

Bus Safety Situation in Thailand: Bus Driver Experiences and Attitudes

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1 Introduction

The World Health Organisation (WHO) estimates that road traffic accidents represent the third leading cause of 'death and disease' worldwide (Zheng, 2007). Every year, around 13,000 people are killed on Thailand's roads. In the year 2006, there were 12,693 fatalities and 17,852 serious injuries (Police Department, 2007). In this paper, all statistics involved accidents are mainly extracted from the report and database of the Police Department of Thailand. From estimation made by Prince Songkla University (Department of Highways, 2007), it was found that road accident costs the nation annually around 200,000 million baht (about 7000 million Australian dollar). Table 1 show that in the past 10 years (from 1996 to 2006) fatalities from road accidents have been steady while road accident numbers and injuries have climbed every year. The police only collect and report data where they become a legal case. The actual number of road casualties is close to 1 million (Department of Highways, 2007).

Table 1 Numbers of accident, fatalities, injuries, and damages in Thailand during 1996 to 2006 (Source:(Police Department, 2007))

Year	No. Accident	Fatalities	Major Injuries	Minor Injuries	Total Injuries	Damages (Million Bath)
1996	88,556	14,405	12,638	37,406	50,044	1,562
1997	82,336	13,836	11,910	36,801	48,711	1,572
1998	73,725	12,234	15,011	37,527	52,538	1,379
1999	67,800	12,040	12,054	35,716	47,770	1,346
2000	73,737	11,988	12,502	40,609	53,111	1,242
2001	77,616	11,652	12,034	41,926	53,960	1,241
2002	91,623	13,116	16,806	52,507	69,313	1,495
2003	107,565	14,012	17,066	62,626	79,692	1,751
2004	124,530	13,766	18,207	75,957	94,164	1,623
2005	122,040	12,858	19,111	75,253	94,364	3,238
2006	110,686	12,693	17,852	65,438	83,290	3,644

Data on bus accidents in Thailand can be obtained from several sources such as The Police Department, Highways Department, the Bus Transport Company, and the Land Transport Department. From past statistics, it was found that bus accident statistics in Thailand from those sources are not consistent in terms of both accident and casualty rates numbers. In this paper, accident database from Police Department is mainly used for presentation and analysis. It was found that in the past seven year from 1999 to 2006; about 3000-4000 buses were involved in accidents every year. The number of bus accidents have been relatively steady at 3343 in 1999 and 3,385 in 2006. Around three fifth of bus accidents occur in Bangkok with the rests in major provinces of Thailand. Figure 1 shows bus accident number in different areas of Thailand during 1986 to 2006. Moreover, analyses of bus crash data on the highway network under the jurisdiction of the Highway Department of Highways show that on average, one bus accident results in 0.42 fatalities, 0.90 severe injuries, and 2.69

minor injuries (Remark: these statistics are based on only bus accidents that occurred on DOH's highways and do not include bus accidents on other road networks). Using these average figures, it was found that bus accidents costs around 7 to 8 billion baht every year and the estimated cost from one bus accident is 2 million baht.

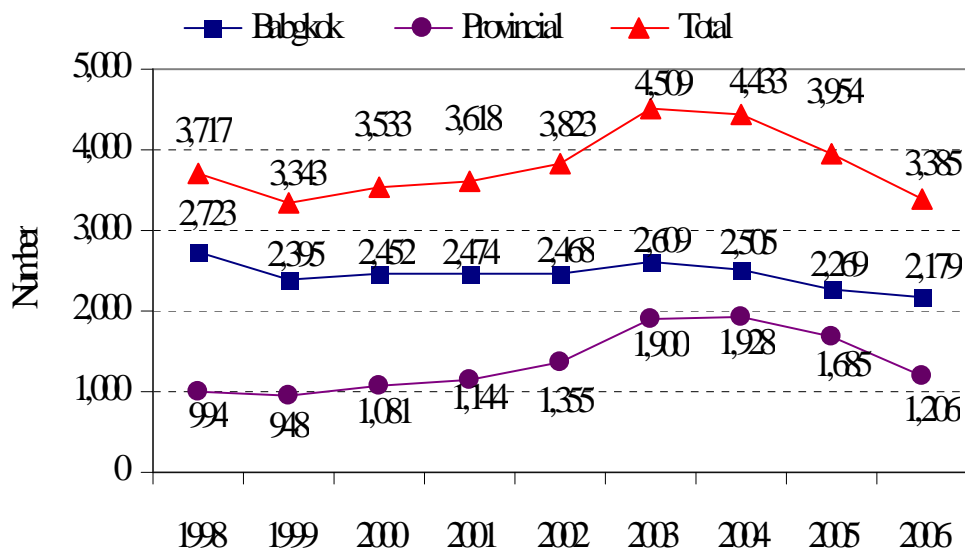


Figure 1 Numbers of bus accidents in different areas of Thailand during 1996 to 2006 (Source:(Police Department, 2007))

Therefore road safety, especially bus safety ought to be considered as one of important issues for Thailand. Bus driver, bus passenger, bus operator, and government agency are four stakeholders involved in bus safety and they likely perceive factors affecting bus safety in different way. This is because of different experiences, attitudes, and differently involved function in the use of bus. (Chang and Yeh, 2005) explored the factors affecting the safety performance of bus companies in Taiwan. The safety performance of individual bus companies is determined by both environmental and organizational factors. Three environmental variables and five organizational variables were incorporated into the model to estimate individual bus company safety performance. Deregulation for a bus company in Taiwan therefore is carried out with safety concern for the entire system. Moreover (Vanlaar and Yannis, 2006) developed a theoretical two-dimensional on prevalence and risk in road accident of 23 countries in Europe in order to understand drivers' perceptions of road accident causes. The objective of this study was to validate the model empirically to answer three questions: How do European drivers perceive the importance of several causes of road accidents; Are there important differences in perceptions between member states; and Do these perceptions reflect the real significance of road accident causes. Risk perception of road users is determined by giving more access to accident information (Zheng, 2007). Members of the general public are enabled to view accident data as they plan their routes, a tool was developed to determine whether information provided by such an application will have any impact on individual risk perception. Both tabular and visualised accident data are incorporated in the tool. An interactive system was designed to enable users to navigate a GIS to browse detailed information about those accidents that occurred in their neighbourhood. The results proved problematic because some participants felt that they were at greater 'risk' after access the online information, while other seems to show a reduction in their perceived risk.

This study examines experiences and perceptions of bus drivers in bus safety situation in Thailand. Questionnaires are used in the face-to-face interviews with bus drivers. Details of the questionnaires and samples used for the interviews will be described in the next section.

2 Questionnaires and samples

Details of the questionnaires and samples used for the busdriver surveys are given in this section. Four groups of stakeholders are involved in issues relating to bus safety, they are : bus driver, passenger, operator, and government agency. This paper focuses on examination of experiences and attitude of bus drivers by using questionnaires in face-to-face interviews. Questionnaires for both parties comprise close-end and open-end questions. For bus driver interview, there are three parts in the questionnaire i.e. personal information, driving information, and factors affecting bus safety. The sample size for bus driver interview, taking into consideration of the number of bus crashes and route category is set at 610. The questionnaires were distributed to four study areas i.e. Bangkok metropolitan, North Region, Northeast Region, and South Region as shown in Figure 2. Moreover, four bus route categories are selected for both surveys to differentiate among the route types as follows:

- Route Type 1: Within Bangkok Metropolitan
- Route Type 2: Between Bangkok and Province
- Route Type 3: Between Province and Province
- Route Type 4: Within Province



Figure 2: Map of Thailand showing various regions

The numbers of questionnaires for bus driver survey are obtained by considering the distribution of bus accidents as shown in Table 2 as reported by Police Department as well as the route type for each area. During the years 2003 to 2005, it was found that nearly 60 % of accident in Thailand occurred in Bangkok with the remaining of some 40 % in regional area. The sample sizes of questionnaires are shown in Table 3. For the drivers interview, the sample of convenience was followed. This next section describes preliminary results of the survey of bus drivers in all four regions of Thailand.

Table 2: Distribution of number and per cent of bus accidents between Bangkok and regional areas

Year	Bangkok (No. buses)	Bangkok (%)	Regional (No. buses)	Regional (%)	Total (No. buses)
2003	2609	58	1900	42	4509
2004	2505	57	1928	43	4433

2005	2269	57	1685	43	3954
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Table 3: Number of samples of bus driver questionnaire assigned to the four study areas

	Bangkok Metropolitan	North Region	Northeast Region	South Region
Busdriver	310	100	100	100
Route type 1	100	-		
Route type 2	150	40	40	40
Route type 3	-	30	30	30
Route type 4	60	30	30	30

3 Preliminary results: bus drivers

At this point of the study, only bus driver surveys are reported, the passenger surveys will be reported in the future.

3.1 Bus driver background information

From the interview of 610 bus drivers, 99 % of whom were male, and were aged between 23 and 65, almost 90 % of them earn between 5000 to 15000 baht per month and only 3% earn more than 20000 baht per month. The income details of bus drivers are shown in Figure 3. Education level of 96 % of the bus drivers is at high school or lower. Driving experiences of bus drivers are scattered in a normal shape with the highest ratios represented in two ranges i.e. between 6 to 10 years and 11 to 20 years of driving experience as shown in Figure 4.

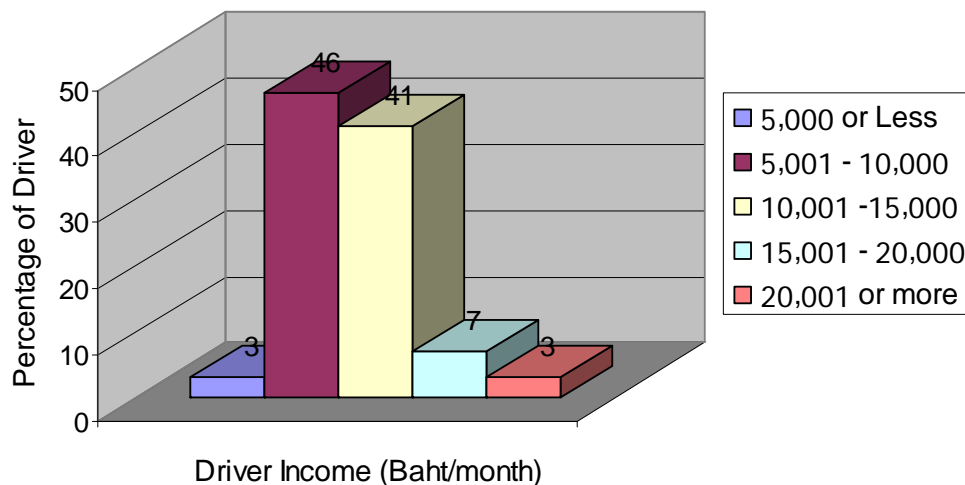


Figure 3: Distribution of Income of drivers

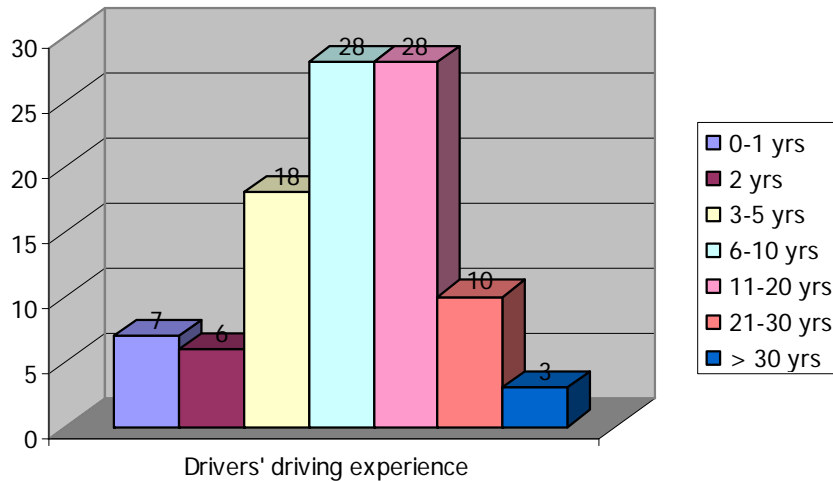


Figure 4: Distribution of bus driving experience shown as ranges of years

3.2 Bus drivers' driving information

Almost 80% of bus drivers learn to drive a bus by themselves including those who used to work as "bus boy" before becoming a bus driver, they get opportunities to learn to drive by taking a bus for a wash or to parking lot. All bus drivers attend driving training organised by either the Land Transport Department or the bus operators. In general, it is compulsory for every bus driver to participate the 2-day training course in driving and other related rules and regulations before renew their licences. On health check, two third of bus drivers regularly check their health at least once a year while around 30 % of them do not have plan for annual health check. Over 80 % of bus driver do not report health problem this is for both self-aware and unaware health problems. The survey results also indicate that over 80 % of drivers have shown no sign of any sickness and have not been admitted to hospital. Ninety per cent of bus drivers report normal eye condition. Moreover, Driving- and Sleeping-period of driver is one of the important factors affecting the occurrence of a bus accident. The survey shows that long driving could have an effect on driver's capacity because of either the stressful condition or tiredness. In general, two third of bus drivers drive continually less than 4 hours while around 5 percent of them drive in relative long period i.e. more than 7 hours, as shown in Figure 5. These long-driving drivers could therefore cause accident on the road system.

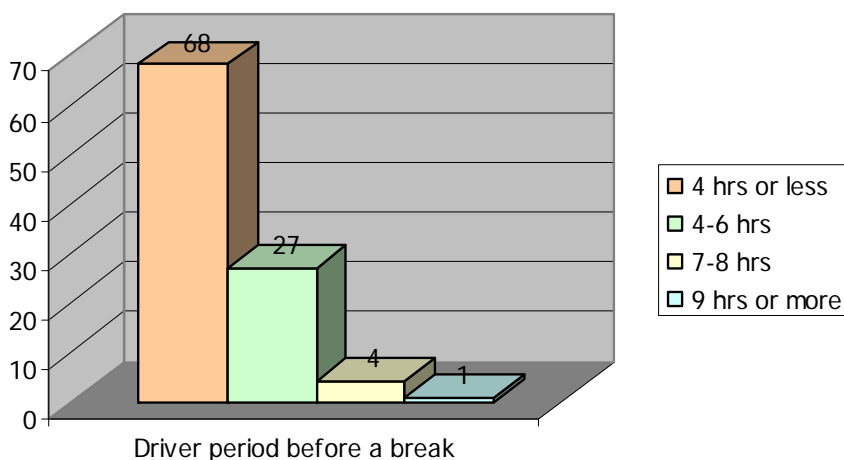


Figure 5: Driving period before a break

3.3 Bus driver experiences and opinions

Regarding accident experiences of bus drivers in Thailand, it was found from the interview that more than 70 % of drivers had not faced any bus accident during their driving career. The minority of drivers had only one accident however, 4 % of them had experiences of accident more than 3 times as shown in Figure 6. The latter shows that drivers having potential for driving problem are still working in the country's bus system.

Among the three contributing factors involved in bus accident i.e. human, vehicle, and road, the interview results show that 85% of bus drivers are of the same opinion that human errors being a major factor causing an accident, followed by vehicle defects and the defective road components. Giving the choices, human errors and vehicle defects were selected as the two factors often associated with bus accidents, and represent 85 % of the causes of bus crashes (see Figure 7). This implies that the bus drivers themselves have admitted to playing a major part in bus accidents in Thailand.

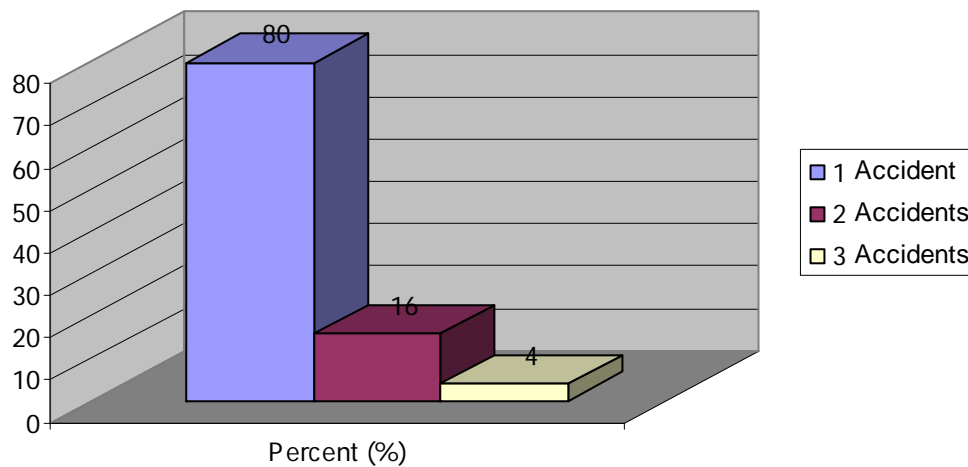


Figure 6: Number of bus accidents experienced by bus drivers

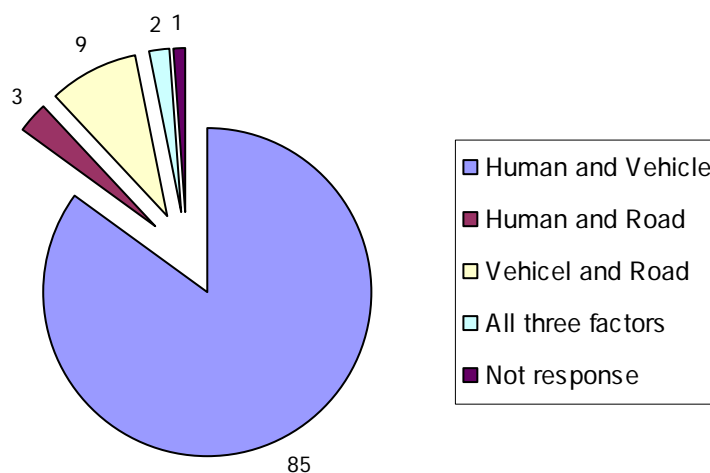


Figure 7: Accident contributing factors according to Bus drivers' opinions

Around 92 % of bus drivers agree that accidents can be prevented by for example, paying full attention to driving and obeying the road rules. Figure 8 presents 6 highest percentages

of accident contributing causes including speeding, abrupt-cutting in, drink drive, sleepiness, faulty vehicle, and defective road. The survey results indicate that bus drivers perceive the drink drive as the most important cause of bus crashes, however, speeding and abrupt-cutting in are another two causes with high percentages compared to other causes. Therefore, these three contributing factors should be given special attention in the effort to reduce bus accident numbers as well as severity in Thailand.

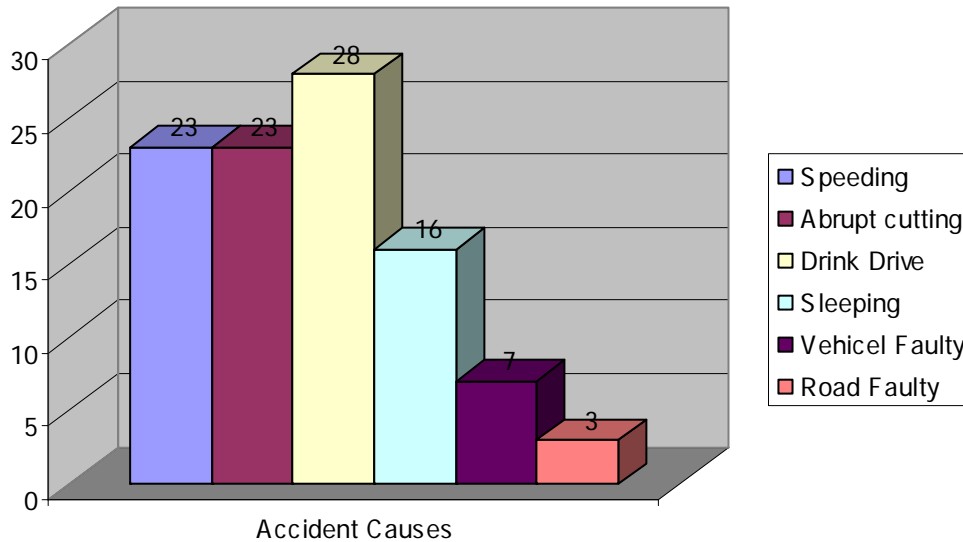


Figure 8: Accident contributing factors according to bus driver opinions

4 Discussion of results

The study aims to identify the characteristics of bus accidents in Thailand. Questionnaire surveys for whole region of the country were carried out. The bus driver plays a key role in the safety condition of the service. Various stakeholders have different perspective of bus safety thus views are important to take into consideration. The findings based on this analysis indicate that not only the socioeconomic background of the bus drivers which demonstrate their social view, but their attitude also confirm the real situation of the safety awareness among the bus drivers. The results also show that the socioeconomic factors also influence the decision to acquire the bus driving occupation. Bus driving is not only the career that is popular among male group, the majority of whom are aggressive (Donovan, et al. 2005) but also most of drivers are likely to work until after their retirement age. It was found that there are some drivers who are older than 60 years. The increase in age may diminish their driving performance due to deteriorating physical conditions. However, most of them are able to earn about double the average income in Thailand, and that may be one dominating reason for them not to leave the profession even after reaching the retirement age of 60. Another point to take into consideration is that some drivers acquire their position thru their learning to drive while working as an assistant on a bus rather than from a formal training or driving education. In addition, it also came across that for those drivers (5 per cent).who want to earn more, their driving duration are longer than the legal allowance.

5 Conclusions and recommendations

The uniqueness of this study approach is in the integration of the assessment of drivers' viewpoint. Based on the findings, bus drivers' characteristics and the traditional means to obtain the drivers' position play an important role in dictating their attitude in providing the

service. In integrating these useful findings, despite the diversity of group of users with dissimilar level of satisfaction of the bus service, the key element is safety awareness that should be kept in mind for both groups, especially, for the bus drivers who are deficient in safety mindedness. This might be due to the ineffective existing safety program in terms of regulation and incentive. The results of the study point out that some bus drivers not only have unsafe manners of driving, but they also drive without realizing the safety contribution they should provide. An example of precarious situations can be viewed from the fact that some of them have no idea about their physical health conditions. Some drivers reported diseases (such as diabetes, heart disease, asthma, etc.) who would be prohibited from driving according to foreign country medical standard (eg. Australia).

The findings from this study give better understanding of the safety problems of bus service in this country. One way of dealing with the problems is by means of deregulation of bus service in terms of bus driver licensing, bus operator licensing, and safety education program for bus passengers. Furthermore, in terms of punishment for both drivers and operators who are found to be the cause of the accident, higher penalty should be considered. Finally, the study highlights the bus safety issue that should help concerned authorities and policymakers to introduce suitable safety measures a proactive accident prevention program. These measures will not only enhance the quality of life of people in terms of safety and equity, but also help in reducing the economic loss due to bus accidents

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