

An Examination of Strategies to Mitigate the Number of Motorcycle Rider Fatalities in Thailand

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Abstract: This paper attempts to examine and quantify the degree of safety-helmet use by motorcyclists and their passengers in Thailand. Specifically, the paper examines the phenomena in three separate locations within Thailand. The paper will also review the literature surrounding road safety in general, road safety for motorcyclists, proper helmet use, Thai acts of parliament aimed at motorcyclists, and the degree to which helmet use is enforced or policed in Thailand. Experts posit that road fatalities, and the serious debilitating injuries caused by road traffic accidents, can impact a nation's GDP by as much as 5%. Perhaps even more importantly, especially in the context of a developing country, is the direct impact to families who lose their prime bread-winner or wage-earner. This loss may either be permanent, as in the case of a fatality, or extended over a protracted period of time, where families find themselves having to care for severely injured members. In the latter case, the requirement for care is often long-term, with little in the way of insurance or medical benefits to offset the burden. It is hoped that a study of motorcycle related road traffic fatalities may identify or highlight interventions or strategies that could be employed to mitigate the road toll in Thailand.

Keywords: Thai Helmet Act 1994; Motorcyclists; Road Toll; Policing; Enforcement

JEL Classification: R41

1. Introduction

1.1 Background of the Research

26,000 people are killed on Thai roads every year and more than 70% of these deaths are motorcyclists or their passengers. The key causes for these fatalities are reported as speeding, drunk-driving, failure to wear seat-belts or, the failure to wear helmets. (Silapachai, 2013)

Are these horrific statistics the result of poor infrastructure? Are they reflective of a lack of effective policing? Are they a reflection of systemic corruption? Are they a result of driver education or the lack thereof? Are these figures more to do with Thai

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culture or developing country culture? Or, are they reflective of the relative increase in vehicle accessibility over the past couple of decades?

It is argued that the only way to create a sustainable change to the road traffic culture is to develop cross-ministry or department initiatives. “It [sic] requires strong political will and concerted, sustained efforts across a range of sectors”. (Jong-wook & Wolfensohn, 2004)

At the time of writing, Thailand is being ruled by a military junta with support of the army and the police force. Thailand’s ruling government is in a unique position where it can demand and enforce compliance to whatever government initiatives or acts of parliament it promulgates.

The Thai junta has demonstrated a strength of political will since the military coup of May 22nd 2014. In 2015, the royal household asked for a lifting of martial law, and the junta did so, but almost immediately, replaced it with Article 44. An independent Thai political analyst, Verapat Pariyawong said that, “Article 44 gives Prayuth the power to override any branch of government in the name of national security, and absolves him of any legal responsibility for his actions. Thai media have referred to it as “the dictator law.” (Doksone, Pett & Pitman, 2015) Zeid Raad al-Hussein, UN High Commissioner for Human Rights is reported as saying Article 44, “leaves the door wide open to serious violations of fundamental human rights” and “annihilates freedom of expression”. Khemthong Tonsakulrungruang of Bangkok’s Chulalongkorn University said: “Section 44 is actually worse (than martial law) as it allows Gen Prayut to execute key decisions without the oversight of a military court.” (AFP Reuters, 2015)

For the sake of this paper, it is assumed that the junta could, if it so desired, demand enforcement and compliance to any act or law. More specifically, the government could insist on immediate compliance if it were serious about lowering the existing road toll. This is central to the research, as an attempt is made to find a legal intervention such as a law or act already in place that could address motorcycle fatalities.

Thailand introduced The Helmet Act in 1994 making it compulsory for motorcyclists and passengers to wear helmets when operating a motorcycle, or riding pillion as a passenger. In the period immediately following the introduction of the Act, it was reported that helmet use among motorcyclists increased dramatically, while at the same time, serious head injuries suffered by traffic victims decreased by more than 40% and deaths attributable to traffic accidents decreased by 20%. (Ichikawa et al., 2003)

What happened to the reported increase in helmet use? Why is it that now, more than 20 years after the introduction of the Helmet Act, we are still witnessing a continuing

annual increase in road traffic fatalities and more relevant, that the percentage of motorcycle fatalities is also increasing?

Thailand does not have an exceptionally high Motor Vehicle to Person Ratio (MVPR) at 206:1000¹ and has in fact, a significantly lower ratio than some of its regional neighbours. Malaysia has an MVPR of 361:1000 and Australia has more than double this with a MVPR of 731:1000. Thailand does not have the longest road network², nor does it have the highest population density³. It does not have the highest or lowest GDP⁴. One thing that Thailand does have however, is the highest proportion of motorcycles globally with 87% of households owning a motorcycle. (Poushter, 2015)

Is the cause behind the second highest national road toll in the world due to the ratio of motorcycles to persons? Perhaps, however, there is no visible trend or pattern when looking at other countries with similar motorcycle ownership percentages. The country with the second highest percentage motorcycles is not itself, the second highest in road fatalities nor in specific motorcycle fatalities. In the initial formulation of this paper, driver education, codified road rules, road rule enforcement, acts of parliament that impact on road users, policing, infrastructure, culture, and the judiciary were considered. Consequently, motorcycle ownership is not the link. If Thailand is not anomalous in any of the other indicators above, what are the underlying contributory factors leading to Thailand being such a dangerous place to drive?

1.2. Statement of the Problem

In the initial formulation of this paper, driver education, codified road rules, road rule enforcement, acts of parliament that impact on road users, policing, infrastructure, culture, and the judiciary were all considered. Subsequent research uncovered some previous research showing unusually high percentages of motorcyclist failing to wear helmets. This then became the focus for the statement of the problem.

In 2009 over 4000 Thais were interviewed in a nationwide study. The findings were that only 60% of riders and 28% of passengers reported wearing a helmet consistently. Interviewees also reported wearing helmets more when they saw an up-beat in police activity and the majority of passengers reported that they were not

¹ https://en.wikipedia.org/wiki/List_of_countries_by_vehicles_per_capita.

² USA= 6.58 million km, China 4.24 million km, India 4.1 million km, Brazil 1.6 million km, Russia 1.28 million km, Japan 1.21 million km, Canada 1.04 million km (source, Road Traffic Technology).

³ Thailand ranks 84th in population density with 132 people per square kilometre, (source CIA World Fact Book).

⁴ Thailand ranks 27th out of 217 at Millions USD\$ 395,282. (source World Bank 2015).

even aware that wearing a helmet for passengers was compulsory. (Jiwattanakulpaisarn et al., 2013)

1.3. Purpose of the Study

It is hoped that a study into some of the factors contributing to the inordinately high number of road deaths and serious injuries each year will enable law makers, insurers, and other stakeholders to come together and form a committee or task force with the sole task of creating a multifaceted campaign. To do this, some exploratory questions were asked in order to explore the subject more deeply.

1.4. Initial Exploratory Questions

Is there any data available on the quality of driver education in Thailand?

How does the driver education process compare to other countries?

Do the road rules conform to international standards?

Is there any single aspect of road use that has the potential to mitigate the road death toll to any significant degree?

Are the road rules enforced consistently?

What is the level of policing in Thailand with regards to road traffic?

How does this policing compare to other neighbouring countries?

Are there infrastructure concerns contributing to the road toll?

Are there economic instruments that could be brought into play to mitigate the road toll?

Is there a cultural paradigm that needs to be addressed in regards to road usage?

Can the lessons learned from other countries be transferred to the Thai context?

Of these questions, the following question provided direction and focus for the subsequent research.

1.5. Research Question

Is there any single aspect of road use that has the potential to mitigate the road death toll to any significant degree?

1.6. Significance of the Study

It is widely reported that up to 5% of the Thai national death toll¹ every year is directly attributable to road traffic fatalities. The effect of this percentage directly

¹ This includes deaths through old age, insurgency acts, disease in fact all of the causes of deaths combined.

impacts on immediate and extended family members, communities, and villages; and indirectly, on the nation as a whole. If this study can identify individual strategies or sets of strategies that have the potential to mitigate these tragedies, then the significance of this paper cannot be stressed enough.

1.7. Definition of Terms

FARS	Fatality Analysis Reporting System (USA)
MVDL	Motor Vehicle Driver's License
NHTSA	National Highway Traffic Safety Administration's (USA)
RBT	Random Breath Testing
RTF	Road Traffic Fatalities
WARTA	Western Australian Road Traffic Authority (Aust)

1.8. Assumptions and Limitations

Assumptions include but are not limited to:

The participants will answer the interview questions in an honest and candid manner.

The inclusion criteria of the samples are appropriate and therefore, assure that the participants have all experienced the same or similar phenomenon of the study.

Participants have a sincere interest in participating in your research and do not any other motives, such as getting a better grade in a course if they are college students or impressing their job supervisor because they agreed to be in your study.

Limitations include but are not limited to:

There may be unknown conditions or factors at the facility where the participants reside, work, or study that could bias the responses of the participants.

If you are collecting data from the elderly, it is possible that some of their recollections of events, situations, and feelings could be questionable.

The number of participants or subjects is enough from which to adequately draw conclusions.

2. Literature Review

2.1 Introduction

“In 2013 the number of people killed in road accidents in Sweden was 264, a record low. Although the number of cars in use in the country and the number of miles driven have both doubled since 1970, the number of road deaths has fallen by four-fifths over the same period. Sweden’s roads have become the world’s safest, with only three of every 100,000 Swedes dying on the roads each year, compared with 5.5 per 100,000 across the European Union, 11.4 in America—and 40 in the Dominican Republic¹, which has the world's deadliest traffic. Other places such as New York City are now trying to copy its success. How has Sweden done it?”. (Economist Explains, 2014)

The article continues; making the observation that road deaths peaked in the 1970s, but since then, they have been on a continued decline. The article proposes that the underlying reason for this decline is the increase in safety features both in cars and in road planning/construction. (Charlton & Smith, 2003)

Traffic accidents are rarely the result of a single act, they are typically, the coming together of several acts, for example, in Bangkok it is not unusual to see cars and motorbikes travelling through amber and even red lights. Nor is it unusual to see people choosing to forgo wearing crash helmets and even, at times, carrying them under their arm to put on in the event of seeing a police road check!

Let us examine a typical daily scenario and break it down into its sub-parts or components.

A motorbike rider carrying two other people including an infant, is travelling at 30 kph. This speed is certainly not normally considered dangerous. They travel this way every afternoon and know the area. Of course, the inherent risk here is that one may become complacent when in familiar territory. The US vehicle sourcing company Car Quest quote an insurance company survey stating that 52% of all accidents occur within 5 miles from a person's home. Common neighborhood collisions include crashing into parked cars, backing out of a driveway and into someone driving by, and side-swiping a car to avoid pedestrians or other vehicles in the road.

Our hypothetical motorcycle family may know the roads, but does everyone else? Add in the fact that none of the riders are wearing helmets coupled with the unfortunate reality that car drivers may be not only exceeding the posted speed limit, but not following traffic signage. Put these together and we have the perfect environment for an additional three or more road fatalities.

¹ At the time of the report.

In Ireland, County Mayo officials examined a range of interventions and identified the most significant. They were education and training, enforcement and engineering.

“There is no doubt that the following activities have prevented the increase in accidents. There are three main approaches to preventing accidents:

Education and training of (a) children in school by road-traffic instructors and school teachers; and of (b) adolescents in the principles of safe driving and in good driving attitudes; by (c) refresher courses for older drivers to bring home safe-driving principles and to refresh their knowledge of traffic law; and by means of (d) newspaper, radio television, and other publicity, to draw the attention of all road users both to dangers and to safe practices on the road.

Enforcement by (a) adopting reasonable and enforceable traffic laws which, at the same time, are best designed to prevent accidents; (b) concentrating the time and energy of traffic officers on the offenses, locations, and times that feature frequently in accidents; and (c) thoroughly testing new drivers to ensure they will not be liable to cause accidents.

Engineering of vehicles and roads: Vehicle engineering, comprising (a) regular inspection for a “warrant of fitness” to ensure that the main components of the vehicle are safe; (b) improving the design of the vehicle to give ease of vision and control to the driver and so reduce the likelihood of injury in an accident; (c) fitting safety equipment, such as seat belts.” (Mayo, 2016)

It would seem that the first two interventions have specific applicability in the above hypothetical scenario. Education programmes tailored for motorcyclists could have created more awareness of personal safety and the associated parenting obligations resulting in our hypothetical family wearing helmets and suffering nothing more than some scrapes and bruises. Continuing this train of thought, education programmes for drivers could also have resulted in our hypothetical car driver obeying the road rules and driving appropriately for the area.

Hand in hand with education is enforcement. Enforcement, not necessarily on the day in question, but having a history of enforcement, in other words en-cultured traffic rules enforcement. The culture where drivers are concerned that they will get caught and fined if and when breaking road rules. The culture that rules need to be followed. This culture of enforcement could have resulted in the driver operating his or her vehicle in a safe manner and perhaps not even colliding with the motorbike in the first place.

It is only a hypothetical scenario but, one that is played out in real-life every day in Bangkok. The notion of education is compelling an attempt has been made to identify the educational and training requirements for a driver’s license around the world. The result of this research was that Thailand did not stand out as significantly

being any different from both other Asian countries as well as European countries, the US, the UK or Australia.

2.2. Findings (organized by Research Questions or Hypotheses)

Table 2.1. Compilation of MVDL Characteristics by Country.

Country	Minimum Age Motorbikes	Minimum Age Car	Compulsory Driving School	Probationary driver Period Yrs	Accompanied driving test	Theory Test	Practical Test	Eyesight Test
Germany	15	18	Y	2	4	Y	Y	Y
Finland	15	18		2	2	19	Y	Y
Singapore	18	18	Y	N/A	Y	Y	Y	Y
UK	16	17			Y	Y	Y	Y
South Africa	16	18	Y	2	Y	Y	Y	
Japan	16	18	Y	1	Y	Y	Y	Y
Thailand	15	18	N	1	N	Y	Y	Y
Australia	16	17	Y	3	Y	Y	Y	Y
USA NC	15	17	Y	1	Y	Y	Y	Y

In many developed countries, there are tiers or stages to obtaining an MDL. These stages typically require:

- a set number of hours driving under the supervision of an experienced driver;
- a prescribed number of driving lessons at an accredited driver school;
- a supervised practical exam;
- an eyesight test and;
- a theoretical exam.

Once the license has been granted, there are often:

probationary periods of up to 24 months. and,

During this period, the new driver has to:

display probationary driver plates when driving, as well as

Abide by a reduced maximum speed limit.

(Twisk & Stacey, 2007)

The Road Traffic Code Thailand is comprehensive and encompasses many situations a driver may find him or herself exposed to whilst driving. That being said, a cursory examination of the road rules from other countries in Asia would indicate that Thailand has many more road rules (over 160¹ specific road rules totaling 58 pages) than its Asian partners. It is believed that a typical driver would not be familiar with all of these rules, let alone the majority of them.

The rules, as they stand now, have a corresponding monetary fine however, there is no indication of the last time these fine amounts were reviewed in order to keep them relative to salaries and inflation. Further, the rules do not encompass some of the more recent changes to driver behavior for example, the use of phones and other devices while driving. Many studies have shown that driver performance is degraded when using cellular phones, in particular, being distracted while looking for the phone or during the act of dialing the phone. (Kauranen, Laakso & Summala, 1999) It is not only the physical act of operating the phone that degrades a driver's skills; other studies have looked at the degradation impact of the telephone conversation itself and found impaired performance when engaged in conversations that place heavy demands on the driver's attention. (Briem & Hedman, 1995) Contemporary driver behaviours such as these need to be acknowledged by the lawmakers and subsequently, given attention and thorough examination. Once completed, consideration must be given to evaluate any need for modifications to the Traffic Act and the associated penalties to address and deter the occurrence of infringements.

Inextricably linked to road rules and road usage are traffic control mechanisms. According to the US Fatality Analysis Reporting System (FARS), 86.3 percent of single vehicle accidents occur in areas where there are no traffic controls such as signage or traffic lights. Interestingly, the majority of accidents that occur where there are traffic signs, occur at stop signs, or stop lights in light traffic conditions. (Guarino et al., 2010) Why do accidents occur at stop signs or stop lights in lighter than usual traffic? Perhaps it is the fact that the driver assumes there is a lowered risk and decides to drive against the sign. Why do people drive while intoxicated? Perhaps it is the assumption of a low risk of getting caught by patrolling police. The FARS report went on to observe that the majority of all accidents occur where there were are traffic lights or signage. Perhaps then, it is not the road rules per se that are contributing to the problem. Perhaps it is instead, the enforcement or policing of these rules.

Interestingly, there are times when driver behaviours have been successfully changed. In the USA, Mrs Candy Lightner founded MADD, Mothers against Drunk Driving four days after her daughter was killed by a drunk driver. The rationale

¹ Thai Government Publication found at [http://www.krisdika.go.th/wps/wcm/connect/bf71ba004ba0f3aa96529e8b4221fda7/Road_Traffic_Act_BE_2522_\(1979\).pdf?MOD=AJPERES&CACHEID=bf71ba004ba0f3aa96529e8b4221fda7](http://www.krisdika.go.th/wps/wcm/connect/bf71ba004ba0f3aa96529e8b4221fda7/Road_Traffic_Act_BE_2522_(1979).pdf?MOD=AJPERES&CACHEID=bf71ba004ba0f3aa96529e8b4221fda7).

behind MADD was to change the drunk driving attitudes of the public, and more specifically, the management and treatment of convicted drunk drivers by the police and the judiciary, through new legislation dealing with the drunk driver. (Amodei, 1982) MADD is generally credited as one of the more significant change agent in several areas. Firstly, MADD has changed public perceptions towards drunk driving; MADD has been instrumental in promoting and achieving increased severity of fines, punishments and imprisonment of convicted drunk drivers. Added to this, MADD has been transformational in lowering police tolerance of drunk drivers. (Fell & Voas, 2006)

A drunk driver being convicted today in the USA faces significant consequences such as license revocation, heavy monetary fines, increased insurance premiums, and the possible confiscation of vehicles. Getting the drunk driver to court rests solely on the work of police. It is up to police to patrol the roads, stop suspected drunk drivers, test for inebriation and then, if found to be over whatever state or county limit, take the offender into custody.

It is argued that the vital link in this equation of getting the offender to court lies solely with the police office on the scene. This then begs the question of policing and enforcement in Thailand.

Whilst the following scenario is purely a subjective observation of a very real experience, it does reflect some of the public held sentiments that exist today in Thailand vis-a-vis police corruption. On having been stopped by police in Bangkok and when discussing the real or imagined road traffic rule violation, it was asked how much would it cost to settle this immediately. The response was 200 baht (approximately US\$6.70), which the policeman took without any receipt being offered. Admittedly, this was only one case and it is not necessarily representative of the police force as a whole, but it does show less than professional behaviour and expectations.

How are the police viewed in Thailand? Is the above experience an anomaly; is it unrealistic? What are the main areas of corruption if any?

The main aspects of police corruption are seen as embezzling government funds, coercing bribes from the public, and accepting protection money from illegal business operators. "While the Royal Thai Police have a very large structure, its officers receive very low salaries. Moreover, unfair appointments and transfers exist at all levels due to interference and intervention from political officials. Due to the aforementioned problems, some police officers are inclined to buy a position, which in turn induces them to extract bribes and protection money. Most importantly, many police officers state that low salaries compels them to commit dishonest acts." (Trimek, 2014)

In the UNICEF publication *Everyday Fears* (UNICEF 2008), a study of more than 700 Thai respondents found that only 32% respected the police. It is believed that any policy changes regarding police and policing needs to take public perception of police into account if the resultant policy is going to enjoy any longevity. Public perception needs to shift and whilst it is not the subject of this paper, it is worthy of future research.

Police the world over have local knowledge about the trends or habits of the communities in their jurisdictions. This intimate knowledge is what allows them to set up effective road blocks and police check stations. Thai police are not necessarily any different to their global counterparts. Thai police do set up regular road blocks however these seem to be aimed more at drivers from up-country. Both heavy trucks and motor cycles are regularly checked, partly on the basis that different vehicle types are involved in different types of accidents with different levels of severity. (Anderson & Hernandez, 2017)

In the case of motorcyclists, the police checks happen towards the end of the month and are aimed at revenue collection from motorcyclists who are not wearing helmets. However, these checks are not done on a regular basis and at times outside these checks, the police seem to be oblivious to helmet infringements. When one considers that non-helmeted riders are considered by many to be 2.5 times more likely to be killed and 3.5 times more likely to suffer serious injury in the event of an accident this ad-hoc approach has no justification. (Quellet, 2006)

Another frightening observation was made that festive periods and long-weekends result in inordinately high road accidents throughout Thailand. (Choiejit & Teungfung) The long weekend road tolls are reported in the newspapers and yet, there still does not seem to be a concerted effort to deal with this in any systematic way. There is not a greater police presence on the roads nor are there media campaigns on the television. It does not seem to be in the forefront of policy makers consciousness or seen as a priority. “We have an insurgency crisis in the south. Every day, a bomb or a shooting [with] one or two people dead. Big headlines in the newspapers the next day. But at the same time we are having 70 people dead each day on our streets — and nobody is saying anything,” says Tairjing Siriphanich, a Bangkok road-safety activist.” (Hundley, 2015)

2.3. Conclusion

It appears that the underlying reasons for the 26,000 plus deaths every year on Thai roads, and more than 120,000 serious injuries, need to be tackled on several fronts. Further, it is believed that any intervention needs to be implemented in a top-down fashion where policy makers, and the government as a whole, acknowledge that 150,000 victims of road accidents annually is a major crisis and then proceed to treat it as such. To do this, there needs to be significant policy development and policy

implementation. Policies need to be developed in concert, not in isolation, so that a sustainable solution can be offered to mitigate the carnage on Thai roads.

3. Methodology

3.1. Introduction

The situation has been identified: The annual road toll on Thai roads is a major concern and accounts for more than 5% of all deaths in the Kingdom. Past trends show a steady increase in fatalities and injuries, in particular, the deaths and injuries of motorcyclists. A total of 1446 motorcyclists and 1105 passengers were observed over a period of three days. 943 motorcyclists and 450 passengers were observed at the intersection of Pracha Utit and Mengjai in Bangkok (Bangkok 1). Following this, 659 motorcyclists and 226 passengers were observed at the Pradit Manuthan/Rama 9 intersection, (Bangkok 2). Another observation was carried out in a rural setting. In this survey, 189 motorcyclists and 84 passengers were observed at the Mittraphap Rd/Testsaban 19 intersection. Bangkok 1 intersection does not have a police presence. Bangkok 2 and Pak Chong intersections have a police booth that is manned during daylight hours. Both surveys were conducted during the operating hours of the police.

Table 4.2. Survey Results

	Wearing Helmets	No Helmets	Totals	% No Helmets
Bangkok 1				
Motorcyclists	816	127	943	13.4
Passengers	23	427	450	94.8
Bangkok 2				
Motorcyclists	524	135	659	20.4
Passengers	32	194	226	85.8
Pak Chong				
Motorcyclists	35	154	189	81.4
Passengers	16	68	84	85.0
Totals	1446	1105	2551	

4. Research Findings

4.1. Introduction

The survey was conducted as a simple observational data collection. These were done during daylight hours as indicated below:

Bangkok 1. Wednesday November 30th, 2016 No police presence

Bangkok 2. Friday, December 2nd, 2016 Police Traffic Office/Cameras

Pak Chong Saturday December 3rd, 2016 Police Booth

The Helmet Act is not open to interpretation, it states categorically that all riders and passengers of motorcycles must wear protective headgear. This study did not evaluate the quality of the helmets being worn, nor did it quantify the number of people wearing their helmets correctly, for example, having the strap fastened, the helmet resting in the proper position on the head and the helmet itself being in serviceable condition. It simply measured the number of people wearing their helmets while operating a motorcycle or being a passenger.

4.2. Conclusions

Looking at riders and their passengers as a group it was found that 57% were wearing helmets. In Bangkok, the majority of riders (83.7%) wore helmets while in Pak Chong only 18.6% wore helmets. In Bangkok, only 8.2% of passengers wore helmets while in Pak Chong, 15% of passengers chose to wear helmets.

Considering helmet wear is a law, it was interesting to see the lack of police interest and or intervention. At the Bangkok intersection the police remained in the police office for the entire duration. In Pak Chong, the police officer at the intersection spent the majority of the time directing traffic but not intervening with helmet wear infringements..

An immediate enforcement of compulsory helmet use could have instant effects on the road toll, especially with low speed accidents where head injury is still a risk, but other body trauma is less so. Helmet use has been mandatory for two decades. However, it is obvious from the surveys, that Thai motorcyclists and passengers do not see helmet use as a mandatory obligation.

5. Suggestions for Future Research

5.1. Introduction

Countries around the world recognize the tragedy of our road tolls and are working with governmental, not for profits, the private sector and international bodies to try

and identify, implement and measure interventions to mitigate road traffic injuries and fatalities.

5.2. Suggestions for Future Research

There was not enough manpower to survey whether or not the riders and passengers were actually wearing their helmets correctly positioned on their heads and fastened appropriately. This may seem a forgone conclusion however, a study in 2011 ascertained that not fastening or wearing helmets in the prescribed manner considerably mitigates their overall effectiveness. (Yu et al., 2011) Whilst it was not quantified, there were numbers of people observed who had the helmet resting on their heads and in some cases, it was possible to see the strap hanging loose. Part of any education campaign needs to be addressing proper use of safety equipment.

In Thailand it is compulsory for passengers and drivers of cars in the front seats to be wearing seat-belts; it is not compulsory for passengers in the rear seats. It is suggested that a similar survey to the one in this paper, simply tallying the number of people wearing seat-belts would show that it is not 100% as is dictated under law.

If this prediction was in fact correct, then a third stage of research could be looking at ways to implement a national campaign addressing both education and enforcement of helmet and seat-belt use among the relevant populations.

5.3. Contribution to Knowledge

The underlying methodology employed in this paper, a simple observational survey, is not new, nor is it cutting edge. What it did show however, is a clear gap between the intention of the Helmet Act and the percentage of motorcycle users adhering to it. Instead of looking at the absolute percentages of compliance, future research should be conducted with more depth and breadth. The survey sample needs to be increased and rather than a purely observational tallying, the survey needs to include interview questions where motorcycle users are able to articulate their rationale for their compliance or non-compliance to the Helmet Act. Coupled with this, police officers on traffic duty should be interviewed to try and determine the underlying reasons for the inconsistent enforcement of the Helmet Act. Future research also needs to take into account the relationship between country town policemen and the rest of the community to see if this has an impact on enforcement. It is also necessary to consider the issue of time as well as space, since temporal instability in accident risk has emerged as an important research theme. (Mannering, 2018)

5.4. Conclusion

Some 1.25 million people die each year as a result of road traffic crashes, according to the WHO's Global status report on road safety 2015. "Road traffic fatalities take an unacceptable toll – particularly on poor people in poor countries," says Dr Margaret Chan, Director-General of WHO. It is interesting to note that the global

trend has two distinct phenomena. There has been a decrease in road fatalities in 79 countries, however, 68¹ countries have seen an increase. Countries that have had the most success in reducing the number of road traffic deaths have achieved this by improving legislation, enforcement, and making roads and vehicles safer. (Chan, 2015) Traffic accidents have become a significant cause of death in Thailand. Governments have introduced road safety programs to reduce the number of deaths and injuries from road traffic accidents and while these may result in short-term changes, they have not proved to be sustainable long-term remedies, not least because of the complexity of all transportation types and purposes. (e.g. Lim, Zhang & Qin, 2016) It would appear that some of the underlying reasons these programmes fail are the absence of systemic and consistent law enforcement, a lack of coordinated effort by stakeholders and a lack of strategic commitment for long-term solutions.

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¹ Thailand is one of these countries experiencing a rise in road traffic fatalities.

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