

**MIROS**  
**BOOK**  
**OF**  
**ABSTRACTS**  
**2020**

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## **MIROS Book of Abstract 2020**

This book compiles and lists the reports published by MIROS in 2020. The reports are fundamentally the outputs of the research projects and operational exercises carried out by the research centres at MIROS. The reports are generated and produced by the respective units under each centre, and focus on their specific areas of expertise in the fields of road safety.

The reports are divided into several categories. All reports are available to the general public except those labelled restricted or confidential. The reports provide extensive insights into various issues related to road safety in general, and more specifically, road safety issues in Malaysia. Depending on the categories, the reports contain analyses, reviews and/or recommendations. Although the reports are official documents produced by MIROS, they not binding on any other parties, whether mentioned in the reports or otherwise. The inputs from the reports are to be used only as references and as sources of information. Reference herein to any specific reports does not necessarily constitute or imply its endorsement, recommendation, or favouring by MIROS, the Ministry of Transport of Malaysia, or the Malaysian Government. Interested parties may contact MIROS to obtain the full report.

## **MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH**

Established on 3rd January 2007, MIROS is a one-stop centre for the generation and dissemination of road safety information and dissemination of road safety information through various media and a concerted training programme. MIROS carries out studies and evaluates current procedures on road safety to generate information that will form the core of its evidence-based intervention programmes to enhance road safety. This effort is also assisted through the establishment of networks and partnerships with more experienced international members of the road safety research field.

Ever since its inception, MIROS has produced a number of research publications on road safety. These reports published in 2020 are available in this book of abstracts.

### **VISION**

To emerge as the world leader in road safety research

### **MISSION**

To foster the science and arts of road safety interventions

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## **MIROS Research Report (MRR)**

MRRs are technical reports derived from research findings. The reports address objectives, methodologies and results that lead to recommendations and conclusions.

## **MRR No. 293**

### **A Pre and Post-Intervention Study for Revised RSE Module in Secondary School (ISBN 978-967-2078-57-9)**

Author(s): Low Suet Fin, Nur Afifah Aisyah Mohmood Nor, Nurfatin Nadia Mohd Suhaimi, Noorita Che Haruna Rashid, Cik Hasliza Ahmad, Siti Zaharah Ishak

Road Safety Education (RSE) module have been implemented in Malaysia since 2007. It was immersed in Bahasa Melayu subject which is the main subject in the curriculum. RSE was introduced to secondary school students (form 1, 2 and 3) in 2012. The evaluation study was conducted in 2015 by MIROS and the findings suggested that the RSE module needs to be revised in terms of the themes and content of the activity books. A project of Review and Redevelopment of RSE Modules for Primary and Secondary schools was launched in 2016 and the Malaysian Institute of Road Safety Research (MIROS) was given the honour to lead the project. Throughout the project, a revised RSE module for secondary school was produced in 2018.

Before the revised RSE modules are implemented, it is essential to study the feasibility of the module. This study used the Context, Input, Process and Product (CIPP) evaluation model on 24 selected secondary schools representing six (6) districts in Malaysia. Out of 24 schools, 12 schools (treatment schools) received the revised modules while the remaining 12 schools (control schools) continue using the existing modules. This is a pre and post-intervention study where the mixed-method design was utilized as a framework to conduct the whole study. Using mixed-method design, elements of quantitative and qualitative research approaches were combined for the broad purposes and depth understanding of the research. The study sample consists of teachers and school administrators. For each school, the principal, senior assistants and all Bahasa Melayu teachers of Form 1, 2 and 3 were included as sample. Besides that, data on school environment and facilities was also obtained.

For the quantitative part of the study, questionnaires have been developed to have an input from Bahasa Melayu teachers regarding two (2) items; knowledge and perception. Meanwhile, a set of checklist items have been utilized to evaluate the aspect of school environment and facilities within and outside the school compound. Questionnaires for Bahasa Melayu teachers aimed to gain inputs regard to their knowledge, skills,

understanding, confidence and need for training in delivering the RSE module. Besides that, the questionnaires also gathered teachers' perceptions pertaining to the teaching facilities in the school, RSE teaching aids, school and agency support, and also their overall perceptions on the RSE module. To support the quantitative findings and to triangulate the elaboration in-depth, a qualitative approach through focus group discussion (FGD) was carried out. Questions used in FGD involved Bahasa Melayu teachers were about contributing factors of the feasibility on RSE module implementation from their perspective. Questions used for school administrators mainly related to students' commuting patterns to school and their view on RSE implementation. There were two phases of data collection. The first phase is the pre-intervention phase which begins before the module was distributed to the treatment school. The second phase is the post-intervention phase which begins in October until November 2018 after the module has been used for eight (8) months. The data collection phase was done with the support received from Road Safety Department (RSD), State Education Departments and the District Education Offices.

The contextual component is important as part of the module's implementation. School administrators should accommodate the school with road safety features and facilities. Schools also need to be adequately equipped with ICT facilities to enhance activities in RSE modules. Regarding the facilities within the school compound, the facility of road safety increased after eight (8) months intervention in the treatment (46.2%) and control (27.3%) school where the percentage recorded by the treatment school was higher than the control school. Besides that, there was an improvement during the post-intervention study in several aspects of ICT facilities in both treatment and control school. The facility of bicycle and motorcycle parking in the treatment and control school have been improved during the post-intervention study. As for the amenities outside the school, there is an increment for safety facilities such as zebra crossing, traffic light with push-button, flyover, pedestrian walkway and traffic calming facility in treatment and control schools.

The input and process components of the modules involved Bahasa Melayu teachers and school administrator. The finding for Bahasa Melayu teachers revealed that there is an increment of mean value in most of the constructs for treatment school during the post-intervention study. Out of 4.00, the mean reported for the treatment school during the post-intervention study was within the range of 2.53 to 3.40 as compared to pre-intervention study (1.92 to 3.21). The highest mean achieved by the construct of

necessity of RSE training (mean score = 3.40). This indicated that most of the teachers agreed that training of RSE immersion in Bahasa Melayu subject is upmost necessary in order to improve their competency. As for Bahasa Melayu teachers in control schools, the mean value of six (6) constructs was improved during the post-intervention study whereas there are declination in the mean value of four (4) constructs such as school facilities, RSE training, perception on electronic and ICT facilities, and teacher's perception on the implementation of RSE. The mean value for the post-intervention study in control schools was within the rage of 2.28 to 3.25. The highest mean value was also recorded by the need of RSE training construct which was 3.25. The result indicated the importance of teacher's training in order to enhance the skill, knowledge and confidence of the teachers to deliver the module successfully.

Comparison between the treatment and control school after eight (8) months of implementation revealed that Bahasa Melayu teachers in treatment schools recorded higher mean value for each construct during the post-intervention stage of the study as compared to Bahasa Melayu teachers in control school. Nonetheless, during the pre-intervention study, teachers from control school recorded higher mean value in most of the constructs compared to the treatment school. This result indicated that the teachers' competency and another aspect of the module implementation in the treatment school who have been received and used the module for eight (8) months have improved during the post-intervention study stage. The possible explanation for the result is that the monitoring and guidance visit to every treatment school has contributed to the improvement of the teachers.

Based on the qualitative analysis on FGD, there are five (5) themes derived from pre and post-intervention study for Bahasa Melayu teachers which are teacher's view on the implementation of RSE Module, teacher's view on the RSE module, skills and confidence in teaching RSE, support from administrative and agencies and teacher's view in teacher's training. Bahasa Melayu teachers from treatment school give more positive feedback for four (4) themes except for view on implementation of RSE module during the post-intervention study compare to control school teachers. Meanwhile, five (5) themes also derived based on analysis for school administrators which are view of RSE, support from other agencies, problem in RSE implementation, student's trend to school and suggestions. School administrators from treatment and control school give a positive view on RSE which shows their awareness on the importance of RSE.

The findings of this study further revealed recommendations by the teachers and administrators. Serious attention and immediate actions are required from various parties involved to ensure the implementation of RSE is able to achieve stipulated objectives. A reasonable approach to improve the implementation of RSE should be taken into consideration. Therefore, Bahasa Melayu teachers need to hold a positive view and attitude towards the implementation of RSE as they are the key personnel in ensuring the implementation of RSE a success. School administrator should play a bigger role in supporting the Bahasa Melayu teachers as well as providing road safety facilities in schools area. Moreover, more involvement and engagement from the Road Safety Department in schools can help to strengthen the establishment of RSE. Last but not least, the involvement of parent in RSE is fundamental as they are the closest individual in children's life.

## **MRR No. 296**

### **Psychological Preparedness & Driving Behaviour among Emergency Response Team in Klang Valley (Fire and Rescue Drivers)**

(ISBN 978-967-2078-58-6)

Author(s): Nuur Sakinah Azman, Nuura Addina Mohamad, Sharifah Osman @ Liew Shyuan Yei, Low Suet Fin, Siti Zaharah Ishak

This research aims to explore the psychological preparedness and the driver behaviour of the ERT service, specifically the fire and rescue team by using a questionnaire adopted and adapted from the Psychological Performance Profile and the Ambulance Driver Self-Assessment Questionnaire (ADSQ). Considering the length of the questionnaire, the time taken by each respondent to answer the questions and that the fire and rescue drivers work in shifts and are on standby mode every time they are on duty at the fire station, only 34 fire engine drivers from Klang Valley participated in this study. Eight performance skills were measured to assess the drivers' psychological preparedness which was Confidence, Physical Arousal, Attention Control, Arousal Control, Imagery Use, Commitment, Self-Talk Use and Physical Condition. The results found that only the skills Imagery Use and Arousal Control has the most number of respondents scoring within the score range of 25-30 ("You made the cut", which means that the fire and rescue driver reflects the foundation of good psychological skills and that he has "made the cut" for continuous positive development in emergency response), which is the second highest score rank. Meanwhile, the constructs measured under Driving Behaviour were Driving Performance, Driving Style, Perceived Driving Competence, Self-Reflection, Reliance on other Road Users and Safety Attitudes. The driving behaviour which the fire and rescue drivers reported to doing most often is keeping enough distance to the vehicle in front (Driving Performance Construct), driving attentively when responding to a call and driving smoothly back to the fire station, both of which fall under the Driving Style Construct. A correlation test also showed that there were several relationships between the specific constructs of the Psychological Performance Profile and Driving Behaviour.



## **MRR No. 297**

### **Identifying Relationship between Skid Resistance and Road Crashes in Malaysia**

Author(s): Rizati Hamidun, Mohd Firdaus Ismail, Akmalia Shabadin, Syed Tajul Malik, Alvin Poi Wai Hoong, Siti Zaharah Ishak

Skid resistance may refer to is the contribution of the pavement to the development of friction that reduces skidding of vehicles on the road. Vehicles skidding on the road continues to be a factor that leads to an accident, especially on the wet road pavement. With an increasing number of crashes on Malaysian road, there a need to call for a study to examine the relationship of skid resistance and road crashes. Utilising local skid resistance value and crash data from local agencies, the Chi-Square test was conducted. The findings indicated that relationship between road accident occurrence and the good pavement surface with higher Grip Number (GN) value (more than 0.41) is statically significant. The possible reasons for this may be the good pavement surface that provides better ride quality might encourage drivers to speed up and tend to be less vigilance while driving. This study could be extended to other road hierarchy in Malaysia to gather more precise data of skid resistance representing a poor pavement surface condition for the establishment of the pavement safety level criterion.

## **MRR No. 299**

### **MIROS Crash Investigation and Reconstruction Statistical Report 2014 – 2016** (978-967-2078-59-3)

Author(s): Afiqah Omar, Kak D Wing, Zarir Hafiz Zulkipli, Ahmad Noor Syukri Zainal Abidin, Siti Atiqah Mohd Faudzi, Mohd Amirudin Mohamad Radzi, Iskandar Abdul Hamid, Mohd Rasid Osman, Siti Zaharah Ishak

MIROS investigated a total of 289 traffic crash cases involving at least one (1) fatality during the three (3) years period from January 2014 to December 2016. This report highlights the statistical analysis of traffic crash cases that had been attended by MIROS throughout the year of 2014-2016. According to the National Motor Vehicle Crash Causation Survey (NMVCCS), it is important to understand the events that lead to crash, in order to prevent the crash from happening. This report summarizes into the descriptive analysis, inferential analysis, indexes on casualties and issues of crash investigation cases from the last three (3) years, 2014 – 2016.

There were 94 cases attended in 2014, 94 cases in 2015 and 101 cases in 2016. Head-on collision recorded the highest proportion compared to other crash configuration. In each year studied, just over a third of the cases attended occurred between 12:00 to 17:59. Most of the cases attended in 2014 occurred in Expressway. However, the pattern shifted, as the highest cases attended in 2015 and 2016 occurred in Federal roads. A large proportion of cases occurred in single carriageway compared to dual carriageway. High number of investigated cases tend to occur on midblock compared to the other types of intersection. More than 50% of the crash cases involved two (2) vehicles for each year, except for 2016. The proportion of crash involving passenger car which excluded 4WD, van and multi-purpose vehicle (MPV) is significantly higher compared to other vehicle types. In terms of weather, the vast majority of cases attended occurred during fine weather and daylight.

The inferential analysis shows some parameters have significant relationships with other variables. The results reveal that the odds ratio of fatal crash with no survivor decreased with driver's age. Both motorcycle rider and pillion are 5.5 times more likely to be killed in a crash than car occupants (95% CI: 3.083-9.770). A crash with two (2) vehicles involved was also associated with higher fatality odds when compared to single vehicle

crash (OR: 2.0, 95% CI: 1.115-3.739). An increase in deformation extent of the vehicle will increase the odds of fatality for vehicle occupants. Occupants in vehicle with deformation extend up to nine (9) experiences 4.0 times risk of fatality compare to those in vehicle with deformation 1-3 (95% CI:1.902-8.491). The odds for vehicle with PDOF 8-10 to involve in fatal crashes without survivor were 2.1 times when compared to PDOF 11-1 (95% CI: 1.048-4.369). For cases involving three (3) fatalities and above, the odds of crashes on federal road are 2.7 times as compared to expressway (95% CI:1.515-4.819). The odds of having three (3) road traffic fatalities and above in a head-on collision is approximately 3.7 times than rear impacts (95% CI: 1.885-7.678).

KSI and fatality index was evaluated in terms of crash factors such as day, time, month, state, vicinity, lighting, weather, road type, intersection, road alignment, carriageway, crash configuration and number of vehicles involved. The analysis showed that KSI index is high on Thursday, time between 2001 to 2400, month of December, state of Sabah, vicinity of wood, daylight, during good weather, in federal road, crossroad intersection, straight and even road alignment, single carriageway, cased involved head-on and multiple vehicles. Except for lighting, a high number of fatality index on night without light instead of daylight and merging lane intersection instead of crossroad, the fatality index has shown the highest number for the parameters listed above. Risky driving and speeding are found to be the most identified crash occurrence factors in the investigated cases for the year 2014 – 2016. Meanwhile, for injury occurrence factors, crash compatibility conquered most of the findings in every variable analysed.

## **MRR No. 301**

### **An Observational Study on Road Safety Practices Based on Road Safety Education**

(978-967-2078-60-9)

Author(s): Roziana Shahril, Siti Zaharah Abdul Khodir, Nurfatim Nadia Mohd Suhaimi, Low Suet Fin, Siti Zaharah Ishak

MIROS was given the honour by Road Safety Department of Malaysia (RSD) to carry out the project of Review and Redevelopment of Road Safety Education (RSE) Module for Primary and Secondary Schools after almost 10 years' implementation of RSE in Malaysia. This RSE were incorporated in Bahasa Melayu subject as a part of the formal curriculum. This study aimed to observe the road safety practices among Form 4 secondary school students in the year of 2016 who receive Road Safety Education partially and later the data will be used to be compared with Form 4 secondary school students in the year of 2017 who receive Road Safety Education in a complete cycle. The observations were collected under scientific and systematic observations that were recorded in observational study form. The observed road safety practices focused on the positive and negative behaviour of seatbelt wearing in the car, helmet wearing and proper fastening, zebra crossing facility usage (with or without push button) and overhead pedestrian bridge usage. These practices are available in the syllabus of Road Safety Education. The sample was obtained in seven selected schools (SMK A, SMK B, SMK C, SMK D, E, F and SMK G) in six (6) states; Melaka, Kedah, Sarawak, Selangor, Sabah and Kelantan. The findings of this study revealed that the overall compliance for the road safety practices among the Form 4 students in the seven (7) schools are not even achieving 50% of compliance in which the highest compliance is only 38.80%, whereas the lowest compliance is 0.62%. On the other hand, when compared to the number of total behaviour, it can be seen that level of compliance is only 17.38%. Low level of compliance for both analyses was expected as these groups of Form 4 students did not receive a complete cycle of road safety education thus the students did not have strong knowledge and awareness of safe behaviours that related to road safety practices.

## **MRR No. 302**

### **Exploratory Study on Motorcycle Personal Protective Clothing Performance**

(978-967-2078-61-6)

Author(s): Mohd Syazwan Solah, Aqbal Hafeez Ariffin, Mohd Hafzi Md Isa, Azhar Hamzah, Noor Faradila Paiman, Zulhaidi Mohd Jawi, Muhammad Syukri Abdul Khalid, Mohd Rasid Osman, Siti Zaharah Ishak

Every year, nearly 1.3 million people are killed and up to 50 million people are injured on the world's roads. Approximately 30% of road deaths involved motorcyclists especially in Asia region every year. The high number of motorcycle-related fatalities suggests the popularity of the mode of transport worldwide which offer ease mobility, accessibility, affordability and flexibility. The major contributor for road traffic fatalities in Malaysia is motorcycle users which accounted for approximately two-thirds of fatalities yearly. Based on the yearly fatal cases statistics, the number keeps increasing consistently with the number of registered motorcycles. As motorcyclists are categorized as vulnerable road users (VRUs), the importance of personal protection equipment (PPE) is crucial to mitigate and minimize the injuries resulted from road crashes. The most basic PPE for motorcyclist is helmet which has been regulated in many Southeast Asia countries due to its effectiveness in reducing head injuries. Other than that, protective clothing is also vital to protect human body parts from injuries. This study attempted to explore the effectiveness of motorcycle protective clothing performance available in the Malaysian market. Selected motorcycle protective clothing was tested using anthropometric test device, calibration equipment and instrument. In addition, market survey was established to explore and survey the type and trend of motorcycle protective clothing available in the market. This study found that motorcycle protective clothing with protector i.e. padding and airbag can show potentially reduced neck and chest injury in contrast with those with no protection. Furthermore, result reveals that 55% of protective clothing available was made of synthetic material. The overall results provide significant information that is useful in the development of countermeasures aimed to improve motorcyclist's safety.

## **MRR No. 304**

### **Effectiveness of OPS Chinese New Year 12/2018 An Evaluation Study**

(978-967-2078-63-0)

Editor(s): Noor Faradila Paiman, Mohd Rasid Osman, Low Suet Fin, Siti Zaharah Ishak

This report contains an evaluation study of OPS CNY 2018. OPS CNY 2018 evaluation study was conducted on 9<sup>th</sup> to 23<sup>rd</sup> February 2018. This year, OPS CNY 2018 focusing on motorcyclist safety. The evaluation was conducted through several research projects. These projects support two (2) main indicators of the OPS CNY effectiveness i.e. road users' perception of enforcement and advocacy and road users' behavioural changes. Among the measured variables are traffic volume and vehicle speed, seat belt wearing, helmet wearing, child restraint system usage, perception of being caught and road safety information dosage. Findings of each measured variable, according to the predetermined indicators, were presented in separate chapters. The comparative trend of road users' perception and behavioural changes during OPS period and normal days baseline period was observed. As a result, it was found that there is an increase in road users' perception of enforcement during the OPS period. In addition, a positive change of road users' behaviour including seat belt wearing, helmet wearing, voluntary CRS usage, heavy vehicle movement compliance can be perceived during the period. However, the advocacy through media needs to be further strategized as it did not show any significant relationship in terms of number of media dosage received with the road user behavioural change. These findings reveal that the OPS CNY 2018 has an effect on road users but it can be further improved in order to reach a satisfactory road safety benchmark. Accordingly, some recommendations are proposed to improve the effectiveness of the OPS, especially on the variables that indicate an alarming percentage of compliance.

## **MRR No. 305**

### **Determination of the Exposure and Travel Mode to School**

(978-967-2078-64-7)

Author(s): Nurulhuda Jamaluddin, Sharifah Allyana Syed Mohamed Rahim, Nur Zarifah Haron, Azzuhana Roslan, Akmalia Shabadin, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

This study is to determine the exposure and travel mode for trip to school by survey method at 59 schools in Selangor. This study approaching parents via student as a child and student. The method was more effective and additionally, quality information was obtained.

This study aimed to collect data on exposure travel to school by the student as well as improve the quality of information on exposure travel among the student. In this study, mode travel was selected as the main variables for mode choice study. Second aims of this study are to understanding and identify what is the reason influence travel mode to school. It can contribute information to better design policies and infrastructure around the school area.

A total of 5426 parents participated in this survey, 47% have child from primary school and 53% have child from secondary school. About 26% of the student lives more than 6 km from school and 41% of parents choose motorcars as the main travel mode for their children. But the analysis shows that 66% choose “walk” mode of travel distance is less than 1 km. Although, the motorcar is the popular travel mode to school, there are some children walk/bicycle to school for almost any distance.

The authorities need to strategize the development of facilities near school. The study in travel mode choice helps the authorities build a better environment for student and community. This study recommends to authority for building the proper walkway more than 1 km from school to resident area. It can reduce the risk of exposure between home and school and develop a safe route to school.

## **MRR No. 309**

### **Effect of Adult Supervision on School Children Crossing Behaviours**

(ISBN 978-967-2078-65-4)

Author(s): Rizati Hamidun, Azzuhana Roslan, Nur Zarifah Harun, Akmalia Shabadin, Nurulhuda Jamaludin, Syarifah Allyana Syed Mohamed, Noraini Othman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

School children who cross a road in front of their school are exposed to the danger of traffic accident. Their characteristics of smaller body size and immature thinking contribute to the risk of an accident while crossing the road. The current research was carried out to investigate the effect of adult supervision on children crossing behaviour. Adult in the study refers to parents and school traffic warden of selected primary schools. This quantitative survey-design study was conducted at eight (8) selected primary schools located in Selangor, specifically at four (4) schools with and four (4) schools without crossing facility. Data were collected by site observations using manual and video recorded the children crossing behaviour. Results show that the percentage of adult supervision at school with and without crossing facility are 90% and 89%. Crossing gap and crossing speed were observed at four (4) conditions: i) crossing with parent and warden, ii) crossing alone with warden, iii) crossing with parent without warden and iv) crossing alone without warden. The crossing gap of children at school with crossing facility was higher than the crossing gap of children at school without crossing facility, whereas, the lowest crossing gap emerged when children crossed the road alone without being assisted by school traffic warden. The crossing speed for children at school with crossing facility showing higher mean speed for all four (4) conditions observed. Findings of this study indicated that the supervision of school traffic warden for school children crossing is crucial to enhance the safety of young pedestrians.



## **MRR No. 310**

### **Evaluation of Roadside Safety on Malaysian Inter-Urban Expressway**

(ISBN 978-967-2078-66-1)

Author(s): Nora Sheda Mohd Zulkiffli, Nusayba Megat Johari, Akmalia Shabadin, Alvin Poi Wai Hoong, Siti Zaharah Ishak, Rizati Hamidun, Khairil Anwar Abu Kassim

This study aimed to evaluate the roadside safety on Malaysian expressway on crash severity in vehicles running off the roadway and providing a wholesome view on the associated crash risks. The study was based on crashes data for PLUS expressway recorded from 2013 to 2015. In run-off from the main lane onto the roadside and hitting objects, vehicles tend to hit safety metal barrier, drainage, non-frangible sign/post/pole and temporary object increase the propensity towards serious injuries, minor injuries and vehicle damage. Result of relative risk indicated, in the case of motorcyclist, a roadside with a rigid structure/bridge or building would be 5.7 times more likely to result in a fatal crash compared to a safety barrier, whilst tree was found to be severe for vehicle occupants with 5.6 times. Downwards slope contributed to the higher risk for heavy vehicle with 5.9 times to be killed in road crashes compared to impact with safety metal barrier. The results from this study also reveal that the provision of a form of barrier against the various roadside objects is an important feature to providing a forgiving infrastructure in the event of a vehicle going off the road.

## **MRR No. 311**

### **Contribution of Commercial Goods Vehicle Volumes in the iRAP Risk Model**

(ISBN 978-967-2078-67-8)

Author(s): Ho Jen Sim, Alvin Poi Wai Hoong, Nusayba Megat Johari, Akmalia Shabadin, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

As the demand for heavy vehicles continues to increase in Malaysia, the number of registered commercial vehicles had also seen tremendous growth over the years. Unfortunately, the risk of traffic accidents associated with commercial vehicles was also growing in the parallel upward trend. In-depth crash investigation by MIROS on 550 fatal crashes which involved light vehicles and commercial goods vehicles (where the number of fatalities was three or more and at least one, respectively by vehicle type) pointed out that head-on and rear-end crashes had almost constituted three-quarter of the total investigated crashes.

On the other hand, one (1) of the national efforts to promote road safety is the adoption of iRAP programmes. iRAP is a non-profit organisation aims to save lives through evidence-based approach; utilising road survey methodology in the identification of road condition and environment. Presently, the iRAP model considers four (4) modes of road users: car occupant, motorcyclist, pedestrian and pedal cyclist, whilst the crash type included in the analysis are run-off, head-on, and intersection-type crashes. Within the Malaysian road context, the non-representation of commercial vehicles or heavy vehicles, as well as other crash type calls for further study on the feasibility of the existing model. Thus this study aims to evaluate the substantiality of run-off and rear-end crash for commercial vehicles to be included in the current road assessment programme.

The bulk of data used in this study is secondary data obtained from the Malaysian Highway Authority (LLM) from the year 2013 to the year 2014. A total of 9152 and 10032 accidents year 2013 and 2014, respectively have been utilised in this study. Though the number of commercial vehicles involved in the crashes had increased, the proportion of involvement had decreased. Run-off accidents had the highest scores which constituted half of the total accidents (51.3% – 52.7%) while the second highest type of accident was rear-ended collision which reported about 28.8% to nearly 30% of the total collisions. Chi-square analysis revealed that rear-ended collision is 1.3 – 1.7 times more likely to

involved in KSI as compared other collision. Commercial vehicles are 1.9–2.2 times more likely involved in rear-end collision as compared to other collision. In both cases, the reverse is true for run-off collision.

## **MRR No. 312**

### **Riding Anger in Relation to Experiencing of Road Crashes among Motorcyclists**

Author(s): Sharifah Osman @ Liew Shyuan Yei, Rizati Hamidun, Nor Fadilah Mohd Soid, Nuur Sakinah Azman, Noradrenalina Isah, Low Suet Fin, Khairil Anwar Abu Kassim

In Malaysia, more than 60% of the fatalities involving road crashes were motorcyclists. It is believed that riding anger to be significantly related to road crashes such as near misses, loss of concentration, tailgating and losing control of the vehicle. The main objective is to explore riding anger in relation to experiencing of road crashes among motorcyclists. The research is conducted using a semi-quantitative approach to measure the riding anger of motorcyclists while riding on the road. In total, 407 respondents participated in this study. The result showed unsafe driving or riding situation were the most commonly reported with riding anger (M=4.36). It means that respondents were most annoyed and irritated while facing these situations. Illegal driving or riding (M=4.29) and inconsiderate (M=4.11) were the next most common types of situation. This was followed by road condition and design (M=3.77), traffic obstruction (M=3.76), rudeness (M=3.72), slow driving or crossing (M=3.32) and rainy condition (M=3.10). Enforcer presence was the lowest score to be anger among riders with the average mean 2.78. Besides that, the finding showed only two (2) subscales appear to be significant with crash involvement which unsafe driving/crossing and rainy condition.

## **MRR No. 313**

### **Implicit Attitude to Speeding: Instrument Development and Validation**

(ISBN 978-967-2078-62-3)

Author(s): Ahmad Azad Ab Rashid, Low Suet Fin, Mohd Firdaus Mohd Siam, Khairil Anwar Abu Kassim

Speeding – while has been acknowledged as the main contribution to the safety outcome, has yet to receive sufficient fundamental research to explore its determining factors. Previous studies have demonstrated the role of attitude in influencing speeding behaviour. This insight, however, was more applicable to the attitude that normally relied on self-report. With the recent development of attitude research, in particular the idea of implicit versus explicit attitude, the study has developed Speeding-IAT – a computerised instrument to measure cognitive association of speeding and favourableness – to explore the implicit attitude of road users in Malaysia towards speeding. The results indicated that 80% of participants indirectly consider speeding favourable (i.e. have positive implicit association to speed); thus shedding some light to why speeding is the main issue in Malaysia. Further, examining the correlation between explicit and implicit attitudes towards speeding revealed a counter-intuitive inverse relation. The discussion section offers some potential explanation of these findings as well as future direction in further uncovering about '*mondobut*' or '*membesit*' – among local colloquial phrases to speeding.

## **MRR No. 314**

### **Determinants Behind Unlicensed Motorcyclists among Secondary School Students**

Author(s): Sharifah Osman @ Liew Shyuan Yei, Nor Fadilah Mohd Soid, Nuur Sakinah Azman, Low Suet Fin, Khairil Anwar Abu Kassim

Malaysia is recognised as one of the countries in this region that has the highest road accident rates among young motorcyclists between ages 16 to 20 years. According to PDRM statistics (2017), in total 1,090 out of 6,740 fatalities involved riders in this age group. The main objective of this research is to find out the determinants behind unlicensed motorcyclists among secondary school students based on self-reporting and parents' perspective on unlicensed riding. The research was conducted using the semi-quantitative approach based on self-reported questionnaires. In total, 454 students and 131 parents or guardians were involved in this study. The mean age of participants (students) who were riding for the first time was 13.14 years, with the youngest only five (5) years old. Results showed that the main factor leading to unlicensed riding was the fact that the participants below eligible age for motorcycle licenses and this caused them to ride illegally on the road. The research found that 40.6% of participants were unlicensed when the accidents occurred. However, the finding showed no significant relationship between the experiencing of accidents and licensing. Further, the result shows that there was a significant relationship between participants the first experience of motorcycle riding and their parents' perspective on unlicensed riding.

## **MRR No. 315**

### **Identification of 'Solutions Information' Elements in Road Crash Reports among the Malay Newspapers in Malaysia**

Author(s): Yusof Ghani, Zulhaidi Mohd Jawi, Mohd Rasid Osman, Khairil Anwar Abu Kassim

As 7,000 road crash fatalities are recorded in Malaysia annually, the story of horrific accidents appears on Malaysian newspapers almost every day without fail. The rule of thumb is the more people killed, the bigger the news coverage. While the news about the road crash is common, little is known about the contribution of news in generating awareness for behaviour change among road users. Therefore, this study investigates the constructive journalism approach to news reporting through one of its constructs, which is the presence of 'solutions information'. The solutions information comes in the form of 'the 6th W' which actually questions 'what's next?', besides the already well-known news elements of '5Ws and 1H'. The study was carried out using a content analysis approach on 100 pieces of road crash news articles from the selected Malay language newspapers over three-month period. This qualitative analysis identifies the demographic distribution of crash victims; such as age, sex, race, time of crash, and the reasons of crash. The analysis primarily seeks the presence or absence of solutions information, which normally in the form of advice from subject matter experts or authorities. Then, a comparison is made among newspapers with regards to the presence of solutions information in their respective news reports. The results indicate that solutions information is non-existence among the Malay newspapers when reporting road crash. The study is hoped to improve the way news on road crash are reported; adding prescription to road safety issues rather than simply describing the events that lead to crash.

## **MRR No. 316**

### **The Assessment of Drop-off and Pick-up (D&P) Zone in School Vicinity**

(ISBN 978-967-2078-69-2)

Author(s): Sharifah Allyana Syed Mohamed Rahim, Nur Zarifah Harun, Azzuhana Roslan, Nurulhuda Jamaluddin, Akmalia Shahabudin, Rizati Hamidun, Rohayu Sarani, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

Statistics from the Royal Malaysian Police (RMP) in 2016 show that 228 accidents occurred in school areas. One of the facility to improve school children safety in school area is drop-off and pick-up zone. Drop-off and pick-up zone in school zone is defined as an area beyond the road reserve or within the school boundary that is dedicated for dropping off and picking up school children by private vehicles, vans and school buses. The study objectives are to identify the availability of designated Drop-Off and Pick-Up (D&P), to assess the utilization of designated D&P and to determine the trend of dropping off student within the school zone. This study which was conducted in Selangor found that out of 60 schools, D&P is only available at 20 schools. From these 20 schools, 11 schools with D&P is available in primary school and the remaining 9 available in secondary school. In terms of utilization of D&P at these schools, 49% of the observed school children used this facility. Observation at school with D&P also the revealed that school children were picked up by their vehicles outside the D&P area with 31% at nearside of the school and 20% at the far side of the school. The observation also shows that the utilization in school with D&P is higher at secondary school with 52% as compared to primary school only 46%. The study also identified that 11 out of 20 schools with D&P are located on primary streets. However, D&P utilization by road type is highest at school located on the federal/state road (67%). This study shows that the D&P utilization for dropping and picking up school children can be further increase if parents/bus drivers do not wait in D&P zones. With the high and effective D&P utilization, it will lower the risk of school children getting involved in an accident while crossing the road.



## **MRR No. 317**

### **Effect of Seatbelt Wearing on Injury Severity in Passenger Vehicle Fatal Collisions**

(ISBN 978-967-2078-70-8)

Author(s): Fauziana Lamin, Afiqah Omar, Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Khairil Anwar Abu Kassim

Seatbelt wearing is among the major determinant of occupant survivability as road traffic collision is discussed. In Malaysia, very limited information can be found on seatbelt wearing compliance and its effect on injury severity. In this study, an examination of the actual passenger vehicle collision data was conducted among crashes investigated by the Malaysian Institute of Road Safety Research (MIROS). The data includes cases within 2007 and 2014. The result indicates very low seatbelt compliance among the crash victims. It was revealed that injuries and fatalities are more prominent between unbelted occupants. The data demonstrate that survivability is slight increases if seatbelt was utilised, even in a severe collision. In view of injury levels, belted occupants are less likely to suffer a higher level of injury severity as compared to those unbelted. Pearson chi-square and logistic regression analysis were performed to evaluate the factors associated with seatbelt wearing and injury severity. As a result, the behaviour of seatbelt wearing was found to be positively associated with occupant gender, seating position and age. Whereas, vehicle deformation extent and vehicle mass were determined to be associated with survivability. These findings could assist the road safety practitioners as well as decision-makers in gaining further insight into the real seatbelt wearing scenario and the resulted injury among the crash victims involving in fatal crashes on Malaysian roads.

## **MRR No. 319**

### **Compilation of OPS Bersepadu Studies Conducted During Hari Raya Aidilfitri 2017**

(ISBN 978-967-2078-71-5)

Editor(s): Low Suet Fin, Nor Fadilah Mohd Soid, Wong Shaw Voon, Khairil Anwar Abu Kassim

Every year, the respective authorities will perform an integrated operation called OPS Bersepadu as an approach to curb the fatality rate incurred during festive seasons. Time, manpower, money and efforts were invested in order to create awareness and enhance traffic regulations among the road users. Thus, MIROS has conducted several studies to assess the effectiveness of OPS Bersepadu conducted for this Hari Raya Aidilfitri (HRA). The evaluation study was conducted through several research projects i.e. seatbelt wearing compliance, helmet wearing compliance, vehicle speed and CRS usage. The findings of each measured variable were presented in separate chapters. The comparative trend of road users' perception and behavioural changes between during OPS and the non-OPS period was observed.

As expected, traffic volume during the OPS period increased on the expressways and Federal Roads. The volume of the vehicles during OPS Hari Raya Aidilfitri was 28% higher compared to normal days. Heavy vehicle banning strategies were found to be effective due to the existence of enforcement during OPS. The percentage of heavy vehicles decreased to 37% for both the expressway and Federal Road during OPS Hari Raya Aidilfitri 2017.

Meanwhile, the speed study found that the mean speed during OPS was 77.6 kph while the mean speed after OPS was 77.0 kph. It was observed that the OPS speed limit violation rate of 80 kph and 90 kph was lower during OPS as compared to after OPS. Even after the speed limit was increased back to 90 kph, there were no significant changes in the mean speed.

As for helmet wearing, proper helmet wearing shows a significant increment among motorcyclists during OPS. While the results are non-indicative for its influence towards helmet wearing, the overall helmet wearing rate, nevertheless, is already positive.

The seatbelt wearing rate was also higher during OPS for driver and front passenger but declined slightly for rear passengers. When comparing the seatbelt wearing rate by types of vehicle, car drivers and front passenger showed a significant increase during OPS. Drivers and front passengers who travelled on expressway also showed a significant increase during OPS. On the other hand, seatbelt wearing among drivers of 4WD and rear passengers of MPV/SUV decreased from before OPS to during OPS.

Despite the launch of OPS Bersepadu, the CRS use observed is still low (below 50%). The decreasing number of CRS used during OPS may be affected by the festive season whereby most family members travel together in one (1) vehicle, hence the limited seats for the occupants. While CRS use can reduce infant fatalities up to 70% and 54%-80% for small children, clearly the importance of the use of CRS is still not a priority among drivers as part of road safety.

The level of POBC for this HRA 2017 was surprisingly high before OPS started. Later, an increment of 2.2% was recorded during OPS. However, the increment was not significant. Meanwhile, the percentage of enforcement visibility throughout the implementation of OPS shifted from medium to high. The results from the inferential statistical analysis clearly show a significant difference in the existence of enforcement activities. This indicates that the road users saw a significant increase in enforcement activities during the implementation of OPS HRA 2017 as compared to before the implementation of OPS HRA 2017.

This study shows that road safety messages play an important role in enhancing awareness. The messages must be focused and not general (such as be safe on the road) to tailor to the road users in complying with specific traffic regulations. Social media platform shows the most received road safety messages among road users. Therefore, the selection of medium plays an important role in conveying messages towards these target group.

## **MRR No. 320**

### **Measurement of Driver Distraction While Using Navigation Device via Driving Simulator**

(ISBN 978-967-2078-68-5)

Author(s): Mohd Firdaus Mohd Siam, Ahmad Azad Ab. Rashid, Mohd Khairul Alhapi Ibrahim, Nurulhana Borhan, Low Suet Fin, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

The navigation device is a very helpful tool to assist and guide drivers that travelling from point A to point B. Unfortunately, it has the potential to distract drivers through several means. The main objective of the study is to measure the driver distraction of navigation device usage in a simulated traffic environment using Detection Response Task (DRT) method. In this study, 46 participants completed a number of secondary tasks while concurrently performing the DRT in a simulated driving environment. For driving scenarios comparison, three (3) scenarios were used; low speed (40 km/h), high speed (110 km/h) and traffic jam. Apart from the 0 character number, other secondary tasks such as 1, 2, 3, 4, 5, 7, 9, 14, 20 number of characters were also assessed. Overall, the results of this research showed that participants responded to lesser stimuli as the number of character increases. On another note, we also found that drivers were more distracted with more demanding task to handle the navigation device as compared to baseline. Besides, the study discovered that novice drivers group was identified to respond significantly faster rate than the experience drivers group.

## **MRR No. 323**

### **Online Survey on Attitude among Car Drivers towards Motorcyclists in Klang Valley**

Author(s): Nuura Addina Mohamad, Sharifah Liew, Low Suet Fin, Khairil Anwar Abu Kassim

With the millions of vehicles travelling on Malaysian road adding up each year, conflicts that cause road crashes and casualties among vehicles and the victims are inevitable. Statistics revealed that almost one (1) million vehicles are involved in road accident each year. Unfortunately, this leads to the high involvement of vulnerable road users specifically the motorcyclists in road crash. Cars involvement in road crash come in the second spot but far lesser than motorcycles. In order to properly understand the interaction between car drivers and motorcyclist, the study probes on how drivers think of the motorcyclists through the experience while they drive. More than 400 drivers in Klang Valley were engaged to answer self-administered questionnaire through online survey. The study found that among car drivers there exist certain attitudes towards motorcyclist which can be categorized as negative attitude, emphatic attitude and awareness of perceptual problems. Findings suggest that drivers have a certain degree of consideration and understanding of motorcyclists. It is also evidenced that significant differences in the attitude among car drivers to motorcyclists are available between drivers only and dual drivers (driver and rider). With the findings, it is suggested that drivers can be further nurtured to be respectful and understanding of riders through campaigns and media exposures. Meanwhile, riders should also increase their visibility to other drivers by wearing and avoiding inappropriate manoeuvres that can compromise their visibility. Training curriculum for new drivers and riders should also highlight the importance of conspicuity problems and enhance understanding of the vulnerability of riders.

**MRR No. 324****Prevalence of Used Child Restraint System in Malaysian Market**

(ISBN 978-967-2078-72-2)

Author(s): Noor Faradila Paiman, Mohd Syazwan Solah, Azhar Hamzah, Mohd Hafzi Md Isa, Mohd Rasid Osman, Khairil Anwar Abu Kassim

Children are much more likely than adults to get serious injuries in car crashes. Child restraint system (CRS) has been proven to reduce injury and prevent fatality in the event of a crash. Mostly, the barrier for parents to buckle their children in the 'best-fit' CRS is the price to buy different type of CRS for different age of children. This study investigated the availability of alternative markets for cheaper CRS, availability of the used CRS selling online or in physical stores in Malaysia and the conditions of the used CRS. It was found that second-hand CRS are widely sold online in various platforms as compared to a physical store and the prices of used CRS do not differ that much as compared to the new products. This shows that consumers have alternative markets to purchase CRS for their children at reasonable prices. Thus, it is recommended for consumers to check the quality of the used CRS before deciding to purchase.

## **MRR No. 325**

### **Understanding Characteristics of Motorcycle-Car Crashes Using Self-Reported Approach: A Case Study**

Author(s): Mohd Hafzi Md Isa, Ahmad Azad Ab Rashid, Zulhaidi Mohd Jawi, Ahmad Noor Syukri Zainal Abidin, Nuura Addina Mohamad, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

Road traffic crashes are becoming an increasing contributor to the mortality rate of Malaysians especially motorcycle users. Although various initiatives have been implemented in the country since decades ago, the number of motorcycle fatalities is still increasing. In order to propose effective intervention activities, accurate and in-depth information on crash data is needed so that certain issues can be prioritised. Due to limitations on existing crash databases, this study embarked on a new method of self-reporting to obtain additional information, especially on detailed crash configurations. In this study, an automotive company was selected as the study population to serve as a case study. Based on the self-reports from 141 participants, the findings revealed that most of the crashes involved males and aged in the 30s, were slight and severe injury cases, occurred during peak hours travelling to and from work places and were side and rear end collisions. It was also revealed that side impacts were primarily due to drivers' faults, specifically performing dangerous turnings at intersections. As for rear impacts, most faults lie with motorcycle riders who followed too close to the cars in front. These findings can be further explored by proposing specific intervention programs so that the number of commuting crashes and injuries can be significantly reduced among the workers. This self-reporting approach can also be replicated and improved for other settings.

## **MRR No. 326**

### **Motorcyclists' Crash Causation Factors Associated with Lane Filtering and Splitting**

ISBN 978-967-2078-73-9

Author(s): Mohd Khairul Alhapiz Ibrahim, Mohd Firdaus Mohd Siam, Low Suet Fin, Khairil Anwar Abu Kassim

This study was conducted to determine motorcycle crash causation factors related to lane filtering and splitting movements. Four (4) motorcyclists were recruited and supplied with a Garmin VIRB XE action camera to record their riding data for a month. The camera was mounted on the helmet and was capable of recording the front view, riding speed, distance of travel, positioning data and acceleration data. The analysis of the recorded riding data had resulted in the classification of 258 crash relevant events, with a staggering 96.5% of them occurred while the participants were filtering or splitting in between lanes. A binary logistic regression was conducted to determine the factors influencing the likelihood of a near miss during a crash relevant event. The results revealed that the odds of the motorcyclists to experience a near-miss while filtering or splitting in between lanes was 8.5 times higher when the conflict partner was another motorcycle, as compared to a heavy vehicle. Further, lane splitting or lane filtering movements on the non-highway roads were 2.2 times more likely to result in a near miss, compared to highways. No other factors were found to be significant based on the current dataset. The results were discussed in terms of the way to mitigate the associated crash risk facing the motorcyclists in Malaysia.



## **MRR No. 327**

### **A Review of Recent Developments in Bus Rapid Transit System**

(ISBN 978-967-2078-74-6)

Author(s): Afiqah Omar, Fauziana Lamin, Kak D Wing, Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Khairil Anwar Abu Kassim

The first Bus Rapid Transit system in Malaysia was implemented in the south-eastern suburbs of Petaling Jaya, Selangor and has been launched to the public since June 2015. The objective of this study is to evaluate the potential of BRT implementation in Malaysia. This report summarizes into the literature review of current BRT systems in other cities, the safety performance of public vehicles in Malaysia, field visit and data collection followed by suggestions for improvement in the BRT system in Malaysia. The results show that 84% of road accidents in Malaysia involved private vehicles, and among public vehicles, taxi recorded the highest number of accidents. From the observation, it can be seen that the travel time of BRT is reliable and consistent, male-female ratio of BRT users is 1.06, 90% of the users are aged between 15 to 64 years old, 0.2% of the users observed are disabled persons and the highest average passenger is detected during afternoon peak period. During the period of the study, the system is still struggling to achieve predicted ridership. Until May 2017, the number of ridership is reported around 6000 a day, where the earlier forecast predicted ridership of 2,400 passengers per hour. Nevertheless, continuous efforts need to be strategized in order to promote the system and future attempts on the extension should be carried out to generate a sustainable public transport system.

## **MRR No. 328**

### **The Characteristics of School Student Riding Bicycle or Motorcycle to School**

(ISBN 978-967-2078-75-3)

Author(s): Nur Zarifah Harun, Sharifah Allyana Syed Md Rahim, Nurulhuda Jamaluddin, Azzuhana Roslan, Rizati Hamidun, Akmalia Shabadin, Muhammad Marizwan Abdul Manan, Siti Zaharah Ishak

The increase in the number of road accidents among the school student raised a concern by parents, especially when children are out of their supervision. The risk of traffic crash between school students and vehicle is compounded if these schools are located near the main road where the high traffic flow can cause the student more prone to accidents. The aim of this study is to identify the characteristics of school students riding motorcycles and bicycles to school in terms of road type, school type, and area type. Besides, the use of bicycle and motorcycle safety gears among school students was also conducted. An observational study was conducted at 15 primary schools and 28 secondary schools. The list of schools was selected from secondary data provided by the Ministry of Education. Data collection for each school was conducted during morning session schools' end time around 12.30 p.m. to 2.30 p.m. A total of 3,280 students were observed. From the observation made, study shows that variables such as gender, different school type, road type, and area type gives different percentages of the number of students riding bicycles and motorcycles to school. In addition, studies found that school student not using the safety gears when riding bicycles and motorcycles. From the observation made, there are some conflicts occurred between students and other vehicles that may endanger the safety of students. In addition, there are some school students riding in danger even though they are still in the school vicinity. Even with the presence of traffic warden, school students are crossing the road with danger and not using the correct path. This does not only jeopardize the safety of motorcyclists but also the safety of other students and other road users.

## **MRR No. 329**

### **Evaluation of the Effectiveness of Pedestrian Building Linkages in Promoting Safe Travel in Kuala Lumpur**

(ISBN 978-967-2078-76-0)

Author(s): Alvin Poi Wai Hoong, Nusayba Megat Johari, Nor Aznirahani Mhd Yunin, Ho Jen Sim, Syed Tajul Malik Syed Tajul Arif, Norfaizah Mohamad Khaidir, Mohd Firdaus Ismail, Nora Sheda Mohd Zulkiffli, Siti Zaharah Ishak, Wong Shaw Voon

The predominant risk faced by pedestrians in Central Business District (CBD) areas is getting hit by motorized vehicles while walking or crossing the road. One of the contributing factors among others is jaywalking, or crossing at inappropriate locations or not waiting for the green light. The solution of providing overhead bridges to reduce such risk often comes with challenges such as high project cost and underutilization of the facilities. In other words, investment in such projects does not necessarily generate the expected return in terms of risk reduction. This study is aimed at evaluating the effectiveness of several building linkages spanning across the road (overhead bridges) in Kuala Lumpur CBD in terms of its utilization and to estimate the project return of investment. The risk of at-grade crossing at these locations were estimated based on observed traffic conflict count to predict the savings in terms of number of injuries prevented. This study showed that the utilization rates of building linkages across the study locations varied greatly and influenced by the presence of escalator and continuous fence on the sidewalk. Most of the pedestrians interviewed further confirmed these as most of them preferred crossing option that takes lesser time and distance (no fencing) and effort (having escalator). Similarly, the risk of crossing at-grade varied across study locations which may be attributed to the different road and traffic characteristics. Based on the above findings, the estimated project return of investment were also found to vary across the study locations. The findings suggested that high return of investment can be obtained at location with high risk of at-grade crossing and high utilization rate of the building linkage. This study provides some evidence of the link between the utilization rate of building linkage, risk of at-grade crossing and the return of investment of a project. The analysis method adopted in this study can be used for project evaluation to prioritize alternative project schemes.

## **MRR No. 330**

### **Test Routes at Driving Institutes in Malaysia**

ISBN 978-967-2078-77-7

Author(s): Ahmad Azad Ab Rashid, Zulhaidi Mohd Jawi, Mohd Khairul Alhapi Ibrahim, Azmi Awang, Low Suet Fin, Mohd Rasid Osman, Mohd Firdaus Mohd Siam, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

In testing for driver licensing in Malaysia, test route plays an important role. Testers evaluate the competency of candidate drivers when they drive along the routes. Because each driving institute has different test routes the prominent question was on whether it gives sufficient opportunity for the evaluation. This study tries to address this question by profiling 22 test routes from 10 institutes and mapping the properties of each route with targeted learning outcomes (LOs) of the driving curriculum. Results reveal that despite variations across these routes, the routes still cover most of the intended LOs. This report further discusses the issue of urbanity status, the issue of balance between ideality and practicality, as a suggestion to enhance test routes in Malaysia, as well as potential directions for future study.

## **MRR No. 331**

### **Safety Star Grading Evaluation on Operators Safety Performance and Public Perception**

(ISBN 978-967-2078-78-4)

Author(s): Mohamad Suffian Ahmad, Ilhamah Othman, Wahida Ameer Batcha, Noor Kamaliah Alias, Aziemah Azhar, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

Safety Star Grading programme provides an indicator of the safety performance of bus operators for the general public to make their best choice with confidence when they want to travel. On the other hand, the safety star grading also would benefit the bus operators themselves in term of their image, publicity and reputation. In year 2015, the level of Safety Star Grading awareness among public was 7.3% and this situation is expected since the program was not extensively publicized (Ahmad et al., 2016). The objectives of this study are to assess the awareness of passenger using the service of award operators; to assess the customer feedback criteria of 5 Star rating in SSG and; to study the difference of six (6) operators awarded with star rating in related to service performance. The sample was randomly selected for six (6) trips of each six (6) express bus with star rating among customers who travel with express bus that involve in this study. This study is based on face to face interview and GPS was used to monitor bus speed. The number of respondents being alert for SSG program also has increase to nearly double from 7.3% in the year 2015 (Ahmad et al., 2015) to 14% in the year 2016. In term of punctuality, the percentage was high ranging from 75% – 97.2% but the pre-journey briefing was low. In term of service, more than 95% of the respondents were satisfied with the service provided and will remain on the same company for another trip. Thus, it shows that the Safety Star Grading program has increased their awareness and implementation level to the public.

### **MRR No. 333**

#### **Identifying Mobile Phone Use on Pedestrian “Crossing Behaviour” at Signalised and Unsignalised Crossing in Klang Valley**

(ISBN 978-967-2078-79-1)

Author(s): Aini Abu Bakar, Nuur Sakinah Azman, Nuura Addina Muhamad, Sharifah Osman @ Liew Shyuan Yei, Low Suet Fin, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

This observational study aims to determine mobile phone distraction among the pedestrians in Malaysia and the influence of mobile phones when crossing the road. The naturalistic observation was conducted at several selected signalised and unsignalised crossings around Klang Valley and the manner in which the pedestrians were using their mobile phone was observed along with their crossing behaviour. The findings of this study showed that 33% of all pedestrians observed at signalised and unsignalised crossing were using mobile phone with the majority observed were texting. All of the associations between the manner of mobile phone use and pedestrian behaviour with gender were significant. However, there were only a few significant associations between the manner of mobile phone use and pedestrian behaviour with age group and crossing type. The study found no significant influence of manner of mobile phone use on pedestrian crossing behaviour. Based on the findings, it is essential that there are an adequate number of road signs and campaigns centring on the dangers of distracted crossing in order to increase the awareness among pedestrians.

## **MRR No. 334**

### **Penggunaan Segi Tiga Keselamatan Sebagai Alat Ikhtiar Keselamatan: Satu Kajian Kes dalam Kalangan Pengguna Kenderaan Persendirian di Malaysia**

(ISBN 978-967-2078-80-7)

Author(s): Muhamad Syukri Abdul Khalid, Mohd Hafzi Md Isa, Zulhaidi Mohd Jawi, Azhar Hamzah, Mohd Syazwan Solah, Noor Faradila Paiman, Mohd Rasid Osman, Siti Zaharah Ishak

Kemalangan perlanggaran belakang kenderaan terletak merupakan salah satu penyumbang kepada kemalangan maut. Pelbagai faktor yang menyebabkan kemalangan ini berlaku, antaranya adalah ketiadaan atau salah guna alat amaran keselamatan. Segi Tiga Keselamatan (STK) merupakan alat yang sesuai untuk digunakan sebagai alat untuk memberi amaran kepada pengguna jalan raya yang lain bahawa kenderaan di hadapan menghadapi masalah dan terpaksa berhenti di jalan raya. Mungkin ramai pengguna di negara kita tidak mempunyai pengetahuan yang jelas tentang penggunaan STK kerana ramai yang menggunakan alat selain STK yang kurang sesuai seperti dahan pokok, baldi dan sebagainya. Tambahan pula, penggunaannya di Malaysia hanya mandatori kepada kenderaan komersil sahaja. Oleh sebab itu, kajian ini dilakukan bertujuan untuk menilai pengetahuan pengguna terhadap STK dan kebolehlaksanaan untuk STK dimandatorikan kepada pengguna kenderaan persendirian. Sebanyak 447 maklumat responden dapat dikumpulkan dan hasil kajian membuktikan hampir 50% pengguna kenderaan persendirian tidak mempunyai pengetahuan yang jelas terhadap penggunaan STK dari segi cara dan jarak letakan. Walaupun begitu, mereka bersetuju untuk menggunakan STK jika berhadapan dengan situasi kecemasan pada masa akan datang. Oleh itu, pelbagai inisiatif seperti kempen kesedaran, program pendidikan dan sebagainya amatlah diperlukan agar STK dapat digunakan sebaik-baiknya dalam memberi amaran dan membantu pengguna jalan raya yang lain untuk lebih waspada dan bertindak lebih awal, seterusnya kemalangan jalan raya dapat dielakkan. Penggunaan STK di Malaysia juga perlu diperluaskan agar dapat dimandatorikan kepada pengguna kenderaan persendirian.

## **MRR No. 335**

### **Development of Variable Speed Limit (VSL) System on Adverse Weather Condition in Malaysian Expressway**

(ISBN 978-967-2078-82-1)

Author(s): Muhammad Ruhaizat Abd Ghani, Mohd Firdaus Ismail, Syed Tajul Malik Syed Tajul Arif, Muhammad Marizwan Abdul Manan, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

A Variable Speed Limit (VSL) is a speed limit which is set dynamically, usually by digital variable message signs, so that the maximum recommended speed changes according to road conditions. There are few control strategies used for adjusting recommended speed limit, different country and different VSL product use different technique to provide recommended speed limit to road users. Thus, the aim of the research is to test the feasibility of VSL towards rain condition along Malaysian expressway.

The study finds that adopted calculation from Federal Highway Administration, US Department of Transportation is feasible to use for Malaysian weather especially rain. Theoretically, the calculation is the best option as guidance to Malaysian road user as it requires all parameter that suitable with Malaysian weather and road condition. The output of this research is a VSL product that able to give real time recommendation on optimum speed limit during rain condition. The product also gives option for user to query data based on specific date and option to download daily data to comma separated value or CSV format.



## **MRR No. 336**

### **The Utilization of Crossing Facilities at School Area**

(ISBN 978-967-2078-83-8)

Author(s): Azzuhana Roslan, Rizati Hamidun, Akmalia Shabadin, Sharifah Allyana Syed Mohamed Rahim, Nur Zarifah Harun, Nurulhuda Jamaluddin, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

Pedestrian facilities at school zone have an important role to ensure the safety of school children. Although the planning authority has provided the guidelines and standards for the school component, there are still some differences between the facilities provided by among schools depending on needs of the area. The study of measuring school facilities performance is important to be taken in order to provide appropriate safety environment. The main objective of this study was to evaluate school crossing facilities in terms of utilisation rate of pedestrian crossing facilities among school children and factor influence student to the crossing the road. A total of duration 45 minutes' observation was conducted from end of school session at 60 selected schools (primary and secondary) in the Selangor. Observer was located around the range of 50 meter from main school gate and all data were recorded manually. The study found out of that, most of the primary school in Selangor provide pedestrian crossing facilities and it is located in distance less than 25 meter from school gate as compared to secondary school. Study also found the utilization rate among school children was average 50% and the present of traffic warden was influencing the utilization rate. Most of the parent's pick-up the school children at opposite the school area. This is the main factor why the school children crossing the road.

## **MRR No. 337**

### **Car Users' Knowledge and Practices on Tyre Maintenance in Malaysia**

(ISBN 978-967-2078-84-5)

Author(s): Muhamad Syukri Abdul Khalid, Mohd Hafzi Md Isa, Zulhaidi Mohd Jawi, Azhar Hamzah, Mohd Syazwan Solah, Noor Faradila Paiman, Muhamad Arif Fahmi Abdul Wahab, Mohd Rasid Osman, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

Tyre is arguably one (1) of the main important parts in vehicle whereby it is the only medium to move and manoeuvre a vehicle. However, tyre maintenance is often disregarded by users and it shows when vehicles can be seen frequently stranded on the roadside due to tyre failure especially heavy vehicles. The previous study found that 43% of private vehicle users have to stop and park their vehicles on the roadside due to tyre problems in 2017. This study aims to assess car users' knowledge and their practices on tyre maintenance. A total of 247 responses were collected and the results show that the majority of them have a lack of knowledge on their tyre specification in terms of sizes, manufacturing date and authenticity. Despite most of the respondents did check their tyre at least once a month in terms of air pressure and tread condition, it is found that 33% of their tyres are in under-inflated conditions during the physical checking. In addition, half of the respondents never check their spare tyre condition and a few suggested that they have no idea in the presence of spare tyre in their car. In conclusion, users should understand more on tyre knowledge and practice a frequent checking of their tyre so that tyre failure crash can be avoided while maintaining the car roadworthiness. Apart from that, it is recommended to install a Tyre Pressure Monitoring System (TPMS) as it may help efficiently in determining tyre pressure and condition status.

## **MRR No. 338**

### **The Investigation on Pavement Surface along Bicycle Lane in Malaysia**

(ISBN 978-967-2078-85-2)

Author(s): Mohd Shafie Nemmang, Ho Jen Sim, Syed Tajul Malik Syed Tajul Arif, Norfaizah Mohamad Khaidir, Juraidah Ahmad, Alvin Poi Wai Hoong, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

Developing bicycle lane was an extensive approach to encourage people to cycle in daily life movement and promoting a healthy lifestyle. Public authorities develop their types of surface for bicycle lane based on their desire and preferences which saw the significant differences between all the surfaces. This study focuses on evaluating and investigating the pavement surface of the bicycle lane. The evaluation including skid resistance ability, texture and waterflow ability of bicycle lane by using on-site data where the locations of data collection including Putrajaya, Penang and Kuala Lumpur. The poorest types of surfaces are brick interlock surface where it has lower texture and skid resistance ability which is dangerous for bicyclist. It is shown that some bicycle lane is not suitable to be used and have a poor design to ensure safety.

## **MRR No. 339**

### **Faktor Pemanduan Tanpa Lesen Memandu yang Sah dalam Kalangan Pemandu Kereta dan Penunggang Motosikal**

(ISBN 978-967-2078-86-9)

Author(s): Noradrenalina Isah, Nor Fadilah Mohd Soid, Ahmad Azad Ab. Rashid, Low Suet Fin, Mohd Firdaus Mohd Siam, Khairil Anwar Abu Kassim

Kehadiran golongan pemandu atau penunggang tanpa lesen memandu yang sah ini menyebabkan mereka terdedah kepada risiko terlibat dalam kemalangan jalan raya dan boleh mendatangkan bahaya kepada para pengguna jalan raya yang lain. Keadaan ini amat membimbangkan ekoran peningkatan statistik kadar kematian akibat kemalangan di negara kita setiap tahun. Hal ini dapat dibuktikan melalui kajian yang telah dilakukan. Berdasarkan kajian tersebut, para pemandu atau penunggang tanpa lesen memandu yang sah didapati mempunyai kecenderungan untuk melakukan aktiviti berisiko semasa memandu atau menunggang di atas jalan raya. Objektif umum kajian ini adalah untuk mengenal pasti masalah kewujudan pemandu dan penunggang tanpa lesen memandu yang sah di negara kita dan faktor utama yang mempengaruhi tingkah laku tersebut. Seterusnya, penyelidik dapat mengutarakan cadangan yang bernas serta langkah-langkah untuk mengurangkan kadar pemanduan tanpa lesen memandu yang sah. Kajian ini menggunakan kaedah kuantitatif iaitu dengan menggunakan borang soal selidik sebagai instrumen kajian. Teknik persampelan kajian ini melibatkan kaedah persampelan mudah dan bertujuan. Seramai 600 orang calon pemandu melibatkan beberapa buah Institut Memandu mengikut zon yang mempunyai pengalaman pemanduan atau penunggangan tanpa memiliki lesen yang sah telah dikenal pasti dan dipilih sebagai responden kajian. Dapatan kajian menunjukkan bahawa antara faktor utama yang mempengaruhi pemanduan dan penunggangan tanpa lesen yang sah adalah disebabkan oleh kos mendapatkan lesen adalah mahal, masalah kewangan untuk mendapatkan lesen memandu, memandu atau menunggang untuk perjalanan dekat sahaja, tambang pengangkutan awam yang terlalu mahal, akses kepada kemudahan pengangkutan awam yang terhad, tiada pengalaman disaman oleh pihak penguat kuasa atas kesalahan tiada lesen memandu atau menunggang yang sah, dan kebolehlihatan aktiviti penguatkuasaan. Beberapa langkah bagi menggalakkan pengambilan lesen yang sah turut diketengahkan. Melalui penemuan dan dapatan kajian ini diharapkan dapat membantu dalam pembangunan strategi yang efektif dan berkesan kepada pihak

berkepentingan dalam mengurangi kadar pemandu dan penunggang tanpa lesen yang sah.

## **MRR No. 340**

### **Risk and Exposure of Motorcycle Activity in Selangor**

(ISBN 978-967-2078-88-3)

Author(s): Akmalia Shabadin, Hawa Mohammed Jamil, Ho Jen Sim, Nurulhuda Jamaluddin

This report contains research findings of the risk and exposure of motorcycle activity in Selangor. Section 1.0 is an introduction on motorcycle accidents and highlights the main purpose of the study. Motorcycles appear to be the dominant transport mode in most developing countries. In Malaysia, motorcycles constitute 47% of the total vehicle population. At the same time, they consistently contribute around 60% of traffic fatalities. The current trend of research is mainly focused on two (2) areas: crash severity and crash risk. Exposures have also been found to play a significant role in motorcyclist traffic safety. This study is set to explore the relationship between exposure and risk for motorcycle crashes.

Section 2.0 provides an overview from past studies on the factors that contribute to the motorcycle crashes. Hurt (1981) concluded that approximately three-quarters of these motorcycle crashes involved collision with another vehicle, which is most usually a passenger automobile and intersections are the most likely place for motorcycle crashes, with the other vehicle violating the motorcycle right-of-way, and often violating traffic controls. Besides that, exposure measure is also an important factor. Forjough and Zwi (1996) said that the differences in the prevalence of motorcycle riders, the amount of riding exposure, the purpose of riding a motorcycle, the type of motorcycle intervention programmes should account for the numbers and incidences of motorcycle crashes and injuries. Besides that, a review of risk factors and patterns of motorcycle injuries done by Lin and Kraus (2009) classified exposure measure in crash-event of time phase and under human influence. A longitudinal study of risk factors for motorcycle crashes among junior college students in Taiwan was done by Lin et al. found that past motorcycle crash history, number of riding days, average riding distance, risk-taking level, alcohol consumption, and traffic violations were all significantly associated with an increased risk of being involved in a crash. Conversely, increasing age, riding experience, and automobile licensure were related to a decreased risk of crashing (Lin et al., 2003).

Section 3.0 covers the method used in this study. This study involved only motorcycle users and the sampling was limited to motorcyclists in Selangor. Questionnaire survey using face-to-face interview and self-completion survey have been chosen as method of data collection. First part of the questionnaire consists of respondents' travel profile such as number of trips made, distance and time travelled for daily, Saturday and Sunday routine. Second part of the questionnaire informs about respondents crash experience and the last part indicates the personal details of the respondents. The descriptive analyses were done to obtain the distributions and profiles of the data. The important variables have been analysed using Logistic Regression model to identify the significant attributes. Mann-Whitney and Kruskal-Wallis have been used to compare the travel pattern between demographic groups.

Section 4.0 reports on the findings of the study. Some interesting findings that can be highlighted are on the exposure measure. This study found that there are significance differences between demographic characteristics and exposure measure (i.e. distance and time travelled, number of trips). On weekdays, married people tend to travel quite far and spend more time on the road compared to single people. Age also plays an important role, as shown in the motorcycle study. Different age demographics travel different distances and time spend on the road differently. The older people gets, the farther they travel. Motorcyclists in urban and rural areas show a notable difference in their travel pattern. This study also revealed that motorcycle crashes always happen during trips to or from work. This study can conclude that only age, gender and income group made significant contribution to the prediction of motorcycle crashes.

## **MRR No. 347**

### **Relationship Land Use Operation Hour and Time of Road Crashes**

(ISBN 978-967-2078-89-0)

Author(s): Azzuhana Roslan, Rohayu Sarani, Nusayba Megat Johari, Sharifah Allyana Syed Mohamed Rahim, Nur Fazzillah Mohamed Noordin

This report highlights the relationship between land use operation hours and time of fatal and serious injury road crashes. The outcomes of this study provide recommendations to the decision-maker to consider land-use types in future development.

846 location of fatal and serious injury road crashes occur in Selangor was re-identifying base on observation on the site. Survey and interview identify land use operation hours, while other variables, such as the number of lane and types of carriageways, also are collected.

To plan land-uses, detail of crash location can support making a decision. PDRM classifies location of crashes area by 7 categories compared to JPBD 13 categories. Different types of land use generate and attract a different number of trips and traffic volume, which in turn have the potential to cause road accidents. In other words, each type of land use is reasonable may generate road accidents.

Most of the land use activities usually start between 0730 and 0830 and end between 1630 and 2000. However, several land use with the same categories of operation several hours, e.g. some industries areas operating between 0800 to 1800 hours, and some were operating between 0800 to 2000 hours. There are also operating for 24 hours. Land use categories by transportation refer to the road network which considers operating for 24 hours and transport facilities, e.g. bus terminal, bus station, and rail station, operating between 0600 to 2400 hours. Results found that 86.41% of fatal and serious road crashes occur during land-use operating hours.

Carriageway and lane width indicates the room for manoeuvres by the road users. 33.81% of fatal road crashes during land-use operating hours occur at two lanes of roadways. In terms of the carriageway, 50.83% occur at double carriageway.



## **MRR No. 348**

### **Road Safety Updates 2012**

(ISBN 978-967-2078-90-6)

Author(s): Rohayu Sarani, Hizal Hanis Hashim, Azzuhana Roslan, Sharifah Allyana Syed Mohamed Rahim, Jamilah Mohd Marjan, Wong Shaw Voon

This report is written with intention to update researchers, agencies and Malaysian road users on the current road safety situation in the country. The first chapter explains the fatality trend and the changes that we have since last three decades. Latest data is used whenever possible, with proper acknowledgement to the data provider.

Chapter 2.0 highlights the big picture of road safety in Malaysia with the exposure and the indices revealed. Chapter 3.0 illustrates the year 2012 performance with regards to the crashes by age of road users, common collision types, motorcycle fatalities as compared to other road users and the statistics by vehicle type. Several initiatives and interventions are discussed in chapter 4.0.

The aim of this report is to provide better information for the researchers and related institutional bodies for better planning of their research and efforts in reducing road crashes and fatalities on Malaysian road.

“Together, we can make a difference”

## **MRR No. 349**

### **Effectiveness of Ops Chinese New Year 2012 on Helmet Use of Malaysian Motorcyclists: A Case Study in Selected Districts in Selangor**

(ISBN 978-967-2078-91-3)

Author(s): Azzuhana Roslan, Norfaizah Mohamad Khaidir, Nusayba Megat Johari, Rohayu Sarani, Mohd Khairul Alhapi Ibrahim, Jamilah Mohd Marjan, Nur Fazzillah Mohamed Noordin

Head injury is the leading cause of motorcyclist fatalities in Malaysia. Non-compliance of helmet use is one of the contributing factors of head injury in motorcycle accidents. This study reports helmet use compliance rate among motorcyclists in selective districts in Selangor during Ops CNY 25 conducted during Chinese New Year in 2012. Rural areas in the country recorded the highest fatal motorcycle accidents from 2001 to 2010, followed by those in small towns, towns and city areas. Semenyih and Kuala Selangor districts in Selangor represent rural and small-town areas, respectively as these areas are associated with higher motorcycle crashes. Data were collected in two sessions (morning and evening) for four hours observation period at selected strategic points at the roadside (single carriageway only). Manual recording of characteristics of helmet use in specially designed forms on-site and the retrieval of traffic volume data for specific locations were from video recordings. Overall, the average compliance rate of helmet use by motorcyclists in small-town areas (96.43%) is higher than that in rural areas (87.02%). Observation showed significant increase in helmet use at small-town areas of Kuala Selangor (95% CI is 0.93, 0.96) for before-during Ops, and for during-after Ops (95% CI is 0.92, 0.95). In Semenyih, none of the areas (rural and small-town) recorded a significant increase in the rate of helmet use, for before and after Ops compared to during Ops. Compliancy of helmet use among pillions is low, especially in rural areas. The study also found that almost 90% of children are pillions, and the compliance rate of helmet use among children was lower than 50% in both rural and small-town areas. Female motorcyclists recorded higher rate in compliancy compared to male motorcyclists during Ops CNY 25. Results also show that on average, the compliance rate of helmet use among male and female motorcyclists were more than 90%. More than 90% of motorcyclists also used open-face helmets. The study reveals that strengthening of enforcement activities for helmet use improves the rate of helmet use, especially among children. Motorcyclists equate Ops Sikap to the presence of police, which

translated to higher enforcement activities, thus increased helmet use compliance during Ops Sikap. However, without a specific target for proper helmet use, there remains to be a doubt or inaccuracy of interpretations on the helmet wearing law. The presence of police officers and advocacy groups on proper helmet use can improve the level of proper helmet use amongst Malaysian motorcyclists and pillion riders.

## **MRR No. 350**

### **Preliminary Assessment on the Usage of Advertisement Sign at Federal Route 2 (Kuala Lumpur – Shah Alam)**

Author(s): Nor Aznirahani Mhd Yunin, Nur Zarifah Harun, Sharifah Allyana Syed Mohamed Rahim

This report highlights several factors affecting the safety of road users due to the presence of roadside advertising signs, especially gantry advertising signs. Section 1.0 touches on different types of outdoor advertising structures that usually found installed at high traffic areas such as highways, major roads and intersections.

Section 2.0 covers the factors that could affect road users' safety due the presence of roadside advertising. Attention distraction, visual clutter, mental workload, positioning of roadside advertising signs, driver reaction time and features on roadside advertising signs are some of the factors discussed in this section.

As mentioned in Section 3.0, the Public Works Department (PWD) and the Malaysian Highway Authority (MHA) have issued guidelines for the installation of advertising structures along federal roads and also on expressways. The guidelines prepared by PWD and MHA described the permitted and prohibited areas for installation of roadside advertising structures.

Section 4.0 covers the feasibility study that was conducted on Federal Highway, Kuala Lumpur. The study found that there are a number of gantry advertising signs installed behind the directional sign on the opposite direction of the traffic. This study is conducted to determine the number of gantry advertising, distance between gantry advertising, distance of gantry advertising to junction and other factors related to roadside advertising signs that may affect the performance of the drivers.

Section 5.0 is the conclusion and suggested recommendation based on the detailed review of the study done. It can be concluded that several factors that should be considered before the installation of roadside advertisement signs.

## **MRR No. 351**

### **Obstructive Sleep Apnea among Commercial Truck Drivers**

Author(s): Wahida Ameer Batcha, Ilhamah Othman, Mohamad Suffian Ahmad, Norlen Mohamed

This report highlights the prevalence of high risk group of Obstructive Sleep Apnea (OSA) among commercial truck drivers based on screening using Berlin Questionnaire. Obstructive sleep apnea (OSA) has been recognised for over a decade as one of the significant risk factors for motor vehicle crashes (MVC). Many studies have shown the relationship between MVC and OSA. In Malaysia, the prevalence of OSA among commercial truck drivers is not known. Due to traffic safety concern of commercial transportation, this study was conducted to determine the prevalence of high risk of OSA and its association with motor vehicle accident. A cross sectional study involving 130 commercial truck drivers selected from a logistic company were conducted. The screening process for identifying the high risk group for OSA was done using Berlin questionnaire. Out of 130 selected drivers, all were eligible for analysis. The study revealed that 14.6% (19) of drivers were categorised as having high risk of OSA while 85.4% (111) having low risk of OSA. The study also identified that symptom of snoring and witnessed apnea as well as BMI and neck circumference was significantly associated with risk group of OSA. The results emphasise on the need to identify the group at risk of OSA among commercial truck drivers and further diagnose them for early intervention.

## **MRR No. 359**

### **Vehicle Kilometres Travelled (VKT) Study of Goods Vehicles: Pusat Pemeriksaan Kenderaan Berkomputer Sendirian Berhad (PUSPAKOM)**

(ISBN 978-967-2078-94-4)

Author(s): Nurulhuda Jamaluddin, Ho Jen Sim, Nusayba Megat Johari, Hawa Mohamed Jamil, Azzuhana Roslan, Sharifah Allyana Syed Mohamed Rahim

This is a report of a study of the Vehicle Kilometres Travelled (VKT) for goods vehicles. From a previous study by MIROS data collected by the postcard method for commercial vehicles resulted in a low response rate because the vehicles is owned by companies. Therefore in the present study, approaching drivers directly led to more accurate data collected more quickly and effectively.

The purpose of the study was to collect the VKT for goods vehicles and improve the quality of information about exposure data. VKT is considered the best indicator to measure the level of road safety and is crucial for road safety stakeholders to address road fatality issues. In this study, the type of goods vehicles, age of vehicles and frequency of service were selected as variables of VKT data to be studied.

Respondents were selected from two (2) of PUSPAKOM's branch offices namely PUSPAKOM at Wangsa Maju and at Gopeng to represent the Central and Northern Regions respectively. 463 respondents were involved in this survey exceeding the valid sample size of 350. The comparison between the two (2) PUSPAKOM branches were made, although both showed a similar trend for VKTs.

Findings were that the VKT kilometres per day for goods vehicles is close to 200 kilometres and the Average Annual VKT (AAKT) is approximately 70,000 kilometres. The total VKT calculation revealed that PUSPAKOM Wangsa Maju had higher total VKT than PUSPAKOM Gopeng and this difference was reflected in the crash records of each branch, thus supporting the theory that the more we travel the higher the probability of being in a crash.

## MRR No. 360

### Development and Improvement of the Bicycle Path in Putrajaya: Design Criteria for the Proposed Bicycle Path in Putrajaya

(ISBN 978-967-2078-95-1)

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This section summarises the design criteria for the proposed bicycle path in Putrajaya into five (5) main categories: types of bicycle lane, bicycle operating space and clearance, geometric design, junction and crossing and others. They are summarised in table format below.

TYPES OF BICYCLE LANE			
	<b>TERM</b>	<b>DEFINITIONS</b>	
<b>Off-road facility</b>	<b>Separated path</b>	A length of path where an exclusive bicycle path is laid adjoining a pedestrian path. It is normally separated by a painted line or physical measures.	
	<b>Shared path</b>	Area that is designated for use by both bicyclists and pedestrians.	
<b>Facility</b>		<b>Width (m)</b>	
<b>Separated path</b>	One way bicycle path	Desirable minimum	2.0
		Absolute minimum	1.5
	Pedestrian path	Desirable minimum	2.0
		Absolute minimum	1.5
<b>Shared path</b>	Bicycle and pedestrian shared path	Desirable minimum	3.0
		Absolute minimum	2.0
BICYCLE OPERATING SPACE AND CLEARANCE			
<b>A) Clear space required by Bicyclists</b>			
Minimum operating space		1.0 m	
Minimum width for design purposes		1.2 m	
Dynamic width (actual width plus deviation)		1.5 m	
<i>(Source: Transport Scotland, 2011)</i>			
<b>B) Critical distance to fixed objects</b>			
<b>Object</b>		<b>Distance from wheel to object (metres)</b>	
Kerb (<50 mm up stand)		0.25 m	
Kerb (>50 mm up stand)		0.50 m	

Continuous features of height < 1.2 m or an isolated feature of any height (e.g. sign posts, cabinet, lamp columns, etc.)	0.25 m
Continuous feature of height >1.2 m or a bridge parapet of any height	0.50 m
Parked cars (in short term parking area with high turnover)	1.00 m

(Source: Cardiff Council, 2011)

GEOMETRY DESIGN			
Design Parameter			Sources
Design speed (kph)		30	
Horizontal alignment	Desirable minimum radius (m)	30	JKR Malaysia, 1986
	Minimum Bellmouth radius at junctions (m)	4.0	
Vertical alignment	Minimum vertical curve length (m)	15	
Gradient	Maximum grade allowable (%)	10	
	Minimum grade allowable (%)	0.5	
Ramp	Ramp grade	1:12 (8.33%) to 1:8 (12.50%)	Department for Transport, 2002
	Flared grade	1:11 (9%)	
Cross-fall	Standard grade (%)	2	JKR Malaysia, 1986
Super-elevation	Maximum super-elevation	0.06	
Sight distance	Minimum dynamic sight distance (DSD) (m) – advance distance a bicyclist requires to see ahead, to make the task of riding feel safe and comfortable and to pass slower bicyclists and pedestrians	45-65	(Transport Scotland, 2011)
	Minimum stopping sight distance (SSD) (m) – distance required to perceive, react and stop safely in adverse conditions	30	JKR Malaysia, 1986
Junction visibility	Area between the bicycle path and the carriageway in the vicinity of a junction must be kept clear of obstruction in order not to hamper visibility		Roads and Traffic Authority (RTA), 2005

**JUNCTION AND CROSSING**



Types of crossing at junctions can be classified as:

- a) Priority junction
- b) Mid-block crossing
- c) Crossing with median refuge
- d) Signalised junction
- e) Roundabout junctions

## OTHER REQUIREMENTS

### A) Coloured surfaces

The purpose of using coloured pavement is to identify areas within the carriageway which are defined for exclusive use by a special group of road users (e.g. bicycle) and other road users are discouraged from entering the path. It also helps to provide sufficient contrast to pavement and therefore offers increased visibility. MUTCD (2009) has outlined 13 colour codes with established general meanings that can be considered for selecting the appropriate colour for bicycle lanes surface.

### B) Surface materials & skid resistance

Skid Resistance	60 British Pendulum Number (BPN)
Common material in market	Thermoplastic paint, resin-based materials with coloured chips, coloured macadam and slurry seal.
Tactile surface	Function: to enable visually impaired pedestrians to position themselves on the correct side of a separated facility. Suggestion: Be installed at the start and end points of a separated path, at junctions and at suitable intermediate locations.

(Source: Brisbane Infrastructure Division, 2008; Santa Clara Valley Transportation Authority (VTA), 2012)

### C) Bus stop on bicycle path

At bus stops where pedestrians habitually wait at the kerb, it is desirable to divert the bicycle space to the rear of the bus stop.

### D) Road marking

- Road markings indicating bicycle path should be placed after most intersections. As a rule of thumb for spacing, multiply designated speed (in km/h) by 7. For example, appropriate spacing in a 60 km/h zone is approximately 400m.
- For a separated path, road markings indicating the path should be at the beginning and approximately every 50 m on pedestrian streets and every 100 m for other paths. Additionally, the road marking should be used to minimise the need for signages.

**E) Traffic sign**

- For a bicycle path with a designed speed of 30 km/h, the signs need to be put 50 m away from the point of danger.
- When using a shared path, it is essential for bicyclists to notice pedestrians and vice versa. This is to reduce any potential conflict.
- Should be taken into consideration especially where the bicycle path ends, symbols are to be located at the end of the designated path or where the path is terminated abruptly.

## **MRR No. 362**

### **Malaysians' Travel Pattern During Chinese New Year 2013**

Author(s): Ho Jen Sim

Malaysians have a long tradition of *Balik kampung* or going back to hometowns during festive seasons. This tradition sees the multi-cultural Malaysians making an exodus to their respective hometowns. During these festive seasons, the number of vehicles on the roads increases by 20% to 30% which inevitably increases the risk of accidents. Numerous strategies including Ops Bersepadu have been implemented with the aim to reduce accidents. These strategies are somehow ineffective as the travel pattern of Malaysians varies due to the spatial geographical environment as well as the length of holiday. This study conducted a travel pattern survey using travel diaries to obtain Malaysian drivers' travel information. Respondents were asked to record their travel activity/trips for several days around the period of their long journey. A total of 300 travel diaries were distributed a week before the 2013 Chinese New Year (CNY) of which only 99 were returned (response rate of 33%). A general conclusion can be drawn based on the results of the survey that respondents travelled farther during festive seasons. The average length of *Balik Kampung* journey is about five times the length on normal days but with lesser trips. On CNY days, more local trips were recorded. Findings show that male drivers travelled farther during the two days of CNY and there is a significant difference between the distance travelled by male and female drivers on the eve of CNY. On other days, no significant difference in terms of travel distance across male and female respondents. The findings from this study suggest that enforcement and emergency response assistance should focus on inter-state travel before festive seasons and the focus of Ops programmes should target the local areas during festive seasons.

Keywords: Travel pattern, festive season.

## **MRR No. 363**

### **Road Safety Education in Primary Schools, Malaysia: Evaluating the Short-Term Effectiveness of RSE Module among Form 1 Secondary School Children in Malaysia Via Observational Study of Their Expected Positive Road Safety Practices on the Road. “Pre-and-Post Intervention”**

Author(s): Hussain H., Law T. H.

One of the national road safety strategies implemented in Malaysia is through educating road safety aspects to the school-aged children with the intention that in the long run it will produce a better generation of road users who are responsible and ethical when on the roads. In year 2012, Road Safety Education (RSE) modules embedded in the Bahasa Malaysia subject was introduced once in every 2 weeks to the Form 1 school children for a period of 16 weeks (an equivalent of 8 hours dosage).

Three states in Malaysia namely; Melaka, Selangor and Sarawak were identified for the RSE observational study. Melaka (Alor Gajah) represented the southern region, Selangor (Klang) the central region, and Sarawak (Kuching) for East Malaysia. A total of 8 Sekolah Menengah Kebangsaan (SMK) were selected to evaluate the RSE intervention. The pre-intervention study was conducted from 18 July 2012 to 30 August 2012 (5 weeks) while the post-intervention observation study was conducted from 8 January 2013 to 7 February 2013 (4 weeks).

Statistical analysis was made to compare the number of positive behaviour between before and after RSE module implementation. Results showed a significant improvement in positive road safety behaviour with regard to wearing car seat belt for front passenger and also wearing helmet properly ( $p < 0.05$ ) after the RSE modules were implemented for the Form 1 school children. It is anticipated that higher positive road safety behaviours would be observed among the school-aged children over continuous and longer period of RSE dosage.

## **MRR No. 366**

### **Report on Secondary School Children's Road Safety Knowledge Acquisition (Via Road Safety Education in Bahasa Melayu Subject): Analyses of Behavioral Intentions**

(978-967-2078-97-5)

Author(s): Ahmad Hariza, Mohd Ibrani, Ma'rof Redzuan, Alfian Abdul Halim

A survey was conducted in six states of Malaysia, namely Selangor, Melaka, Perak, Kelantan, Sabah and Sarawak which comprise of schools from district of Klang, Alor Gajah, Taiping, Bachok, Kota Kinabalu and Kuching respectively. A pre-implementation (of Road Safety Education [RSE] in Bahasa Malaysia Subject) survey was first conducted in July and August 2012 before the implementation of the RSE module in Secondary One, in which a total of 535 Secondary One and Secondary Two school students participated. After four month period, a post survey was conducted in January and February 2013 and 465 students involves for this period. Both qualitative and quantitative methods were adopted within the study's methodological framework. Qualitative approaches were fully applied to ascertain the measurement of knowledge increase due to the RSE exposed to sampled students. Moreover, a quantitative analytical framework were then adopted to discern the statistical findings based on the Theory of Planned Behaviour theoretical framework, which were subsequently conceptualised and operationalised according to the requirements of a pre-determined sampling framework (subjectively provided by MIROS as per indicated within the consultancy requirements). All three psychological constructs measured (attitude, subjective norms and intentions) were found to be consistently stable within a reasonable pattern of increase among inculcated-knowledge overall scores of RSE among the respondents. In conclusion, road safety knowledge among Secondary One school students was found to be prevalent within the suburban and urban areas within the sampled areas and states. This effect is partly due to the introduction of the Road Safety Educational Modules implemented during the course of 4 months. Thus, this showed that even though not conclusive, the implementation of RSE curriculum has been found to be partially successful.

## **MRR No. 367**

### **Assessing Teacher Readiness in Implementing the Scoring of Pedestrian Facilities by Schools in Selangor**

(978-967-2078-98-2)

Author(s): Norainy Othman, Siti Noradiah Jamaludin, Nusayba Megat Johari, Akmalia Shabadin

The main objective of the study was to identify the issues related to teachers' readiness in conducting the scoring exercise through the guidelines provided to them, namely "Guidelines for Pedestrian Facilities: School Area". The teachers, whom were selected by their respective school principals, were evaluated on their potential to perform the exercise and the preparedness to conduct the exercise. The mode of dissemination of forms accepted by Ministry of Education was through post, which meant no briefing was delivered to the school prior the scoring exercise. This raised an issue, as the demonstration of exercise could not be assessed in the study. However, teachers' readiness in terms of their prior experience and existing knowledge relating to this scoring exercise helped to identify the issues of teachers self-administering the scoring form. 169 respondents, comprising teachers from nine Educational District Offices in Selangor were involved. In general, the survey on implementation readiness was implemented among teachers who had completed the Pedestrian Facilities Scoring Form in 2014. It indicated that two factors were possible influencing factors towards teachers readiness from the descriptive analysis performed. From the four factors studied, it was found that a majority of the teachers agreed that potential to perform the scoring exercise is a critical factor towards readiness to implement the task. Most of the teachers also responded positively that preparedness to perform the scoring exercise is another critical factor to being ready to complete the scoring form. Among characteristics of preparedness to perform is the importance of training relating to the task prior to the scoring exercise implementation. Further in-depth analysis is recommended for future study.

## **MRR No. 368**

### **Motorcycle Fatal Crashes During Focused Enforcement Intervention: Ops Selamat 1/2012**

(978-967-2078-99-9)

Author(s): Fauziana Lamin, Ahmad Noor Syukri Zainal Abidin, Siti Atiqah Mohd Faudzi, Afiqah Omar, Norlen Mohammed

Motorcycle crashes have gained considerable attention due to a significant increase in numbers in each year over the last ten (10) years. These alarming figures have led road safety practitioners to strategise effective intervention measures. A good understanding of motorcycle crashes could help in instituting possible countermeasures that are more effective. For that reason, crash data involving fatal motorcycle crashes during Ops Selamat 1/2012 were collected. Crash factors that included the three (3) main road safety elements i.e. human, vehicle and road, were accordingly observed. This resulted in dominant crash characteristics being captured and highlighted including crash parameters that were not available in the existing police database. These findings play an important role in recognising motorcycle crash patterns in Malaysia, with a focus on festive seasons. These data will also assist in providing a basis for strategising road safety interventions.

## **MRR No. 369**

### **Development of a VKT Index for Commercial Vehicles**

(978-967-2988-00-7)

Author(s): Ho Jen Sim, Azzuhana Roslan, Nurulhuda Jamaluddin, Sharifah Allyana Syed Mohamed Rahim

Vehicle Kilometers Travelled (VKT) is the total kilometers travelled by motor vehicles on any particular road system during a given period of time. VKT is an indicator commonly used to measure road safety performance in a particular country and also serves as an indicator for international traffic safety comparison purposes.

The vehicle kilometer study has been conducted in Malaysia since year 2005. However those studies were not without flaws. Many problems such as low response rate, inadequate sample or insufficiently comprehensive due to the involvement of limited types of vehicles or that the studies were only carried out at certain states. Therefore, this study was formulated to acquire the odometer readings when vehicles went for their periodic inspection at PUSPAKOM service centres.

For this study, there were 20,896 data entries with the frequency of each category ranging between 5 units to 7302 units. The samples were further divided into four main clusters namely: heavy vehicles, taxi, bus and rent vehicles. A total of 16,350 heavy vehicles that were included in this study recorded 459,411,958 km travelled over the 6-month period. In this cluster, the smallest sample size was 5 units of vehicles which were from rigid agriculture lorry and window van. The biggest sample size consisted of 7,302 units with an average of 18,726 km distance travelled. The express bus had the longest average distance travelled of 97,165 km while the least was the school bus/factory bus with an average of 13,595 km in the 6-month period.

A total of 2,505 taxis were included in the analysis with a recorded distance travelled of 69,510,493 km in the study period. Motorcar type of taxi comprised 98.8% of the samples. Of note is that noted that the window van was preferred over the motorcar for longer distance travel with the mean distance travelled being about 36% higher. Lastly, there were 715 commercial motorcars in this study. The average distances travelled for the jeep was 22,618 km.



It must be admitted that this study encountered some deficiencies in terms of accuracy of data. Efforts have been made to improve data recording and the respective PUSPAKOM service centers are committed to ensuring high quality data for future studies.

## **MRR No. 370**

### **Riding Behaviour of Motorcyclists in the Klang Valley**

(978-967-2988-01-4)

Author(s): Nuur Sakinah Azman, Rabihah Ilyas, Noradrenalina Isah, Mohd Khairul Alhapi Ibrahim

This self-reported research used the Motorcycle Riding Behaviour Questionnaire (MRBQ) to study the riding behaviour of motorcyclists in the Klang Valley. The MRBQ includes questions on traffic errors, speed violation, stunts, safety equipment and control errors. In addition, information regarding the respondents' demographic details, riding experience, summons details, crash involvement of the respondents (if any) and injuries sustained in the crashes were also asked. 345 respondents have participated in this study. Data was collected at shop lots, shopping malls and various government agencies in various districts in the Klang Valley in order to attract respondents of all ethnicities, age groups and social economic status. Principal components analysis on the Malaysian version of the MRBQ showed a 5-factor solution; Safety Violations, Traffic Errors, Speeding, Safety Equipment and Precaution. Of these five components of riding behaviour, Safety Violations was the most frequently-reported behaviour among motorcyclists in the Klang Valley. Meanwhile, crash risk was defined as the number of summonses received by the respondents within the past 12 months. Positive relationships were found between the number of summonses received and safety violations and speeding behaviour, thus indicating that these two riding behaviours may be significant predictors of crash risk among motorcyclists who have also been issued with at least one traffic summons within the preceding 12 months.

## MIROS Inquiry Report (MIR)

MIRs are reports on selected accidents/cases that are considered high profile and of national interesting nature. It starts off as a briefs report for internal evaluation, which is then expanded into full reports as required. These reports are “**RESTRICTED**” and intend for internal use only. They are not available to the general public.



## **MIR No. 364 (RESTRICTED)**

### **Multi-Vehicle Fatal Crash at KM23.1 of the Middle Ring Road 2 Expressway (19th May 2013)**

Author(s): Kak D-Wing, Afiqah Omar, Ahmad Noor Syukri Zainal Abidin, Fauziana Lamin, Norlen Mohamed, Wong Shaw Voon

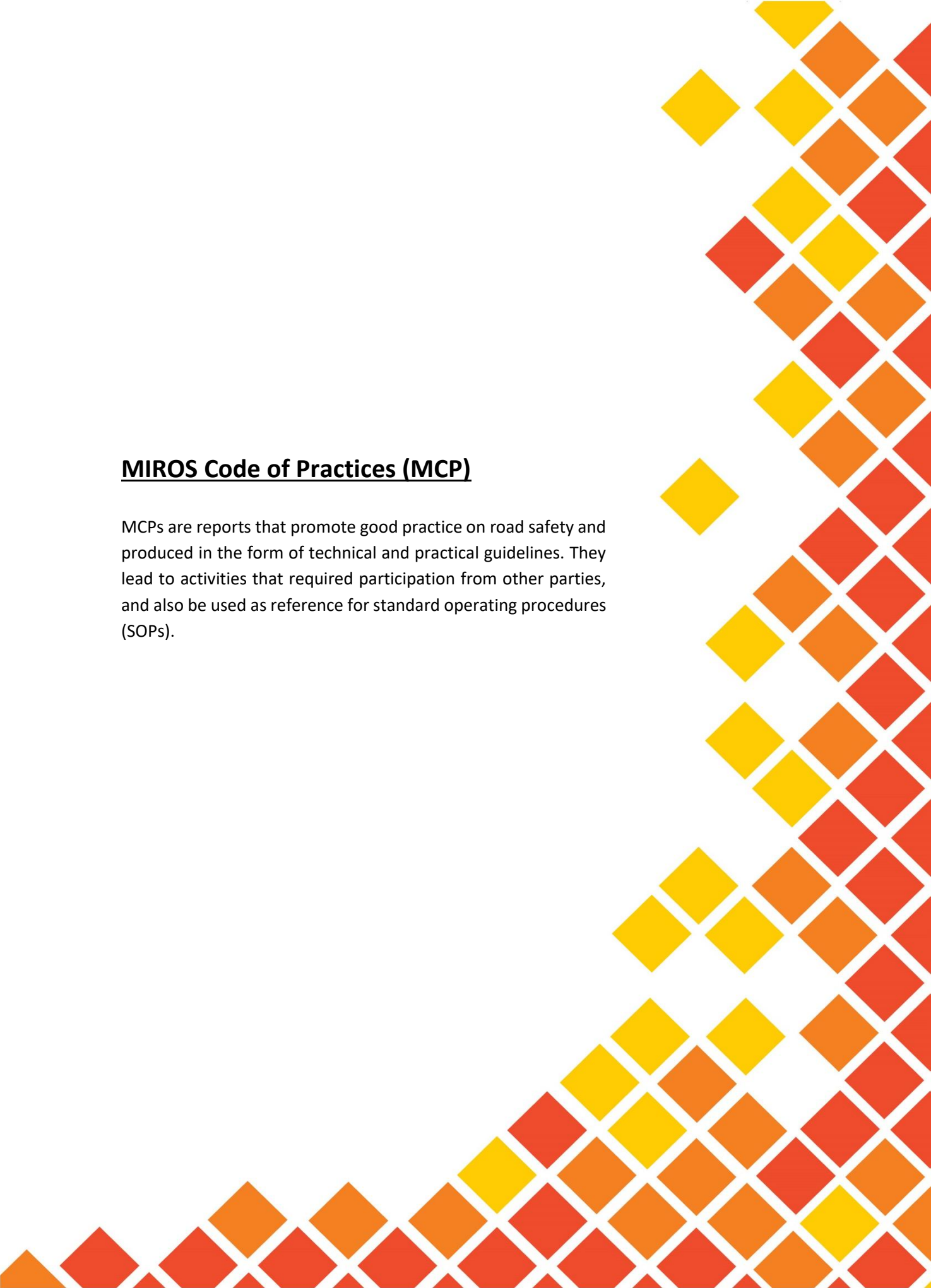
A multi-vehicle crash causing four fatalities occurred at around 5.30 pm on 19 May 2013. The crash involved three vehicles which were a Perodua Viva (Viva), a Proton Satria (Satria) and a Suzuki Swift. Those killed were the four occupants of the Viva.

The main cause of the crash was the speeding by the Satria. Scientific analysis revealed that the minimum travelling speed of the Satria was 137.47 kilometres per hour. However, there were two other contributing factors to the crash as well such as insufficient traffic calming facilities, the absence of speed limit signs etc. These factors were equally important and could have reduced the crash severity or prevented the crash from occurring if actions had been taken to resolve the problems namely, poor speed management at the downhill stretch from Bukit Antarabangsa to the Middle Ring Road 2 Expressway and a sub-standard wire rope barrier installed at the crash site.

These issues should not be treated as isolated case as the same issues are likely to be found in other areas of this country. Thus, remedial action taken should not be focused only on preventing similar crashes from occurring at the same location as the crash site, but should also be considered at other hilly roads and improper installation of safety barriers especially wire rope barriers throughout the country. Therefore, all relevant authorities should take action seriously and appropriately to implement all the recommendations made.

## **MIROS Code of Practices (MCP)**

MCPs are reports that promote good practice on road safety and produced in the form of technical and practical guidelines. They lead to activities that required participation from other parties, and also be used as reference for standard operating procedures (SOPs).



## **MCP No. 361**

### **Code of Practice: Evidence-Based Enforcement**

(ISBN 978-967-2078-96-8)

Author(s): Hizal Hanis Hashim, Sharifah Allyana Syed Mohamed Rahim, Karen Judith Goonting, Rohayu Sarani, Jamilah Mohd Marjan, Nur Fazzillah Mohamed Noordin

Road accidents are a severe problem in Malaysia. The number of casualties due to road accidents have increased steadily over the past few years. Since the year 2003, the number of fatalities have been consistently above 6,000 deaths, with casualties amounting to 26,000. The country has not seen any significant reduction in overall accidents and fatalities since then.

Due to this alarming figure, the government has introduced several new policies and laws to heighten the road safety status in the country. One of the most significant components in ensuring the success of these new policies and laws is enforcement. Enforcement on road traffic laws is being done on a day to day basis by traffic police and Road Transport Department (RTD). However, conducting enforcement is often in small scale and exclusive areas due to limited enforcement personnel and equipment.

The concept of evidence-based enforcement tackles the issue by placing the significant amount of enforcement officers and equipment at selected locations that are known to have a high number of road traffic accidents. Gathered evidence from previous road accident data and strategies are formulated based on the known evidence. Implementation of this concept in other countries has shown to yield a better result in reducing both accidents and fatalities.

To introduce the concept of evidence-based enforcement in Malaysia, the conducting of a Professional Development Programme involve enforcement officers from both the Royal Malaysian Police and Road Transport Department. The programme has shown a positive result in helping to build an enforcement strategy. The participant has identified the critical elements in developing enforcement strategy by answering the common question of what are the problems, who are usually involved in the problems, why the problem occurs, where and when usually the problem occurs and how to tackle the

problem. Answers to these questions significantly help to implement a more focus and effective enforcement by using a limited amount of personnel and equipment.

The development of this code of practice is for easy reference and implementation of evidence-based enforcement by road traffic authorities and enforcement personnel in Malaysia. It is also designed for a complete guide on understanding and to use road accident data for evidence and information. Focus or targeted enforcement provide effective treatment for specific road safety issues; thus helping in reducing both accidents and fatalities.



## MIROS Crash Analysis Report (MCAR)

MCARs are reports produced on selected cases of accidents, usually originating from MIRs. These reports are “**RESTRICTED**” and are not available to the general public.



## **MCAR No. 332 (RESTRICTED)**

### **Fatal Single Vehicle Crash at Lagenda Heights T-Junction, Sg. Petani, Kedah**

Author(s): Ahmad Noor Syukri Zainal Abidin, Mohd Rasid Osman, Khairil Anwar Abu Kassim

A road crash occurred at a T-junction entering to Taman Lagenda Heights in Sg. Petani, Kedah on 1 May 2016. The crash occurred at approximately 4.40 am, during fine weather condition. The crash involved a Honda City which was occupied with a single occupant who was the driver during the material time. The crash occurred when the vehicle lost control while turning right at the T-junction from Jalan Lagenda Utama direction. As a result, it rammed into the curb at the middle of the junction, causing the driver's airbag to deploy and killing the driver instantly. Further investigation on the driver airbag and referring to the report provided by Honda Malaysia concluded that it was caused by the rupture of the airbag inflator which was installed inside the steering hub. The system is the key element during airbag deployment. Nonetheless, the inflator, which is believed have exploded with excessive force, had caused for rupture of the inflator structure thus causing debris to be thrown together with the gas during airbag deployment. The case highlighted an incident involving a mechanical defect to the driver airbag system. With regards to the highlighted issues mentioned, MIROS had recommended several corrective and preventive measures pertaining to driver airbag defect.

## **MCAR No. 342 (RESTRICTED)**

### **KM11 Bentong – Raub Road Crash**

Author(s): Mohd Amirudin Mohamad Radzi, Ahmad Noor Syukri Zainal Abidin, Norlen Mohamed

On 12 April 2014, a fatal road crash occurred at KM11 Bentong – Raub Road involving an express bus (double deck) with registration number WTC 3829, owned by Transnasional Express Sdn Bhd. This crash event happened during fine weather condition.

The said bus was travelling from Putrajaya Sentral heading to Kota Bharu, Kelantan when the crash occurred. At approximately 12.30 am, the bus lost control and the driver had to make a sudden manoeuvre to the opposite lane. The bus hit the first guardrail causing heavy scratch marks on the offside body of the bus due to the impact with the guardrail. Rut marks at the unpaved shoulder and the 11.3° exit angle mark indicate that the bus had gone up the embankment and hit the electric post after hitting the first guardrail. Then, it slid, quarter rolled and crashed into the other guardrail (in the same direction as the said bus) before came to the rest position. A total of three (3) fatalities were recorded in the crash. The deceased and injured passengers were sent to Hospital Bentong and Hospital Temerloh.

Several identified issues are highlighted in this report included road and environment where there was no signage to warn road users that the lanes were merging from two to one at the crash site and also absence of the streetlights along the crash site and this is dangerous to vehicles travelling at night. Besides that, from the human factor's issues, it was found that the bus driver was driving under influence (drugs).

After taking into consideration all the findings and issues, recommendations are proposed at the end of this report for consideration by the related authorities. The proposed recommendations are listed below:

- i. Standardise the implementation of guidelines and requirements for road design and signage
- ii. Implement and monitor seatbelt wearing for all passengers of express buses
- iii. Inspect the exterior structural body for all express buses

- iv. Intensify national rollout of the implementation of OSHA ICOP SHE 2010 for the Transportation Industry

## **MCAR No. 343 (RESTRICTED)**

### **Slim River Crash Investigation KM366.8 North-South Expressway**

Author(s): Afiqah Omar, Fauziana Lamin, Norlen Mohammed

This is a report of a comprehensive investigation into the crash involving a multi-purpose vehicle (a Toyota Vellfire) and an articulated truck on 8 October 2014 at KM366.8 of the North-South Expressway. The crash occurred at around 2:00 am and the weather was reported to be fine during that time. The incident claimed one life, while another three occupants was injured, including the Vellfire's driver. The victims were sent to Slim River Hospital for post mortem and treatment, respectively.

A team from the Malaysian Institute of Road Safety Research was dispatched to the crash site to carry out an in-depth crash investigation and thorough analysis of the crash. Besides focusing on environmental factors and vehicle damage, this report also highlights possible findings from the crash reconstruction. The central cause of the injury causation was the crash incompatibility between the vehicles involved, and the small frontal overlap crashes which resulted in the underride of the front passenger compartment. A vehicle inspection of the truck revealed that the Rear Underrun Protection Device (RUPD) did not comply with the standards required by UNECE Regulation 58. If the truck was equipped with standards compliant RUPD, the underride may be prevented and the fatality may not have occurred.

From the human behavior perspective, the crash may not have occurred if the driver of the Vellfire had been fully aware on the existence of a large and probably slow moving vehicle. The inattention of the driver can be seen from the evidence gathered. There were no braking marks found from the Vellfire to indicate evasive action to try and avoid the collision.

## **MCAR No. 344 (RESTRICTED)**

### **Malim Nawar Crash Investigation Study**

Author(s): Fauziana Lamin, Afiqah Omar, Norlen Mohammed

The Malaysian Institute of Road Safety Research (MIROS) received a letter from the Perak State Assemblyman for the Malim Nawar about his concerns as to the apparent frequency of road crashes along Jalan Malim Nawar – Kuala Dipang. MIROS' crash investigation team was instructed to conduct investigations and observe crash patterns along the route. Information on 24 crash cases that had occurred along the route within a ten-month period was acquired from Ibu Pejabat Polis Daerah Kampar and analysed. In addition, an in-depth crash investigation was conducted in respect of a recent fatal motorcycle crash as a case study. As a result, crash patterns along the route were identified. Dominant crash characteristics were highlighted and discussed. The case study further confirmed the findings from the 24 crash cases. The findings from the 24 cases and the case study can be used as a basis for proactive countermeasures to assist in improving the existing road system with possible road engineering interventions. Since this study was conducted for a very focused area, the crash characteristics that had been identified can be utilised for the benefit of road safety advocacy and more strategic enforcement that ultimately would help improve road safety especially for the local community.

**MCAR No. 345 (RESTRICTED)**

**Multiple-Vehicle Crash Involving an RTD Vehicle KM12 Jalan Ayer Tawar – Ipoh**

Author(s): Ahmad Noor Syukri Zainal Abidin, Norlen Mohamed

Abstract not available.

## **MCAR No. 346 (RESTRICTED)**

### **Jalan Besar Besout Road Crash**

Author(s): Siti Atiqah Mohd Faudzi, Norlen Mohamed

A fatal road crash occurred on 8 July 2013 on a rural road surrounded by oil palm plantations. It occurred at approximately 9.20 pm. There was no street lighting along the road and the weather was reportedly fine at the time of the crash. The road at the crash site is a midblock with horizontally straight and vertically even road layout. No curvature was spotted within a 500 meter radius from the point of impact. It was a single carriageway road design with no median or road barrier along the straight stretch. The crash involved a passenger car bearing registration number WGM 7228 and an oil palm pick-up truck with an illegally painted registration number. The passenger car was a Proton Wira and it was with occupied two passengers. The truck only had a driver and was fully loaded with oil palm. The crash occurred when the passenger car was travelling to Besout. It rammed into the offside frame of the truck's rear end traveling in the same direction as the passenger car. Both occupants of the passenger car died instantly. The truck driver escaped unhurt. The bodies were sent to the Slim River Hospital for post mortem.

This investigation revealed possible contributory factors from issues with the road environment, truck conspicuity, crash compatibility, restraint systems, rear underrun protection devices, illegal modification of vehicles and improper work scheduling.

Several recommendations were made namely, establish and implement road safety assessments and road mapping of all public roads in plantation areas, ensure all trucks and tractors on public roads comply with all safety features, implement safe operation practices for trucks and tractors for the plantation sector and increase awareness for road users on public roads in plantation areas.

## **MCAR No. 357 (RESTRICTED)**

### **Multivehicle Fatal Crash at KM421.6 North-South Expressway (PLUS) 20th March 2013**

Author(s): Kak D-Wing, Norlen Mohamed

A crash involved a truck (HINO King) and a passenger vehicle (Mercedes Benz C250) at KM421.6 of the North-South Expressway northbound on 20 March 2013. The passenger vehicle impacted at the side of the truck and underran through the underneath structure of the truck. This caused serious intrusion to the passenger compartment of the passenger vehicle and killed all three occupants.

A crash investigation was conducted to determine the contributory factors to the crash. Physical evidence of the crash site and the damaged vehicles were collected for the crash reconstruction. The crash sequences and mechanism were determined through the process of investigation. The main issues that possibly caused the crash would be addressed and made known to the relevant authorities in order that appropriate action be taken. Further to that, recommendation would be provided accordingly to prevent similar crashes in the future.

The main issues were divided into three categories which are road condition, vehicle specification and driver condition. From the road perspective, the major issue was the absence of street lighting at the crash site. Limited light source at that road stretch would limit the sight distance of drivers at night time. As for minor road issue, there was no guardrail installed at the crash site. If the guardrail was present, the truck could have been deflected back to its travelling direction and would not have lost control after it went off road. For vehicle specification, the non-compliance with UNCEC Regulation 48 (on reflective markers) and missing side underrun protection bar were the identified issues that needed to be addressed in the future. As for the driver's condition, he was very likely in a fatigue condition which could have caused loss of control of the truck and occurrence of the crash. From the crash mechanism analysis and vehicle damage analysis, the possibilities of speeding and burst tyres were ruled out. It makes fatigue the most likely factor that caused the crash.



The crash could have been prevented or its severity minimized if any one of the identified issues was addressed before the crash occurred. Thus, all relevant authorities should take action seriously and appropriately to implement all the recommendations.

## **MCAR No. 358 (RESTRICTED)**

### **Multivehicle Fatal Crash at KM306.1 North-South Expressway (PLUS) 17th April 2014**

Author(s): Kak D-Wing

A crash involving a Mitsubishi Canter (the truck) and Toyota Alphard (the MPV) occurred at KM306.1 North South Expressway (NSE) on 17<sup>th</sup> April 2014. The MPV impacted the rear end of the truck causing an under-run through the structure of the truck. This resulted in serious intrusion of the truck into the passenger compartment of the MPV, killing two of its occupants.

A crash investigation was conducted to determine the contributory factors to the crash. Physical evidence of the crash site and damaged vehicles was collected for the purpose of crash reconstruction. The crash sequence and mechanisms were determined through the process of investigation. The possible causes of the crash would be addressed and recommendations would be suggested to prevent such crashes in the future. All these would be relayed to the related authorities for appropriate action.

Three categories of information were required for a thorough investigation: road condition, vehicle specification and driver condition.

For information on road aspects, the major issue was the absence of proper traffic speed management on this stretch. The MPV was travelling above the posted speed limit, thus severely reducing stopping distance and reaction time to any hazard on the road. Another minor road issue was the absence of street lights at the crash site. A limited light source at this road stretch would limit the sight distance of drivers at night time; this was further compounded by the absence of street light at the crash site.

As for driver condition, the MPV driver was very likely in a fatigue condition which could have caused the crash. There were no skid marks before the impact location on the straight uphill road. In addition, the rear-end markers of the truck were functioning well, thus the issue of conspicuity does not arise in this crash. Failing to slow down or avoiding the Truck on such a straight road is definite evidence to show that the driver was not

aware or misjudged the distance between the MPV and the truck. It is therefore deduced that fatigue was the most likely contributory factor for the crash.

The crash could have been prevented or its severity minimised if any one of the mentioned issues were addressed before the crash occurred. Thus, all related authorities should take action to implement the appropriate recommendations.

## MIROS Road Safety Assessment (MRSA)

MRSAs are audit reports on roads in Malaysia. Its is generally produced by the Road Safety Engineering and Environment Research Centre. They can be used as a reference and guidelines which can lead to other activities that promote road safety. Unless stated otherwise, these reports are “**RESTRICTED**” and not available to the general public.



## **MRSA No. 292 (RESTRICTED)**

### **Road Safety Assessment: KM142.4 North-South Expressway**

Author(s): Nor Aznirahani Mhd Yunin, Nora Sheda Mohd Zulkiffli, Rohayu Sarani, Siti Zaharah Ishak

On 3<sup>rd</sup> June 2018, three (3) people died and 25 others were injured due to a road traffic accident involving a tanker, a container lorry and an express bus occurred at KM142.4 of North-South Expressway, northbound. This crash had prompt for a Road Safety Assessment (RSA) to be conducted by the Malaysian Institute of Road Safety Research (MIROS) on the following day. The RSA aims to identify road engineering deficiencies that can be improved to minimize the severity of crashes due to poor vehicle condition or human errors and recommend road safety measures to improve the safety within the assessed area. Road engineering observation and traffic survey were conducted on 4th June 2018 from 1.30 pm to 2.45 pm to understand the current situation of the assessed area. Detailed examination on any potential hazard within the assessed area was conducted and several recommendations were proposed to overcome these hazards. Installation of speed limit sign and transverse rumble strip were suggested to overcome speed issues within the area. Proper end treatment of wire rope and installation of Plastic Jersey Barrier is required at the assessed area to prevent unwanted incidents from happening.

## **MRSA No. 294 (RESTRICTED)**

### **Road Safety Assessment: KM147 (North-bound) North South Expressway E1, Juru**

Author(s): Syed Tajul Malik Syed Tajul Arif, Nusayba Megat Johari, Siti Zaharah Ishak

A road safety assessment was conducted at KM147 on the North-South Expressway (E1) in October 2017. The Guidebook for Traffic and Road Safety Audit (MeTRA) was used as a reference in carrying out the assessment. Data such as traffic characteristics and road geometry were collected in order to understand the traffic within the assessed area.

Below are several key findings identified:

- i. Shoulder width of the assessed section of the highway measured 2.8 m, 20 cm less than the suggested 3.0 m width for rural expressways by REAM.
- ii. Guardrail height was found to be 20 mm shorter, at 610 mm, than the recommended height. Guardrail post spacings were however found to conform to the TL-3 standard.
- iii. The 85th percentile speed of vehicles was between 88 km/h and 103 km/h for different vehicle class, lower than the speed limit of 110 km/h,
- iv. Past crash history of recurring fatal heavy vehicle crashes between the year 2013-2015.

Based on the findings, several countermeasures were proposed with the aim to improve the road safety level. The proposed mitigation measures are as below:

- i. Provision of a minimum of 3.0 m shoulder width along the rural expressways to accommodate heavy vehicle breakdown,
- ii. The use of W-beam guardrail should conform to at least TL-3 standards, with sufficient rail height of 710 mm. However, on specifically identified site such as this area, the use of high capacity barrier such as TL-6 may be considered to contain heavy vehicles upon the incident of a crash.

## **MRSA No. 295 (RESTRICTED)**

### **Road Safety Assessment: Intersection of Indah Water Konsortium, Batu 5 Jalan Klang – Banting**

Author(s): Muhammad Marizwan bin Abdul Manan, Syed Tajul Malik bin Syed Tajul Arif, Rizati Hamidun, Siti Zaharah Ishak

On 16<sup>th</sup> of November 2017, a Road Safety Assessment (RSA) was carried out at the unsignalized T-intersection connecting the Indah Water Konsortium (IWK) with Federal Route 5, Jalan Klang to Banting. This RSA was done in response to the request from the IWK, which claimed that the current intersection has numerous crashes history and wanted it to be assessed in terms of its safety for the existing road users. The findings show that traffic volume during the peak hour has almost double compared during the off-peak hour and there was a high percentage of a heavy vehicle passing this intersection the during off-peak hour. Our observation has shown that there was an illegal and risky movement, occurred mostly during the peak hour when vehicles tend to bypass the main road by entering the intersection and immediately revert by merging into the main traffic. There were also other issues around the unsignalized intersection such as poor pavement condition, faded road markings, improper sign placement and exposed drainage sump, which was addressed and recommended with countermeasures for improvement. We are recommending that the traffic movement (path and access) inside the intersection be calm by installing traffic calming devices and all road deficiencies are rectified.

## **MRSA No. 298 (RESTRICTED)**

### **Road Safety Assessment: FT011, Serting – Muadzam**

Author(s): Nurulhuda Jamaluddin, Norfaizah Mohamad Khaidir, Azzuhana Roslan, Rizati Hamidun, Siti Zaharah Ishak

A road safety assessment (RSA) was conducted at FT011, Serting – Muadzam on 26<sup>th</sup> December 2017. The Guidebook for Traffic and Road Safety Audit (MeTRA) was used as a reference in carrying out the assessment. Data such as traffic characteristics and road geometry were collected in order to understand the traffic within the assessed area. There are three (3) key findings identified in this assessment (i.e. visual aid, roadside safety and road surface). Based on the findings, several countermeasures were proposed with the aim to improve the road safety level at Bandar Seri Jempol area. The suggested countermeasures include repaint pavement marking to ensure correct driving path, use of high reflectivity pavement marking to improve night time driving condition, use of reflectors such as RRPM or Cat Eye to increase visibility, clear any hazards from the roadside, replace any broken W-beam guardrail and ensure smooth patching on potholes.



## **MRSA No. 300 (RESTRICTED)**

### **Road Safety Assessment: Jalan TKS 1, Taman Kajang Sentral, Kajang**

Author(s): Ho Jen Sim, Norfaizah Mohamad Khaidir, Rizati Hamidun, Siti Zaharah Ishak

In response to a complaint received from Rail Asset Council (RAC) related to a road safety issue at Jalan TKS 1, Taman Kajang Sentral particularly at the junction linking to SILK Highway, a Road Safety Assessment (RSA) was conducted on 7<sup>th</sup> June 2017. Several road deficiencies were identified and based on the assessment conducted, the RSA team has suggested that the junction be modified as three-legged junction instead of four-legged junction. This is to reduce the number of conflict points at the junction and furthermore to improve pedestrian safety. Besides, it is also recommended to provide periodic maintenance to the road side debris, signage and lane marking, the safety aspect of the undeveloped area. Transverse bar as a measure of traffic calming is suggested on the main carriageway of SILK Highway to reduce the speed of vehicles approaching the junction of TKS. Last but not least, it is also proposed to provide alternative route information on the VMS (Variable Message Sign) to advise the road users to use an alternative route to Taman Kajang Utama instead of queuing at the interchange to the Taman Kajang Utama.

## **MRSA No. 303 (RESTRICTED)**

### **Road Safety Assessment: Motorcycle Shelter**

Author(s): Nora Sheda Mohd Zulkiffli, Mohd Shafie Nem Mang, Siti Zaharah Ishak, Akmalia Shabadin, Norfaizah Mohamad Khaidir, Rizati Hamidun, Muhammad Marizwan Abdul Manan

To facilitate the motorcyclists needs during their commute is motorcycle shelter. Motorcycle shelter is one of the facilities built along highways in Malaysia to cater for motorcyclists to allow them to stop and take rest especially during rainy day. In 2018, there are several accidents were reported involving another vehicle crashed into motorcycles at provided shelter. This study was conducted at four (4) motorcycles shelter located along PLUS expressway. It serves with six and eight lanes dual carriageways for road users travelling from North to South and South to North. This Road Safety Assessment (RSA) finds out that motorcycle shelter provided meets the requirements as stated in the Nota Teknik Jalan (NTJ 33/2015), a guide for expressway and non-expressway road. However, spot speed measurement revealed that the vehicles travelling along the provided facilities are more than 110 km/h. The traffic volume study recorded that car, MPVs and vans recorded as the highest percentage of vehicles within all assessment areas, followed by motorcycle or heavy vehicle and bus. Since the data collection conducted during fine weather, only 2% of motorcycle used the facilities at each study location to take rest before continuing their journey. Other issues highlighted in this study are missing the concrete drain cover and litter at motorcycle shelter. Thus, several recommendations were recommended which can be useful in improving the safety aspect in providing motorcycle shelter facilities.

## **MRSA No. 306 (RESTRICTED)**

### **Road Safety Assessment: KM45 Jalan Ipoh – Teluk Intan**

Author(s): Nurulhuda Jamaluddin, Hawa Mohamed Jamil, Norfaizah Mohamad Khaidir, Rizati Hamidun, Khairil Anwar Abu Kassim

A road safety assessment was conducted at KM45 Jalan Ipoh – Teluk Intan in October 2017. The Guidebook for Traffic and Road Safety Audit (MeTRA) was used as a reference in carrying out the assessment. Data such as traffic characteristics and road geometry were collected in order to understand the traffic within the assessed area.

Below are several key findings identified:

- i. Road alignment
- ii. Visual aid
- iii. Overtaking behaviour

Based on the findings, several countermeasures (in stages) were proposed with the aim to improve the road safety level at the curve. The proposed mitigation measures are as below:

- i. Provide central hatching to reduce speed and improve lane discipline
- ii. Provide lighting or reflector such as RRPM/Cat Eye at centerline
- iii. Increase a number of warning sign and standardize the speed limit sign
- iv. Enforcement on illegal overtaking

## **MRSA No. 307 (RESTRICTED)**

### **Road Safety Assessment: KM16 Jalan Ipoh – Lumut**

Author(s): Sharifah Allyana Syed Mohamed Rahim, Nurulhuda Jamaluddin, Norfaizah Mohamad Khaidir, Rizati Hamidun, Khairil Anwar Abu Kassim

This report highlights the road deficiencies found during the Road Safety Assessment (RSA) stage 5 conducted at KM16 Jalan Ipoh – Lumut. The summary of findings and recommendations below were suggested as countermeasures to address the issues.

Observation shows car/van/MPV dominating the route by 71% followed by motorcycles (18%) and the remaining are heavy vehicles. The compliance to the posted speed limit is high only less at all three measured locations. Risky behavior of illegal overtaking was observed during on-site assessment.

Based on the results obtained, the following recommendations were suggested:

- i. Double line is painted as the center line road marking to prohibit overtaking.
- ii. Center line is painted to improve visibility and increase lane discipline.
- iii. Enforcement on illegal overtaking should be enforced by police or the Road Transport Department.

**MRSA No. 308 (RESTRICTED)**

**Road Safety Assessment: SK Taman Melawati 2**

Author(s): Sharifah Allyana Syed Mohamed Rahim, Nur Zarifah Harun, Azzuhana Roslan, Norfaizah Mohamad Khaidir, Siti Zaharah Ishak, Khairil Anwar Abu Kassim

Abstract not available.

## **MRSA No. 318 (RESTRICTED)**

### **Road Safety Assessment: Jalan Kuala Lumpur – Seremban (F1): Beranang – Kajang**

Author(s): Norfaizah Mohamad Khaidir, Alvin Poi Wai Hoong, Akmalia Shabadin, Siti Zaharah Ishak, Rizati Hamidun, Khairil Anwar Abu Kassim

This report highlights the road deficiencies found during the Road Safety Assessment (RSA) stage 5 conducted along Jalan Kuala Lumpur – Seremban (F1) from Beranang to Kajang. Detail assessment was conducted at three (3) locations i.e. Rinching, Taman Pelangi Semenyih 2 and Taman Asa Jaya. The summary of findings and recommendations below were suggested as countermeasures to address the issues.

For the year 2013 to 2015, the number of fatal and serious injury crashes recorded 45% from total crashes on the road segment between Beranang to Kajang. Observation shows car/van/MPV dominating the route by 72% followed by motorcycles (20%) and heavy vehicles (8%). More than 70% of road users was found driving below the posted speed limit of 70 km/h.

Localised and network assessment conducted highlights roadside and junction safety as the main safety concerns along the road. Based on the iRAP model, 3-star rating road is acceptable. However, findings from the network assessment indicated that 59% of the road sections within the segment were rated below 3-star for vehicle occupant and 67% for motorcyclist. Thus, improvements are highly recommended to increase the star rating or road safety level along the road.

Based on the results obtained, the following recommendations were suggested:

- i. Roadside hazards should be managed efficiently such as by installing crash barrier at suitable location and relocating roadside hazards to reduce the risk.
- ii. Bus stops should be provided with the proper design of bus lay-by to improve the traffic flow and at the same time to avoid risk of rear-end crashes.
- iii. Road maintenance should be planned to address problems like pavement marking defects.

## **MRSA No. 341 (RESTRICTED)**

### **Assessment of an AES Camera Location for Red Light Running RSA at a 3-Legged Intersection on Jalan Ipoh**

Author(s): Nurulhuda Jamaluddin, Norfaizah Mohamad Khaidir, Nusayba Megat Johari, Hawa Mohamed Jamil, Ho Jen Sim, Jamilah Mohd Marjan

A road safety audit was carried out as a result of the implementation of the Automated Enforcement System (AES). The audit was important to ensure that the locations for red light camera installation are free from poor design of the intersection.

The objective of this report is to highlight the safety aspects at the intersection on Jalan Ipoh. This report also makes recommendations for the improvement of the safety of road users at the observation site. The approach taken for this audit involved several steps including a site survey, data collection and data analysis. Each of the processes and the parameter collected are explained in the report.

Among the road safety issues identified were the improper lane balance, inadequate number of head signals, malfunctioning red light displays, poor condition of the road pavement, signage problems and unloading activities. The recommendations made were based on the Arahan Teknik Jalan and other reliable sources.

## **MRSA No. 352 (RESTRICTED)**

### **Road Safety Assessment: Taman Sunway Kayangan Seksyen U9**

Author(s): Nurulhuda Jamaluddin, Hawa Mohamed Jamil

Public complaints received on the safety of road users at Taman Sunway Kayangan B49 (Jalan Batu Arang) led to the carrying out of a road safety assessment by MIROS. The assessment site is a four-lane carriageway that comes under the jurisdiction of Public Works Department (PWD) in the District of Petaling, Selangor. The assessment area has been classified as residential, commercial area and new growth land.

The objective of this report is to highlight the safety aspects especially public transport and pedestrian infrastructure at Taman Sunway Kayangan. This report also provides recommendations to improve the safety of road users at the observed site. The approach taken for this assessment involved several steps including site survey, data collection and data analysis. Each of the steps and the parameter collected are explained in the report.

Among the road safety issues identified were the absence of the bus lay-by, the absence of a pedestrian crossing, uncovered drainage and manhole, old road pavement markings and lack of signages. Recommendations suggested are based on the Arahan Teknik Jalan (ATJ) and other reliable sources.



## **MRSA No. 353 (RESTRICTED)**

### **A Report on Road Safety Assessment: KM330 Jalan Raub – Kuala Lipis**

Author(s): Hawa Mohamed Jamil, Alvin Poi Wai Hoong, Hizal Hanis Hashim, Nur Fazzillah Mohamed Noordin

This report highlights the findings and recommendation for the Road Safety Assessment that was carried out at KM330 Jalan Raub – Kuala Lipis.

The assessment adopted Road Safety Audit Guideline by Jabatan Kerja Raya as well as referring to Guidebook for Traffic and Road Safety Audit (MeTRA) to compliments the JKR Guideline. Data collection was carried out by drive-through video recording, taking photographic evidence at the site, measurement of road geometrics and traffic characteristics observation.

Several road safety deficiencies were identified, and recommendations are given as listed below:

- Illegal overtaking manoeuvres were observed to be occurring at the site. This act becomes more serious when a larger-sized vehicle is the one carried out the overtaking.
- Narrow paved shoulder, especially at the curve near KM330. This imposed danger to motorcyclists since large lorries were observed to be encroaching and using the narrow paved shoulder when negotiating the curve.
- Edge line at the assessed site was almost gone. Failure in providing sufficient delineation may lead to accidents since the driver cannot tell as to where they should be heading.
- The crash barrier at the site was hit and not rectified. It would result in a lesser impact performance of the crash barrier.
- A sump was left uncovered. Users using the road may slip and fell into the sump.
- Pothole and uneven road patching apart from rutting were spotted at the site.
- There is also the presence of loose debris on the paved shoulder. It is harmful to drivers, especially during night time.

Also incorporated in this assessment report literature reviews for the possible road safety issues exist at the site. For the first time, this MIROS Road Safety Assessment report has included a special topic on Crash Modification Factor (CMF). CMF for a countermeasure indicates the proportion of the expected number of crashes after implementation of the countermeasure at a specific site (United States Department of Transportation [U.S.DOT], 2010). Countermeasures programmes and its prioritization were also suggested in this report to help improve the safety condition at the site, thus benefiting the road user.

## **MRSA No. 354 (RESTRICTED)**

### **Road Safety Assessment at Signalised Intersection along Jalan Bakar Sampah, Port Dickson: Road Engineering Requirements for Verification of Automated Enforcement Camera Location**

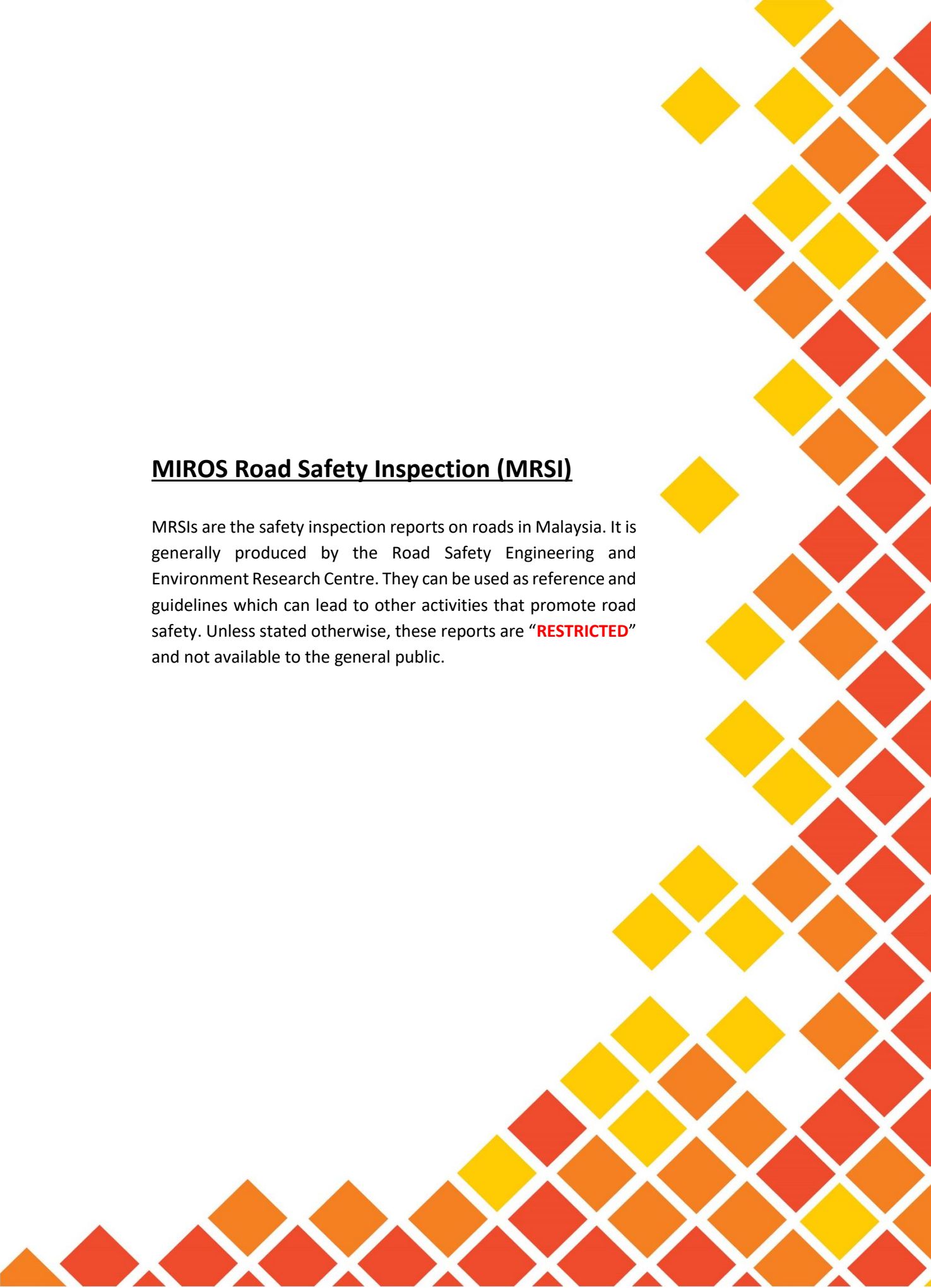
Author(s): Norfaizah Mohamad Khaidir, Nusayba Megat Johari, Jamilah Mohd Marjan

This report showcases the method of evaluating potential AES camera locations for intersections. The draft guideline Road Engineering Guidelines on Verification of AES Camera Location at Signalised Intersections in Malaysia was referred to conduct the evaluation. Findings identifying deficiencies and recommending countermeasures and necessary action to rectify problems are presented in tabular form.

The study location is a four-legged intersection on Jalan Bakar Sampah, Port Dickson. The site checklist consisted of (1) site pre-requisites, (2) intersection geometry, (3) traffic signal operation system, (4) traffic signal devices, and (5) visual aid and road markings. The overall results of the investigation showed that the location is suitable for AES red-light camera installation but the location needs to be preceded by minor adjustment and rectification work. Findings indicate that the compatibility of AES camera system with the existing traffic signal needs to be ironed out. The amber light for the intersection should be in working condition and be corrected to a display of three (3) seconds for each leg of the intersection. Though visual aids and road markings were present on much of the intersection area, the faded road markings observed on site should be repainted. The lack of space for the positioning of the camera was addressed with the suggestion that the camera be installed on the side of the road behind a barrier system. The implementation of the improvements suggested are expected to reduce red-light running that may have been a result of the design of the road.

## MIROS Road Safety Inspection (MRSI)

MRSIs are the safety inspection reports on roads in Malaysia. It is generally produced by the Road Safety Engineering and Environment Research Centre. They can be used as reference and guidelines which can lead to other activities that promote road safety. Unless stated otherwise, these reports are “**RESTRICTED**” and not available to the general public.



## **MRSI No. 321 (RESTRICTED)**

### **ROAD SAFETY INSPECTION REPORT: SMK Datuk Menteri & PUSPAKOM Sri Lalang, Ayer Hitam, Johor**

Author(s): Sharifah Allyana Syed Mohamed Rahim, Ho Jen Sim, Muhammad Marizwan Abdul Manan, Khairil Anwar Abu Kassim

On 30 June and 1 July 2020 a Road Safety Inspection (RSI) was carried out by Malaysian Institute of Road Safety Research (MIROS) near SMK Datuk Menteri and PUSPAKOM Sri Lalang Ayer Hitam Johor. A request by YB Ministry of Transport had triggered the inspection to be carried out due to high risk crash prone area.

The summary of findings and recommendations below were suggested as countermeasures to address the issues.

- i. Spot speed measurement revealed that more than 80% of driver travelled over the posted speed limit of 80 km/h near SMK Datuk Menteri and 29.7% near PUSPAKOM Sri Lalang.
- ii. Road safety deficiencies of roadside hazards, unsafe pedestrian walkway and poor pavement condition were observed.
- iii. Unsafe behaviour of not wearing safety helmet and riding opposite travel direction were also observed

Based on the results obtained, the following recommendations were suggested for short term measures:

#### SMK Datuk Menteri

- i. Install adequate signage for school in accordance to Nota Teknik Jalan 18/97, Manual Fasilitas Keselamatan Jalan and other standards.
- ii. 4 meter width of 2-lane single carriageway could be narrow to 3.3 meter of 2-lane dual carriageway road by installing median or central hatching.
- iii. Install suitable road side protection
- iv. Resurface pavement surface
- v. To remove the obstruction along pedestrian walkway and to cover deep drain

- vi. It is suggested to conduct campaign to increase awareness among road users and to increase enforcement activity and visibility of police within the area

#### PUSPAKOM Sri Lalang

- i. One of the two junctions need be closed to minimise the risk and conflict between road user, hence right turn to PUSPAKOM Sri Lalang is not allowed by extending the median. A one way street is proposed on the service road.
- ii. Old road marking need to be removed and new road marking should be paint clearly.

## **MRSI No. 322 (RESTRICTED)**

### **ROAD SAFETY INSPECTION REPORT: (1). Access Point at Teo Seng, FT01: (2). Jalan Temoh – Jalan Bayu, FT 01**

Author(s): Ho Jen Sim, Sharifah Allyana Syed Mohamed Rahim, Muhammad Marizwan Abdul Manan, Khairil Anwar bin Abu Kassim

A Road Safety Inspection (RSI) was carried out on 1 July 2020 on two access points along FT 01. This inspection was requested by the upon request by the Minister of Transport in response to the complaints by road users on the frequent conflicts occurring along the sections. The inspection covers the 200 m – 400 m within the 2 access points. The aims of this inspection are to:

- i. identify risky road behaviour and road user exposure; and
- ii. identify road environment and engineering deficiencies; and
- iii. recommend potential countermeasures to increase the safety

Main findings and recommendations are as follows:

Short term Measures:

- i. Access point at Teo Seng Farming
  - To realign the trap lane with proper lane marking as well as the storage lane
  - Provide traffic calming measures such as rumble strips, flashing amber, warning sign
  - Increase enforcement activities on speeding
  - Relocate the food stall
- ii. Jalan Temoh – Jalan Bayu unsignalised junction
  - Convert the section into one way system
  - Minimise the hazards by providing safety barrier to the utility pipes and drain
  - Provide traffic calming measures
  - Increase enforcement activities on speeding

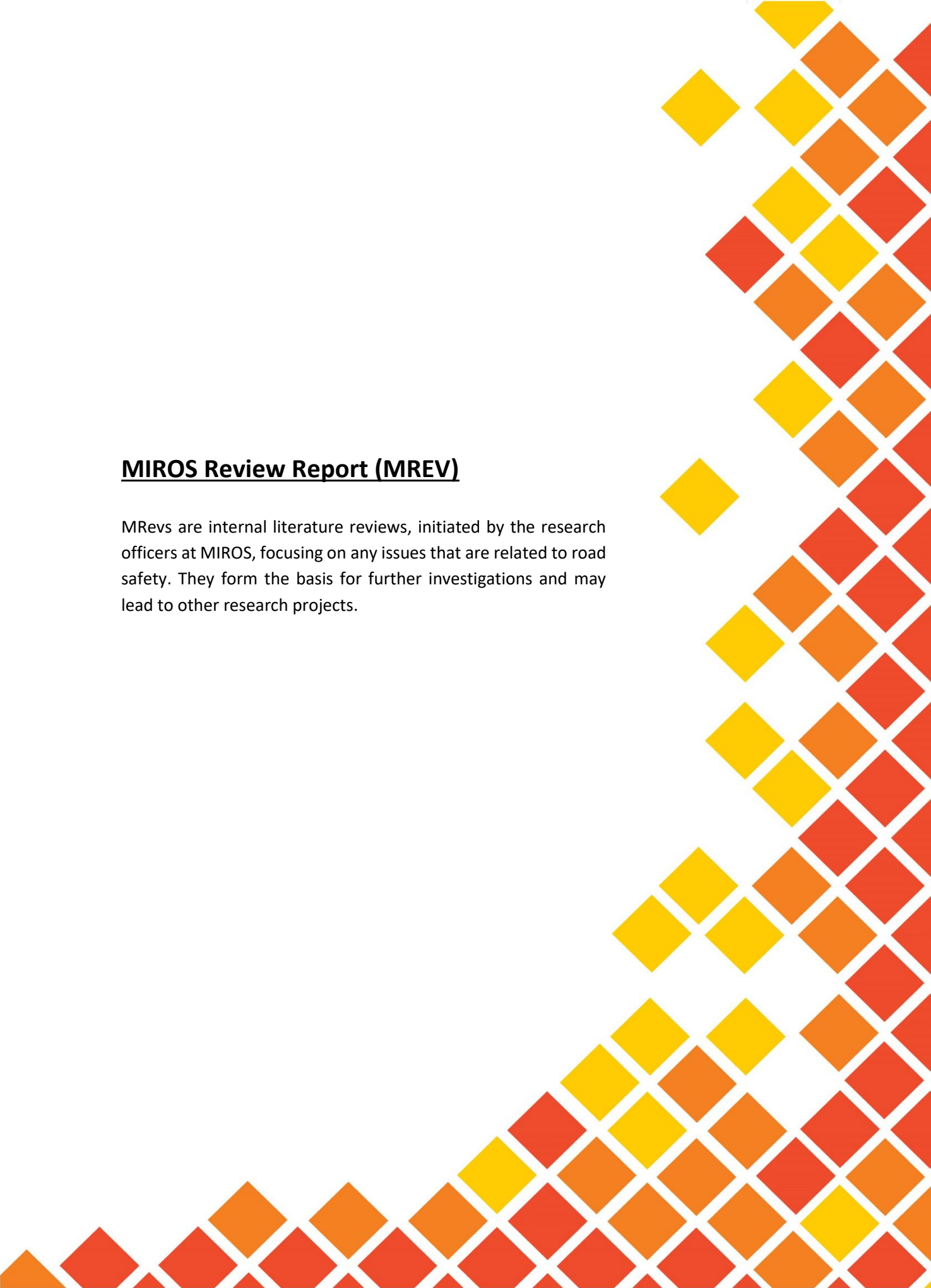
- Install additional warning sign on the access point and speed limit sign
- Provide pedestrian crossing facilities

In long term, it is advised to widen the roads from existing dual lane single carriageway to four-lane dual carriageway at both areas to allow proper protected right turn lane and provide pedestrian crossing facilities.



## **MIROS Review Report (MREV)**

MRevs are internal literature reviews, initiated by the research officers at MIROS, focusing on any issues that are related to road safety. They form the basis for further investigations and may lead to other research projects.



## **MRev No. 355**

### **Review of Setting Minimum Speed on Expressway**

(ISBN 978-967-2078-92-0)

Author(s): Ho Jen Sim, Nusayba Megat Johari, Sharifah Allyana Syed Mohamed Rahim

The issue of road hogging has become more prevalent on Malaysian roads and there are calls to the Malaysian Highway Authority (MHA) to impose a minimum speed limit on Malaysian expressways. In response to this, MIROS has been requested to review the feasibility of implementing minimum speed limit in Malaysia. A thorough review of literature shows that minimum speed limit is not practised as common as the maximum speed limit. The minimum speed limit (either at a fixed value or 20 km/h below the posted speed limit) is only exercised in certain countries such as the USA, UK, Portugal, Australia, Japan and Indonesia. It was also noted that there is a limited study on the effect of minimum speed limit on road safety.

In general, the objective of imposing minimum speed in those countries is to reduce the unsafe interactions between fast and slow moving vehicles by improving the uniformity of traffic flow and safety of operation. It is proven that the large speed differentials between fast and slow drivers contribute to the accident crashes. With the setting of minimum speed limit, those vehicles that cannot achieve the minimum speed are advised to use other alternatives than the freeway. Several studies have highlighted the hazard of the presence of slow moving vehicles on a high mobility road through cases involving vehicles travelling 10 mph below mean speed. Differences in speeds below mean speed was found to be of higher risk compared to differences in speeds above the mean speed. Setting of minimum speed can decrease the risk by reducing the differential speeds. Nevertheless, there are other concerns that introducing a minimum speed limit may increase unfavourable lane changing, rear end accident as well as complicating the enforcement activities.

In conclusion, the determination of minimum speed limits should be of sound from an engineering perspective. Thorough traffic investigation must be carried out beforehand to understand the locality effect of the expressway (i.e urban/rural), the rationale of implementation (such as setting minimum speed on fast lane only on two-lane dual

carriageway) as well as the practicality of enforcement activity. It is the responsibility of the authority to ensure that any changes in speed limits would not compromise the safety of users, community concern and traffic efficiency.

## **MRev No. 356**

### **A Review of the Effects of Changing Speed Limits on Roads in Malaysia**

(ISBN 978-967-2078-93-7)

Author(s): Ramizam Noor Zaman, Alvin Poi Wai Hoong, Syed Tajul Malik Syed Tajul Arif, Abdul Rahmat Abdul Manap, Karen Goonting

Purpose of review: For several years the public have been demanding for speed limits on certain roads in Malaysia to be increased. Reasons usually given are that higher speeds will shorten travel time, reduce fatigue among long distance drivers, more consistent with the greater safety features in modern vehicles and presence of varying speed limits on relatively short stretches of road.

The recurrence of these demands has prompted the Ministry of Transport to instruct the Malaysian Institute of Road Safety Research (MIROS) to study this issue from an empirical science-based perspective and advise the Ministry accordingly.

Speed limits and road safety: Research from around the world has consistently found excessive speed to be a significant factor in crash causation and injury severity especially for speeds ranging from 25 km/h to 120 km/h. Also, large speed differences between the vehicles on a road also increase the likelihood of a crash occurrence. Crash investigations by MIROS have revealed that speeding is related to 21% of crashes and speeding significantly contributed to crash causation and fatalities. This is consistent with trends in other countries.

How effective is speed limit change? Numerous studies from several countries have consistently revealed that increasing speed limits on low and moderate speed roads had no significant effect on vehicle speeds or on crash frequency, while a speed limit increase on high speed roads like expressways was generally associated with higher traffic speeds and more crashes and fatalities. Decreasing speed limits on low to moderate speed roads was found to significantly reduce the number of fatal crashes.

Factors, feasibility and cost: In deciding whether or not to change a speed limit, factors from the following perspectives should be considered, in addition to their feasibility and cost:

- Type of road: Whether the road is low, moderate or high speed. Any increase in speed limits on high speed roads are highly likely to result in more fatalities and more severe injuries. Any proposal to increase speed limits on low to moderate speed roads need to also consider the other factors below.
- Road design and environment: How feasible would it be to upgrade road geometry and crash barriers in order to raise the safety levels of these roads to accommodate the possibility of greater crash risk? In addition, the cost of reconstruction work would likely be very high.
- Safety level of vehicles: Are most of the cars that the average Malaysian will drive 'crashworthy' enough to adapt to incremental increases in speed limits? A rough estimate of installing additional safety technologies in new vehicles to ameliorate vehicle performance at higher speeds is about RM7,400 per vehicle.
- Vulnerable road users: The type and amount of pedestrian traffic in the area (for example schools and hospitals).
- Road user behaviour: Studies have found that most motorists typically do not change their driving speeds even when the speed limit is increased by 8 km/h – 24 km/h.
- Air pollution: Optimum cruise speeds to minimise harmful emissions is probably about 40 km/h – 50 km/h.
- Fuel economy: Studies show that all cruising speeds at which fuel economy is achieved is below 100 km/h.

Questionable speed limits in Malaysia: There are some situations where the speed limits in these areas should be reviewed. An obvious example is the speed limit at school zones which is currently limited to 30 km/h. Motorists tend to ignore this limit, especially in rural areas, outside school hours and if the school is on a federal road. Other examples are in this report. The answer is not a simple case of just increasing speed limits at these areas. Rather, the situation needs to be studied in its entirety from all relevant perspectives before a decision can be made.

Conclusion: In conclusion, the public's reasons for higher speed limits are not supported by the vast amount of research done in this area, albeit in countries other than Malaysia. In addition, even though increased speeds do not result in more crashes on low to moderate speed roads, there are many other valid considerations which must be taken

into account in order to reach a balanced decision which will further the good of the entire country and not just the specific desires of a section of the public.

### **Recommendation 1**

With the exception of certain areas mentioned in Recommendation 2 below, speed limits should remain unchanged for all types of roads via expressways, federal roads and state roads as well as rural and urban roads for the following reasons:

- More fatalities: Any increase in speed limits on high speed roads are highly likely to result in more fatalities and more severe injuries.
- Vulnerable road users: Even though research shows that increased speed limits on low to moderate speed roads are unlikely to result in more fatalities or crashes, any proposal to increase speed limits on these types of road needs to also consider other factors such as whether there are high concentrations of pedestrian traffic or slow moving vehicles on these roads, such as outside schools or hospitals.
- Logistics and high reconstruction costs: If increases in speed limits are to affect long stretches of road and/or be in many areas of the country, the cost of reconstruction work is likely to be high as it would be necessary to raise the safety levels of these roads to accommodate the possibility of greater crash risk.
- Vehicle safety technologies: Except for high-end luxury motor vehicles, cars which most Malaysians will drive may not have a level of safety technology sufficient to mediate the additional crash risk and injury severity which greater travelling speeds impose. Currently it is unknown how many new passenger vehicle models in Malaysia have sufficient safety technologies like Electronic Stability Control, Intelligent Speed Adaption and Adaptive Cruiser Control.
- No change in driver's speed: Most motorists typically do not change their driving speeds even when the speed limit is increased by 8 km/h – 24 km/h.
- Air pollution: Optimum cruise speeds to minimise harmful emissions is probably about 40 km/h – 50 km/h.
- Fuel economy: Studies show that all cruising speeds at which fuel economy is achieved is below 100 km/h.

## **Recommendation 2**

There are some situations where speed limits should be reviewed, for example at school zones which currently have 30 km/h advisory speed limits. Motorists tend to ignore this limit especially in rural areas, outside school hours and if the school is on a federal road. The same situations occur in the vicinity of hospitals and mosques where high pedestrian activities are observed. This limit should be made regulatory and enforced during certain time periods for the following reasons:

- i. Speed limit status: The current status is advisory which has no legal implication on the road users if the advisory limit is violated.
- ii. Pedestrian activity: There is less or no pedestrian activity outside school hours from 7.00 pm to 6.00 am on weekdays and during weekends and public holidays. It is not necessary to apply this limit during these periods, as it causes inconvenience to the road users as they are required to travel at a lower speed even when there is no interruption from pedestrian activity.

Since this limit is enforceable at only a short section of road in the vicinity of school areas during certain time periods, road users approaching such locations should be properly informed. The current practice of having advanced warning signs when approaching school areas can be adopted.

However, it should be noted that schools should not be located along high speed major roads where there is high interaction between school children and high speed motorised vehicles. Schools should be located within residential areas or along municipal roads where vehicle speeds are low.

Other examples are in this report. The answer is not a simple case of just increasing speed limits at these areas. Rather, the situation needs to be studied in its entirety from all relevant perspectives before a decision can be made.

## **MRev No. 365**

### **A Feasibility Study on Increasing the Speed Limit: Ayer Keroh – Simpang Ampat Section along PLUS Expressway (KM196–KM217)**

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The Malaysian Highway Authority (MHA) has requested MIROS to commence a study on the suitability of increasing the speed limit from 90 km/h to 110 km/h. The objective of this study was to assess and to make recommendations on the feasibility of increasing the speed limit within the study area. The road section for the study is on the PLUS Expressway (E2), from KM196–KM217 for both directions. Spot speed data was collected using the smart sensor for approximately 30 minutes at each site during off peak hours. The study covered 8 sites from the 21 km stretch, where 4 sites were located at the south bound stretch while the other were located in the north bound stretch. For each north and south bound stretch, there were two spots located within the 90 km/h speed limit stretch while the other two spots were located before and after the 90 km/h speed limit stretch. Additionally, accident data was obtained from PLUS from the year 2009 to 2012. Analysis of vehicle speeds revealed no significant difference between the mean speeds in the 90 km/h and 110 km/h zones. This shows that the 90 km/h posted speed limit did not influence the driving behavior of the road user. Further analysis also found that the speed variance between both directions was less than 2%. These provide an indication that uniformity of traffic flow exists between both zones. Next, analysis of accident data between the 90 km/h and 110 km/h zone on the 6 lane, dual carriageway from the year 2009 to September 2012 shows that the difference in the number of fatal crashes in the two speed zones are minimal. Chi square test revealed that the difference is not significant. This may be due to several factors and not due to vehicle speed factor alone. The speed limit may be increased on the condition that the road geometry and design can accommodate the new increased speed. This should be confirmed by the relevant parties. The parties are responsible to ensure of no occurrence of cross winds at the said location. Additionally, for a 60 km stretch, the total sum of accidents is 90. In the event the speed limit is to be increased, the crash rate should be monitored to track the safety performance at this section. More effort should be invested to further reduce the current crash rate along this expressway section.





## NOTES

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