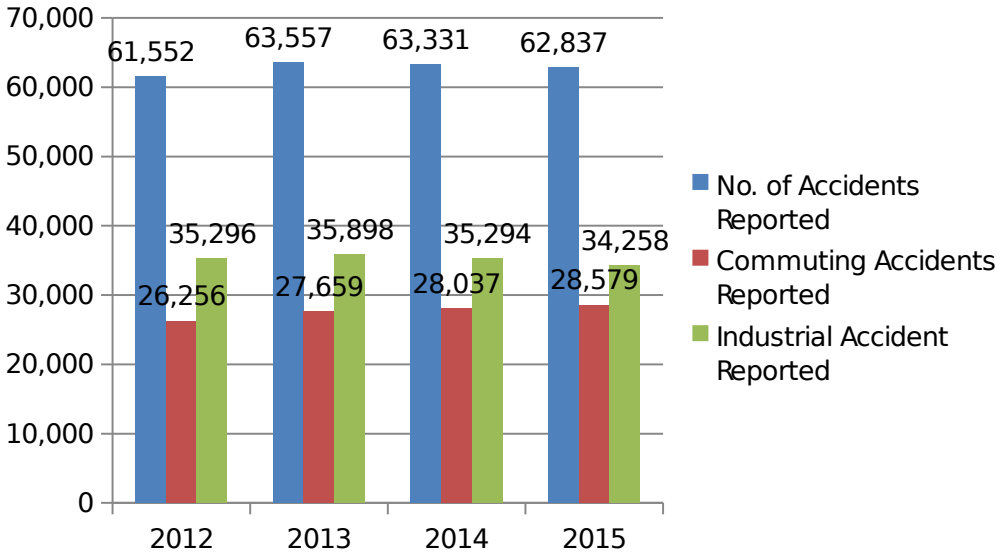

Figure 1.0
Total Number of Reported Accidents 2012–2015
Source: Retrieved from SOCSO Annual Report, 2015

Thus, researcher found that, commuting accident as the main problem and suitable to investigate for further analysis as through research.

COMPANY XYZ Center has selected as a main focus for this study because the researcher further examined the relationship among the dependent variable which is commuting accidents to or return from the workplace among workers and the independent variable which has found to be three major elements such as fatigue factors, job factors and environmental factors.

The outcome of the study expected to raise the level of awareness towards safety and health needs in the individual and at workplace. In addition, the workers generally can identify what are the common causes that contribute to the commuting

accident to or return from workplace and can take the preventative measures in controlling them.

The company can continuously review the personality, psychic, sociological and economic cost incurred that may lead to the company's bad reputation or image and can affect the overall company's production and operation. Thus, the company of COMPANY XYZ Center can evaluate the programs that have been performed to obviously ascertain either it helped the company to prevent further commuting accident to or return from workplace among workers.

Traffic accidents especially motorcycle caused the most accidental deaths at work in Malaysia. According to (Nordin, 2014), there are four types of the problems related to the rising number of commuting accidents such as lack of awareness among workers about safe riding and driving, lack of comprehensive training programs targeted at commuting accidents, lack of commuting safety management and lack of road safety elements in OSH management systems at workplace. Jamaluddin, Sim, Shabadin, Johari, & Ameer (2015), showed that there are other additional aspects such as demographic, land use effect and traffic conditions which influence to the exposure and risk of accidents.

Based on the Social Security Organization, COMPANY XYZ Center is a top employer which has had high number of workers that commute accident to or return workplace, it was mentioned that the similar problems are getting worst year by year.

It has been recorded that there were frequent numbers of accidents occurred each year and the trend is increasing from year to year resulted unpredictable cost to the industry. If there are no steps taken for prevention, it can be more serious and badly affected the image of the company (Darus, 2015).

On the average, there were fifty (50) workers are commuting accident to or return from workplace since 2014 to 2015 in COMPANY XYZ Center compare the smallest numbers of workers who are commuted in accident to or return from workplace from other Tenaga Nasional Berhad has branches throughout nationwide (COMPANY XYZ Annual Report, 2015). Therefore, COMPANY XYZ Center are suitable place to conduct of this study despite of efforts have done to ensure the safety environment.

All the accident happened has varied factors. The important steps are to identify the factors of accident so that it can be prevented and reduce the number of commuting accident to or return from workplace among workers. Thus, by determining the elements of the commuting accident to workplace, it is essential to investigate those that occurred and considering the appropriate preventative measures in reducing the risk of them from happening again.

1.3 Research Questions

1. What is the relationship between fatigue, job and work, environmental and commuting accident?
2. What the difference means scores of fatigue factor, job and work factor, environmental factor and commuting accident factor by gender?
3. Why to indicate the difference in the commuting accident, fatigue, job and work, and environmental within the education level?
4. How to investigate whether there is an association between educational level and commuting accident?

1.4 Research Objectives

1. To identify the relationship between fatigue, job and work, environmental and commuting accident.
2. To indicate the difference means scores of fatigue factor, job and work factor, environmental factor and commuting accident factor by gender.
3. To indicate the difference in the commuting accident, fatigue, job and work, and environmental within the education level.
4. To investigate whether there is an association between educational level and commuting accident.

1.5 Significance of the Study

1. The present study will extend the existing knowledge about the occurrence of commuting accidents to workplace by motorcycle among workers in Malaysia which could be attributed to many factors.

2. As past studies predominantly look at commuting accident among workers from the employer's perspective, the addition of employer from the worker's perspective will bring in additional understanding of safety concepts and factors and the impact of commuting accident to the workers.

3. By incorporating accident prevention and safety awareness into the study which is implementing in the company, it can be developed to provide greater insights into the role of employers not only in relation to the organizations internally, but also externally such as academic and society.
4. The inclusion of employers or companies can take action to articulate by introducing and implementing comprehensive and sustainable training programs that focus on commuting accident among workers.

1.6 Research Scope and Limitation of the Study

Based on the research model, the scope of this study is to examine the constructs namely fatigue factor, job and work factor and environmental factors towards commuting accident to or return from workplace. The respondents of the study are among motorcyclist workers from COMPANY XYZ Center located at Bangi area.

There are two main limitations in this study such as this study has relied on quantitative methodology of data collection, thus it is restrictive. In addition, the survey method was used for data collection and it is self–reported data. Thus, it could lead to vague the result and unclear data because certain question may be interpreted differently by respondents.

Next the respondents were limited to the working people who are riding the motorcycle only to or return from COMPANY XYZ Center which have the potential to involve in the commuting accident. It can be concluded that the findings of the study cannot be generalized to the Malaysia as a whole.

1.7 Definition of Key Terms

Table 1.1
List of Definition of Key Terms by Various Scholars

Key Terms	Author	Definition
Commuting Accident	International Labor Organization, 2014	An accident occurring on the habitual route, in either direction, between the place of work or work–related training such as the worker's principle or secondary residence, the place where the worker usually takes his or her meals, or the place where he or she usually receives his or her remuneration which results in death or personal injury.
Stress and Fatigue	Health and Safety Edition, 1999	The adverse reaction a person has to excessive pressure or other types of demand placed upon them.
Gender and Age	FAO, 1997	Gender is defined as the relation between men and women, both perceptual and material.
	Oxford Dictionary, 2015	Age is defined as the length of time that a person has lived or a thing has existed.
Location of Workplace	Oxford Dictionary, 2015	The exact coordinate of a place where people work such as am office of factory in health and safety condition.
Working Shift	Hearthfield, 2016	Shift work occurs in a work schedule that utilizes twenty–four (24) hours a day occasionally, seven (7) days a week, to keep an organization operating.

Table 1.1 (Continued)

Key Terms	Author	Definition

Type of Vehicle used	Road Transport Act, 1987	A structure capable of moving or being moved or used for the conveyance of any person or thing and which maintains contact with the ground when in motion.
Commuting Exposure	Jamaluddin, Sim, Shabadin, Johari, & Ameer, 2015	The amount of travel in which accident may occur. The more frequency of travelling and the higher probability of an accident occur.

1.8 Organization of the Thesis

This report is divided into five (5) chapters which include an introduction to the study, followed by literature review, research methodology, analysis and findings, and conclusion.

- **Chapter 1: Introduction**

  This chapter contains an introduction of the study. It provides the overall background of the research on teleological factor contributing towards commuting accident to or return from workplace among motorcyclist workers of COMPANY XYZ Center. This chapter consists of background of study, problem statement, research objective, research questions, significance of the study, research scope and limitation of the study, definition of key terms and organization of the thesis.

- **Chapter 2: Literature Review**

  This chapter provides a review of the literature on the teleological factors, overview of motorcyclists' worker from COMPANY XYZ Center, commuting accident based on SOCSO report. Besides, this chapter also provides literature review on reported commuting accident for motorcycle by MIROS and other related to those in. This chapter also discusses the theoretical basis in this research which based on Technology Acceptance Model (TAM).

- **Chapter 3: Research Methodology**

  This chapter describes the methodology used in this study. This study can be categorized as quantitative research. The research design, research model or framework, hypotheses, operational definition, measurement of variables or instrumentation, data collection procedures, sampling, and data analysis have been discussed in this chapter.

- **Chapter 4: Analysis and Findings**

  This chapter presents analysis and findings of this study. The statistical techniques that have been used in the analysis are descriptive analysis reliability test, Kolmogorov-Smirnov-Z, Pearson correlation, multiple linear progression, independent t–test, analysis of variance (ANOVA), post–hoc multiple comparison test, and Chi–square test.

- **Chapter 5: Conclusion**

  This chapter provides conclusion of the study. Besides, this chapter concludes further discussion on contribution of the study and recommendation made to address the main results from the analysis.

CHAPTER 2

Literature Review

2.1 Introduction

This chapter reviews past studies and researches made and resources on the study that were related to the topic here. It presents the definition of independent and dependent variables. The literature review will be addressing area related to the research problems in which will determine the teleological factors contributing towards commuting accident to or return from workplace among motorcyclist workers of Tenaga Nasional Berhad Research Center.

2.2 Review of Related Literature

2.2.1 Vehicle: Motorcycle

The motorcycle is a standard or common vehicle because the purchasing price is low, insurance surcharge rates are low, running costs are low, license issuing as low as 16 years old, and ease of travel on congested roads compare to other type of vehicle or public vehicle which is the commuting is faster and cheaper (Oxley, Yuen, Ravi, & Hoareau, 2013). According to (SOCSO Report, 2015), the highest percentage proportion of the commuting accidents by type of vehicle used is motorcycle which contributes to 76.9% than others example cars, bus, van, pedestrians and lorries.

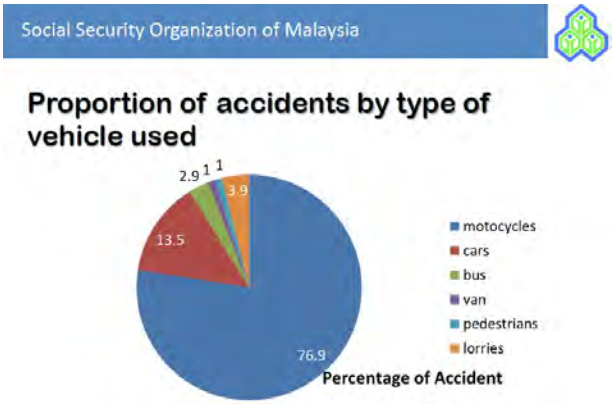

Figure 2.0
The Proportions of Accidents by Type of Vehicles are used.
Source: SOCSO Report 2015.

2.2.2 Commuting Accident

The commuting accident is unforeseeable events that happen to the worker on the way from home to work or vice versa. (Sarrion & Recio, 2015), mentioned that teleological factor refers to the work–home journey and the purpose of relationship is the journey must to get to work or return from work without any important detours, breaks, or alterations.

The "commuting" word derived as to the journey from home to the workplace or from the workplace back home while an "accident" is an unplanned event, which could result in injury to person, or in damage to plant and equipment or both (James, 1983). Thus, the commuting accident can be defined as an accident that happened during travelling from home to workplace or work–related training location on the usual route to the place which results in personal injury or death (Kirch, 2008).

According to (Aziz & Yusof, 2015), commuting accident is not new in occupational safety and health and the accident that occurred during commuting must fall within the range of the law in order to be treated as a commuting accident.

Under Malaysian law, the definition of commuting accident can be found in Section 24 of the Employees Social Security Act 1969 which states that commuting accident happening to an insured person shall be deemed to arise out of and in the course of his employment if the accident happens while the insure person is travelling on a route between his place of residence or stay and his place of work, on a journey made for any reason which is directly connected to his employment and on a journey between his place of work and the place where he takes his meal during any authorized recess.

Section 24 further excludes any accident which occurred during any interruption of, or deviation from the worker's journey made for the above purposes. It is obvious from the definition that an employee's travel from his home to the workplace and from the workplace to his home would constitute a journey directly interlinked with his employment. Time, place and circumstances are substantial to determine such an occurrence.

2.2.3 Social Security Organization Malaysia (SOCSO Malaysia) on Reported Commuting Accidents

Social Security Organization was established as a government department to enforce the Employee Social Security Act 1969. SOCSO administers the Employment Injury Insurance Scheme which is protection for employees against industrial accidents including occupational diseases and accidents while travelling for work related purpose.

According to the 2015 Social Security Organization (SOCSO) Annual Report, a total of 62,837 accident cases were reported in 2015, reflecting a reduction of 494 cases or 0.78% in comparison to 63,331 cases in 2014 (Table 2.0 and Figure 1.0). All of these, 55.73% were industrial accidents while the remaining 44.27% were work related commuting accidents. From the total number of accidents reported, it was found that the industrial accident showed a decrease by 2.94% comparison to 2014 from 35,294 cases to 34,258 cases in 2015 but the number of reported commuting accident has increased by 542 cases or 1.93% to 28,579 cases in 2015 compared to 28,037 cases in 2014, as reflected in Figure 2.0.

Table 2.0
Types of Accident Reported
Source: Retrieved from SOCSO Annual Report, 2015

Item	2011	2012	2013	2014	2015
Bilangan kemalangan dilaporkan Number of accidents reported	59,897	61,552	63,557	63,331	62,837
Bilangan kemalangan semasa perjalanan[1] dilaporkan Number of commuting[1] accidents reported	24,809	26,256	27,659	28,037	28,579
Bilangan kemalangan perusahaan[2] dilaporkan Number of industrial[2] accidents reported	35,088	35,296	35,898	35,294	34,258
Kadar kemalangan (per 10,000 pekerja) Accident rate (per 10,000 employees)	104	105	104	102	99
Kadar kemalangan perjalanan (per 10,000 pekerja) Commuting accident rate (per 10,000 employees)	43	45	45	45	45
Kadar kemalangan perusahaan (per 10,000 pekerja) Industrial accident rate (per 10,000 employees)	61	60	59	57	54

SOCSO in 2014 reported that 28,037 of its contributors had been involved in accidents whilst commuting to work. Referring to Royal Police Malaysia (RPM), 2014 reported the commuting accidents which occurred during 6.01a.m to 8.00a.m and 6.01p.m to 8.00p.m. All period of time have mentioned are people busy going and coming back from or to their residence, during authorized rest time or any period related work.

Next, time of commuting accident reported by SOCSO, most of accidents happened on the way to and return from workplace and most of deaths due to commuting also happened on the way to and return from workplace. In conclusion, SOCSO has continuously made an effort in creating a culture of accident prevention at work and on the way to work. This is to ensure that the occupational safety and health awareness is enhanced to protect the interests and welfare of employees in line with the requirements of the

three pillars of Social Security adopted by SOCSO, namely Prevention, Rehabilitation and Compensation. This is also in line with Section 40 of the Employees' Social Security Act 1969.

2.2.5 Malaysian Institute of Road Safety Research (MIROS) on Reported Commuting Accident: Motorcycle

According to (Sarani, Roslan, & Saniran, 2011), the numbers of registered motorcycles are continuing to grow rapidly for every year and each year 1% of them get involved in commuting accident. Even though in terms of percentage is smaller but when it comes to total, the result will be in the big amount of huge losses to the economic output of the country.

Based on the MIROS statistic (2016), 1% of the motorcycle involved in the road accident more than 10,000 riders and pillions are injured and killed every year. There are many factors contributing to the road accident especially among motorcyclist because they are considered as vulnerable road users as the vehicle itself does not deliver full protection unlike other motor vehicles.

The Health and Safety Edition, 2004 mentioned that stress is the adverse reaction a person has to excessive pressure or other types of demand placed upon them. These pressures of demands at work include working long hours, sometimes over time, workload demands, and supervisory pressures. In another perspective, James and Arroba, 1999 mentioned that stress is a form of

body reaction towards any problem and pressure resulted to an imbalance between our inner resources and skills on one hand, and pressures we encounter and support received to deal with these factors.

Developed and developing economies are depending on transportation systems that operate well beyond the normal operation hours such as 8 hours per day. As workday for operating time convey people and fright to meet personal and business needs. A multitude of factors can contribute to the level of fatigue or performance efficiency observed during extended working operation hours. (Rosa, 1995), mentioned that sub factors can be related towards fatigue is working–rest scheduling and workload. Indirectly, can contribute in the commuting accident to or return from workplace.

2.2.6 Environmental Factors towards Commuting Accident

Environmental is connecting to the natural world and the effect of human activity on its condition. In current decades, many vehicles especially motorcycle crashes can be attributed to driver error. The most common environmental factors leading to commuting accident to or return at workplace such as poor weather condition, traffic volume and road design. In terms of road design, the road characteristics given in the police report in the Philippines include straight or flat, curved, inclined, curved and inclined, on a bridge and other type of roads can make accident to occur as part of environmental factors (T. Flores, T. Gotohio, C. Paras, & R. Seva). A study in

the United States estimated the probability of motorcyclist's injury severities in single and multi–vehicle crashes can be verdict as road crashes occurring on vertical or horizontal curves are ominously to contribute on debilitating injuries (Marmor & Nicholas, 2006).

Road design details can also cause more frequent and more severe crashes (Abdelfatah, 2016). There are many different ways that road design, road maintenance or road conditions can cause accidents such as poorly lit roads and intersections, poorly marked curves, poorly designed intersections, unmarked lane shift and turn lanes, dangerous bridge joints, loose gravel or sand on pavement and debris in the road. Motorcycles are mostly susceptible to a range of issues associated with the road surface that can lead to a crash because especially the case in locations where the motorcyclists may be braking and turning such as at an intersection or on a curve in the road (Making roads more motorcycle friendly, 2015).

Malaysia has one of the highest traffic fatality rates in the world because one of the major factors that influence transportation system sustainability is traffic safety (Abdelfatah, 2016). Motorcycles are a fast and seemingly efficient form of personal transportation because they are different from other motor vehicles in their physical operation such as much smaller size, lower weight, two wheel rather than four–wheel base, and driver exposure with seating on top of vehicle rather than inside it. The motorcycle designed renders them highly unstable for many potential users while

providing little protection in the event of a commuting accident to or return from workplace (Allison, Swanseen, Metha, & Gabler, 2010).

Next, in terms of other environmental conditions such as motorcycles crashes in the urban areas are more likely to be on arterials and higher risk because of higher functional classification roads with high volume of traffic congested (Fagnant & Kockelman, 2015). Studies showed on congestion level and accident rate indicate that the accident rate is defined as the ration between the number of accidents and linked traffic volume because the increase in the congestion level is likely to cause a higher number of less severe accidents (Ehrlich, Steele, Flanagan, & Pedersen, 2003). So, in order to promote safety especially for motorcyclist on the road, the authorized people either in government or private sectors must working together to identify and further enhance current motorcycle training and outreach to transportation system users and professionals in order to improve motorcycle safety throughout nationwide and elsewhere.

Weather is most certainly out of our control and rain or the poor weather conditions contribute to a fair few car accidents. Torrential rain and any resulting flooding can also cause major road safety risk because when motorcyclists drive on slippery or wet roads it is easy to lose control of the motorcycle and will effecting towards commuting accident (The Claim Solicitors, 2004). It is very important to know and check frequently for vehicle maintenance or characteristics regarding stability during windy conditions. In

Iceland, cross winds acting laterally on the side of the vehicle are commonly as strong as the vehicle velocity induced air–speed then the air pressure acting sideways can thus be high as the drag force in driving direction (Thordarson & Olafsson, 2008).

2.2.7 Fatigue Factors towards Commuting Accident

Driver fatigue is a serious problem can be resulting in many thousands of road accidents each year. It is not possible to calculate the exact number of sleep or tiredness at workplace which has related towards commuting accident. Research shows that driver fatigue can be contributory factor in up 20% or road accidents and up to one quarter of fatal and serious accidents (Road Safety Information, 2011). The workers who suffer from a sleep disorder that prevents them from getting sufficient sleep is likely to be excessively tired during their waking hours and will be at higher risk of falling asleep when driving to or return from workplace.

Fatigue is a common problem which can be found in male and female workers. Male and female workers who experience complaints of fatigue appeared to be younger and more highly educated because of the rank position in the company. Among women, only gender–specific biological complaints and psychosocial problems were related to fatigue (Bensing, Hulsman, & Schreurs, 1999). In terms of biological framework refers to the influence of

the reproductive function, female workers likely to complaint for fatigue because the menstrual cycle, pregnancy, childbirth, breast feeding, medicinal birth control and menopause which are responsible for mental and physical disturbances especially at workplace which medical consumption that cannot be found in men (Hanjabam & Kailashiya, 2015).

Next, gender fatigue especially female workers at the workplace are easier to get compare to male workers because female workers with the higher academic qualification will be overlooking in decision making position in the private sector (Kamberidou, 2010). So, female workers can be highly to contribute towards commuting accident to or return from workplace.

In addition, the current investigation found that in terms of self–reporting when accident occurred, males' reporting of crashes or close calls caused by driving especially using a motorcycle when tired was spread evenly for those younger than 65 years of age, whereas females within twenty–six (26) years old to forty (40) years old age group reported more close call events or crashes than younger cohorts (Armstrong, Obst, Livingstone, & Haworth, 2009). When the purpose of journey in which the close call or crash occurred was examined, some gender differences did emerge. For example, females were less likely to have experienced the incident when commuting to work, but more likely than males to be on their way to pick up or drop off children from child care. Female were more likely to be closer to home and driving for a shorter time than male at the time if the close call. Thus, there may be a

different pattern and possible different underlying causes or incidents caused by driving when tired for females (Kostyniuk, Molnar, & Eby, 1995).

2.2.8 Job and Work Factors Contributes towards Commuting Accident

Based on the Malaysia's Employment Act, (1995), subsection (1)(a) thereof, an employee who is engaged under his contract of service in shift work may be required by his employer to work more than eight hours in any one day or more than forty–eight (48) hours in any one week but the average number of hours worked over any period of three weeks, or over any period exceeding three weeks as may be approved by the Director General, shall not exceed forty–eight per week.

Next, a study showed that the comparative risk of death was 1.5 times were higher among the motorcyclist than other road users (Road Safety Research Center, 2002) and motorcyclist are known as the majority road users in Malaysia. The reason is the employees with lower income rank prefer to ride motorbikes to workplace compared to cars (Abdul Aziz & Yusof, 2015). So, they can do for future saving when the time is getting older.

Many studies have found that the younger drivers tend to have higher accident rate compare to the elders (Bant, Bhatija, Bendigeri, & Kaul, 2010). The reason is for road accident among younger drivers is their experience in driving and lack of safety awareness. Furthermore, the younger drivers' risky behaviors are also influenced by their psychological development at their stage of life (Nik Mahdi, Bachok, Mohamed, & Shafei, 2014).

There are many reasons for a motorcycle collision to occur especially in Malaysia. One of that is commonly happened when a rider of motorcycle is driving while drowsy. Improper working shift particularly at night shift were found to feel drowsier, show unfortunate performance on the road and were at higher risk of being commuting accident to or return from workplace (Kurland, 2015). Shift workers when driving to or return workplace are tired and trying to drive are a hazard to both self and others on the road. Road accident statistics showed that at least one in six crashes are essentially the consequence inattention or lapses (South Australian Branch, 2006).

The employer of the organization should have systems in place to organize properly in terms of health and safety risk of shift work because the most obstacles in the culture shits may be to get health service employer to recognize shift work as health and safety issues. There are group of people which be more vulnerable than others when working in shift work such as young workers adapting to shift work for the first time, older workers,

pregnant workers and on call workers who follow a shift with a period of on call (Sunley & Lee, 2012).

In addition, day or night workers are exposing to the risk of danger because resulting in lower cognitive performance and one's ability to concentrate (Norman, 2011). They are twice as likely to be involved in commuting accident to or return from workplace which can impact on their family and social lives. Thus, it is very important that the employer aware of the risk for the employee legal duties under health and safety which relate with laws and complies with the working time regulations.

2.3 Summary

All of these three (3) factors of teleological variables such as fatigue, job and work, and environmental influence on commuting accident to or return from workplace. The conceptual framework was well–designed based on the literature review above.

CHAPTER 3

METHODOLOGY

3.1 Introduction

Research methodology is used to obtain the objectives of the study and giving comprehensive results of the study despite avoiding deviation on the objectives. There are three stages of methodology involved in this study, namely research design, data collection methods, and data analysis. In terms of data collection method, a survey method was applied to gather data from the respondent sample. For the process of data analysis, Statistical Package for Social Science (SPSS) Version 23.0 was used.

3.2 Research Model/ Framework

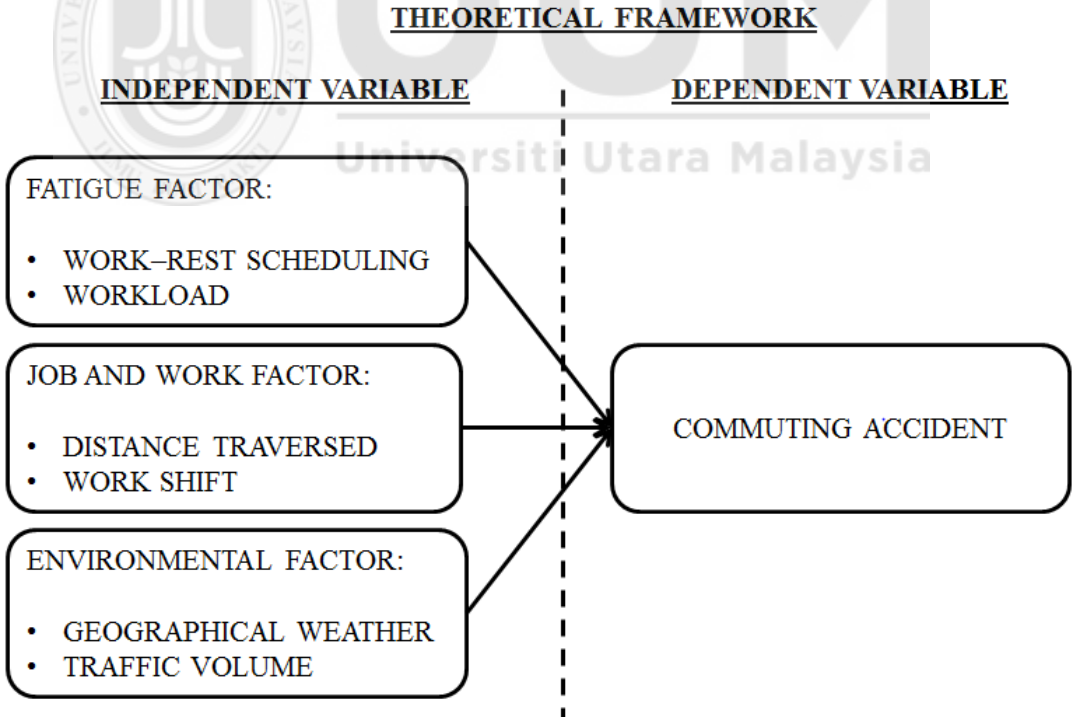

Figure 3.0
Theoretical Framework

This study has begun with a preliminary investigation and was continuing with a conceptual development and analysis. Later, a conceptual design has structured for furthering the research into data evaluation and implementation. Thus, the overall study was reviewed and the result has gained based upon to the findings. The basic source of information for this paper is under organization. Tenaga Nasional Berhad has selected according to the list of top 100 employers which have claimed the SOCSO for those workers who are commuted to accident. Since there are many branches inclusive main office, so, this research has focused on at COMPANY XYZ office in Bangi, Selangor because of number of workers and geographical area which is urban city with congested traffic and potential to increase the number of commuting accident to or return from workplace.

3.3 Research Design

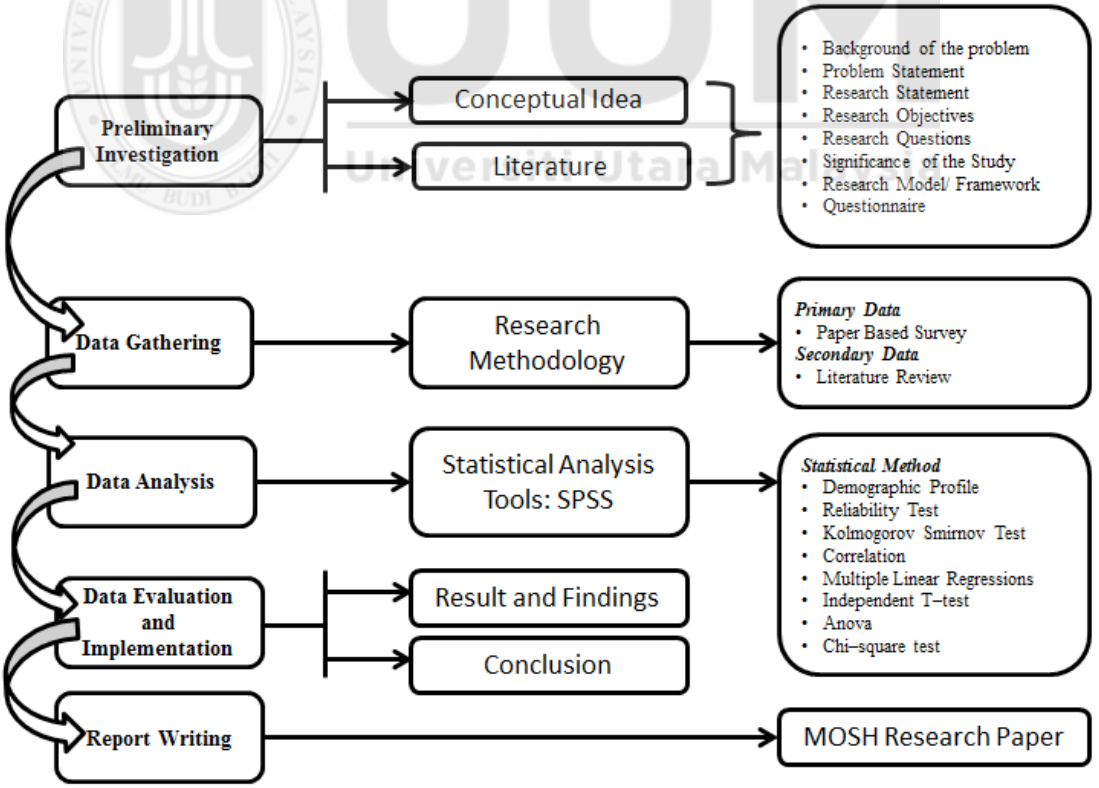

Figure 3.1
Research Design

3.4 Hypotheses/ Propositions Development

Testable Hypothesis for the study:

Hypothesis, H_0: There is no significance relationship between fatigue, job and work, environment and commuting accident.

Hypothesis 1, H_1: There is a significance relationship between fatigue, job and work, environment and commuting accident.

Hypothesis, H_0: There is no significance difference in mean score of fatigue factor among gender.

Hypothesis 2, H_2: There is a significance difference in mean score of fatigue factor among gender.

Hypothesis, H_0: There is no significance difference in mean score of environmental factor among gender.

Hypothesis 3, H_3: There is a significance difference in mean score of environmental factor among gender.

Hypothesis, H_0: There is no significance difference in mean score of commuting accident factor within educational level.

Hypothesis 4, H_4: There is no significance difference in mean score of commuting accident factor within educational level.

Hypothesis, H_0: There is no significance difference in mean score of fatigue factor within educational level.

Hypothesis 5, H_5: There is no significance difference in mean score of fatigue factor within educational level.

Hypothesis, H_0: There is no significance difference in mean score of environmental factor within educational level.

Hypothesis 6, H_6: There is significance difference in mean score of environmental factor within educational level.

Hypothesis, H_0: There is no relationship between educational level and commuting accident.

Hypothesis 7, H_7: There is relationship between educational level and commuting accident.

3.5 Operational Definition (Variables)

Work–Rest Scheduling

According to (Cambridge Dictionary, 2017), the work–rest scheduling is to cause someone or something to doing a particular event or activity or stop being active for a period of time in order to relax and get back the worker strength.

Workload

(Shah, et al., 2011), mentioned that the intensity of the amount of work or job task to be done by employee which can be contributed as a factor of a mental stress.

Distance Traversed

The amount of travel in which accident may occur. The more frequency of travelling and the higher probability of an accident occur (Jamaluddin, Sim, Shabadin, Johari, & Ameer, 2015).

Working Shift

Shift work occurs in a work schedule that utilizes 24 hours a day occasionally, 7 days a week, to keep an organization operating (Hearthfield, 2016).

Geographical Weather

(National Geographic, n.d), stated that the circumstance of the atmosphere in a place during limited period of time.

Traffic Volume

(Civil Engineering Dictionary , 2014), defined that as the procedure to determine the main volume of traffic moving on the roads which given at a particular section during a particular of time.

3.6 Measurement of Variables/ Instrumentation

A Likert scale is a common scale used to employ questionnaire. This approach is used to range responses in survey research. In this questionnaire, participants responded to the items using a 6-point Likert scale ranging from 1 ("Strongly Disagree") to 6 ("Strongly Agree"). The scale is as follows: 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree and 6 = strongly agree.

The questionnaire has four (4) sections as follows: section A = demographic; section B = fatigue factors; section C = job or work factors; section D = environmental factors; and section E = commuting accident to or return from workplace. The questionnaire was taken from previous studies as follows:

Table 3.0
Source of Every Section

No.	Variable	Item	Scale	Source
1	Independent Variable–Fatigue Factors • Work–Rest Scheduling. • Workload.	***Section B*** Question 1–10	1(Strongly Disagree)–6(Strongly Agree)	(Geiger–Brown , Trinkoff, & Rogers, 2011)
2	Independent Variable–Job and Work Factors • Distance Traversed. • Working Shift.	***Section C*** Question 1–10	1(Strongly Disagree)–6(Strongly Agree)	(Geiger-Brown, Trinkoff, & Rogers, 2011)
3	Independent Variable–Environmental Factors • Geographical Weather • Traffic Volume.	***Section D*** Question 1–10	1(Strongly Disagree)–6(Strongly Agree)	(Crundall, Bibby, Clarke, Ward, & Bartle, 2008)

Table 3.0 (Continued)

No.	Variable	Item	Scale	Source
4	Dependent Variable–Commuting Accident • Involvement of Co–Workers of Motorcyclist.	***Section E*** Question 1–10	1(Strongly Disagree)–6(Strongly Agree)	(Crundall, Bibby, Clarke, Ward, & Bartle, 2008)

3.7 Data Collection Procedures

There are many types of methods that can be applied in collecting data from the identified respondents such as interview session, questionnaire, observation etc. In the context of this study, survey method was chosen and it was administered during site visits to COMPANY XYZ Center.

The self-delivery approached issued due to time constraints as well as its clear advantages over another method such as postal, and interview, as that will take a longer time in order to achieve the same size of sample. To ensure better return rate, the questionnaires were handed over by hand during safety meetings at COMPANY XYZ Center to identify the respondents.

A cover letter or a recommendation letter for Master Project from Universiti Utara Malaysia (UUM) and a set of questionnaires were prepared to be distributed among the selected projects (See Appendix 1). The questionnaire consist relevant questions that would be able to tap respondents valuable feedback pertaining the objectives of the study. The selected company was given almost two weeks to complete the survey.

The randomly selected samples were asked on their personal knowledge and experience on safety practices while commuting to or return from workplace. For confidentiality purposes, they do not have to identify themselves. This is the group of individuals which as the responsibility to ensure safety practices to or returns from workplace.

3.8 Sampling

This study is to investigate the contribution factors towards commuting accident to or return from workplace among motorcyclists worker from COMPANY XYZ Research. Two hundred (200) size of the population but only one hundred and thirty three (133) samples size was taken (Krejcie & Morgan, 1970) in the COMPANY XYZ.

Regarding the sampling method, convenience sampling which adopted in the process of selecting samples for the target population. Concerning convenience sampling, it was a sampling method in which samples were selected on the basis of easy availability. Since the researcher is staying in Kuala Lumpur, he could easily approach the samples among workers in COMPANY XYZ. After distributing the questionnaires, the respondents have been asked to distribute the questionnaires among their acquaintances to participate in the survey. This technique is known as snowball sampling to easily get a bigger number of participants.

3.9 Data Analysis Techniques

The gathered data was analyzed using the SPSS program version 23.0. After coding the data, frequencies, minimum, and maximum scales of all the items measured it was then inserted into the programs to determine the respondents‟ answers. According to Hofmann (2003), descriptive statistics are best describe organizing and summarizing as it discussed important characteristics of the data and the inferential statistics represent a particular relationship in the population. In simple words, descriptive statistics summarizes the sample data and inferential statistics are for drawing inferences about the population. Data screening is used to gather and insert into SPSS, the temptation to plunge forward with sophisticated multivariate statistical analysis must be resisted without critically examining the quality of the data collected.

This study deployed nine (9) statistical methods to analyze the data. Descriptive statistics are used to describe the basic features and it provides synopsis about the sample and the measures. Mean analysis is one of the descriptive statistical methods which may be conducted using SPSS version 23.0. This method generated the value of mean, mod, median, standard deviation, variance, maximum, minimum, significant value (p–value), Beta, R^2 and based on method that researcher will be used. Basically the mean is the average score of distribution. Generally it applied in order to indicate the value of scale variables that is been used in the questionnaires to tap the relevant information regarding behavior (Farooqui, 2011).

3.9.1 Demographic and personal characteristics of the sample

As an initial step in the data analysis, descriptive statistics were performed to provide a background of the sample in relation to the variables being studied. Gender, marital status, highest education level, race, age, working experience and travel distance were stated and graphical displays such as pie chart and bar charts as well as summary of frequency and percent were provided for each variable.

3.9.2 Pilot Study

A pilot test was conducted to assess instrument reliability, refined individual items and to ensure accurate interpretation of the instrument's instructions. The pilot study was also able to provide information concerning ambiguities within the questionnaire thus dealing with the issue of content validity. Content validity is a subjective measure of how appropriate the items seem to a set of reviewers who have some knowledge of the subject matter (Venkatesh & D. Davis, 2000). A sample of thirty (30) workers from COMPANY XYZ was selected for the pilot test. A pilot instrument was distributed to each workers and data collection concluded with 100% response. Cronbach's alpha or known as common measure of internal consistency ("reliability") was used in a pilot study to determine the reliability of the questionnaire. The internal consistency Cronbach's α is 0.7 or higher for a set to be considered as a scale (Vinodkumar & Bhasi, 2010).

3.9.3 Reliability of Items

Reliability is the degree to which a scale or instrument consistently measures whatever it measures. Reliability is expressed as a coefficient between 0 and 1.00. The higher the coefficient the more reliable is the instrument. Cronbach's alpha is the most common measure of internal consistency especially for attitudinal measures like those used in this data. Cronbach's alpha estimates internal consistency by determining how all items on a test relates to all other items and to the total test-internal coherence of data. If the values exceed 0.69, then the scale is said to have internal consistency, hence a set of items considered reliable. The Cronbach's alpha coefficient computed for the 40 items was 0.953 indicating reliability of the items for the study.

3.9.4 Test for Normality

The Kolmogorov-Smirnov-Z statistic was used to check for normality of the data such as fatigue factor, job and work factor, environmental factor and commuting accident factor.

3.9.5 Analysis of Correlations

Correlation is a method to analyze data which measure linear relationship between two variables that computes a coefficient value. In SPSS version 23.0, the Bivariate Correlations procedure compute Pearson's correlation coefficient, Spearman's rho and Kendall's tau-b with their significance levels. Correlations measure how variables or rank orders are related. Before calculating a correlation

coefficient, the data is been screened for outliers and evidence of a linear relationship. Pearson's correlation coefficient is a measure of linear association.

A Pearson correlation is a number measure the strength and direction of the linear relationship between the two variables. The correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, +1 indicating a perfect positive correlation, and 0 indicating no correlation at all. (A variable correlated with it will always have a correlation coefficient of 1.) The p-value associated with the correlation is known as Sig. (2-tailed). The footnote under the correlation table explains on the single and double asterisks signify.

Before any further interpretation is carried out in the correlation analysis, the Pearson coefficient or known as r coefficient value need to be indicated at the first place. The r-values indicate the strength of association, while the p-value indicates whether there is significant correlation between variables or not. According to (Man & Zain, 2014), the basis used to consider correlation strength is Guildford (1973) Rule of Thumb as shown in following table 3.1.

Table 3.1
Pearson correlation table (using Guildford (1973) Rule of Tthumb)

Correlation coefficient (r)	Strength of relationship
< 0.20	Negligible

0.21–0.40	Weak
0.41–0.70	Moderate
0.71–0.90	Strong
> 0.90	Very Strong

3.9.6 Multiple Linear Regressions

Regression is calculated by using variance and factorial analyses are related to means. Although one-way analysis of variance associated with the mean determined by a group of variables, factorial analysis of variance designed to test the difference between the set of instructions that are grouped by more than one classification variables or factors. As with one-way analysis of variance, the procedure examines the differences between group mean and the spread of value within groups.

3.9.7 Independent T–test

Two independent sample t–tests compare the differences of the two means with standard error of the difference in the means of different samples (Bryman & Cramer, 2011). In this study, independent sample t-test were conducted to determine if there is any significant difference in means scores of fatigue factor, job and work factor, environmental factor and commuting accident factor by gender.

Before independent samples t-test conducted, distribution of data must be normal. Levene's test for equality of variances was also taken into consideration in testing the hypotheses. Levene's test indicates whether variance of the distribution is equal or not. P–value of more than 0.01 indicates equal variances assumed whereas p-

value less than 0.01 mean equal variances not assumed. Thus, p–value chosen for two independent samples t–test depends upon the assumption indicated by Levene's test.

3.9.8 Analysis of Variance (ANOVA)

Analysis of variance is a procedure used for comparing sample means to see if there is sufficient evidence to infer that the mean of the corresponding population distribution also differ. Analysis of variance is able to compare many distributions. In this study, analysis of variance wishes to see if any of three (3) different educational levels towards environmental factor differed significantly from each other which would require one-way ANOVA to accomplish this. One way ANOVA could tell us if there are significant differences with any of comparisons of the three (3) education levels in the sample.

3.9.9 Post–Hoc Multiple Comparison Test

This method will be using if there is significant difference in mean score in the commuting accident, fatigue, job and work, and environmental within the education level then Post–Hoc Multiple Comparison Test would be conducted. In addition, if the researcher are performing many independent or dependent statistical tests at the same time. Thus, this post–hoc will give the most significant value among other factors.

3.9.10 Chi–Square Test

Chi-square test of independence is used as a confirmatory analysis (Keller & Warrack, 2006). The decision is to reject the null hypotheses if the computed chi-square statistics is greater than the critical value from the chi-square distribution with (r–1) (c–1) degrees of freedom, where r = row total and c = column total or if p–value of the chi-square statistics is less than the predetermined level of significance which is 0.05 in this study. It would be necessary to combine categories if cells have frequencies below 5 for chi-square test to be valid.

In this study, chi-square analysis will be used to see if there is significant association between respective variable (educational level: SPM, STPM and Degree) and selected factor (commuting accident). The workers from COMPANY XYZ who are aware in terms of safety towards commuting accident to or return to workplace was determined by the level of safety awareness such as clueless, realization and proactive (Personal Safety Awareness, 2012).

3.10 Summary

Thus, the methodology presented in this chapter is intended to provide insight into how the study was conducted in relation to the research title mentioned in Chapter One. Literature Review (Chapter 2) is to show the supporting materials for this paper and the technique of the research can be view in Chapter 3. The discussions on the outcome of the study, based on the methodology used, are covered in Chapter Four.

CHAPTER 4

Results and Discussion

4.1 Introduction

In this chapter the results of the data analysis are presented. The primary data collected through questionnaire survey was coded and analyzed using Statistical Package for Social Science (SPSS) version 16.0 and Microsoft Excel 2016. As stated previously in Chapter 3, a few statistical techniques such as Correlation Test and Multiple Linear Regression Test, Independent T–Test, Analysis of Variance (ANOVA), and Chi Square Test were applied in analyzing data. Data analysis is the most important part of the entire research phase. This chapter is divided into six sections and they summarize the results of all statistical techniques used. The purpose of this study was to examine the teleological factors which can be contributing towards the commuting accident among motorcyclists of COMPANY XYZ Center.

4.2 Overview of Data Collected

4.2.1 Response Rate

One hundred and thirty three (133) surveys were initially send to TNB Research Center in order to get the data collection from two hundreds (200) population size (Krejcie & Morgan, 1970). All surveys are returned accordingly without any missing of the survey and all questions were fully answered by respondents. The survey was conducted within 15 minutes to 20 minutes. All surveys are collected right after the respondent answered the questions. All surveys are returned and useable. So, it shows that the response rate was 100%.

4.3 Profile of Respondents

Table 4.0
Demographic Profile of Respondents

	Demographic Factor	Frequency	Percent (%)
1	**GENDER**		
	- Male	71	53.4
	- Female	62	46.6
2	**MARITAL STATUS**		
	- Single	95	71.4
	- Married	35	26.3
	- Divorced	3	2.3
3	**HIGHEST EDUCATION LEVEL**		
	- SPM	41	30.8
	- STPM/ Certificate/ Diploma	71	53.4
	- Bachelor Degree	21	15.8
	- Master	-	-
	- PhD Holder	-	-
4	**RACE**		
	- Malay	63	47.4
	- Chinese	43	32.3
	- Indian	24	18.0
	- Others	3	2.3
5	**AGE**		
	- 18–28 years	71	53.4
	- 29–39 years	44	33.1
	- 40–50 years	18	13.5
	- 51–60 years	-	-
6	**WORKING EXPERIENCE**		
	- Less than 2 years	57	42.9
	- Between 2 to 5 years	50	37.6
	- Between 6 to 10 years	20	15.0
	- More than 10 years	6	4.5
7	**DISTANCE TRAVERSED**		
	- Less than 10KM	41	30.8
	- Between 10KM to 20KM	54	40.6
	- Between 20KM to 30KM	23	17.3
	- More than 30KM	15	11.3

4.4 Goodness of Measures

4.4.1 Reliability Test Analysis

Reliability of the instrument is the degree to which an assessment tool produces stable and consistent results (Phelan & Wren, 2006). The purpose of the reliability is to inform the researcher as to which items work better than the others to measure what is supposed to be measured that enables the items to be revised from the instrument to make the questionnaire consistent. The goals of developing reliable measure is to minimize the influence on the scores of chance or other variable unrelated to the intent of the measure (McMillan & Schumacher, 2001).

The pilot study was administered to 30 respondents in COMPANY XYZ Center for undertaking this research paper for ensuring that all the items in the survey will be useable and can proceed to collect the actual survey from the respondents. So, these 30 respondents of their survey were excluding from 133 respondents to take the actual survey because the population size is N=200 (Krejcie & Morgan, 1970).

The error in measurement may be from ambiguous statement in the questionnaires, a word that carries double meaning. Based on Table 4.1, the instruments can be used if the value of internal consistency based on Cronbach's alpha are more than 0.7 or else has to change the instruments (Tavakol & Dennick, 2011). This is to determine the accuracy and precision of the instrument. The internal consistency estimates, based on Cronbach's alpha, were satisfactory thus acceptable.

Table 4.1
Cronbach's alpha value

Cronbach's alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.8 \leq \alpha < 0.9$	Very Good
$0.7 \leq \alpha < 0.8$	Good
$0.6 \leq \alpha < 0.7$	Moderate
$\alpha < 0.6$	Poor

4.4.2 The reliability analysis on items

The following Table 4.2 represents the result of the fatigue factor. The responses for the fatigue factor were analyzed to be very good reliable towards the commuting accident to or return from workplace among motorcyclists. As illustrated in Table 4.2, Cronbach's alpha for reliability coefficient is 0.808. Therefore, all items in this factor are considered to be included in the questionnaire.

Table 4.2
Reliability of Items

No.	**Factors**	**Reliability Statistic (Cronbach's Alpha)**	**No. Items**
1	Fatigue	0.808	10
2	Job and Work	0.860	10
3	Environmental	0.786	10
4	Commuting Accident	0.807	10

4.4.3 Kolmogorov Smirnov Test Statistics

One–sample Kolmogorov–smirnov test would be used to check the normality of the data such as fatigue factor, job and work factor, environmental factor and commuting accident factor with tested by the hypothesis:-

H_0: The data of fatigue factor, job and work factor, environmental factor and commuting accident are normal.

H_1: The data of fatigue factor, job and work factor, environmental factor and commuting accident are not normal.

Table 4.3
Kolmogorov Smirnov Test Statistics

No.	Factors	p–value	No. Items
1	Fatigue	0.197	10
2	Job and Work	0.144	10
3	Environmental	0.131	10
4	Commuting Accident	0.555	10

Since p–value > 0.05 for the distribution of fatigue factor, job and work factor, environmental factor and commuting accident factor. Therefore, the researcher failed to reject H_0. As conclusion, the data for all the factors are considered normal.

4.5 Tested Research Objective/ Hypothesis

4.5.1 Analysis of correlations and multiple linear regressions

Research Objective 1: To identify the relationship between fatigue, job and work, environmental and commuting accident.

Table 4.4
Correlations between factors

	Fatigue	Job and Work	Environmental	Commuting Accident
Fatigue	1			
Job and Work	0.386**	1		
Environmental	0.487**	0.292**	1	
Commuting Accident	0.331**	0.201*	0.438**	1

**correlation is significant at the 0.01 level (2-tailed)
*correlation is significant at the 0.05 level (2-tailed)

These will be tested by H_2 given by:

$H_{0:}$ There is no significance relationship between fatigue, job and work, environment and commuting accident.

$H_{1:}$ There is a significance relationship between fatigue, job and work, environment and commuting accident.

Table 4.4 shows that there is significant (p-value = 0.000 < 0.001 level of significant) positive correlation (r=0.331) between fatigue and commuting accident, both job and work is positively (r=0.20) significant (p-value = 0.020

< 0.05) and environmental is positively (r=0.438) significant (p-value = 0.000 < 0.001) towards commuting accident. Thus, H_0 is rejected.

Multiple Linear Regressions is used to identify variables for determining the factors that are related to the commuting accident which is presented in Table 4.5. Based on the following Table 4.5, three (3) predictor variables have provided to $R^2 = 0.211$ (21.1%) to the commuting accident.

Table 4.5
Analysis of Multiple Linear Regressions

Factor	TELEOLOGICAL FACTORS CONTRIBUTING TOWARDS COMMUTING ACCIDENT TO OR RETURN FROM WORKPLACE AMONG MOTORCYCLIST WORKERS OF COMPANY XYZ CENTER					
	B	Std. Error	Beta	Significant	Tolerance	VIF
Constant	20.819	3.922		0.000	-	-
Fatigue	0.111	0.074	0.141	0.135	0.698	1.433
Job and Work	0.044	0.089	0.043	0.618	0.937	1.195
Environmental	0.306	0.077	0.357	**0.000**	0.750	1.333
R^2	0.211	-	-	-	-	-
F Value	11.533	-	-	-	-	-
Significant	**0.000**	-	-	-	-	-

The commuting accident model is depicted as below:

Commuting Accident = 20.819 + 0.111 (***Fatigue***) + 0.044 (***Job and Work***) + 0.306 (***Environmental***)

Based on the model it can be determined that and increase in y unit for environmental factor with increase about 0.306 score in commuting accident

while both fatigue and job and work factors are fixed. Moreover, a change in Job and Work factor will give arise at about 0.044 score in commuting accident without involving fatigue factor and environmental factor. However, fatigue factor will increase at about 0.111 score in commuting accident. Thus, 20.819 are considered constant. As overall, the multiple linear regression models are significant at 0.000 with the F value 11.533.

4.5.1.1 Discussion of the relationship between fatigue, job and work, environmental and commuting accident.

Out of the three factors, the environmental factor shows the highest degree of correlation with commuting accident. According to (Sultan, Ngadiman, A. Kadir, Roslan, & Moeinaddini, Factor Analysis of Motorcycle Crashes in Malaysia, 2016), the main impact for commuting accident based on the environmental factors is weather condition which includes both location such as urban area and rural area.

The workers from COMPANY XYZ Center are living in different scattered of region whether in urban area or rural area. The demographic profile showed that the respondents who are using motorcycle to and return from workplace live in different area which can be proved under distance traversed section (See table 4.0).

The motorcyclists live in urban area are expose with the dangerous during bad weather or wet weather such as rain which is generally happen in Malaysia and easily to commute accident because frequently urban area has

excessive traffic volume and a higher level of infrastructure than rural area because based on the Google map, the radius within 10 kilometers from COMPANY XYZ Center is urban area which nearby with Mabank Academy, PETRONAS Sdn. Bhd. Academy, CIMB Putra Bangi Academy, Insititut Latihan Pos Malaysia and others education hub. However, rural area which can be considered as more than 30 kilometers from COMPANY XYZ has less traffic volume and fewer vehicles on the road.

As a result, the motorcyclists are able to drive at higher speed owning to less traffic on the poorer roads that were not design for higher speed. Thus, it shows that, the area is congested with people and indirectly, the traffic volume will be increased and the design of poor road will become worse especially during bad weather which can cause commuting accident to or return from workplace among motorcyclists (Sultan, Ngadiman, A. Kadir, Roslan, & Moeinaddini, Factor Analysis of Motorcycle Crashes in Malaysia, 2016).

4.5.2 Independent T–Test

Independent t-test will generate a significant value indicating whether there is a difference means scores of fatigue factor, job and work factor, environmental factor and commuting accident factor by gender.

Table 4.6
Descriptive Analysis for Independent T–Test

	Gender	N	Mean	Std. Deviation
Commuting Accident Factor	Male	71	4.0028	.59136
	Female	62	4.1500	.46930
Fatigue Factor	Male	71	3.9507	.73735
	Female	62	4.2806	.58389
Job and Work Factor	Male	71	3.9493	.46839
	Female	62	3.9758	.57679
Environmental Factor	Male	71	4.3465	.66092
	Female	62	4.5645	.58059

Table 4.5 indicates that the mean scores of fatigue factor and environmental factor, among female workers are higher compared to male workers. This fatigue factor is a normal problem, which can be found more frequently among women than men (Bensing, Hulsman, & Schreurs, 1999). However, there is a similar in mean scores for male and female in both commuting accident factor and job and work factor. Thus, it can be concluded that female have more contribution towards works–rest scheduling, workload, weather condition and traffic volume.

4.5.2.1 Analysis of fatigue factor and environmental factor by gender

Research Objective 2: To indicate the difference means scores of fatigue factor, job and work factor, environmental factor and commuting accident factor by gender.

This section will be compared between gender in terms of fatigue factor and environmental factor that will be tested by hypothesis:-

A. Fatigue Factor:

H_0: There is no significance difference in mean score of fatigue factor among gender.

H_2: There is a significance difference in mean score of fatigue factor among gender.

B. Environmental Factor:

H_0: There is no significance difference in mean score of environmental factor among gender.

H_3: There is a significance difference in mean score of environmental factor among gender.

Table 4.7
Analysis of Independent T–test

		Levene's Test for Equality of Variances		T-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Commuting Accident Factor	Equal variances assumed	4.137	.044	-1.574	131	.118
	Equal variances not assumed			-.1599	129.865	.112
Fatigue Factor	Equal variances assumed	6.179	.014	-2.832	131	.005
	Equal variances not assumed			-2.877	129.814	**.005**
Job and Work Factor	Equal variances assumed	1.551	.215	-.292	131	.770
	Equal variances not assumed			-.288	117.523	.774
Environmental Factor	Equal variances assumed	2.410	.123	-2.008	131	**.047**
	Equal variances not assumed			-2.025	130.994	.045

According to Table 4.5 and Table 4.6, there was a significant difference in fatigue factor (p-value = 0.005 < α = 0.05) and environmental factor (p-value = 0.047 < α = 0.05) between male and female at 5% level of significance (α).

However, there is no significant difference in the mean scores of commuting accident (p-value = 0.112 > α = 0.05) and job and work factors (p-value = 0.770 > α = 0.05) between male and female. Therefore, H_0 for commuting accident and job and work factors are rejected.

4.5.2.2 Discussion on the difference means scores of fatigue factor, job and work factor, environmental factor and commuting accident factor by gender.

Based on Table 4.6 stated that male and female workers in COMPANY XYZ Center have relationship with fatigue factor at workplace. This fatigue factor by gender can contribute towards commuting accident to or returns from workplace. (Merriman, 2009), stated that gender fatigue can be defined to the phenomenon that human being with lack the energy to construct the workplace by the repetition method. This significance difference of fatigue factor among gender can be observed by comparing between male and female at the tendency of easiness to get fatigue at the workplace.

Table 4.5 shows that the number of female workers getting experienced with fatigue are high than male workers. (Women Are More Tired Than Men - Here's 7 Possible Reasons Why, 2013), showed that female is easy to get fatigue compare to male such as doubling up on the work that female do at workplace and home because female still tend to do more of housework and child rearing than male do. So, those females are working outside of house or workplace as well fundamentally has two jobs.

Workers at COMPANY XYZ Center which include male and female are experienced with the fatigue factor which consists of work–rest scheduling and workload at the workplace. Work–rest scheduling has to be well–designed in order to get job satisfaction for both gender workers especially

those workers who are working as site worker which is always travel back and forth from one location to another different locations. This can be contributing as one part of the fatigue factor.

Female workers at COMPANY XYZ Center proved that working without proper work–rest scheduling can affect their health and indirectly can cause the commuting to or return from workplace. On top of the previous sentences, female workers are easily to get tired because of pregnancy and menstruation which have been increasingly documented (Health and Safety Guidelines for Shift Work and Extended Working Hours, 2000). As workers in the research company, either male or female workers have to conduct a research from outside of the company by visiting at the working site frequently such as weekly or monthly based upon their roster. If the female workers from COMPANY XYZ are having menstruation period, then it might affect the mood, hormone and focus to perform the job task given by the employer. Thus, this can make work stress increases with effect by lacking of focus while driving on the road and indirectly, female workers will be involved towards the commuting accident to or return from workplace.

Female workers are easy to get fatigue when they were receiving heavy workload than male workers from their employers (Anitei, Chraif, & Lonita, 2015). Male workers are typically having a major role in paid work and as breadwinners because male gained more power and social recognition, while women are downgraded to invisibility with the lack of social value

(Artarcoz, Cortes, & Borrell, 2011). For example, male workers with the higher position can simply give the instruction to female workers for assigning job task which will be completed upon the due date. Especially after assigning the job task, micromanagement will be imposed like management style whereby a male manager closely observers or controls the work of subordinates or employee. This can make female workers are not comfortable to complete their tasks and work pressure will be increased. Thus, female workers will lose their focus while driving on the road and can be caused commuting accident to or return from workplace.

4.5.3 Analysis of Variance (ANOVA)

Research Objective 3: To indicate the difference in the commuting accident, fatigue, job and work, and environmental within the education level.

Analysis of variance will generate a significant value indicating whether there is a difference in commuting accident, fatigue, job and work, and environmental within education level. These will be tested by hypothesis given by:

A. Commuting Accident

$H_{0:}$ There is no significance difference in mean score of commuting accident factor within educational level.

$H_{4:}$ There is significance difference in mean score of commuting accident factor within educational level.

B. Fatigue factor

$H_{0:}$ There is no significance difference in mean score of fatigue factor within educational level.

$H_{5:}$ There is significance difference in mean score of fatigue factor within educational level.

C. Environmental factor

$H_{0:}$ There is no significance difference in mean score of environmental factor within educational level.

$H_{6:}$ There is significance difference in mean score of environmental factor within educational level.

Table 4.8
Descriptive Analysis of ANOVA

		N	Mean	Std. Deviation	Std. Error
Commuting Accident	SPM	41	3.4537	.22704	.03546
	STPM	71	4.1732	.21971	.02608
	Degree	21	4.9333	.24563	.05360
Fatigue					
	SPM	41	3.8244	.81663	.12754
	STPM	71	4.1479	.59543	.07066
	Degree	21	4.5048	.46095	.10059
Job and Work					
	SPM	41	3.8341	.55390	.08650
	STPM	71	3.9803	.48362	.05740
	Degree	21	4.1476	.52973	.11560
Environmental					

	SPM	**41**	**4.0293**	**.71946**	**.11236**
	STPM	**71**	**4.6028**	**.44109**	**.05235**
	Degree	**21**	**4.7429**	**.61933**	**.13515**

Table 4.9
Analysis of Variance (ANOVA) for Indicating the Difference in Commuting Accident, Fatigue, Job and Work, and Environmental within the Education Level

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig. (p-value)**
Commuting Accident Factor	Between Groups	31.984	2	15.992	312.727	**0.000**
	Within Groups	6.648	130	.051		
	Total	38.631	132			
Fatigue Factor	Between Groups	6.715	2	3.357	7.830	**0.001**
	Within Groups	55.742	130	.429		
	Total	62.457	132			
Job and Work Factor	Between Groups	1.417	2	.709	2.690	0.072
	Within Groups	34.257	130	.264		
	Total	35.674	132			
Environmental Factor	Between Groups	10.716	2	5.358	16.586	**0.000**
	Within Groups	41.996	130	.323		
	Total	52.712	132			

Results shown in Table 4.8 revealed that there is a significant difference in commuting accident (p-value = 0.000), fatigue (p-value = 0.001), and environmental (p-value = 0.000) within educational level at 5% level of significance (α). Since the results indicate that there is significant difference in commuting accident, fatigue and environmental factor. Therefore further analysis was conducted by using Post Hoc Multiple Comparison Test.

Based on the following Table 4.9, for those who are Degree holder there is significant different (p-value < 0.05) in fatigue factor with SPM and STPM holder. Among SPM, STPM and Degree holder, those who are from Degree holder scored higher in fatigue factor which consists of work–rest scheduling and workload because the rank and highest position in the company. Meanwhile, for the environmental factor, SPM holder has significant different with STPM and Degree holder. Among these three categories, SPM shows the highest score in the environmental factor compared to STPM and Degree holder which consists of geographical weather and traffic volume. This result reviewed that SPM holder with low rank position will be more exposed mobile activities such as frequently involved with site visits work.

Furthermore, in the commuting accident factor shows that all the qualification levels are different to each other among SPM, STPM and Degree holder. Based on the Table 4.7, Degree holder score highest (mean = 4.9333 ≈ 5, Category: Agree) followed by STPM (mean = 4.17 ≈ 4, Category: Slightly Agree) and SPM (mean = 3.45 ≈ 3, Category: Slightly Disagree). These results proved that the decrease in education level will decrease the level in safety awareness of rules and regulations on the road which is can be contributing towards commuting accident. In other words, the workers are from Degree holder will be more aware on the safety compare to SPM and STPM holder.

Table 4.10
Analysis of Post Hoc Multiple Comparison Test

	(I) Educational Level	(II) Educational Level	Mean Difference (I–II)	Std. Error	Sig. (p-value)
Commuting Accident	SPM	STPM	-.71958*	.04436	**.000**
		Degree	-1.47967*	.06068	**.000**
	STPM	SPM	.71958*	.04436	**.000**
		Degree	-.76009*	.05617	**.000**
	Degree	SPM	1.47967*	.06068	**.000**
		STPM	.76009*	.05617	**.000**
Fatigue					
	SPM	STPM	-.32350	.14580	.076
		Degree	-.68037*	.16243	**.000**
	STPM	SPM	.32350	.14580	.076
		Degree	-.35687*	.12293	**.016**
	Degree	SPM	.68037*	.16243	**.000**
		STPM	.35687*	.12293	**.016**
Environmental					
	SPM	**STPM**	**-5.7355***	**.12396**	**.000**
		Degree	**-.71359***	**.17576**	**.001**
	STPM	**SPM**	**.57355***	**.12396**	**.000**
		Degree	**-.14004**	**.14493**	**.604**
	Degree	**SPM**	**.71359***	**.17576**	**.001**
		STPM	**.14004***	**.14492**	**.604**

* The mean difference is significant at the 0.05 level.

However, there is no significant difference in the mean scores of job and work factors (p-value = 0.770 > α = 0.05) within educational level. Therefore, H_0 for job and work factors is not rejected. In addition, all level

have same point of view about the Job and Work factor which is consisting of distance traversed and work shift.

4.5.3.1 Discussion on the difference in the commuting accident, fatigue, job and work, and environmental within the education level.

Based on the result of research objective 3, researcher found that the point of view among workers are different to each other because all workers are having different background of education level such as SPM, STPM and Degree holder towards commuting accident, fatigue, job and work and environmental factors. The differences can be observed through result.

Among four (4) factors as mentioned on the above paragraph, three (3) factors are significant such as commuting accident factor, fatigue factor and environmental factor but the results showed that job and work factor is not significant within education level because all different qualification holders are agreed with the same experienced when answering the questionnaire under the job and work factor section. They have same opinion regarding distance traversed and working shift.

Next, among three (3) significant factors, commuting accident is the most significant compare to fatigue and environmental. The reason is all the education level have different point of view which can categorized under slightly disagree (SPM), slightly agree (STPM), and agree (Degree). However, fatigue is slightly agreed (SPM and STPM) and agrees (Degree). Environmental is slightly agreeing (SPM) and agree (STPM and Degree) which specify under these two categories only.

Most significant towards three factors are the workers from Degree holder. So, researcher would like to focus on degree holder than SPM and STPM holder. All degree holder in COMPANY XYZ Center with the minimum rank executive and above experienced with the mental fatigue because they are usually make the decision for their subordinate workers. According to (Extreme tiredness and fatigue management, 2012), mental fatigue can be considered as confusion, slowness of thought, an incapability to focus and will usually result in sleepiness. It is very difficult for drivers to overcome their own level of fatigue especially mental fatigue. The ability to self–assess becomes increasingly impaired as the motorcyclists worker get more fatigued. For example to identify whether experiencing with mental fatigue or not like narrowing attention, head nodding, inability to keep the eyes open during riding on the road, daydreaming and wandering thoughts, constant yawning or rubbing on both eyes and drifting in the lane. All of these signs caused by mental fatigue and can make the driver to commute an accident on the road.

Based on the Table 4.9, workers from degree holder agreed that their work–rest scheduling is keep changing frequently which may cause fatigue because they have to take some time to adapt and adjust their working time. A work–rest scheduling comprises the frequency, duration, and timing of rest breaks (Hsiea, Hsiaoa, & Chengb, n.d). The employer should establish a proper design for job rotation at the workplace. Proper job rotation is the best way to improve the quality in organization of work such as balance workload which assigned to the employee (Tharmmaphornphilas, Green, Carnahan , & Norman, 2003). Thus, to handle and manage subordinate in different job scope can cause stress at workplace.

Next, stress at workplace can positively influence workers from degree holder to focus when they commute by motorcycle to or return from workplace because the workload given by the employer does not manageable and aligned with the job scope for example, workers who are supposed to do in research product under research and development department have to do other task such as do monthly event of the company under marketing department. Indirectly, they will be procrastinating to the actual task and the number of workload will be keep increased. Long work hours because of heavy workload cut into time available for sleep and work–related stress can make hard the motorcyclists to sleep when the time is available ((EU-OSHA), 2010). Thus, when fatigue–related accidents occur speeds tend to be higher than average and the consequences are more severe because braking is absent or late.

In terms of the environmental factor, the workers (Degree holder) have self–discipline for safety awareness because they have checked their motorcycle frequently to ensure that the motorcycle is in the good condition and properly equipped to operate in poor weather conditions such as tires are fitted on the slippery road during commute to or return from workplace. Driving in bad weather condition requires careful attention and the vehicles have to be properly equipped to drive in those ((EU-OSHA), 2010). In conclusion, the risk of accidents increases when vehicle travel under hazardous conditions, (EU road freight transport sector, 2004).

According to the result, workers (Degree holder) agreed that they will be adjusting time and routes if there is a poor weather conditions to avoid from accident occurred. This can be explained that they are putting effort to find alternative routes to reach at the workplace. They concerned about their safety first rather than to reach at the workplace on time by exposing the danger on the road especially during poor weather conditions and traffic congested. In addition, they are considering about safety for planning their route during the traffic congested to or return from workplace such as speed limit, minor road provided for motorcyclist, safety place where can stop during emergency like poor weather or other safety aspects on the road. So, there is a greater chance of accident during poor weather because the motorcyclists tend to speed up (Shankar, V & Mannering, F, 1996).

Ultimately, the motorcyclist's workers from Degree holder granted that it is easier for motorcyclist to make sudden swerves to avoid an accident than car drivers. As mentioned by (Clarke, D, Bartle, P, & Truman, W, 2004), the accident are three (3) likely to occur on T–junctions whereas a turning driver usually fails to see an approaching motorcycle or to sufficiently judge the time available to cross the junction because the motorcyclists are less conspicuous. Thus, they are more likely to consider themselves to be responsible and safe drivers and less likely to report performing dangerous violations and not considered as hostile driver to traffic laws.

4.5.4 Association between educational level and commuting accident.

Research Objective 4: To investigate whether there is an association between educational level and commuting accident.

One of the objectives of this study is to investigate whether there is an association between educational level and commuting accident. Chi-square test is carried out to determine this association. The hypothesis to test this objective is given by:

H_0: There is no relationship between educational level and commuting accident.

H_8: There is relationship between educational level and commuting accident.

Table 4.11

Analysis of Association between Educational Levels and Commuting Accident (Chi–square test)

	Commuting Accident (Safety Awareness)		
Educational Level	**Clueless (%)**	**Realization (%)**	**Proactive (%)**
SPM	**41 (100)**	0	0
STPM	0	**71 (100)**	0
Degree	0	0	**21 (100)**
Chi–square = 266.000		**P–value = 0.000**	

Table 4.10 shows that majority of all 41 workers from SPM holders; they are in the clueless category followed by all 71 workers from STPM holders; they are in the realization category and all 31 workers from Degree holders; they are in proactive category in the safety awareness towards commuting accident factor.

Furthermore, chi-square test shows that the association between educational level and commuting accident is significant with chi-square value of 266.000 and p-value of 0.000 at 5% level of significant. This indicates that with higher education qualification can increase their knowledge in terms of safety awareness towards commuting accident. Thus, H_0 is rejected.

4.5.4.1 Discussion on Association between Educational Level and Commuting Accident.

COMPANY XYZ Center workers from Degree holder have proactive in terms of safety awareness compare to SPM and STPM holder, with the reasons that they used to practiced and trained such as attending the workshop, team–building and seminar during the study period in higher education institution. Indirectly, they gained knowledge for abiding rules and regulations in any events.

The workers from COMPANY XYZ Center who are used motorcycle to commute to or return from workplace are not aware about safety rules on the road such as perform all appropriate visual checks on motorcycle, motorcyclists should take greater precautions in a wet weather conditions and motorcyclists have to point out the signals to other driver when coming from behind which they have to practice all the rules on that provided by authorized department such as Jabatan Pengangkutan Jalan (JPJ) during training in the driving school, especially low level position in the company to increase their knowledge in terms of abiding the rules.

4.6 Summary

This chapter presents the results and findings of the study. Reliability test was conducted and the results of Cronbach's alpha value indicate that all items in the questionnaire have very good internal consistency. Nine (9) constructs have been tested using statistical analysis methods with the hypothesis.

CHAPTER 5

Conclusion and Recommendation

5.1 Introduction

This chapter describes the conclusion reached and the recommendation put forward for future and further research. The chapter highlights the significance of the results obtained in the study. Besides, the limitations drawn from the study were specified in order to improve for future study.

5.2 Review of objectives

The purpose of this study is to determine which among the teleological factors are highly contribute towards commuting accident to or return from workplace among motorcyclists worker in COMPANY XYZ. Findings and results of the study were organized based on four research questions to achieve the following research objectives of the study such as to identify the relationship between fatigue, job and work, and environmental towards commuting accident, to indicate the difference means scores of fatigue factor, job and work factor, environmental factor and

commuting accident factor by gender, to indicate the difference in the commuting accident, fatigue, job and work, and environmental within the education level and to investigate whether there is an association between educational level and commuting accident.

5.2.1 Research objective 1

The first objective of this study was to identify the relationship between fatigue, job and work, and environmental towards commuting accident. In order to achieve this objective, the analysis begins with the descriptive statistics of the independent variable such as fatigue, job and work and environmental with dependent variable such as commuting accident. Furthermore, analysis of correlation factors was used to identify the relationship between independent variable and dependent variable. As a result, it shows that three of these factors has positively relationship towards commuting accident to or return from workplace among motorcyclist workers from COMPANY XYZ because based on the result from Table 4.4, the correlations between factors shows that when the number of these three factors increase then the contribution towards commuting accident will be increased.

However, the result (See Table 4.5) revealed that environmental factors are the higher degree relationship towards commuting accident. Thus, the finding is consistent with the prior study of (Marmor & Nicholas, 2006) in USA and (T. Flores, T. Gotohio, C. Paras, & R. Seva) in Philippines.

5.2.2 Research objective 2

This objective was to indicate the difference means scores of fatigue factor, job and work factor, environmental factor and commuting accident factor by gender. Independent T–Test was used to test the hypotheses 3 and hypotheses 4. The result indicates that gender has significant towards commuting accident with measured by fatigue factor and environmental factor. Among gender, female motorcyclists workers are prevailed with the highest mean score (See Table 4.6) compare to male motorcyclists workers. Thus, the result was aligned with the prior studies of (Bensing, Hulsman, & Schreurs, 1999), (Kamberidou, 2010) and (Women Are More Tired Than Men - Here's 7 Possible Reasons Why, 2013).

5.2.3 Research objective 3

The third objective was to indicate the difference in the commuting accident, fatigue, job and work, and environmental within the education level. In order to obtain the result for this objective, Analysis of Variance (ANOVA) was used. The hypothesis testing results as shown in Table 4.8 proves that there was significant difference in commuting accident factor, fatigue factor and environmental factor. Therefore further analysis was conducted by using Post Hoc Multiple Comparison Test as shown in Table 4.9 and the result showed, those who were in the Degree holder has significant different in commuting accident with SPM and STPM holder.

The results proved that there is a positively relationship such as the decrease in education level will be decreasing the level in safety awareness or rules and regulations on the road which is can be contributing towards commuting accident

because the SPM holders was considering as clueless category. They will be riding motorcycle without abiding the road safety and self–safety as long the journey can be reaching as soon as possible. In addition, the finding is similar with the studies of (Sultan, Ngadiman, A. Kadir, Roslan, & Moeinaddini, Factor Analysis of Motorcycle Crashes in Malaysia, 2016).

5.2.4 Research objective 4

The last objective was to investigate whether there is an association between educational level and commuting accident. The hypothesis was tested to obtain the result for research objective 4. Chi–square test has been used to generate a significance value of association between education level such as SPM, STPM and Degree holders and commuting accident in terms of safety awareness by providing three level of awareness such as clueless, realization and proactive. The results based on Table 4.10 explained that the respondents who are taking the survey from COMPANY XYZ such as all 41 workers from SPM holders; they are in the clueless category (100%) followed by all 71 workers from STPM holders; they are in the realization category (100%) and all 31 workers from Degree holders; they are in proactive category (100%). In conclusion, with higher education qualification level can increase their knowledge in terms of safety awareness level towards commuting accident. This finding is aligned with (Navidian, Rostami, & Rozbehani, 2015).

5.3 Limitations of the Study

According to (Huberman, Michael, & Miles, 2017), limitation of the study can be defined as those attributes of design or methodology that obstructed or influenced the clarification of the findings from the researcher.

There are two main limitations in this study such as this study has relied on quantitative methodology of data collection, thus it is restrictive. In addition, the survey method was used for data collection and it is self–reported data. Thus, it could lead to vague the result and unclear data because certain question may be interpreted differently by respondents.

Next the respondents were limited to the working people who are riding the motorcycle only to or return from COMPANY XYZ which have the potential to involve in the commuting accident. It can be concluded that the findings of the study cannot be generalized to the Malaysia as a whole.

5.4 Recommendation

Fatigue or sleepiness is related with a range of workers especially motorcyclists involving in commuting accident to or return from workplace (Peden, et al., 2004). This fatigue factor occurred because of the improper work–rest scheduling and heavy workload given by the employer of the company. Motorcyclist, particularly female workers who are not used to work under pressure because of menstruation can commute to the accident to or return from workplace. Based on the finding, the female workers are not advisable to ride a motorcycle for commuting to or return

from workplace during menstruation period because they will be exposing towards on the road accident.

The COMPANY XYZ workers from SPM holder usually perform jobs which is highly physical-strength demanding. Theses physically demanding work not only leads to physical fatigue but causes the loss of productivity. As a result, the organization of labors' work should be recommended to cope with minimizing both workers' physical demands and time for completing their jobs.

Employer should provide in house training to educate people as the road users including pedestrians to become more aware and abide the safety rule for commuting to or return from workplace. Thus, employees should now understand the serious costs and effects for the commuting accident can have on them and their families. The employers need for employee to work as safely as possible which has been graphically illustrated and reinforced.

5.5 Implication

The appropriate location to conduct the study for measuring the fatigue factors, job or work factors and environmental factors that can contribute towards commuting accident to or return from workplace among workers are COMPANY XYZ, since the workers are frequently use motorcycle as a main vehicle to workplace and according to demographic profile of the respondent in Chapter 4, they stayed between 10KM to 20KM from their workplace to home or vice versa which is far and the traffic congested frequently happen among the radius of the Bangi area. Indirectly, the

workers are stressful, need to depart early from their house in order to reach the workplace on time. This potentially can cause commuting accident to or return from workplace.

The relationship among fatigue factors, job or work factors and environmental factors as independent variable in this research that play as the measurement to obtain the results from dependent variable which is commuting accident to or return from workplace. These three factors have to measure in terms of the relationship whether positively or negatively contribute towards commuting accident. The result shows that these three factors positively contribute towards commuting accident to return from workplace among motorcyclist's workers from COMPANY XYZ.

Based on the survey (See Table 4.5), environmental factors are highly contributed towards the number of commuting accident because the geographical weather and traffic volume is strongly affected for the motorcyclist workers. In terms of geographical weather, when it comes to heavy rains, the motorcyclists have to find the appropriate location to stay such as under the bridge or flyover before they can continue their journey. This can make motorcyclists wanted to speed up for ensuring that they can reach at the workplace as soon as possible. Otherwise, they will be getting wet or stuck in the middle of traffic congested. (Marmor & Nicholas, 2006), mentioned that slippery road can cause the motorcyclists involved in commuting accident than other type of vehicle since motorcycle has two tires which are not strong enough to avoid from accident happened.

According to (Marmor & Nicholas, 2006), the young age starting from 18–28 years old has the higher number of commuting accident on the slippery road. So, this statically proved that the respondent of this research between 18–28 years old are potentially to involve in commuting accident to return from workplace. (Hennessy & Wiesenthal, 1999), stated that the increasing of the traffic volume which may cause traffic congested can make the motorcyclists stress and indirectly this can consequence to the motorcyclist involved in commuting accident to or return from workplace.

5.6 Suggestion for Future Research

I. Research Methodology

Since this study has restricted to quantitative methodology used in data collection, therefore it is recommended that further research should be undertaken to adopt both quantitative and qualitative methodology for data collection to provide wider perspective to subsequent research. Next, it is advisable to carry out a structured interview because this is to ensure that the survey of the data become more meaningful, precise and robust.

II. Geographical Area

This study has been focused to get the responses from motorcyclists worker which is frequently commute to or return from workplace only. Thus, it is recommended

that the scope of the geographical area for future research can be widened. Indirectly, it gives a room for a higher tendency of result generalization.

III. Employer's Perspective

This research paper demonstrates the pain and suffer incurred by employees and their employers as a result of commuting accident to or return from workplace. They need to bring commuting accident to an irreducible minimum is therefore clear reinforced. The employers should well–understand that an employee and their family can be affected by an accident, to a far greater extent than was generally realized. Thus, they have to delegate the task accordingly and designed the workload with effectively and efficiently.

IV. Education and Society

The employee and employer must be correlated in terms of safety awareness especially in the commuting aspect. They have to abide the road safety rules especially those are riding the motorcycle in order to avoid from accident occur. The employer should provide training programs not for just motorcyclists but for all type of vehicles among the company workers.

5.7 Summary

This chapter was to explain the conclusion and recommendation of this study based on the findings, and provides an explanation to improve for the future research.

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Appendix A

SAMPLE QUESTIONNAIRE

UNIVERSITI UTARA MALAYSIA

Dear Respondents,

I am Master student that has enrolled for this program which is Master in Occupational Safety and Health Management (MOSH) of Universiti Utara Malaysia and conducting a survey among COMPANY XYZ employees which specifically within the service sector to fulfill the Master's requirement of the university.

I understand and recognize that your time is valuable and many demands are made upon it by your heavy workload. However, your participation in this survey, which will require only about 10–15 minutes of your time, is vital to the success of this study.

All the information provided in this questionnaire will be confidential for the present study purposes. No information pertaining to individuals will be divulged to any third person or organization. In sum, the information obtained in this study will be used purely for academic purposes only.

Thank you very much for your cooperation in responding to the questionnaire. Your participation in this study is greatly appreciated.

Best Regards,

Ungku Ismith Syafiq Bin Ungku Khalid
Master in Science of Occupational Safety and Health Management's Candidate

Section A: Demographic Information

Bahagian A: Maklumat Demografik

Please check (□) in the appropriate box or fill in the blank, where appropriate.
Sila tandakan (□) dalam kotak yang berkenaan.

1. Gender/ *Jantina*:

   □ Male/ *Lelaki* □ Female/ *Perempuan*

2. Marital status/ *Status Perkahwinan*:

   □Single/ *Bujang* □ Married/ *Berkahwin* □ Divorced/ *Janda atau Duda*

3. Highest educational level/ *Tahap pendidikan*:

   □ SPM □ STPM/ Certificate/ Diploma □ Bachelor Degree/ *Ijazah Sarjana Muda*
   □ Master Degree/ *Ijazah Sarjana* □ PhD Holder/ *Doktor Falsafah*
   (Others please specify/ *lain–lain, sila nyatakan*):_____

4. Race/ *Bangsa*:

   □Malay/ *Melayu* □ Chinese/ *Cina* □Indian/ *India* (Others, please specify/ *Lain–lain, sila nyatakan*): _____

5. Age/ *Umur*:_____ years/ *tahun*:

   □ 18–28 years/ *tahun* □ 29–39 years/ *tahun* □ 40–50 years/ *tahun* □ 51–60years/ *tahun*

6. How long have you been working with current company?/ *Berapa lamakah anda berkhidmat pada pekerjaan semasa anda?*

   □ Less than 2 years/ *Kurang daripada 2 tahun.*
   □ Between 2 to 5 years/ *Antara 2 sehingga 5 tahun.*
   □ Between 6 to 10 years/ *Antara 6 sehingga 10 tahun.*
   □ More than 10 years/ *lebih daripada 10 tahun.*

7. How long the distance that you have to travel to or return from workplace?/ *Berapakah jarak antara tempat kerja anda dari/ ke rumah anda?*

   □ Less than 10KM/ *Kurang daripada 5 tahun.*
   □ Between 10KM to 20KM/ *Antara 5KM sehingga 20KM.*
   □ Between 20KM to 30KM/ *Antara 20KM sehingga 30KM.*
   □ More than 30KM/ *Lebih daripada 30KM.*

SURVEY OF COMMUTING ACCIDENT TO OR RETURN FROM WORKPLACE/ *SOAL SELIDIK BERKENAAN KEMALANGAN PERJALANAN SEMASA PERGI DAN BALIK DARI TEMPAT KERJA*

Strongly Disagree/ Sangat Tidak Setuju	Disagree/ Tidak Setuju	Slightly Disagree/ Sedikit Tidak Setuju
1	2	3
Slightly Agree/ Sedikit Setuju	Agree/ Setuju	Strongly Agree/ Sangat Setuju
4	5	6

Instruction: As an employee which ride a motorcycle frequently to or return from your workplace, you have to think about your fatigue factors, job or work factors and environmental factors which can cause commuting accident to or return from workplace. To what extent you are agree or disagree whether each statement below based on your potential, situation, or experience? **Circle** your answer using the scale provided.

Arahan: *Sebagai pekerja yang sering menunggang motosikal ke atau balik dari tempat kerja, anda hendaklah memikirkan faktor keletihan, tugasan dan pekerjaan dan alam sekitar yang menyumbang pada berlakunya kemalangan semasa pergi dan balik dari tempat kerja. Sejauh manakah anda bersetuju atau tidak bersetuju pada kenyataan yang diberikan dalam jadual di bawah mengikut potensi, situasi atau pengalaman anda? Kemudian, bulatkan jawapan yang berkenaan mengikut skala yang yang telah diberikan.*

Section B: Fatigue Factors

Bahagian B: Faktor–Faktor Keletihan

1	I do appear to "suffer" from permanent tiredness, even on rest days and holidays, because I have the limitless energy. *Saya mengalami keletihan yang teruk walaupun semasa cuti rehat atau cuti umum disebabkan kekurangan tenaga.*	1	2	3	4	5	6
2	I have ever felt sleepy while I am driving to or return from workplace. *Saya akan berasa mengantuk semasa memandu pergi dan balik dari tempat kerja.*	1	2	3	4	5	6
3	I think my pressure at workplace can cause commuting accident. *Saya rasa tekanan di tempat kerja akan menyebabkan berlakunya kemalagan perjalanan.*	1	2	3	4	5	6
4	I continued to drive after noticing symptoms of sleepiness. *Saya akan meneruskan perjalanan jika terdapat simptom mengantuk atau kepenatan.*	1	2	3	4	5	6
5	My work–rest scheduling is keep changing frequently which may cause fatigue because I have to take sometime to adapt and adjust my working time. *Jadual rehat Saya sentiasa bertukar dari sesama ke semasa yang boleh menyebabkan keletihan kerana saya akan mengambil masa untuk menyesuaikan diri dan perubahan jadual kerja.*	1	2	3	4	5	6
6	My workload prompted me which I can consider as the factors of commuting accident. *Bebanan tugasan saya di tempat kerja boleh dijadikan sebagai faktor–faktor berlakunya kemalangan perjalanan.*	1	2	3	4	5	6
7	Stress at workplace can positively influence my focus when I do commute by motorcycle to or return from workplace. *Tekanan di tempat kerja boleh mempengaruhi tumpuan semasa berulang–alik ke tempat kerja.*	1	2	3	4	5	6
8	My perception towards commuting accident can be avoided if my workload will be improved and to be more reasonable. *Persepsi saya terhadap kemalangan perjalanan boleh diatasi jika bebanan tugasan saya dapat dibaiki dan lebih berpatutan.*	1	2	3	4	5	6
9	Work–rest scheduling which designated for me is realistic. *Jadual rehat yang dilakarkan untuk saya adalah realistik.*	1	2	3	4	5	6
10	I do feel my heavy workload can impact the quality of safety when I have to commute to or return from workplace. *Saya merasakan bebanan tugasan saya boleh memberi kesan terhadap kualiti keselamatan apabila saya berulang–alik dari tempat kerja.*	1	2	3	4	5	6

Section C: Job or Work Factors

Bahagian C: Faktor–Faktor Tugasan dan Pekerjaan

1	I think that short distance for travelling to or return from workplace can avoid accident will be happened. *Saya rasa jarak yang dekat untuk perjalanan pergi dan balik dari tempat kerja boleh mengelakkan daripada berlakunya kemalangan.*	1	2	3	4	5	6
2	I am sort of person who feels at my best early in the morning, and who tends to feel tired earlier than most people in the evening. *Saya adalah orang yang suka pada waktu pagi dan akan merasai kepenatan dengan kadar segera pada waktu petang berbanding dengan orang lain.*	1	2	3	4	5	6
3	I do still use the same route thoroughly when I have commuting to or return from workplace even though there are no safety precautions on the road for motorcyclist who is undertaking the journey. *Saya masih menggunakan arah perjalanan yang sama semasa saya pergi dan balik dari tempat kerja, walaupun tanpa mempunyai langkah–langkah keselamatan yang terdapat di atas jalan raya bagi penunggang motosikal.*	1	2	3	4	5	6
4	My employer considered advising to me that work irregular hours can cause the dangers of driving home to or return from workplace when I have excessively tired. *Apabila saya menghadapi keletihan yang berlebihan, majikan akan memberi nasihat kepada saya bahawa bekerja pada masa yang tidak tetap akan menyebabkan bahaya apabila memandu pulang ke rumah sama ada dari atau ke tempat kerja.*	1	2	3	4	5	6
5	I am the type of person who can get distraction to focus on road safety while I am driving for long distance. *Saya adalah orang yang mudah mendapat gangguan fokus di atas jalan raya apabila saya memandu pada jarak yang jauh.*	1	2	3	4	5	6
6	I do feel that overall the advantages of my shift system outweigh the disadvantages. *Saya merasakan sistem jadual kerja adalah lebih baik daripada keburukan.*	1	2	3	4	5	6
7	To what extent do you agree with the following statements about travelling to work by motorcycle can be more expose with the accident on the road compare by using other type of vehicles? *Sejauh manakah anda bersetuju pada kenyataan bahawa menunggang motosikal di tempat kerja boleh terjebak pada kemalangan jalan raya berbanding dengan menggunakan kenderaan yang lain.*	1	2	3	4	5	6
8	My health been affected by working shifts which may cause accident when I have to commute to or return from workplace. *Kesihatan saya terjejas dengan bekerja shift yang boleh menyebabkan kemalangan apabila berulang–alik ke atau dari tempat kerja.*	1	2	3	4	5	6
9	Are you agree that the motorcyclist will not be put at risk from commuting accident caused by driving excessive distances without appropriate breaks? *Adakah anda bersetuju bahawa penunggang motorsikal tidak akan berada dalam keadaan berisiko terhadap kemalangan perjalanan kerana memandu dalam jarak yang jauh tanpa rehat yang betul.*	1	2	3	4	5	6
10	I have been involved in a 'near hit' where I felt that my safety, or the safety of my colleagues or the public especially on the road, was at risk because of some aspect of shift work. *Saya terlibat dengan hampir berlakunya kemalangan dimana saya merasakan keselamatan diri saya atau keselamatan rakan sekerja saya atau orang awam terutamanya di atas jalan raya adalah berisiko disebabkan oleh sebahagian daripada aspek bekerja shift.*	1	2	3	4	5	6

Section D: Environmental Factors

Bahagian D: Faktor–Faktor Alam Sekitar

1	I do have considered that poor weather conditions, such as heavy rain or foggy, when I am planning the journerys. *Saya menitiberatkan aspek cuaca yang teruk dalam meracang perjalanan saya seperti hujan lebat atau kabus.*	1	2	3	4	5	6
2	Are you satisfied that sufficient time is allowed to complete journeys safely? *Adakah anda berpuas hati jika mempunyai masa yang mencukupi untuk pejalanan yang lengkap dan selamat?*	1	2	3	4	5	6
3	I have checked my motorcycle frequently in terms of properly equipped to operate in poor weather conditions, for example my tires are fitted on the slippery road. *Saya kerap memeriksa motosikal untuk memastikan berada dalam keadaan beroperasi yang baik dalam cuaca yang buruk contohnya tayar motosikal saya selamat ketika berada di atas jalan raya yang licin.*	1	2	3	4	5	6
4	I try to avoid periods of peak traffic flow. *Saya cuba untuk mengelakkan kesesakkan lalu lintas semasa tempoh yang sibuk.*	1	2	3	4	5	6
5	Are you agree if your journey times and routes can be adjusted to take account of poor weather conditions to avoid from accident occured? *Adakah anda bersetuju jika perjalanan dan masa anda boleh di ubah apabila berlakunya cuaca yang buruk untuk mengelakkan daripada berlakunya kemalangan?*	1	2	3	4	5	6
6	Do you feel pressured to complete journeys where wheather conditions are exceptionally difficult because the number of traffic congested is keep increasing at certain period of time? *Adakah anda mengalami tekanan bagi menlengkapi perjalanan semasa cuaca buruk yang tidak dapat dielakkan kerana kesesakkan trafik yang semakin meningkat dari semasa ke semasa?*	1	2	3	4	5	6
7	Commuting accident can be caused by bad weather if the driver does not understand, how to reduce risk such as should take extra care if driving in strong winds or heavy rains. *Kemalangan perjalanan boleh disebabkan oleh cuaca yang buruk jika pemandu tidak memahami untuk mengurangkan risiko seperti mengambil perhatian yang lebih jika memandu dalam keadaan angin kencang atau hujan lebat.*	1	2	3	4	5	6
8	Do you agree, when traffic is congested between your house to or return from your workplace can cause you to have an accident? *Adakah anda bersetuju, jika kesesakkan trafik antara rumah anda ke atau dari tempat kerja anda boleh menyebabkan kemalangan?*	1	2	3	4	5	6

9	I know who to contact if I have to cancel a journey to or return from workplace because of poor weather conditions. *Saya tahu untuk menghubungi pihak yang berkenaan jika saya ingin membatalkan perjalanan pergi atau balik dari tempat kerja semasa cuaca yang buruk.*	1	2	3	4	5	6
10	During the traffic congested, my route planning take account into safety consideration such as speed limit, minor road provided for motorcyclist, safety place where can stop during emergency like poor weather or other safety aspects on the road. *Semasa kesesakkan trafik, saya akan memastikan langkah–langkah keselamatan dalam perjalanan diambil kira seperti kelajuan had laju, jalan untuk penunggang motosikal, tempat selamat yang boleh berhenti semasa keadaan kecemasan contohnya cuaca yang buruk atau lain–lain aspek keselamatan di atas jalan raya.*	1	2	3	4	5	6

Section E: Commuting Accident To or Return from Workplace by Motorcyclist

Bahagian E: Kemalangan Perjalanan Pergi dan Balik dari Tempat Kerja bagi Penunggang Motosikal

1	Motorcyclists should travel in which of the following positions within a lane? *Penunggang motorsikal seharusnya menunggang mengikut posisi dalam garis lurus yang betul.*	1	2	3	4	5	6
2	Motorcycles are easy to spot, even against a cluttered background. *Penunggang motorsikal adalah senang untuk dilihat walaupun berlatarbelakang yang serabut atau tidak tersusun di atas jalan raya.*	1	2	3	4	5	6
3	The motorcycle test is easier than the driving test. *Ujian memandu motorsikal adalah lebih senang berbanding ujian memandu yang lain.*	1	2	3	4	5	6
4	When driving in interweaving traffic, I am aware that motorcycles are harder to spot. *Apabila memandu dalam keadaan trafik yang yang berhubung seperti kesesakkan trafik, keadaan laluan motorsikal adalah sukar bagi saya untuk melihat.*	1	2	3	4	5	6
5	The average motorcyclist takes greater precautions than the average driver in wet weather condition. *Secara purata, penunggang motorsikal adalah perlu untuk mengambil lebih terhadap langkah keselamatan berbanding purata bagi pemandu yang lain semasa berada dalam keadaan cuaca yang buruk.*	1	2	3	4	5	6
6	It is easier for motorcyclists to make sudden swerves to avoid an accident than car drivers. *Penunggang motorsikal adalah lebih mudah untuk membuat lencongan atau penukaran arah secara mendadak bagi mengelakkan kemalangan berbanding dengan pemandu kereta.*	1	2	3	4	5	6
7	Motorcycles are as easy to see at night as cars.	1	2	3	4	5	6

	Penunggang motorsikal adalah lebih mudah untuk dilihat pada waktu malam seperti pemandu kereta.						
8	You can suddenly be surprised by the appearance of a motorcycle coming from behind. *Kehadiran motorsikal dari arah belakang boleh menyebabkan anda terkejut secara tiba–tiba.*	1	2	3	4	5	6
9	I perform all appropriate visual checks on my motorcycles. *Saya memeriksa semua hal yang berkaitan dengan alat penglihatan pada motorsikal.*	1	2	3	4	5	6
10	Other drivers should take more car to look out for motorcycles. *Selain daripada penunggang motorsikal, mereka perlu memastikan penglihatan yang lebih terhadap laluan atau pergerakkan motorsikal.*	1	2	3	4	5	6

END OF QUESTIONNAIRE/ TAMAT SOAL SELIDIK
THANK YOU/ TERIMA KASIH