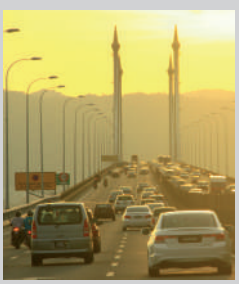
MRR No. 373



Research Report

Road Traffic Injury Prevention Study (R-TRIPS)

Road Traffic Statistical Report for the period ofApril 2010 to March 2011

Hizal Hanis Hashim
Rohayu Sarani
Nur Fazzillah Mohamed Noordin

MIROS
MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH
ASEAN ROAD SAFETY CENTRE

Road Traffic Injury Prevention Study (R-TRIPS)

Road Traffic Statistical Report for the period of April 2010 to March 2011

Hizal Hanis Hashim
Rohayu Sarani
Nur Fazzillah Mohamed Noordin

MIROS
MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH
ASEAN ROAD SAFETY CENTRE

Published by:
Malaysian Institute of Road Safety Research (MIROS)
Lot 125-135, Jalan TKS 1, Taman Kajang Sentral,
43000 Kajang, Selangor Darul Ehsan, Malaysia.

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Hizal Hanis Hashim
Road Traffic Injury Prevention Study (R-TRIPS): Road Traffic Statistical Report for the period of April 2010 to March 2011 / Hizal Hanis Hashim, Rohayu Sarani, Nur Fazzillah Mohamed Noordin.
(Research Report; MRR No. 373)
ISBN 978-967-2988-06-9
1. Traffic safety--Malaysia.
2. Traffic safety--Statistics.
3. Crash injuries--Prevention.
4. Accidents--Prevention.
5. Government publications--Malaysia.
I. Rohayu Sarani. II. Nur Fazzillah Mohamed Noordin.
III. Title. IV. Series.
363.1256509595

Printed by:
VISUAL PRINT SDN BHD (186281-A)
No. 47, 47-1, Jalan Damai Raya 1,
Alam Damai, 56000 Cheras,
Kuala Lumpur.

Typeface: Calibri
Size: 11 pt

Contents

		Page
List of Table		iv
List of Figures		v
Acknowledgements		vii
List of Participating Hospitals		ix
About Road Traffic Injury Prevention Study (R-TRIPS)		xi
1.	Introduction	1
2.	Methodology	3
2.1	Statistical Analysis	4
3.	Results	5
3.1	Road Traffic Injury Victims by Hospital	5
3.2	Road Traffic Injury Victims for Emergency Department by Hospital	6
4.	Result and Discussions	7
4.1	Sample Population	7
4.2	SHE COP Elements	7
4.3	Facilities and Services	8
4.4	Driving Behaviour and Practices	12
4.5	Pre-departure Inspections	18
5.	Conclusion and Recommendations	20
References		22

List of Table

Page

Table 1 Number of road traffic injury victims by hospital 5

List of Figures

		Page
Figure 1	Number of road traffic injury victims by hospital	5
Figure 2	Observation on selected SHE elements	8
Figure 3	Observations of bus facilities and services	9
Figure 4	Seatbelt availability in the buses	10
Figure 5	Availability of fire extinguisher on buses	10
Figure 6	Display of emergency numbers in buses	11
Figure 7	Display of customer service number in buses	11
Figure 8	Inappropriate driving behaviours (IDB)	12
Figure 9	Perception of high-speed driving	13
Figure 10	Average speed of buses	13
Figure 11	Maximum speed measured using GPS and the mean value	14
Figure 12	Maximum speed measured using GPS and the mean value	15
Figure 13	Average speed during day time	16
Figure 14	Average speed during night time	17
Figure 15	Percentage of drivers wearing a uniform	17
Figure 16	Percentage of observed JPJ activities	18
Figure 17	Observation on JPJ availability at each terminal	19

Acknowledgements

The Road Traffic Injury Prevention Study (R-TRIPS) group would like to thank all those who have participated and contributed to the first R-TRIPS report, from April 2010 to March 2011.

We want to extend our special thanks to the following parties:

1. All hospital coordinators, doctors, medical assistants and staff nurses from the Emergency Department and Forensic Department of the participating hospitals; their commitment and timely data collection and submission helped to smooth the progress of the project,
2. The Clinical Research Centre (CRC) for its continuous support and guidance,
3. The Ministry of Health, Malaysia for the support and commitment, and
4. The Malaysian Institute of Road Safety Research (MIROS) for the research grant to support the project.

Road Traffic Injury Prevention Study (R-TRIPS) Team Members

	Name	Designation
1	Dr Jamilah Binti Mohd Marjan	Director Road Safety Engineering and Environment Research Centre, Malaysian Institute of Road Safety Research (MIROS)
2	Dr Norlen Mohamed	Director Vehicle Safety and Biomechanics Malaysian Institute of Road Safety Research (MIROS)
3	Dr Sabariah Faizah Binti Jamaluddin	Head of Department Emergency and Trauma Department,

		Sungai Buloh Hospital
4	Dr. Mohd Shah Bin Mahmood	Head of Department Department of Forensic Medicine, Kuala Lumpur Hospital
5	Dr. Nurul Kharmila Binti Abdullah	Department of Forensic Medicine, Hospital Kuala Lumpur
6	Dr Jamaiyah Binti Haniff	Clinical Research Centre, Ministry of Health
7	Hizal Hanis Bin Hashim	Research Officer MIROS
8	Rohayu Binti Sarani	Research Officer MIROS
9	Sharifah Allyana Binti Syed Mohamed Rahim	Research Officer MIROS
10	Masitah Binti Mohd Salleh	Emergency and Trauma Department, Sungai Buloh Hospital

List of Participating Hospitals

1. Emergency and Trauma Department, Kuala Lumpur Hospital
2. Emergency and Trauma Department, Selayang Hospital
3. Emergency and Trauma Department, Sungai Buloh Hospital
4. Emergency and Trauma Department, Ampang Hospital
5. Emergency and Trauma Department, Serdang Hospital
6. Emergency and Trauma Department, Tengku Ampuan Rahimah Hospital
7. Forensic Medicine Department, Selayang Hospital
8. Forensic Medicine Department, Kuala Lumpur Hospital
9. Forensic Medicine Department, Sungai Buloh Hospital
10. Forensic Medicine Department, Ampang Hospital
11. Forensic Medicine Department, Serdang Hospital
12. Forensic Medicine Department, Tengku Ampuan Rahimah, Klang Hospital

About Road Traffic Injury Prevention Study (R-TRIPS)

The Malaysian Institute of Road Safety Research (MIROS) has begun to embark in road injury data collection for road traffic crashes since April 2010 to understand better the injury impact from road crashes in Malaysia. The study named as Road Traffic Injury Prevention Study (R-TRIPS) is a collaborative study between MIROS and Ministry of Health (MOH), through Clinical Research Hospital (CRC) and National Institute of Forensic Medicine (IPFN). The collaboration was established by sharing the common objectives and goals to reduce the number of trauma and to improve trauma care in the country. Yearly, an average of 70% of major trauma cases in Malaysia is due to road traffic crashes, thus by having this study is hugely beneficial all related stakeholders on road safety.

The general objectives of the study are:

a) To collect a comprehensive set of injury data for road safety research and trauma management;
b) To evaluate and assess the trauma care management in the country concerning road safety; and
c) To analyse injury data collected from the study towards the provision of intelligence.

The specific aims of the study are:

a) To determine injury trends in road crashes;
b) To capture injury data related to the Motor Vehicle Accident (MVA);
c) To identify size and characteristics of injury problem due to MVA;
d) To stimulate and facilitate research on road traffic injury; and
e) To develop evidence-based policies and practices.

Utilising the existing study of National Trauma Database (NTrD), R-TRIPS expansion of the scope of data collection includes all road traffic crash victims seeking treatment at Emergency Departments (ED) from selected hospitals. The hospitals (Sungai Buloh Hospital, Ampang Hospital, Tengku Ampuan Rahimah Hospital, Kuala Lumpur Hospital, Serdang Hospital, and Selayang Hospital) are in the Klang Valley area of Malaysia. Data collection for this study was over 12 months, starting from April 2010 until March 2011. There were a total of 45 data elements collected, comprising patient particulars, admission, injury, clinical signs at accident site, clinical details, injury severity score through six body regions of Abbreviated Injury Score (AIS), diagnosis and operative procedure, in-hospital outcome and use of alcohol and drugs.

Data elements collected in this study are vital to both MIROS and MOH to conduct useful research studies in the future. Also, the availability of road traffic injury data would provide an added value to the existing crash data obtained from traffic police and brings new perspectives in injury prevention research.

1. Introduction

The availability of road traffic injury data has since been a problem in many countries. International Road Traffic and Accident Database (IRTAD) started looking into issues of compiling data from the Organization for Economic Co-operation and Development (OECD) countries since 1988. It deals with the availability of data and compilation from OECD Countries. The problems faced in collecting the injury data include incomplete reporting, inconsistent definition, reporting forms, classification of causes of injury and most importantly there is no clear responsibility of who is to develop the system for data collection.

Such a system is essential for any country keen to reduce fatalities and injuries due to traffic crashes. An understanding of the current problems faced, and the development of road safety policies can be made more transparent through research on injuries sustained by the victims in road crashes.

The availability of road traffic injury data is very poor in Malaysia. However, since 2006, Malaysia, through the Ministry of Health, has started developing the National Trauma Database (NTrD) of which road traffic injury forms the highest group. The details of injury related to road traffic accidents though are still substandard, where it excludes relevant data under the NTrD reporting. The information extraction from the data is the percentage of trauma due to road traffic accident and trauma by road user types only. It is inadequate from the view of the policymakers, vehicle engineering, road planners and road safety engineers. Thus the *Road Traffic Injury* project called R-TRIPS was developed to enhance the quality of injury data for research purposes. It was a collaboration work by MIROS and the Ministry of Health, Malaysia which commenced in 2010 for one year.

Exploring the injury data sustained by different age groups of road users in specific vehicles and on different types of the road environment may generate research that enables policies to be developed based on age or the road user group and many more. The study of the road user behaviour too can be made possible via the injuries data. Understanding injuries related to the road environment and roadside features may give solutions to the type of road improvements that reduce fatalities or injuries.

Through the detailed injury data collected research into the behaviour of road users driving under the influence of substances (DUI) may also be investigated. The effects of non-wearing of helmets or seatbelts can affect the degree of injuries sustained. It determines the seriousness of specific problems within the society that may directly or indirectly cause fatalities and injuries. Strategic enforcement may be the outcome of the research carried out using the injury data.

Injuries inflicted unto the road users upon impact due to the weakness in the vehicle design can also contribute to the enhancement of the design of the said vehicle itself. Thus, the availability of injury data is crucial to the improvement of road safety in any country.

2. Methodology

In this study, data were collected from six government hospitals in the Klang Valley area from 1 April 2010 until 31 March 2011. The six hospitals were as follows:

a) Sungai Buloh Hospital;
b) Kuala Lumpur Hospital;
c) Selayang Hospital;
d) Ampang Hospital;
e) Serdang Hospital; and
f) Tengku Ampuan Rahimah Hospital.

This study involves all road traffic accident victims that came to these hospitals for treatment. It includes all those administered in the three zones of the Emergency Departments, namely, Green (non-critical), Yellow (semi-critical) and Red Zone (critical). Data were collected using a modified National Trauma Database (NTrD) Notification Form (Appendix A). Trained Injury Data Registrars then filled out the form based on the data retrieved from hospital records, either manually or from the hospital information system. Out of the six abovementioned hospitals, four were hospitals with the electronic patients' registration system. After filling all the details, the Injury Data Registrars keys in all the data into NTrD web-based data entry system.

2.1 Statistical Analysis

Before conducting any analysis, data cleaning ensures the quality of data collected. It includes checking for missing values, wrong entry, and extreme values. It enables the researcher to check whether the information keyed in by the Data Registrar is a valid value or not. For missing values, records were tracked again from the respective hospitals, to get the value where possible. Descriptive analysis performed provide an understanding of the characteristics of the data collected.

3. Results

An analysis of data for the full duration of the project (1 April 2010 – 31 March 2011) recorded a total of 35,543 cases. The following figures and tables depict the results from the data collection of this study.

3.1 Road Traffic Injury Victims by Hospital

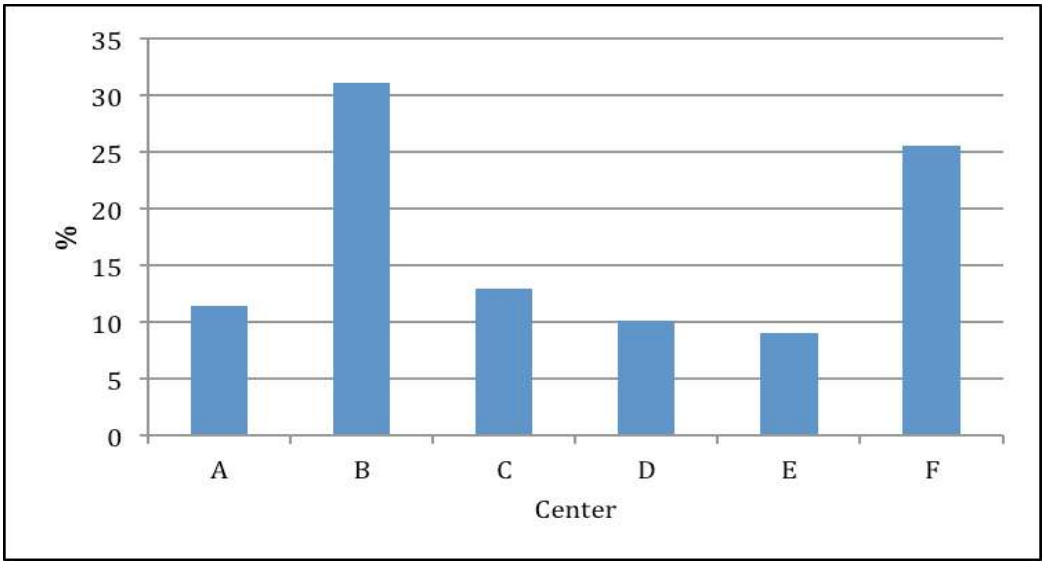


Figure 1 Percentage of road traffic injury victims by hospital

Table 1 Number of road traffic injury victims by hospital

Hospital	Frequency	%
A	4,039	11.4
B	11,054	31.1

C	4,561	12.8
D	3,590	10.1
E	3,187	9.0
F	9,112	25.6
Total	35,543	100

3.2 Road Traffic Injury Victims for Emergency Department by Hospital

The data collection activities were completed by 2 February 2009. The data were then gathered and analyzed according to the objectives of the study. The descriptive analyses obtained the distributions and profiles of the data. Finally, report writing was from 13 February till 20 February 2009. The categorizing of results obtained were according to the three main criteria, and the discussion highlighted the new findings. At the end of the report, there are conclusions and recommendations listed to improve the SHE implementation of commercial bus operators and enforcement bodies, as well as suggestions on improving further study at the end of this report.

4. Result and Discussions

This section discusses the results and findings of the study. This section divides into four subsections; sample population, SHE elements observation, facilities and services and driver behaviour and practices.

4.1 Sample Population

The total number of companies involved in this study was 39, and the number of buses under observation was 154.

4.2 SHE COP Elements

Figure 2 shows that many companies are closely observing the four SHE elements; usage of antiglare film, wearing of uniform by drivers, availability of fire extinguishers, and rest after four hours of driving. Besides, the observation was, usage of illegal cruise control tools such as bricks, brooms and rocks were not prevalent. Only one out of 154 buses observed was found to have these illegal cruise control tools in the drivers' compartment.

It is interesting to note that a high percentage of drivers did not use seatbelts, although it is a mandatory requirement. Also, a significant number of buses did not even have seatbelts for the drivers. Only 20% of the buses provided seatbelts for the drivers. The trend was the same for front-row passengers. The availability of seatbelts for the whole bus was even worse. Display of emergency and customer service hotline was minimal.

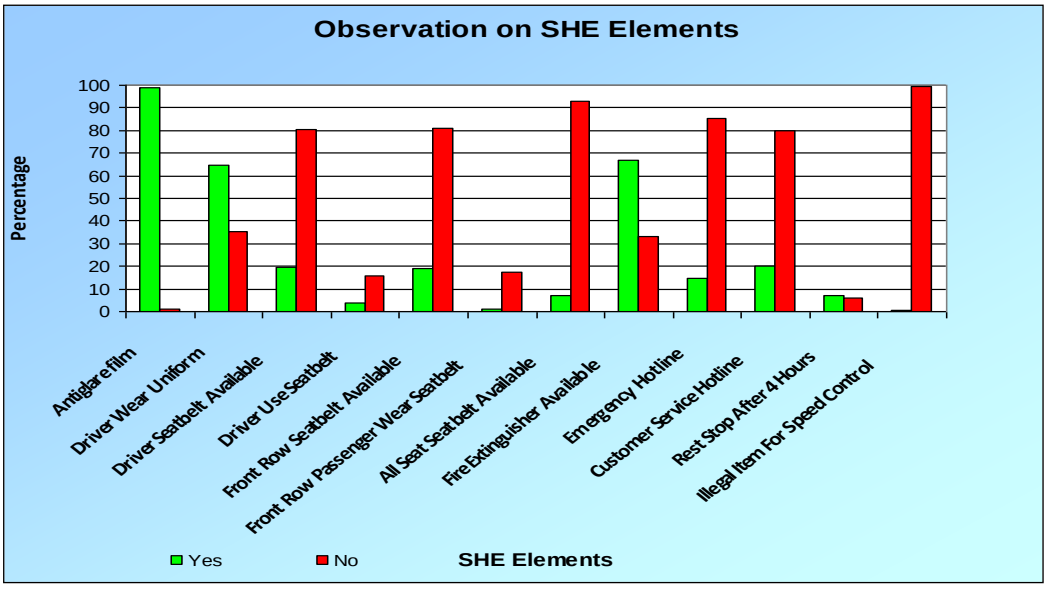


Figure 2 Observation on selected SHE elements

4.3 Facilities and Services

Figure 3 shows the observers' perceptions of the housekeeping of the buses. Most of the observers were satisfied with the cleanliness of the buses (either interior or exterior), seat adjustability, "feel safe" during the journey, spacious legroom and the interior temperature of the buses. In terms of departure and arrival times, a majority of the observers agreed that the buses were not punctual most of the time.

A significant number of observers experienced vibrations while travelling on the buses. It indicated that many of the buses are either, not well maintained, or, had reached the end of service life.

It is interesting to note that for the 'Others' category, some of the comments highlighted were as follows:

- Driver smoking while driving
- No signalling before changing lane
- Spitting while driving
- Sleepy while driving
- Driving non-roadworthiness bus
- Overtaking at double line
- Red-light running

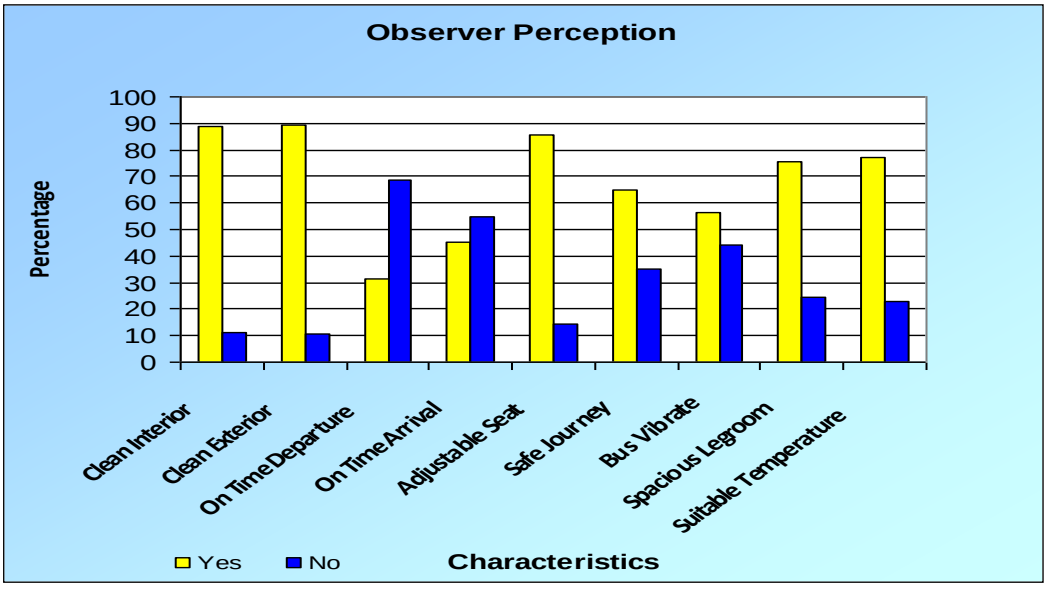


Figure 3 Observations of bus facilities and services

Figure 4 shows the availability of driver, front passengers and overall passengers' seatbelts. From the observations, although seatbelts are available on the buses, only a few of the drivers or the passengers used them.

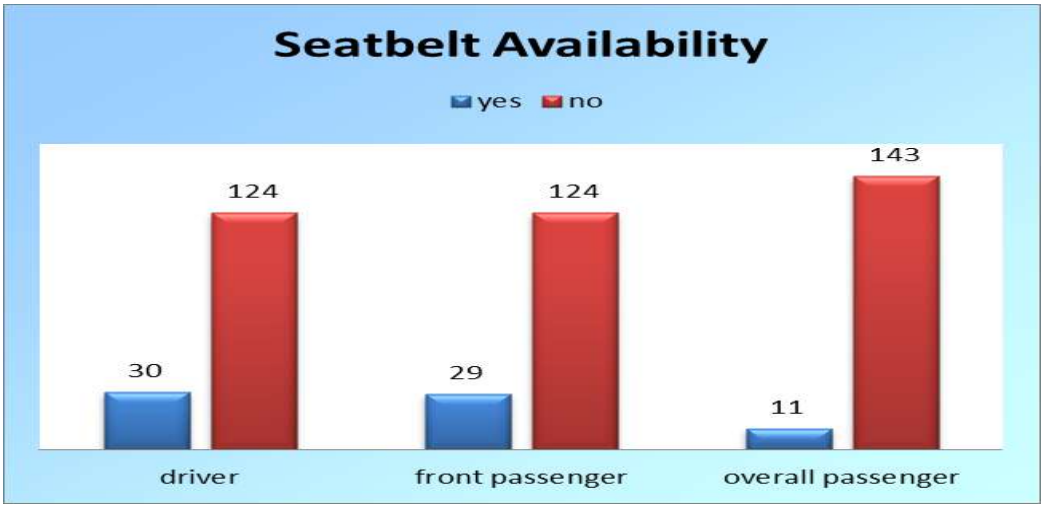


Figure 4 Seatbelt availability in the buses

Figure 5 shows the availability of fire extinguishers in the buses. Although the percentage of availability was high, most of the fire extinguishers were hidden and difficult to access.

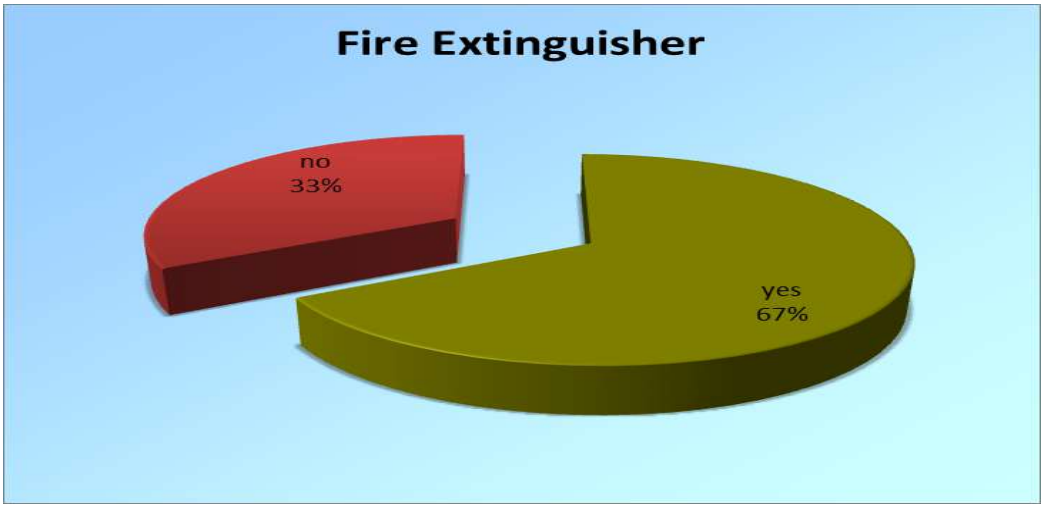


Figure 5 Availability of fire extinguisher on buses

Figure 6 and Figure 7 show the visibility of emergency and customer service contact numbers in the buses. From the observations, most of the buses did not display the required numbers.

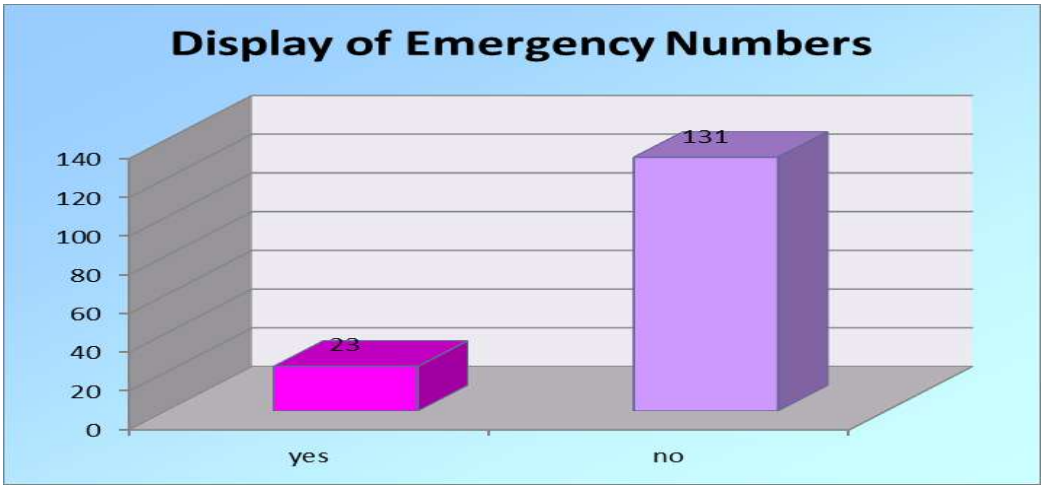


Figure 6 Display of emergency numbers in buses

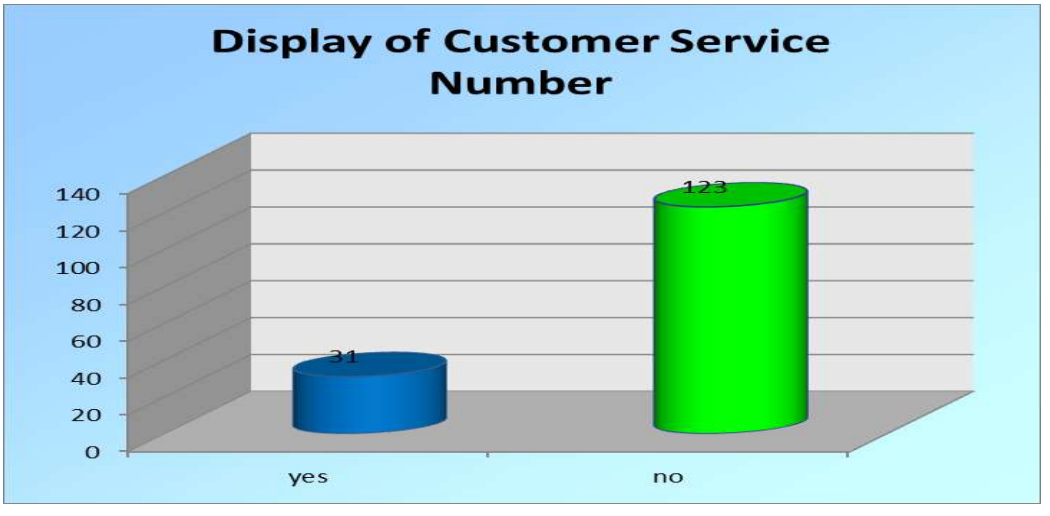


Figure 7 Display of customer service number in buses

4.4 Driving Behaviour and Practices

Figure 8 shows the categories of Inappropriate Driving Behaviours (IDB) as observed during the study. Using a mobile phone, tailgating, harsh braking and dangerous overtaking were the four categories with the highest number of infractions. The usage of mobile phone by bus drivers was quite widespread. Tailgating, dangerous overtaking and harsh braking are hazardous manoeuvres which can lead to accidents.

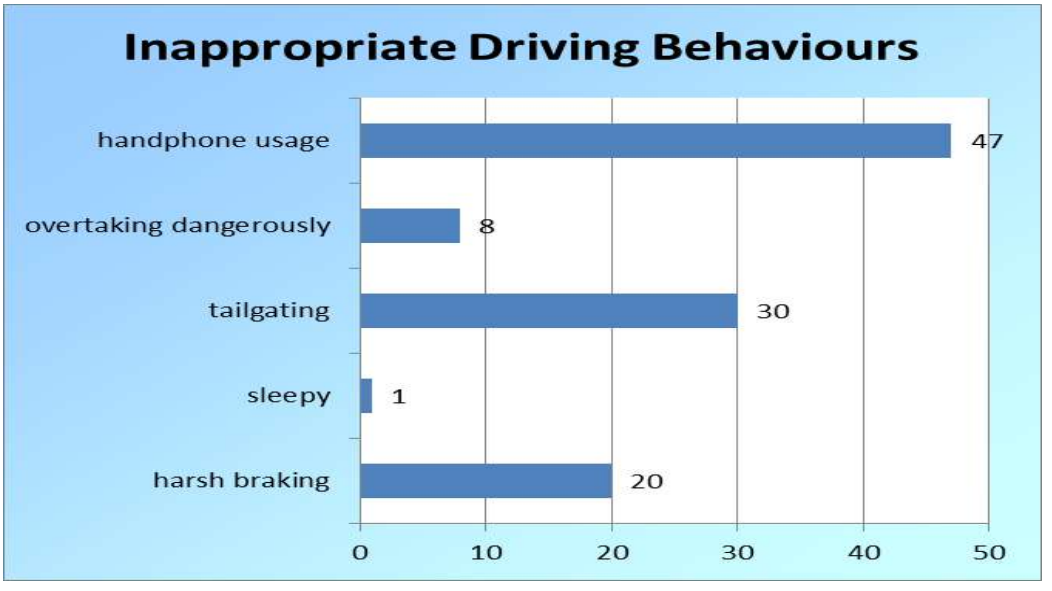


Figure 8 Inappropriate driving behaviours (IDB)

Figure 9 shows the occasions when the drivers are driving at high speed. It can be generalized that the observers perceived the drivers as not driving at high speed throughout the journey but only on certain occasions. Based on the samples, speeding for the entire journey was low (15%), but for "part of the journey" the percentage was quite high (42%). Although it was challenging to verify the buses' speed quantitatively, most of the observers felt that the drivers were driving at high speed. Figure 10 shows the calculated average speed for all the buses. 59% of the buses exceeded the speed

limit of 90 km/h. Besides, the observation showed 20% of the buses travelling at a speed of more than 100 km/h.

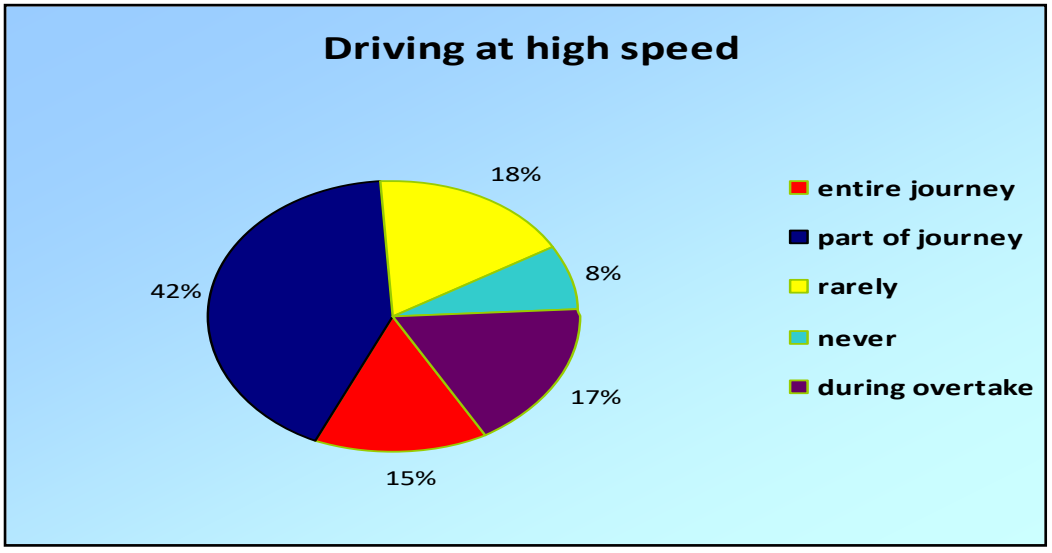


Figure 9 Perception of high-speed driving

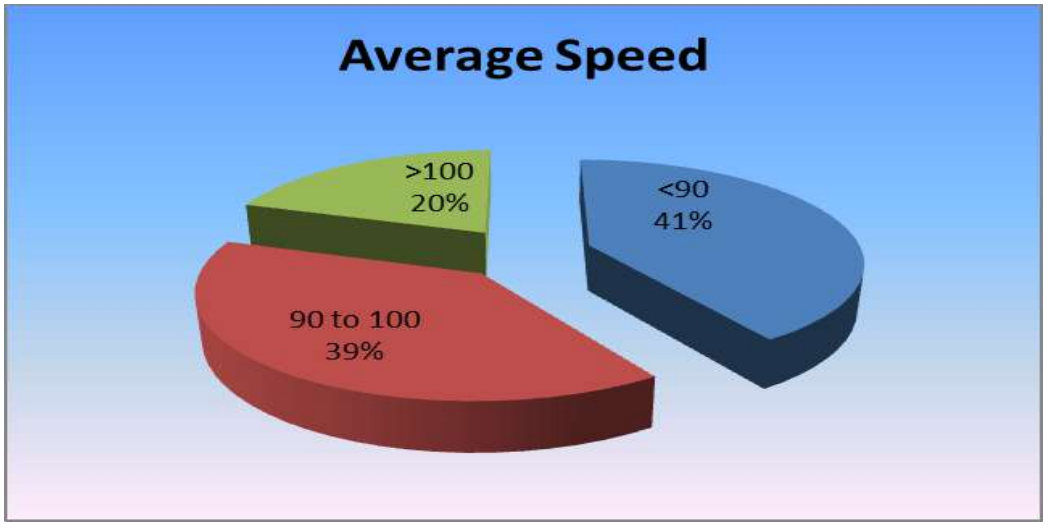


Figure 10 Average speed of buses

Figure 11 shows the maximum speed of the selected buses measured by GPS and also the mean value. Only 37 buses were involved. On these selected buses, the observers measured the maximum speed using mobile GPS devices. The graph shows that the mean value of the maximum speed was 114 km/h. The lowest maximum speed was 95 km/h, and the highest was 132 km/h. All the maximum speeds exceeded the highway speed limit for buses.

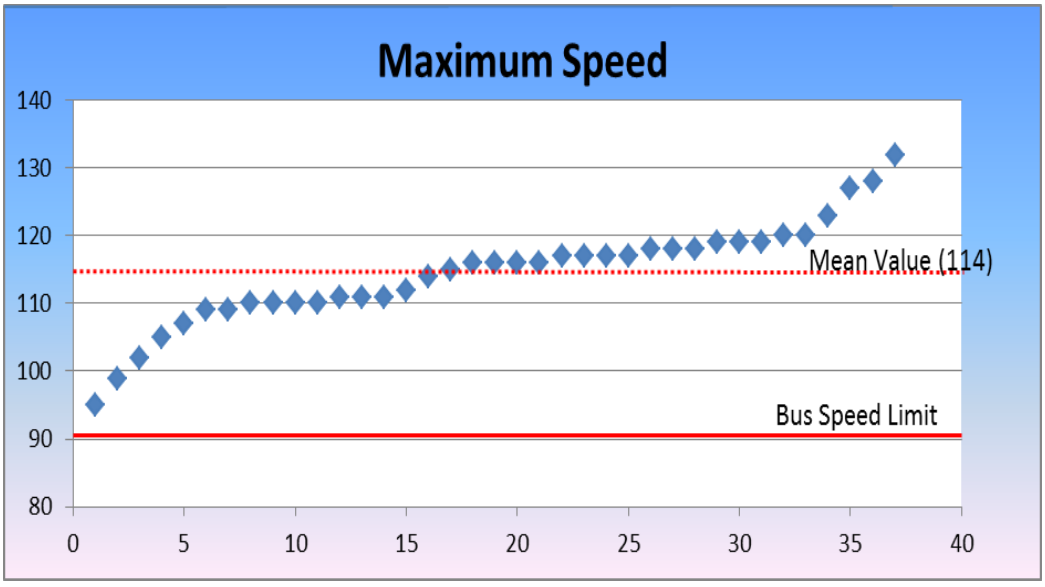


Figure 11 Maximum speed measured using GPS and the mean value

Figure 12 shows the average speed of the selected buses. The mean value for the average speed was 88km/h, which is just below the speed limit. 42% of the buses have an average speed exceeding 90km/h, and this is an unhealthy trend.

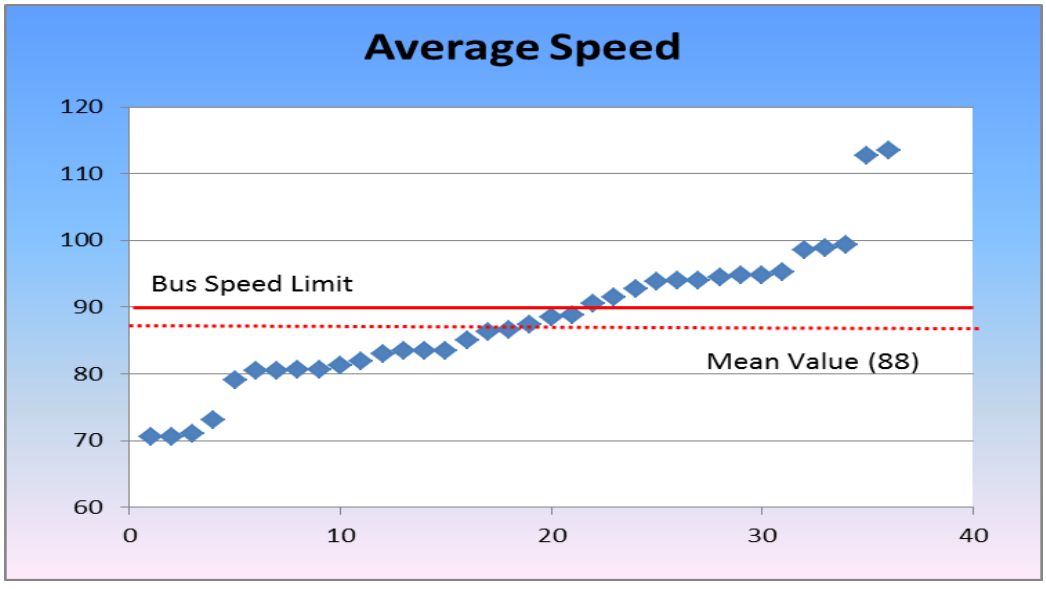


Figure 12 Maximum speed measured using GPS and the mean value

Figure 13 shows the breakdown of the average speed during daytime travelling. Day time travelling is defined as any journey undertaken between 6:00 am and 7:00 pm. More than 50% of the journeys had an average speed exceeding 90 km/hr, which is the speed limit. Also, 4% of them had an average speed exceeding 110 km/hr. This trend is unhealthy for public safety.

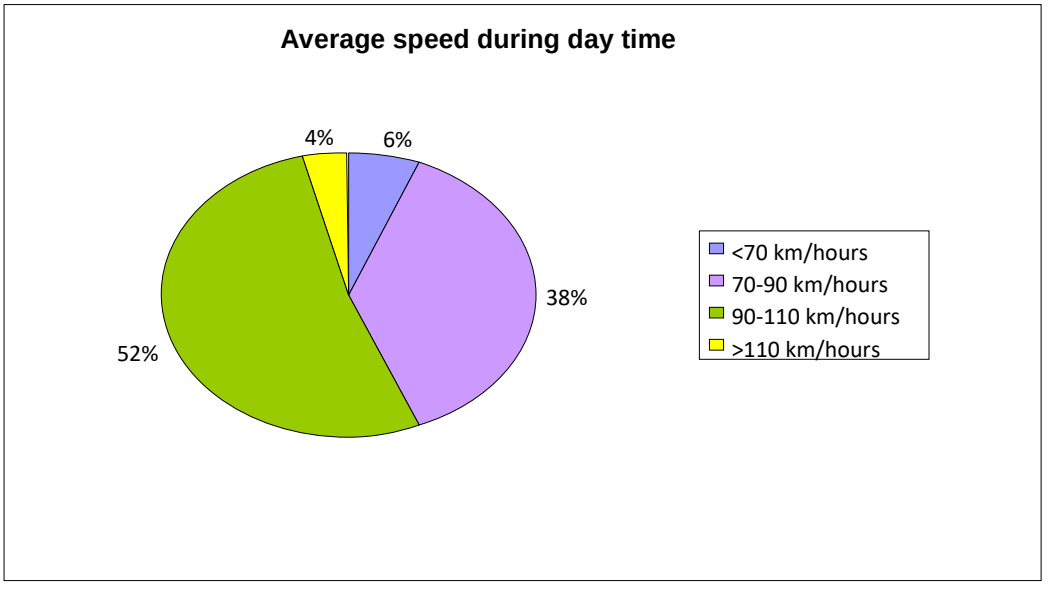


Figure 13 Average speed during day time

Figure 14 shows the breakdown of the average speed during night time travelling. The definition of nighttime travelling is any journey undertaken between 7:00 pm, and 6:00 am. 7:00 pm is the boundary separating day time and night time journey. If a bus starts the journey at 6:00 pm and arrives at 9:00 pm, the journey is a night journey as most of the travelling time is during the night. More than 60% of the journeys had an average speed exceeding 90 km/h, which is the speed limit. Also, 12% of them had an average speed exceeding 110 km/h. In comparing the results of day travel and night, the conclusion made is that there was a tendency to drive at a higher speed during the night. It might be due to the perception of being caught during the night was lower.

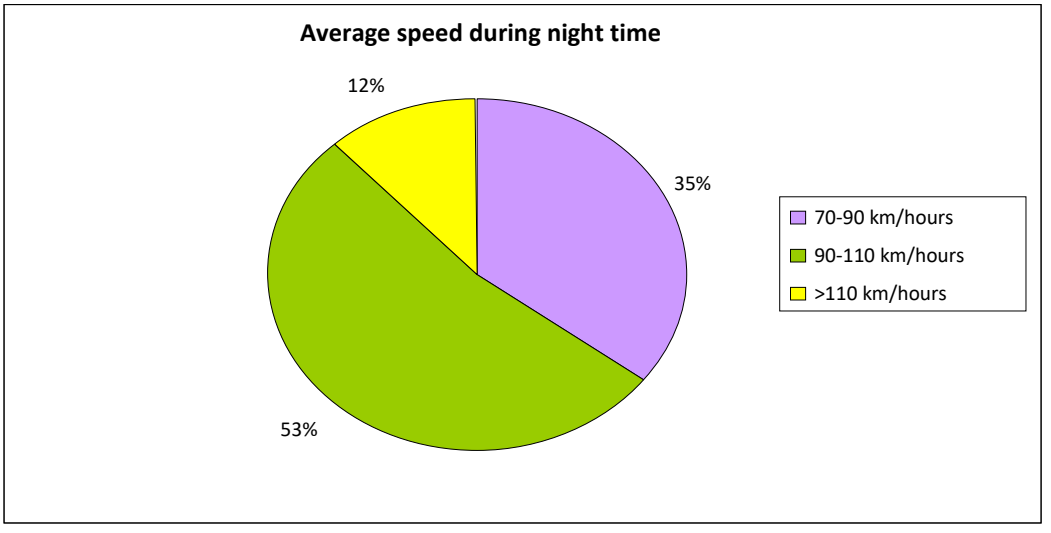


Figure 14 Average speed during night time

Figure 15 shows the percentages of drivers wearing a uniform. 65% of the drivers complied with this requirement of the SHE COP. This practice was commendable, and all bus operators should adopt this.

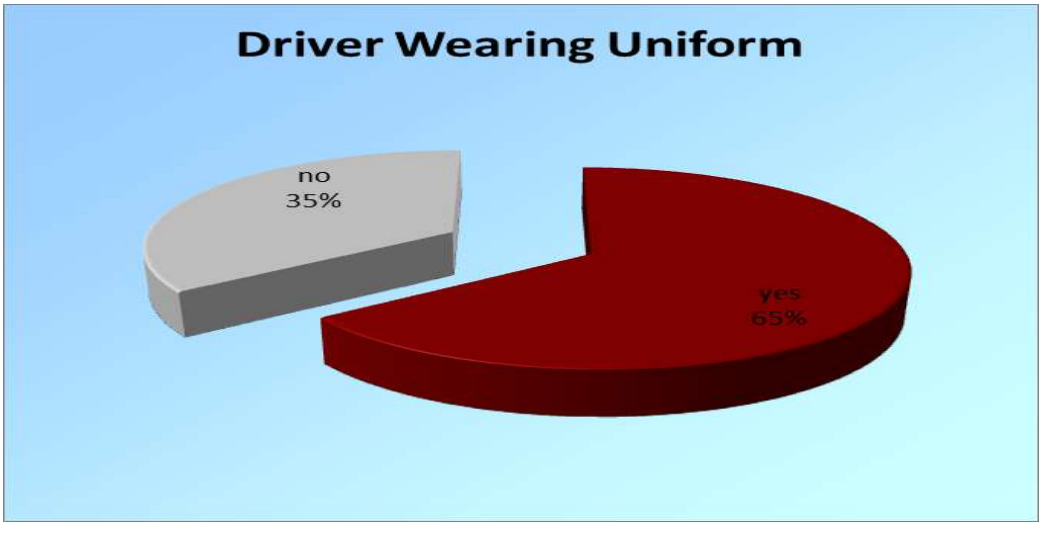


Figure 15 Percentage of drivers wearing a uniform

4.5 Pre-departure Inspections

Figure 16 shows the observation of JPJ activities at the listed terminals, excluding Batu Pahat. From the observations, JPJ officers were visible at the terminals during 59% of the time. Although JPJ officers were available at the terminals, most of them did not conduct a pre-departure inspection. In Shah Alam and Melaka, JPJ officers only checked the documents submitted by the drivers.

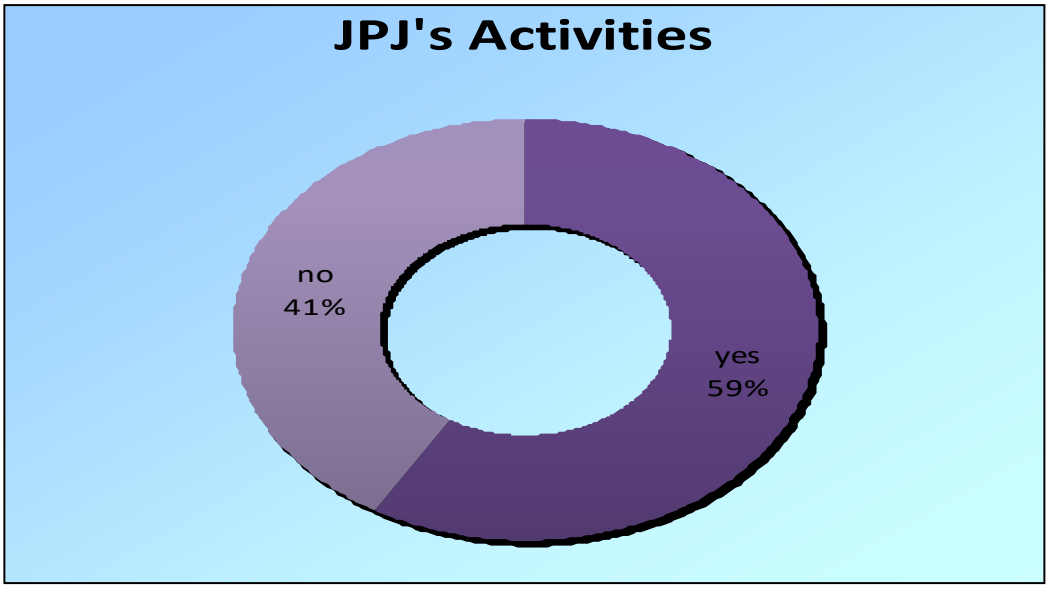


Figure 16 Percentage of observed JPJ activities

Figure 17 shows the presence of JPJ officers at the eight terminals. The observation showed the presence of the officers was inconsistent. It might be due to the duty schedule of JPJ officers being different for different terminals. The observation of JPJ officers presence is consistent at only three terminals; Shah Alam, Klang and Melaka.

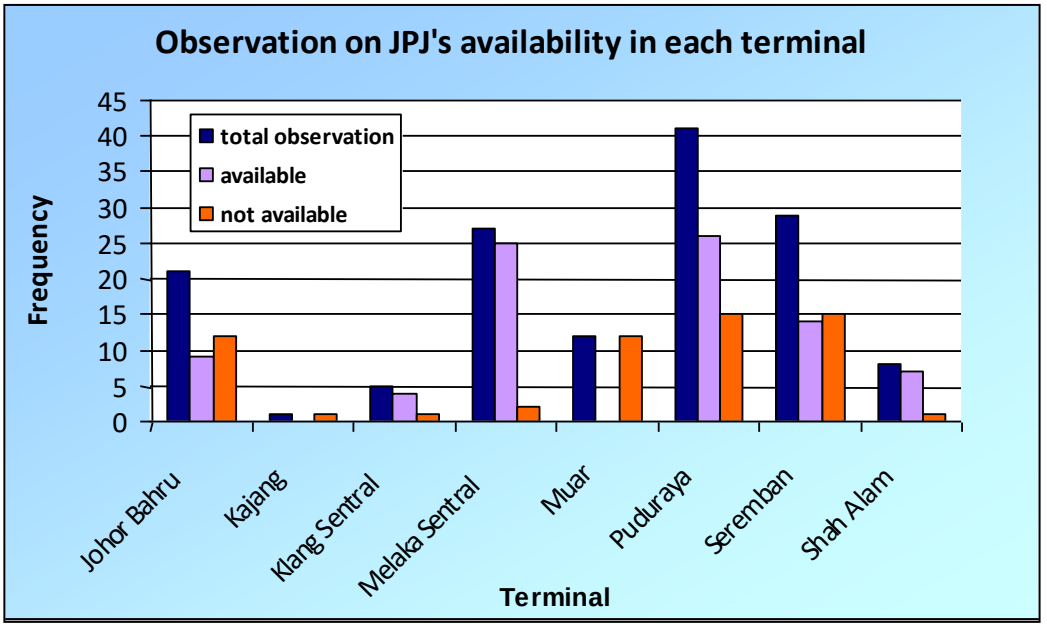


Figure 17 Observation on JPJ availability at each terminal

5. Conclusion and Recommendations

This study has three main objectives. The first objective is an evaluation on the level of implementation of SHE Code of Practice among express bus operators plying the Southern Region routes, based on selected SHE elements compliance. From the observations, widely practised SHE COP elements included the usage of antiglare film, wearing of uniform by drivers, availability of fire extinguishers, and rest after four hours of driving. Also, the observation showed the usage of illegal cruise control tools such as bricks, brooms and rocks were not prevalent. However, the followings need attention: drivers were not using seat belts, the majority of buses did not have seatbelts for the drivers and front-row passengers, usage of front row passengers seatbelts and display of emergency and customer service hotlines. It concludes that the level of SHE COP implementation is still at the infancy stage.

The second objective is to evaluate the speed profile of the express buses. 56% of the buses had average speed exceeding the maximum permissible speed on the highways (90 km/h). It concludes that buses travelling during night time tend to travel at a higher speed when compared to buses travelling during day time. Among the buses observed, the maximum speeds ranged from 95 km/h to 132 km/h. All the maximum speeds exceeded the highway speed limit for buses.

The third objective is to observe the implementation and operation of pre-departure inspection carried out by JPJ. From the observations at terminals, the presence of JPJ officers varied according to the time of day and location. Besides, the pre-departure inspection was limited to only checking of documents submitted by bus drivers.

The proposal of recommendations follows, capping this study:

1. The top management of bus companies should improve awareness of SHE practices in their operations such as usage of seatbelts for drivers and front-row passengers, display of emergency and customer service hotlines and high visibility and accessibility of fire extinguishers.
2. The respective companies must enforce The prohibition of using mobile phone and smoking while driving on their bus drivers.
3. Top management of bus companies should provide training to instil ethical and safe driving habits among drivers.
4. Top management of bus companies is encouraged to install GPS monitoring system on their buses to monitor their buses. SHE Committee must effectively use the data generated to manage the safety of buses.
5. JPJ officers should ensure their availability as per schedule for a pre-departure inspection.
6. JPJ personnel should conduct pre-departure inspection according to the standard checklist and procedures (for example inspection of brake system).
7. Wider availability of the AADK personnel to conduct drug tests on bus drivers.

Recommendations for future study:

- A similar study is recommended to be conducted outside the festive season.
- The study should adopt the stratified sampling approach from a known population.

References

Alvarez, A. (2007). *Commercial Motor Vehicle Driver Safety Belt Usage*. Federal Motor Carrier Safety Administration.

Department for Transport. (2007). *Rule 148, Highway Code*, Department for Transport, United Kingdom.

Heishman, S. J. (1998). *Behavioral-cognitive effects of smoking, addicted to nicotine: A national research forum*. US DHHS, PHS, NIH, Bethesda, MD.

Idaho Transportation Department. (2008). *Idaho Commercial Driver's License Manual*. Idaho Transportation Department, Division of Motor Vehicles.

James, L. (1997). *Congressional Testimony on Aggressive Driving*. Honolulu: University of Hawaii.

Joint, M. (1995). *Road rage*. The Automobile Association Group Policy Road Safety Unit, London.

Kentucky Institute of Medicine. (2005). *Saving lives, saving money: The impact of a Kentucky primary seat belt law*. Kentucky Institute of Medicine.

King, Y. & Parker, D. (2008). *Driving violations, aggression and perceived consensus. Revue européenne de psychologie appliquée*, *58*, 43 - 49.

Leistikow, B. N., Martin, D. C., Jacobs, J., Rocke, D. M., & Noderer, K. (2000). Smoking as a risk factor for accident death: A meta-analysis of cohort studies. *Accident Analysis and Prevention*, *32*, 397 - 405.

Mason, J. M., Fitzpatrick, K., Seneca, D. L., & Davinroy, T. B. (1992), Identification of inappropriate driving behaviours. *Journal of Transpn. Engrg.*, ASCE 118(2), 281 - 82.

Ministry of Transport NSW. (2005). *Safety Management System (SMS) Guidelines: For Bus and Coach Operators in NSW*. Pursuant to section 9D(2)(c) of the Passenger Transport Act 1990.

MIROS. (2007). *Kod Amalan Keselamatan, Kesihatan dan Alam Sekitar untuk Sektor Pengangkutan*. MCP 1/2007.

Mohd Rasid Osman, Fuad A., Ilhamah O., Zarir H. Z., Noor Faradila P., Mohd Sukri A., & Muhammad Sahidi M. (2008). E*valuation of the effectiveness of OPS Bersepadu with respect to selected SHE practices.* Unpublished report.

National Transportation Safety Board. (1999). *Bus crashworthiness issues*. Highway Special Investigation Report: PB98-917006, NTSB/SIR-99/04, Washington, D.C.

Ontario Medical Association (OMA). (2008). *Cellular phone use and driving: A dangerous combination*. Ministry of Transportation, Toronto.

Parker, D., Lajunen, T., & Summala, H. (2002). Anger and aggression among drivers in three European countries. *Accident Analysis and Prevention*, 34, 229 - 235.

Queensland Transport. (2003). *Fire extinguishers in buses: public passenger vehicles inspection*. Vehicle Standards Instruction, Queensland Government.

Shinar, D. (1998). Aggressive driving: The contribution of the drivers and the situation. *Transport. Res.*, Part F 1: 137 - 160.

Taylor, M. C., Lynam, D. A., & Baruya, A. (2000). *The effects of drivers' speed on the frequency of road accidents*. TRL Report 421, prepared for the Road Safety Division, DETR.

U.S. Department of Transportation. (2008). *Safety belt usage by commercial motor vehicle drivers (SBUCMVD) 2007 survey*. Final Report, Federal Motor Carrier Safety Administration, U.S. Department of Transportation.

UNCTAD. (2000). *Risk Management.* ASYCUDA, Automated System for Custom Data.

Verona, E., & Sullivan, E. A. (2008). Emotional catharsis and aggression revisited: Heart rate reduction following aggressive responding. *Emotion,* 8(*3*), 331 – 340.

Research Report

Road Traffic Injury Prevention Study (R-TRIPS)

Road Traffic Statistical Report for the period of April 2010 to March 2011

Designed by: MIROS

MIROS
MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH
ASEAN ROAD SAFETY CENTRE

Malaysian Institute of Road Safety Research
Lot 125-135, Jalan TKS 1, Taman Kajang Sentral
43000 Kajang, Selangor Darul Ehsan
Tel: +603 8924 9200 **Fax:** +603 8733 2005
Website: www.miros.gov.my **E-mail:** dg@miros.gov.my

ISBN 978-967-2988-06-9
9 789672 988069